



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

TEL: (412) 395-3699

R. Alex Bosiljevac
Environmental
Coordinator

March 28, 2016

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

**RE: G70-B General Permit Registration Application
EQT Production Company
WEU-4 Natural Gas Production Site**

Dear Director Durham:

Enclosed are one (1) original hard copy and two (2) complete PDFs included on CD-ROM of a G70-B General Permit Registration Application for the WEU-4 natural gas production site. A legal advertisement will be published in the next few days and proof of publication will be forwarded as soon as it is received. Please contact me for payment of the application fee by credit card.

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

Sincerely,

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

R. Alex Bosiljevac
EQT Corporation

Enclosures



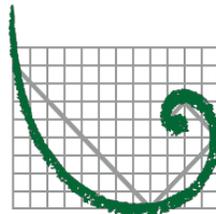
EQT Production Company

G70-B General Permit Registration Application

WEU-4 Natural Gas Production Site

Shirley, West Virginia

Prepared By:



ERM

**ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.
Hurricane, West Virginia**

March 2016

INTRODUCTION

EQT Production Company (EQT) is submitting this G70-B General Permit Application to the WVDEP's Department of Air Quality for the WEU-4 natural gas production site located in Tyler County, West Virginia. This application addresses the operational activities associated with the production of natural gas and condensates at the WEU-4 pad.

FACILITY DESCRIPTION

The EQT WEU-4 natural gas production site will operate in Tyler County, WV and will consist of thirteen (13) permitted natural gas wells. Natural gas and liquids (including water and condensates) will be extracted from underground deposits. The natural gas will be transported from the wells to a gas line for compression and additional processing, as necessary. The produced liquids will be stored in storage vessels.

The applicant seeks to authorize the operation of:

- Thirteen (13) permitted natural gas wells;
- Thirteen (13) line heaters each rated at 1.54 MMBtu/hr heat input;
- Fourteen (14) 400 barrel (bbl) tanks for storage of produced condensate and water;
- Three (3) thermoelectric generator (TEG) each rated at 0.013 mmBtu/hr heat input;
- One (1) 140 bbl sand trap blowdown tank for storage of condensate and water;
- One (1) enclosed combustion devices each with a capacity of 19.22 MMBtu/hr heat input;
- One (1) 110 hp natural gas compressor engine; and
- One (1) line heater rated at 1.15 MMBtu/hr heat input.

A process flow diagram is included in this application in Attachment D.

STATEMENT OF AGGREGATION

The WEU-4 pad will be located in Tyler County, WV and operated by EQT Production Company. Stationary sources of air pollutants may require aggregation of total emission levels if these sources share the same industrial grouping, are operating under common control, and are classified as contiguous or adjacent properties. EQT will operate the WEU-4 with the same industrial grouping as nearby facilities, and some of these facilities are under common control. EQT, however, is not subject to the aggregation of stationary emission

sources because these sites do not meet the definition of contiguous or adjacent facilities.

The WEU-4 pad will operate under SIC code 1311 (Crude Petroleum and Natural Gas Extraction). There are surrounding wells and compressor stations operated by EQT that share the same two-digit major SIC code of 13 for Crude Petroleum and Natural Gas Extraction. Therefore, the WEU-4 pad does share the same SIC codes as the surrounding wells and compressor stations.

EQT Production Company is the sole operator of the WEU-4 pad. EQT is also the sole operator of other production sites and compressor stations in the area. Therefore, EQT does qualify as having nearby operations under common control.

There are no EQT owned or operated sites within a one (1) mile radius of the WEU-4 pad. EQT's CPT-11 Natural Gas Production site is 5.5 miles northeast of the WEU-4 pad. Nearby sites do not meet the definition of contiguous or adjacent properties since they are not in contact and do not share a common boundary. Operations conducted at the WEU-4 site do not rely on or interact with other sites. Furthermore, operations separated by this distance do not meet the common sense notion of a "plant."

On August 18, 2015 the EPA Administrator signed the *Source Determination for Certain Emission Units in the Oil and Natural Gas Sector*. This notice is to clarify how properties in the oil and natural gas sector are determined to be adjacent in order to assist permitting authorities and permit applicants in making consistent source determinations. The following proposed regulatory text defines "adjacent" for the oil and gas sector in terms of proximity.

Pollutant emitting activities shall be considered adjacent if they are located on the same surface site, or on surface sites that are located within ¼ mile of one another.

The WEU-4 and CPT-11 pads are located on surface sites located greater than EPA's ¼ mile proposed ruling. Although the applicant notes the proposed status of this adjacency determination, it is the only guidance available on a finite distance impacting the adjacency determination, and has been noted due to lack of finalized guidance. Based upon the proximity of nearby facilities, EQT does not believe aggregation based upon adjacency is required.

Based on the above reasoning, EQT is not subject to the aggregation of stationary emission sources since the stationary sources are not considered contiguous or adjacent facilities.

REGULATORY DISCUSSION

This section outlines the State air quality regulations that could be reasonably expected to apply to the WEU-4 pad and makes an applicability determination for each regulation based on activities conducted at the site and the emissions of regulated air pollutants. This review is presented to supplement and/or add clarification to the information provided in the WVDEP G70-B permit application forms.

The West Virginia State Regulations address federal regulations, including Prevention of Significant Deterioration permitting, Title V permitting, New Source Performance Standards, and National Emission Standards for Hazardous Air Pollutants. The regulatory requirements in reference to WEU-4 are described in detail in the below section.

WEST VIRGINIA STATE AIR REGULATIONS

45 CSR 02 – To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

The line heaters are indirect heat exchangers that combust natural gas but are exempt since the heat input capacities are less than 10 MMBtu/hr.

45 CSR 04 – To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

Operations conducted at the WEU-4 wellpad are subject to this requirement. Based on the nature of the process at the wellpad, the presence of objectionable odors is unlikely.

45 CSR 06 – Control of Air Pollution from the Combustion of Refuse

The enclosed combustion device located on the WEU-4 natural gas production site is subject to this regulation. Per 45 CSR 6-4.3, opacity of emissions from the enclosed combustion device shall not exceed 20 percent, except as provided by 4.4. Particulate matter emissions from this unit will not exceed the levels calculated in accordance with 6-4.1.

§45-6-4.1 Determination for Maximum Allowable Particulate Emissions

Emissions (lb/hr) = F x Incinerator Capacity (tons/hr)

Incinerator Capacity = 0.12 tons per hour or 245 lbs/hr

$\rho_{NG} = 0.042 \text{ lb/scf}$ – Density of NG from EPA AP42 – Sections 1.4 and 3.2 (NG combustion)

$$\frac{140,000 \text{ scf}}{\text{day}} * \frac{1 \text{ day}}{24 \text{ hours}} * \frac{0.042 \text{ lb}}{\text{scf}} = \frac{245 \text{ lb}}{\text{hr}} = \frac{1,073 \text{ tons}}{\text{year}}$$

If the Incinerator Capacity is less than 15,000 lbs/hr, then $F = 5.43$

$$F = 5.43 * (0.12 \text{ tons per hour})$$

$$F = 0.67 \text{ lbs / hour}$$

The enclosed combustion devices utilize AP-42 Section 1.4 PM emission factors to determine emissions from the combustion of refuse natural gas. Based upon the type of fuel combusted and the emission factors utilized, the PM emissions from the enclosed combustion devices will be well below the maximum allowable particulate emissions mandated by 45 CSR 06.

45 CSR 10 – To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

The line heaters are indirect heat exchangers that combust natural gas but are exempt since the heat input capacities are less than 10 MMBtu/hr.

45 CSR 13 – Permits for Construction, Modification, Relocation, and Operation of Stationary Sources of Air Pollutants

This G70-B permit application is being submitted for the operational activities associated with EQT's production of natural gas.

45 CSR 14 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration (PSD). The G70-B applicability criterion excludes facilities that meet the definition of a major source as defined in 45 CSR 19 for being eligible for the general permit.

Operation of equipment at the WEU-4 pad will not exceed emission thresholds established by this permitting program. EQT will monitor future construction and modification activities at the site closely and will compare future increase in emissions with the PSD thresholds to ensure these activities will not trigger this program.

45 CSR 16 - Standards of Performance for New Stationary Sources (NSPS)

45CSR 16 applies to registrants that are subject to the NSPS requirements described in more detail in the Federal Regulations section. Applicable requirements of NSPS, Subpart JJJJ and OOOO are included in the G70-B general permit.

This facility is expected to contain gas well affected facilities under Subpart OOOO. This facility will contain a spark ignition internal combustion engine subject to Subpart JJJJ. No additional NSPS are applicable for this facility. Additional discussion is provided in the Federal Regulation Discussion of this permit application.

45 CS R19 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contributed to Non-attainment

Federal construction permitting programs regulate new and modified sources of non-attainment pollutants under Non-Attainment New Source Review (NNSR). The G70-B applicability criterion excludes facilities that meet the definition of a major source as defined in 45 CSR 19 for being eligible for the general permit.

Operation of equipment at the WEU-4 pad will not exceed emission thresholds established by either of these permitting programs. EQT will monitor future construction and modification activities at the site closely and will compare future increase in emissions with the NSR thresholds to ensure these activities will not trigger this program.

45 CSR 25 – Control of Air Pollution from Hazardous Waste Treatment, Storage, and Disposal Facilities

No hazardous waste will be burnt at this well site; therefore, it is not subject to this hazardous waste rule.

45 CSR 30 – Requirements for Operating Permits

45 CSR 30 applies to the requirements of the federal Title V operating permit program (40 CFR 70). 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 combined HAPs, and 100 tpy of other regulated pollutants.

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

45 CSR 34 – National Emission Standards for Hazardous Air Pollutants (NESHAP)

45 CSR 34 applies to registrants that are subject to the NESHAP requirements. Excluded from G70-B general permit eligibility are sources that are subject to NESHAP Subpart HHH.

The following NESHAP included in the G70-B permit are not subject to the WEU-4 facility:

- 40CFR63 Subpart HH (National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities).

FEDERAL REGULATIONS

40 CFR 60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines).

Subpart JJJJ sets forth nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compound (VOC) emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject internal combustion engine.

The Ford CSG-637 is a 110 HP EPA Certified 4 stroke rich burn (4SRB) spark ignition (SI) engine manufactured in 2015. Per 40CFR60.4230(a)(4)(iii), an engine manufactured on or after July 1, 2008 with a maximum engine power less than 500 HP must comply with the provisions of 40 CFR 60 Subpart JJJJ.

Emission standards contained in the EPA Certificate of Conformity issued to this engine conform to 40 CFR 60 Subpart JJJJ Table 1 - NO_x, CO, VOC Emissions Standards for Stationary Non-Emergency SI Engines greater than 100 HP. Therefore, per 40CFR60.4243(a)(1), EQT must operate and maintain the certified stationary SI internal combustion engine and control device according to the manufacturer's emission-related written instructions to ensure applicable emission standards outlined in Part 60 Subpart JJJJ Table 1 are maintained. Additionally, performance testing is not required.

40 CFR 60, Subpart OOOO (Standards of Performance for Crude oil and Natural Gas Production, Transmission and Distribution)

Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO₂) emissions from affected facilities that commence construction, modification or reconstruction after August 23, 2011. The applicable provisions and requirements of Subpart OOOO are included under the G70-B permit.

The only affected facilities expected to be subject to Subpart OOOO located at the WEU-4 production pad are listed below:

- Each gas well affected facility, which is a single natural gas well.

There are several equipment types that will be installed at WEU-4 that do not meet the affected facility definitions as specified by EPA. These include pneumatic controllers and storage vessels.

Pneumatic Controllers: Pneumatic controller installed at this facility will be intermittent bleed rate devices. Therefore, the facility will not qualify as a pneumatic controller affected facility.

Storage vessels: Based on PTE calculations included within this permit, each storage vessel will be manifolded and routed to an enclosed combustion device such that emissions from each of these tanks are expected to be below 6 tons per year (tpy) of VOC. Therefore, these tanks will not be considered group 2 storage vessel affected facilities as specified in §60.5365(e).

No additional NSPS are expected to be applicable to this facility.

40CFR63 Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines)

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAPs) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This Subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

The Ford CSG-637 is a 110 HP EPA Certified 4 stroke rich burn (4SRB) spark ignition (SI) engine manufactured in 2015. The engine meets the requirements of 40 CFR 60 Subpart JJJJ. Per 40CFR63.6590(c)(1), no further requirements apply for a new stationary RICE located at an area source subject to regulation under 40 CFR 60 Subpart JJJJ.

No additional NESHAP are expected to be applicable to this facility.

General Permit G70-B will establish an emission cap on the following regulated and hazardous air pollutants:

Pollutant	Maximum Annual Emission Limit (tons/year)	WEU-4 Potential to Emit (tons/year)
Nitrogen Oxides	50	15.88
Carbon Monoxide	80	15.63
Volatile Organic Compounds	80	24.19
Particulate Matter - 10/2.5	20	1.10
Sulfur Dioxide	20	0.04
Any Single Hazardous Air Pollutant	8	1.04 (as C ₆ H ₁₄)
Total Hazardous Air Pollutants	20	2.61

The fugitive emissions of a stationary source shall not be considered in determining whether it is a major stationary source for the purposes of 45CSR30-2.26.b or for eligibility of this General Permit.



west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone (304) 926-0475
Fax (304) 926-0479
www.dep.wv.gov

G70-B GENERAL PERMIT REGISTRATION APPLICATION

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

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

SECTION I. GENERAL INFORMATION

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

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

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

City: **Pittsburgh**

State: **PA**

ZIP Code: **15222**

Facility Name: **WEU-4 Natural Gas Production Facility**

Operating Site Physical Address: **None**

If none available, list road, city or town and zip of facility. **Jefferson Run, Shirley, WV 26434**

City: **Shirley, WV**

Zip Code: **26434**

County: **Tyler**

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

Latitude: **39.36648**

Longitude: **-80.82080**

SIC Code: **1311**

NAICS Code: **211111**

DAQ Facility ID No. (For existing facilities)

None

CERTIFICATION OF INFORMATION

This G70-B General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of the Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. **Any administratively incomplete or improperly signed or unsigned G70-B Registration Application will be returned to the applicant. Furthermore, if the G70-B forms are not utilized, the application will be returned to the applicant. No substitution of forms is allowed.**

I hereby certify that _____ is an Authorized Representative and in that capacity shall represent the interest of the business (e.g., Corporation, Partnership, Limited Liability Company, Association Joint Venture or Sole Proprietorship) and may obligate and legally bind the business. If the business changes its Authorized Representative, a Responsible Official shall notify the Director of the Division of Air Quality immediately.

I hereby certify that all information contained in this G70-B General Permit Registration Application and any supporting documents appended hereto is, to the best of my knowledge, true, accurate and complete, and that all reasonable efforts have been made to provide the most comprehensive information possible.

Responsible Official Signature: 

Name and Title: **Kenneth Kirk - Executive Vice President**

Phone: **(412)553-5700**

Fax:

Email: **kkirk@egt.com**

Date:

3/28/2010

If applicable:

Authorized Representative Signature: _____

Name and Title:

Phone:

Fax:

Email:

Date:

If applicable:

Environmental Contact **Alex Bosiljevac**

Name and Title: **Environmental Coordinator**

Phone: **(412) 395-3699**

Fax:

Email: **abosiljevac@egt.com**

Date:

OPERATING SITE INFORMATION

Briefly describe the proposed new operation and/or any change(s) to the facility: **The WEU-4 Natural Gas Production Facility will be a new production site expected to be in production in June 2016.**

Directions to the facility: **From Shirley head west on WV-23W toward Camp Run Road. Turn left after 1.6 miles onto Pratts Run. Turn right onto Left Hand Fork Jefferson Run. In 0.9 miles, turn left onto Low Gap. Turn left after 0.3 miles onto Jefferson Run-Wilbur Hill Road. Turn right onto access road. Site is approximately 1.0 mile on right.**

ATTACHMENTS AND SUPPORTING DOCUMENTS

I have enclosed the following required documents:

Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22).

- Check attached to front of application.
 I wish to pay by electronic transfer. Contact for payment (incl. name and email address):
 I wish to pay by credit card. Contact for payment (incl. name and email address): **Alex Bosiljevac - abosiljevac@eqt.com**
 \$500 (Construction, Modification, and Relocation) \$300 (Class II Administrative Update)
 \$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO ¹
 \$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH ²

¹ Only one NSPS fee will apply.

² Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ.

NSPS and NESHAP fees apply to new construction or if the source is being modified.

- Responsible Official or Authorized Representative Signature (if applicable)
- Single Source Determination Form (**must be completed in its entirety**) – Attachment A
- | | |
|---|---|
| <input type="checkbox"/> Siting Criteria Waiver (if applicable) – Attachment B | <input checked="" type="checkbox"/> Current Business Certificate – Attachment C |
| <input checked="" type="checkbox"/> Process Flow Diagram – Attachment D | <input checked="" type="checkbox"/> Process Description – Attachment E |
| <input checked="" type="checkbox"/> Plot Plan – Attachment F | <input checked="" type="checkbox"/> Area Map – Attachment G |
| <input checked="" type="checkbox"/> G70-B Section Applicability Form – Attachment H | <input checked="" type="checkbox"/> Emission Units/ERD Table – Attachment I |
- Fugitive Emissions Summary Sheet – Attachment J
- Gas Well Affected Facility Data Sheet (if applicable) – Attachment K
- Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment L
- Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment M
- Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N
- Tanker Truck Loading Data Sheet (if applicable) – Attachment O
- Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment P
- Pneumatic Controllers Data Sheet – Attachment Q
- Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment R
- Emission Calculations (please be specific and include all calculation methodologies used) – Attachment S
- Facility-wide Emission Summary Sheet(s) – Attachment T
- Class I Legal Advertisement – Attachment U
- One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments

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

Attachment A

SINGLE SOURCE DETERMINATION FORM

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

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

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

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

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

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

See Introduction for additional source aggregation analysis.

Attachment B

CITING CRITERIA WAIVER – (NOT APPLICABLE)

Attachment C
BUSINESS CERTIFICATE

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

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

BUSINESS REGISTRATION ACCOUNT NUMBER: 1022-8081

This certificate is issued on: 08/4/2010

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

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

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

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

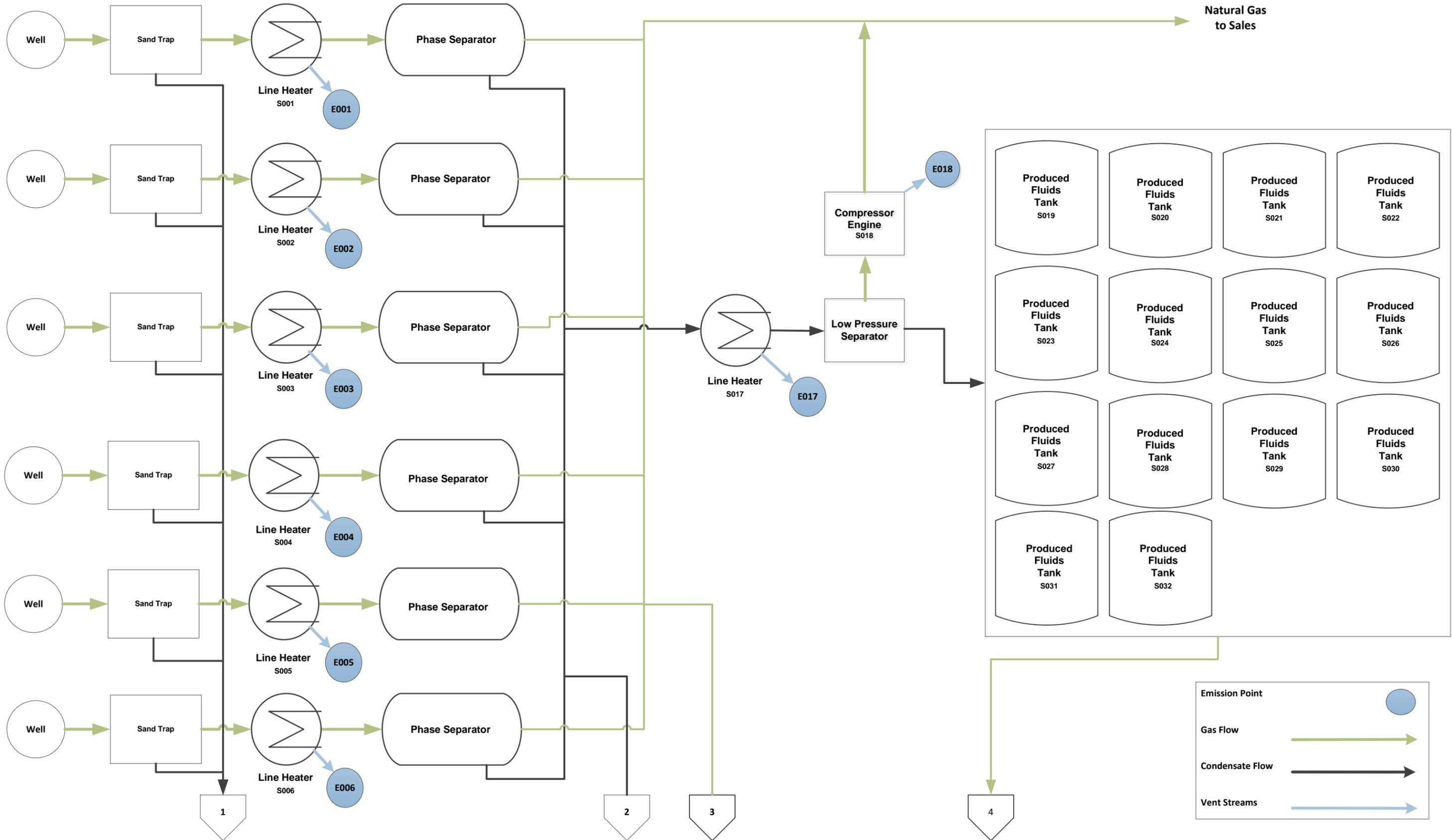
TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them.
CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of
this certificate displayed at every job site within West Virginia.

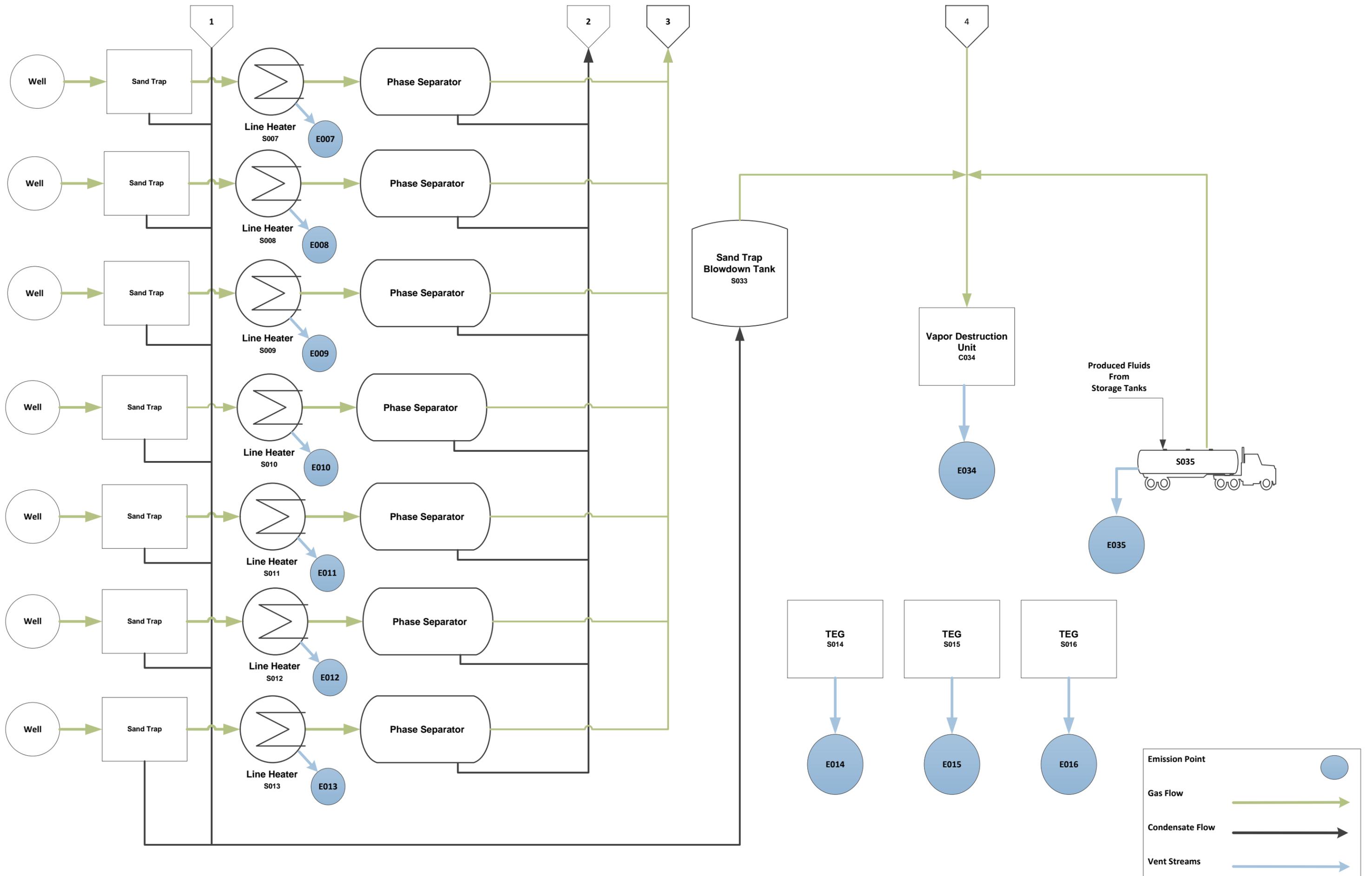
Attachment D
PROCESS FLOW DIAGRAM

Attachment D

WEU-4 Natural Gas Production

Process Flow Diagram





1

2

3

4

Well

Sand Trap

Line Heater

S007

E007

Phase Separator

Well

Sand Trap

Line Heater

S008

E008

Phase Separator

Well

Sand Trap

Line Heater

S009

E009

Phase Separator

Well

Sand Trap

Line Heater

S010

E010

Phase Separator

Well

Sand Trap

Line Heater

S011

E011

Phase Separator

Well

Sand Trap

Line Heater

S012

E012

Phase Separator

Well

Sand Trap

Line Heater

S013

E013

Phase Separator

Sand Trap
Blowdown Tank
S033

Vapor Destruction
Unit
C034

E034

Produced Fluids
From
Storage Tanks

S035

E035

TEG

S014

E014

TEG

S015

E015

TEG

S016

E016

Emission Point

Gas Flow

Condensate Flow

Vent Streams

Attachment E

PROCESS DESCRIPTION

Attachment E

Process Description

This permit application is being filed for EQT Production Company and addresses operational activities associated with the WEU-4 natural gas production site. Incoming raw natural gas from the thirteen (13) wells enters the site through a pipeline. The raw gas is first routed through the sand trap to remove any sediment. Fluids from this sand trap are manually blown down to the sand trap blowdown tank (S033), as needed. From the sand trap, raw gas is routed through line heaters (S001-S013) to assist with the phase separation process in the downstream high pressure phase separators. In the high pressure phase separators, produced fluids are removed from the raw gas before being dumped to a second stage of fluid separation. The produced fluids pass through a line heater (S017) to further assist in the separation process. At this low pressure separator, produced fluid pressure is reduced from approximately 380 psig to 30 psig. Vapors realized at the low pressure separator are directed to a 110 bhp compressor engine (S018) and routed to the sales pipeline. Produced fluids from the low pressure separator are routed to the produced fluids storage tanks (S019-S032). Emissions from the produced fluids tanks and sand trap blowdown tank are directed to one of the two enclosed combustion devices (C034) and combusted. Produced fluids are pumped into a tank truck (S035) on an as-needed basis and are disposed of off-site. Vapors during truck loading will be controlled by the enclosed combustion device.

Three thermoelectric generation units (S014, S015, S016) are operated and provide power to the WEU-4 natural gas production site.

A process flow diagram is included as Attachment D.

Attachment F

PLOT PLAN

Coordinates
Latitude: 39.36648
Longitude: -80.82080
Elevation: 1,094 ft
Drawn: 2/24/2016

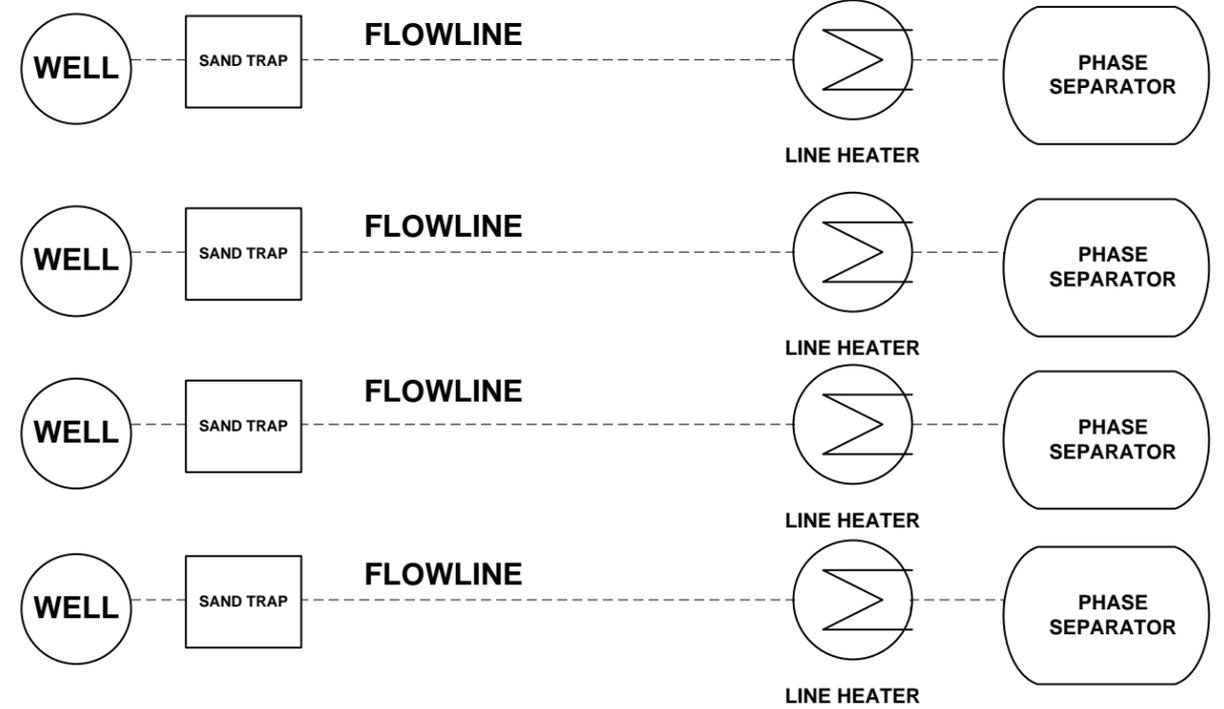
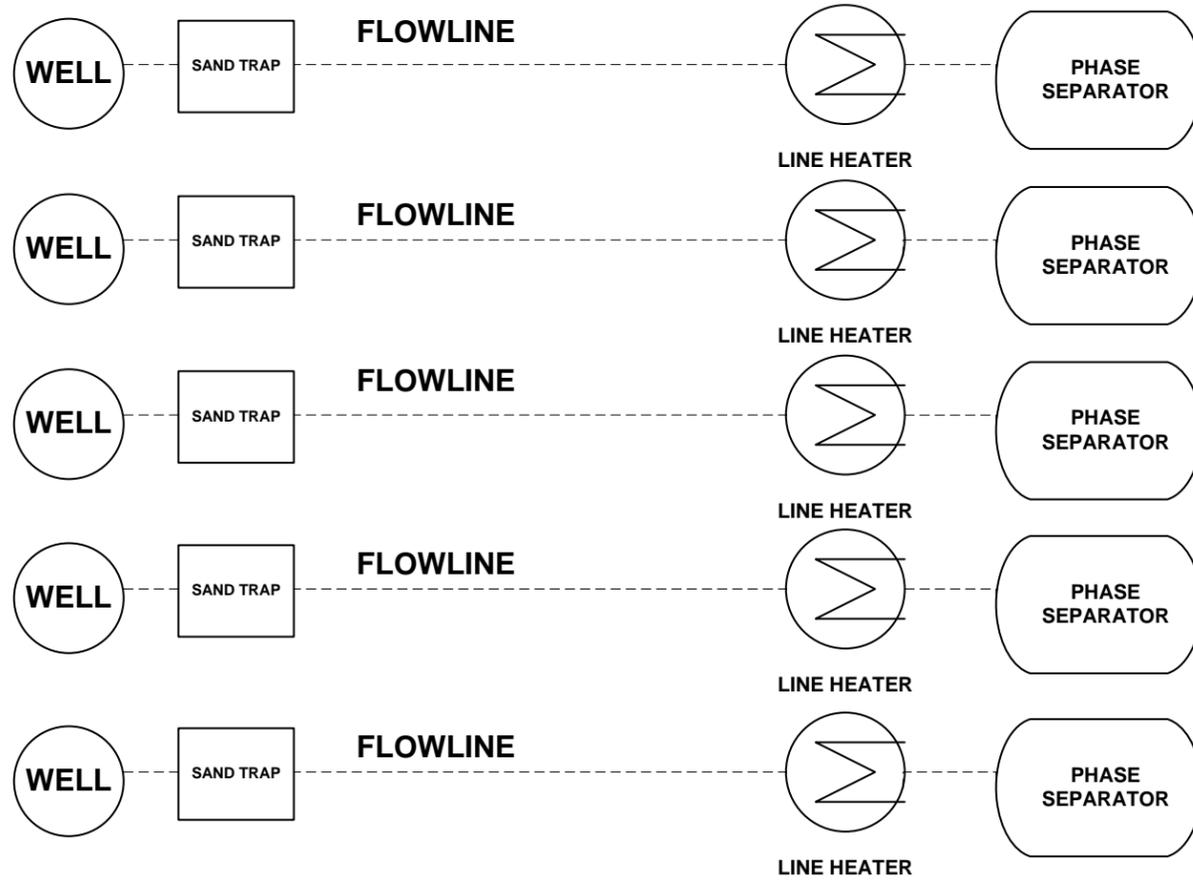
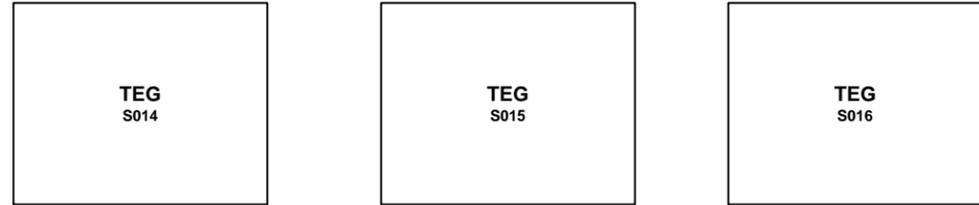


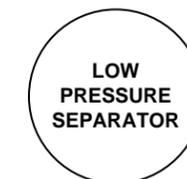
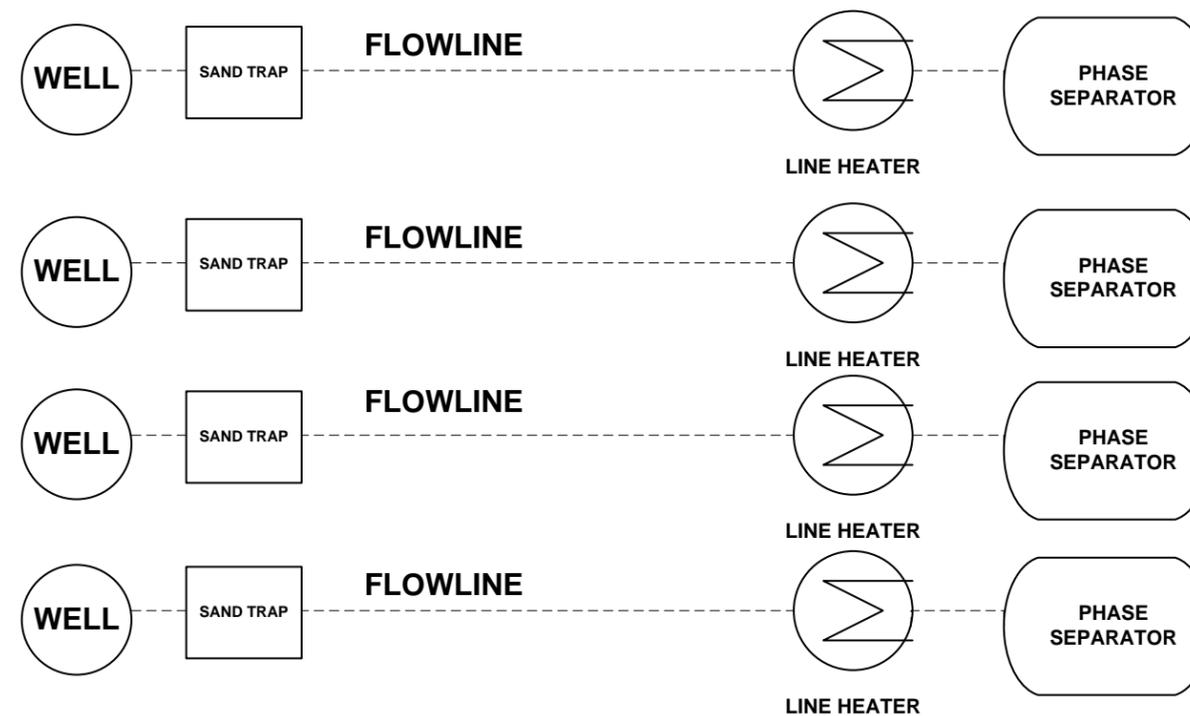
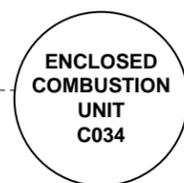
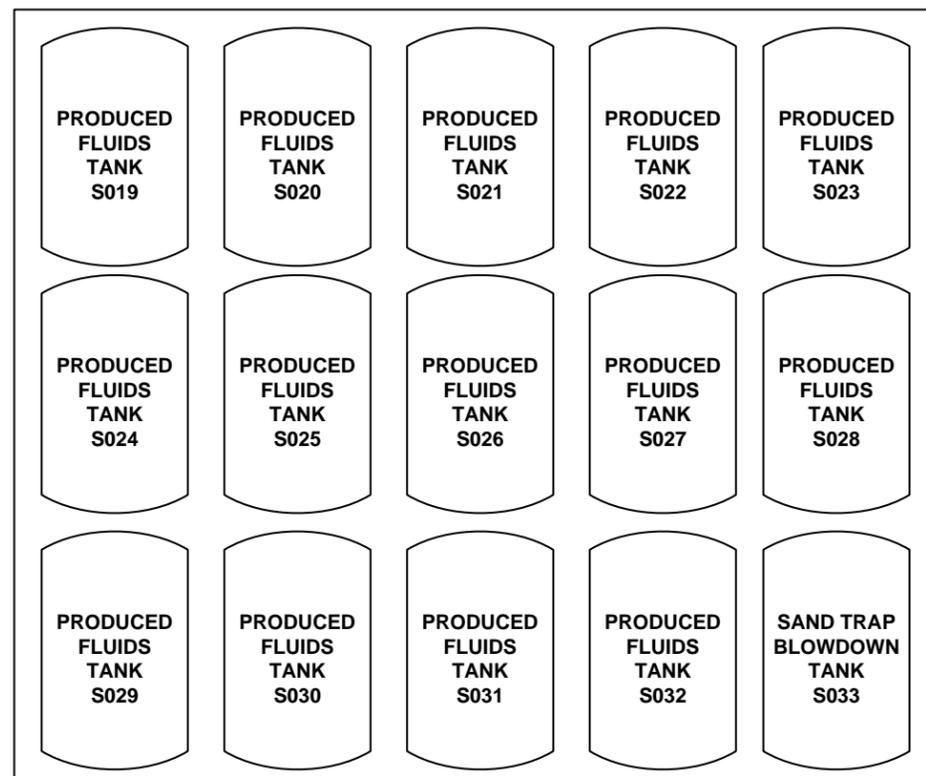
Attachment F

Plot Plan

EQT WEU-4 Natural Gas Production Site

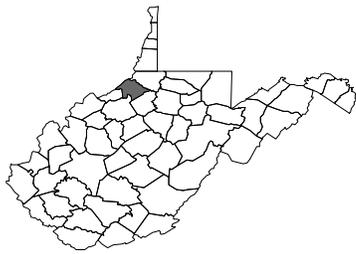
TRUCK ENTRANCE



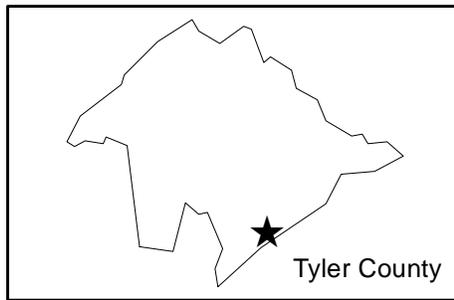


Attachment G

AREA MAP



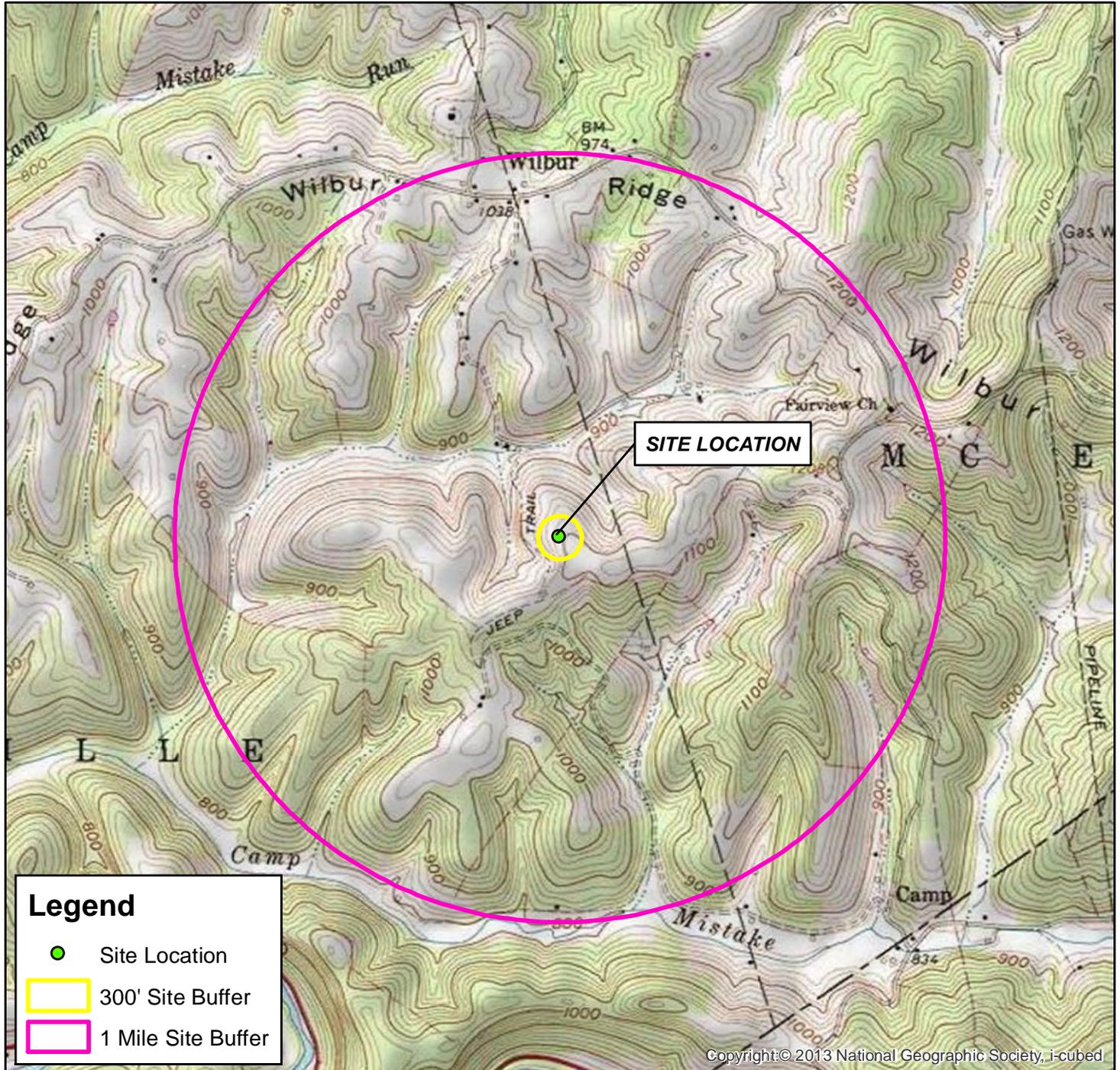
West Virginia



Tyler County



LAT. 39.36648 LON. -80.82080
 TYLER COUNTY
 WEST VIRGINIA



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USGS 1:24K 7.5' Quadrangle:
 West Union, WV

SITE LOCATION MAP

Legend

- Site Location
- 300' Site Buffer
- 1 Mile Site Buffer



EQT PRODUCTION COMPANY

WEU-4 Well Pad
 Tyler, West Virginia

GIS Review: JS

CHK'D: JS

0250395

Drawn By:
 SRV-2/23/16

Environmental Resources Management

ATTACHMENT G

Attachment H
APPLICABILITY FORM

ATTACHMENT H – G70-B SECTION APPLICABILITY FORM

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

General Permit G70-B was developed to allow qualified applicants to seek registration for a variety of sources. These sources include gas well affected facilities, storage vessels, gas production units, in-line heaters, heater treaters, glycol dehydration units and associated reboilers, pneumatic controllers, centrifugal compressors, reciprocating compressors, reciprocating internal combustion engines (RICES), tank truck loading, fugitive emissions, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

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

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

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

Attachment I

EMISSION UNITS / EMISSION REDUCTION DEVICES (ERD) TABLE

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

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

Emission Unit ID ¹	Emission Point ID ²	Emission Unit Description	Year Installed	Manufac. Date ³	Design Capacity	Type ⁴ and Date of Change	Control Device(s) ⁵	ERD(s) ⁶
S001	E001	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S002	E002	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S003	E003	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S004	E004	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S005	E005	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S006	E006	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S007	E007	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S008	E008	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S009	E009	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S010	E010	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S011	E011	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S012	E012	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S013	E013	Line Heater	2016	2015	1.54 MMBtu/hr	New	NA	NA
S014	E014	Thermal Electric Generator	2016	2015	0.013 MMBtu/hr	New	NA	NA
S015	E015	Thermal Electric Generator	2016	2015	0.013 MMBtu/hr	New	NA	NA
S016	E016	Thermal Electric Generator	2016	2015	0.013 MMBtu/hr	New	NA	NA
S017	E017	Line Heater	2016	2015	1.15 MMBtu/hr	New	NA	NA
S018	E018	Natural Gas Compressor Engine	2016	2015	110 hp	New	Non-Selective Catalytic Reduction	NA
S019	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S020	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S021	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S022	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S023	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S024	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S025	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA

S026	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S027	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S028	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S029	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S030	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S031	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S032	E034	Produced Fluid Tank	2016	2015	400 bbl	New	C034	NA
S033	E034	Sand Trap Blowdown Tank	2016	2015	140 bbl	New	C034	NA
C034	E034	Enclosed Combustion Device	2016	2015	19.22 MMBtu/hr	New	NA	NA
S033	E034 E035	Tank Truck Loading Rack	2016	2015	94,332 gal/day	New	C034	NA

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

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

³ When required by rule

⁴ New, modification, removal, existing

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

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

Attachment J

FUGITIVE EMISSIONS SUMMARY SHEET

ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

Source/Equipment: Facility Wide									
Leak Detection Method Used		<input type="checkbox"/> Audible, visual, and olfactory (AVO) inspections		<input type="checkbox"/> Infrared (FLIR) cameras		<input checked="" type="checkbox"/> Other (please describe) Permittee will follow section 4.1.4 in issued permit.		<input type="checkbox"/> None required	
Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)				
					VOC	HAP	GHG (CO ₂ e)		
Pumps	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both					
Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	482	EPA, 40 CFR 98 Subpart W	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	1.21	0.73		46.22	
Safety Relief Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	14	EPA, 40 CFR 98 Subpart W	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	0.05	0.03		1.99	
Open Ended Lines	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	35	EPA, 40 CFR 98 Subpart W	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	0.20	0.12		7.47	
Sampling Connections	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both					
Connections (Not sampling)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	2,130	EPA, 40 CFR 98 Subpart W	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	0.60	0.36		22.69	
Compressors	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1	EPA, 40 CFR 98 Subpart W Table W-1B: Default average component counts are used for major equipment. Compressor components (12 valves and 57 connections) are included in valve and connection counts.	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both					
Flanges	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both					
Other ¹	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both					

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

Please provide an explanation of the sources of fugitive emissions (e.g. pigging operations, equipment blowdowns, pneumatic controllers, etc.):

Fugitive emissions occur from sealed surfaces associated with production equipment, including equipment leaks.

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

NA

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

NA

Attachment K

GAS WELL AFFECTED FACILITY DATA SHEET

ATTACHMENT K – GAS WELL AFFECTED FACILITY DATA SHEET

API Number	Date of Flowback	Date of Well Completion	Green Completion and/or Combustion Device
47-095-02278	TBD	TBD	Green Completion
47-095-02279	TBD	TBD	Green Completion
47-095-02280	TBD	TBD	Green Completion
47-095-02281	TBD	TBD	Green Completion
TBD	TBD	TBD	Green Completion
TBD	TBD	TBD	Green Completion
TBD	TBD	TBD	Green Completion
TBD	TBD	TBD	Green Completion
TBD	TBD	TBD	Green Completion

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

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

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

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

Where,

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

Attachment L
STORAGE VESSEL DATA SHEET

ATTACHMENT L – STORAGE VESSEL DATA SHEET

GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name WEU-4 Storage Tank Area	2. Tank Name Produced Fluid Tanks (S019-S032)
3. Emission Unit ID number S019-S030	4. Emission Point ID number E034
5. Date Installed , Modified or Relocated (<i>for existing tanks</i>) 06/2016* Anticipated Was the tank manufactured after August 23, 2011? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Type of change: <input checked="" type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other <input type="checkbox"/> Relocation
7A. Description of Tank Modification (<i>if applicable</i>) NA	
7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Was USEPA Tanks simulation software utilized? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>If Yes, please provide the appropriate documentation and items 8-42 below are not required.</i>	

TANK INFORMATION

8. Design Capacity (<i>specify barrels or gallons</i>). Use the internal cross-sectional area multiplied by internal height. 16,800 gallons	
9A. Tank Internal Diameter (ft.) 12	9A. Tank Internal Diameter (ft.) 12
10A. Maximum Liquid Height (ft.) 20	10A. Maximum Liquid Height (ft.) 10
11A. Maximum Vapor Space Height (ft.) 20	11A. Maximum Vapor Space Height (ft.) 10
12. Nominal Capacity (<i>specify barrels or gallons</i>). This is also known as “working volume”. 16,800 gallons	
13A. Maximum annual throughput (gal/yr) 33,051,480	13B. Maximum annual throughput (gal/day) 90,552
14. Number of tank turnovers per year 1,967	15. Maximum tank fill rate (gal/min) 62.9
16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Is the tank system a variable vapor space system? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input checked="" type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Other (describe)	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:	
<input type="checkbox"/> Does Not Apply	<input type="checkbox"/> Rupture Disc (psig)
<input type="checkbox"/> Inert Gas Blanket of _____	<input type="checkbox"/> Carbon Adsorption ¹
<input checked="" type="checkbox"/> Vent to Vapor Combustion Device ¹ (vapor combustors, flares, thermal oxidizers, enclosed combustors)	
<input checked="" type="checkbox"/> Conservation Vent (psig)	<input type="checkbox"/> Condenser ¹
-0.5 oz Vacuum Setting 14.0 oz Pressure Setting	
<input checked="" type="checkbox"/> Emergency Relief Valve (psig)	
-0.5 oz Vacuum Setting 14.4 oz Pressure Setting	
<input type="checkbox"/> Thief Hatch Weighted <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No - A lock down screw hatch will be installed instead of Thief Hatch.	
¹ Complete appropriate Air Pollution Control Device Sheet	

20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).									
Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method ¹
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
Produced Fluid (Pre-Control)	214.29	938.57	0.03	0.15	0.16	0.70	214.48	939.42	EPA - ProMax

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

TANK CONSTRUCTION AND OPERATION INFORMATION			
21. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunitite lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) WELDED			
21A. Shell Color: Green		21A. Shell Color: Green	
22. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable			
22A. Is the tank heated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		22B. If yes, operating temperature:	
22C. If yes, how is heat provided to tank?			
23. Operating Pressure Range (psig): Must be listed for tanks using VRUs with closed vent system.			
24. Is the tank a Vertical Fixed Roof Tank ? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		24A. If yes, for dome roof provide radius (ft): 5 ft	
24B. If yes, for cone roof, provide slop (ft/ft): NA			
25. Complete item 25 for Floating Roof Tanks <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/>			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type (<i>check one</i>): <input type="checkbox"/> Metallic (mechanical) shoe seal <input type="checkbox"/> Liquid mounted resilient seal <input type="checkbox"/> Vapor mounted resilient seal <input type="checkbox"/> Other (describe):			
25C. Is the Floating Roof equipped with a secondary seal? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25D. If yes, how is the secondary seal mounted? (<i>check one</i>) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):			
25E. Is the floating roof equipped with a weather shield? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25F. Describe deck fittings:			
26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does not apply			
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded		26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> other (describe)			
26D. Deck seam length (ft.):		26E. Area of deck (ft ²):	
		26F. For column supported tanks, # of columns:	
		26G. For column supported tanks, diameter of column:	
27. Closed Vent System with VRU? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
28. Closed Vent System with Enclosed Combustor? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
SITE INFORMATION			
29. Provide the city and state on which the data in this section are based: Charleston, WV			
30. Daily Avg. Ambient Temperature (°F): 70.0		31. Annual Avg. Maximum Temperature (°F): 65.5	
32. Annual Avg. Minimum Temperature (°F): 44.0		33. Avg. Wind Speed (mph): 18 mph	
34. Annual Avg. Solar Insulation Factor (BTU/ft ² -day): 1,123		35. Atmospheric Pressure (psia): 14.7 (Atmosphere)	
LIQUID INFORMATION			
36. Avg. daily temperature range of bulk liquid (°F): 108		36A. Minimum (°F): 108	
		36B. Maximum (°F): 108	
37. Avg. operating pressure range of tank (psig): 0.0 (Atmosphere)		37A. Minimum (psig): 0.0 (Atmosphere)	
		37B. Maximum (psig): 0.0 (Atmosphere)	
38A. Minimum liquid surface temperature (°F): 108		38B. Corresponding vapor pressure (psia): 0.33	
39A. Avg. liquid surface temperature (°F): 108		39B. Corresponding vapor pressure (psia): 0.33	
40A. Maximum liquid surface temperature (°F): 108		40B. Corresponding vapor pressure (psia): 0.33	
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:		Produced Fluid	
41B. CAS number:			
41C. Liquid density (lb/gal):		7.89	

41D. Liquid molecular weight (lb/lb-mole):	19.67		
41E. Vapor molecular weight (lb/lb-mole):			
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year.	From: January To: December		
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.	110 F 30 psia		

STORAGE TANK DATA TABLE

List all deminimis storage tanks (i.e. lube oil, glycol, diesel etc.)

Source ID # ¹	Status ²	Content ³	Volume ⁴
NA	NA	NA	NA

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the compressor station. Tanks should be designated T01, T02, T03, etc.
2. Enter storage tank Status using the following:
 EXIST Existing Equipment
 NEW Installation of New Equipment
 REM Equipment Removed
3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, diesel, mercaptan etc.
4. Enter the maximum design storage tank volume in gallons.

ATTACHMENT L – STORAGE VESSEL DATA SHEET

GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name WEU-4 Storage Tank Area	2. Tank Name Sand Trap Blowdown Tank (S033)
3. Emission Unit ID number S031	4. Emission Point ID number E034
5. Date Installed , Modified or Relocated (<i>for existing tanks</i>) 06/2016 Anticipated Installation Was the tank manufactured after August 23, 2011? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Type of change: <input checked="" type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other <input type="checkbox"/> Relocation
7A. Description of Tank Modification (<i>if applicable</i>) NA	
7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Was USEPA Tanks simulation software utilized? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>If Yes, please provide the appropriate documentation and items 8-42 below are not required.</i>	

TANK INFORMATION

8. Design Capacity (<i>specify barrels or gallons</i>). Use the internal cross-sectional area multiplied by internal height. 5,880 gallons	
9A. Tank Internal Diameter (ft.) 10	9B. Tank Internal Height (ft.) 10
10A. Maximum Liquid Height (ft.) 8	10B. Average Liquid Height (ft.) 5
11A. Maximum Vapor Space Height (ft.) 8	11B. Average Vapor Space Height (ft.) 5
12. Nominal Capacity (<i>specify barrels or gallons</i>). This is also known as “working volume”. 5,880 gallons	
13A. Maximum annual throughput (gal/yr) 1,379,700	13B. Maximum daily throughput (gal/day) 3,780
14. Number of tank turnovers per year 234.6	15. Maximum tank fill rate (gal/min) 2.6
16. Tank fill method <input type="checkbox"/> Submerged <input type="checkbox"/> Splash <input checked="" type="checkbox"/> Bottom Loading	
17. Is the tank system a variable vapor space system? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof <input type="checkbox"/> vertical <input checked="" type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Other (describe)	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:	
<input type="checkbox"/> Does Not Apply	<input type="checkbox"/> Rupture Disc (psig)
<input type="checkbox"/> Inert Gas Blanket of _____	<input type="checkbox"/> Carbon Adsorption ¹
<input checked="" type="checkbox"/> Vent to Vapor Combustion Device ¹ (vapor combustors, flares, thermal oxidizers, enclosed combustors)	
<input type="checkbox"/> Conservation Vent (psig)	<input type="checkbox"/> Condenser ¹
Vacuum Setting Pressure Setting	
<input checked="" type="checkbox"/> Emergency Relief Valve (psig)	
-0.5 oz Vacuum Setting 14.4 oz Pressure Setting	
<input checked="" type="checkbox"/> Thief Hatch Weighted <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No - Two 16 oz. weighted emergency hatches.	
¹ Complete appropriate Air Pollution Control Device Sheet	

20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).									
Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method ¹
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
Produced Fluid (Pre-Control)	909.98	3,985.67	<0.01	<0.01	<0.01	0.02	909.98	3,985.69	EPA - ProMax

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

TANK CONSTRUCTION AND OPERATION INFORMATION			
21. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunitite lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) WELDED			
21A. Shell Color: Green	21B. Roof Color: Green	21C. Year Last Painted: NA	
22. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable			
22A. Is the tank heated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?	
23. Operating Pressure Range (psig): Must be listed for tanks using VRUs with closed vent system.			
24. Is the tank a Vertical Fixed Roof Tank ? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	24A. If yes, for dome roof provide radius (ft): 5 ft.	24B. If yes, for cone roof, provide slop (ft/ft): NA	
25. Complete item 25 for Floating Roof Tanks <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/>			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type (check one): <input type="checkbox"/> Metallic (mechanical) shoe seal <input type="checkbox"/> Liquid mounted resilient seal <input type="checkbox"/> Vapor mounted resilient seal <input type="checkbox"/> Other (describe):			
25C. Is the Floating Roof equipped with a secondary seal? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25D. If yes, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):			
25E. Is the floating roof equipped with a weather shield? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25F. Describe deck fittings:			
26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does not apply			
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded		26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft ²):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
27. Closed Vent System with VRU? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
28. Closed Vent System with Enclosed Combustor? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
SITE INFORMATION			
29. Provide the city and state on which the data in this section are based: Charleston, WV			
30. Daily Avg. Ambient Temperature (°F): 70 °F		31. Annual Avg. Maximum Temperature (°F): 65.5 °F	
32. Annual Avg. Minimum Temperature (°F): 44 °F		33. Avg. Wind Speed (mph): 18 mph	

34. Annual Avg. Solar Insulation Factor (BTU/ft ² -day): 1,123		35. Atmospheric Pressure (psia): 14.70	
LIQUID INFORMATION			
36. Avg. daily temperature range of bulk liquid (°F): 79.3		36A. Minimum (°F): 79.3	
		36B. Maximum (°F): 79.3	
37. Avg. operating pressure range of tank (psig): 0.0 (Atmosphere)		37A. Minimum (psig): 0.0 (Atmosphere)	
		37B. Maximum (psig): 0.0 (Atmosphere)	
38A. Minimum liquid surface temperature (°F): 79.3		38B. Corresponding vapor pressure (psia): 0.32	
39A. Avg. liquid surface temperature (°F): 79.3		39B. Corresponding vapor pressure (psia): 0.32	
40A. Maximum liquid surface temperature (°F): 79.3		40B. Corresponding vapor pressure (psia): 0.32	
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:		Produced Fluid	
41B. CAS number:			
41C. Liquid density (lb/gal):		7.96	
41D. Liquid molecular weight (lb/lb-mole):		19.64	
41E. Vapor molecular weight (lb/lb-mole):			
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year.		From: January To: December	
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.		85 F 380 psig	

Attachment M

**HEATER AND REBOILERS NOT SUBJECT TO
40CFR60 SUBPART Dc**

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

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

Emission Unit ID# ¹	Emission Point ID# ²	Emission Unit Description (manufacturer, model #)	Year Installed/Modified	Type ³ and Date of Change	Maximum Design Heat Input (MMBTU/hr) ⁴	Fuel Heating Value (BTU/scf) ⁵
S001	E001	Line Heater	2016	New	1.54	1,262
S002	E002	Line Heater	2016	New	1.54	1,262
S003	E003	Line Heater	2016	New	1.54	1,262
S004	E004	Line Heater	2016	New	1.54	1,262
S005	E005	Line Heater	2016	New	1.54	1,262
S006	E006	Line Heater	2016	New	1.54	1,262
S007	E007	Line Heater	2016	New	1.54	1,262
S008	E008	Line Heater	2016	New	1.54	1,262
S009	E009	Line Heater	2016	New	1.54	1,262
S010	E010	Line Heater	2016	New	1.54	1,262
S011	E011	Line Heater	2016	New	1.54	1,262
S012	E012	Line Heater	2016	New	1.54	1,262
S013	E013	Line Heater	2016	New	1.54	1,262
S014	E014	TEG	2016	New	0.013	1,262
S015	E015	TEG	2016	New	0.013	1,262
S016	E016	TEG	2016	New	0.013	1,262
S017	E017	Line Heater	2016	New	1.15	1,262

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

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

³ New, modification, removal

⁴ Enter design heat input capacity in MMBtu/hr.

⁵ Enter the fuel heating value in BTU/standard cubic foot.

Attachment N

INTERNAL COMBUSTION ENGINE DATA SHEET

ATTACHMENT N – INTERNAL COMBUSTION ENGINE DATA SHEET

Emission Unit ID# ¹		S018					
Engine Manufacturer/Model		Ford / CSG-637					
Manufacturers Rated bhp/rpm		110 / 3,200					
Source Status ²		NS					
Date Installed/ Modified/Removed/Relocated ³		06/2016					
Engine Manufactured /Reconstruction Date ⁴		2015					
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable) ⁵		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input checked="" type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources		<input type="checkbox"/> 40CFR60 Subpart JJJJ <input type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources		<input type="checkbox"/> 40CFR60 Subpart JJJJ <input type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources	
Engine Type ⁶		4SRB					
APCD Type ⁷		NSCR					
Fuel Type ⁸		PQ					
H ₂ S (gr/100 scf)		0.25					
Operating bhp/rpm		110 / 3,200					
BSFC (BTU/bhp-hr)		6,552.9					
Hourly Fuel Throughput		686.5	ft ³ /hr gal/hr	ft ³ /hr gal/hr			ft ³ /hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)		6.01	MMft ³ /yr gal/yr	MMft ³ /yr gal/yr			MMft ³ /yr gal/yr
Fuel Usage or Hours of Operation Metered		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Yes <input type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>
Calculation Methodology ⁹	Pollutant ¹⁰	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ₁₁	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ₁₁	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ₁₁
MD	NO _x	0.42	1.85				
MD	CO	0.88	3.85				
MD	VOC	0.29	1.29				
AP	SO ₂	<0.01	<0.01				
AP	PM-Filterable	<0.01	0.01				
AP	PM-Condensable	<0.01	0.03				
AP	Formaldehyde	0.01	0.06				
AP	Total HAPs	0.02	0.07				
AP	GHG (CO ₂ e)	82.58	361.69				

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

NS Construction of New Source (installation)	ES Existing Source
MS Modification of Existing Source	RS Relocated Source
REM Removal of Source	
- 3 Enter the date (or anticipated date) of the engine's installation (construction of source), modification, relocation or removal.
- 4 Enter the date that the engine was manufactured, modified or reconstructed.

**Engine Air Pollution Control Device
(Emission Unit ID# S018, use extra pages as necessary)**

Air Pollution Control Device Manufacturer's Data Sheet included?
Yes No

NSCR SCR Oxidation Catalyst

Provide details of process control used for proper mixing/control of reducing agent with gas stream: **Sequential Multipart Fuel Injection**

Manufacturer: Ford	Model #: CSG-637
---------------------------	-------------------------

Design Operating Temperature: 1,600 °F	Design gas volume: scfm
---	--------------------------------

Service life of catalyst: 5000 hours	Provide manufacturer data? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
---	--

Volume of gas handled: 444.9 cfm at 1,600 °F	Operating temperature range for NSCR/Ox Cat: From °F to °F
---	---

Reducing agent used, if any:	Reducing agent used, if any:
------------------------------	------------------------------

Pressure drop against catalyst bed (delta P): **6"** inches of H₂O

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions:

Is temperature and pressure drop of catalyst required to be monitored per 40CFR63 Subpart ZZZZ?
 Yes No

How often is catalyst recommended or required to be replaced (hours of operation)?
5000 hours

How often is performance test required?
 Initial
 Annual
 Every 8,760 hours of operation
 Field Testing Required
 No performance test required. If so, why (please list any maintenance required and the applicable sections in NSPS/GACT, **40CFR60.4243(a)(1) – EQT must operate and maintain the certified stationary SI internal combustion engine and control device according to the manufacturer's emission-related written instructions, keep records of conducted maintenance to demonstrate compliance, but no performance testing is required.**

Attachment O

TANKER TRUCK LOADING DATA SHEET

ATTACHMENT O – TANKER TRUCK LOADING DATA SHEET

Emission Unit ID#: S035		Emission Point ID#: E034, E035		Year Installed/Modified: 2016	
Emission Unit Description: Tank Truck Loading Rack					
Loading Area Data					
Number of Pumps: 1		Number of Liquids Loaded: 1		Max number of trucks loading at one (1) time: 1	
Are tanker trucks pressure tested for leaks at this or any other location? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Not Required If Yes, Please describe:					
Provide description of closed vent system and any bypasses. Emissions collected and controlled by enclosed combustion device. Bypass is not available.					
Are any of the following truck loadout systems utilized? <input type="checkbox"/> Closed System to tanker truck passing a MACT level annual leak test? <input type="checkbox"/> Closed System to tanker truck passing a NSPS level annual leak test? <input checked="" type="checkbox"/> Closed System to tanker truck not passing an annual leak test and has vapor return?					
Projected Maximum Operating Schedule (for rack or transfer point as a whole)					
Time	Jan – Mar		Apr - Jun		Jul – Sept
Hours/day	As needed		As needed		As needed
Days/week	As needed		As needed		As needed
Bulk Liquid Data (use extra pages as necessary)					
Liquid Name	Produced Fluids				
Max. Daily Throughput (1000 gal/day)	94.33				
Max. Annual Throughput (1000 gal/yr)	34,431.2				
Loading Method ¹	SP				
Max. Fill Rate (gal/min)	42				
Average Fill Time (min/loading)	100 min				
Max. Bulk Liquid Temperature (°F)	85 °F				
True Vapor Pressure ²	NA				
Cargo Vessel Condition ³	U				
Control Equipment or Method ⁴	Enclosed Combustion Device (C032)				
Max. Collection Efficiency (%)	70 %				
Max. Control Efficiency (%)	98 %				
Max.VOC Emission Rate	Lb/hr	0.09			
	Ton/yr	0.39			
Max.HAP Emission Rate	Lb/hr	<0.01			
	Ton/yr	<0.01			
Estimation Method ⁵	EPA AP-42, ProMax				

- | | | | | | | |
|---|-----|---|----|-------------|-----|---|
| 1 | BF | Bottom Fill | SP | Splash Fill | SUB | Submerged Fill |
| 2 | | At maximum bulk liquid temperature | | | | |
| 3 | B | Ballasted Vessel | C | Cleaned | U | Uncleaned (dedicated service) |
| | O | Other (describe) | | | | |
| 4 | | List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets) | | | | |
| | CA | Carbon Adsorption | | VB | | Dedicated Vapor Balance (closed system) |
| | ECD | Enclosed Combustion Device | | F | | Flare |
| | TO | Thermal Oxidization or Incineration | | | | |
| 5 | EPA | EPA Emission Factor in AP-42 | | | MB | Material Balance |
| | TM | Test Measurement based upon test data submittal | | | O | Other (describe) |

Attachment Q

PNEUMATIC CONTROLLERS DATA SHEET

**ATTACHMENT Q – PNEUMATIC CONTROLLERS
DATA SHEET**

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

Yes No

Please list approximate number.

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

Yes No

Please list approximate number.

Attachment R

**AIR POLLUTION CONTROL DEVICE / EMISSION
REDUCTION DEVICE (ERD) SHEET**

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

**VAPOR COMBUSTION
(Including Enclosed Combustors)**

General Information

Control Device ID#: C034	Installation Date: 2016 <input checked="" type="checkbox"/> New <input type="checkbox"/> Modified <input type="checkbox"/> Relocated	
Maximum Rated Total Flow Capacity ~7,800 scfh 188,000 scfd	Maximum Design Heat Input (from mfg. spec sheet) 19.22 MMBTU/hr	Design Heat Content 1,262 BTU/scf

Control Device Information

Type of Vapor Combustion Control?

Enclosed Combustion Device Elevated Flare Ground Flare
 Thermal Oxidizer

Manufacturer: LEED Fabrication Model: Enclosed Combustor 48"	Hours of operation per year? 8,760
---	---

List the emission units whose emissions are controlled by this vapor control device (Emission Point ID# **S019-S030, S031, S033**)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
S019-S030	Produced Fluid Tanks		
S031	Sand Trap Blowdown Tank		
S033	Tank Truck Loading Rack		

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

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

Waste Gas Information

Maximum Waste Gas Flow Rate 1,499.40 (lb/hr)	Heat Value of Waste Gas Stream Variable BTU/ft³	Exit Velocity of the Emissions Stream (ft/s)
--	--	---

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

Pilot Gas Information

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

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

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

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

Additional information attached? Yes No

Please attach copies of manufacturer's data sheets, drawings, flame demonstration per §60.18 or §63.11(b) and performance testing.



**Environmental Control Equipment
Data Sheet**

Item/Tag No.:		Page	1	of	3
Project No.:		Revision:	A		
Project:		Date:	10 November 2014		
P.O. No.:	-	By:	JS		
RFQ No.:	-	Checked:	SG		
Ref. P&ID:	-	Approved:	MS		
Client:		Supplier:	LEED FABRICATION		
Site:		Model No.:	L30-0028-00		
Unit/Lease:		Remarks:			

GENERAL

1 Design Code:		NDE:	LEED Fabrication Standards		
2 Service:		Customer Specs:	<input type="checkbox"/> Yes		
3 Description:	Standard Dual Stage 60 High Efficiency Combustor		<input checked="" type="checkbox"/> No		

PROCESS DATA

Gas Composition:	mol %	Process Conditions:		
		Variable	Value	Units
4 Methane		Flow Rate	Up to 300	Mscfd
5 Ethane		Pressure	Up to 12	oz/in2
6 Propane		Temperature		°F
7 I-Butane		Molecular Weight		
8 n-Butane		Process/Waste Stream	<input checked="" type="checkbox"/> Gas	<input type="checkbox"/> Liquid
9 I-Pentane		Detailed Process Description / Process Notes:		
10 n-Pentane		1. Turndown 10:1. Based on an expected normal operating rate indicated above.		
11 n-Hexane		2. DRE: 98 % operating at design conditions		
12 CO2		3. Burner Pressure Drop: Min. 0.12 oz/in2		
13 N2		4. Gas mixture heating value estimated to be 1500 BTU/SCF unless specified by customer		
14 Helium				
15 H2O				
16 C7				
17 C8				
18 C9				
19 C10				
20 C11+				
21	TOTAL			
Other Components:	PPMV	Available Utilities:		
22 H2S		Fuel / Pilot Gas	Min. 30psig Natural Gas /Propane 40-50 SCFH	
23 Benzene		Instrument Air	NA	
24 Toluene		Power	120 V / 60 Hz or Solar Power	
25 E-Benzene		Steam	NA	
26 Xylene		Purge Gas		

DESIGN DATA

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

EQUIPMENT SPECIFICATION

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



**Environmental Control Equipment
Data Sheet**

Item/Tag No.:		Page	2	of	3
Project No.:		Revision:	A		
Project:		Date:	10 November 2014		
P.O. No.:	-	By:	JS		
RFQ No.:	-	Checked:	SG		
Ref. P&ID:	-	Approved:	MS		
Remarks:	-	Supplier:	LEED FABRICATION		
		Model No.:	L30-0028-00		

Client:	
Site:	
Unit/Lease:	

EQUIPMENT SPECIFICATION

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

FABRICATION AND INSPECTION

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

Additional Notes:



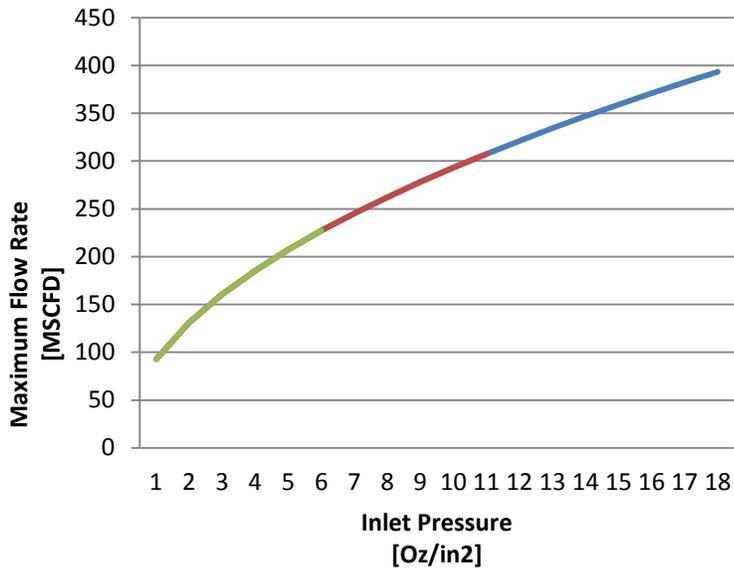
Environmental Control Equipment
Data Sheet

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Project No.:		Revision:	A		
Project:		Date:	10 November 2014		
P.O. No.:	-	By:	JS		
RFQ No.:	-	Checked:	SG		
Ref. P&ID:	-	Approved:	MS		
Client:		Supplier:	LEED FABRICATION		
Site:		Model No.:	L30-0028-00		
Unit/Lease:		Remarks:	-		

GENERAL ARRANGEMENT



60 HEC



- Max Flow Rate (MSCFD) @ LHV 1000 BTU/SCF
- Max Flow Rate (MSCFD) @ LHV 1500 BTU/SCF
- Max Flow Rate (MSCFD) @ LHV 2000 BTU/SCF

Flare Size (in)	# of Orifices (N)	Pressure (oz/in ²)	Flow Rate (m ³ /s)	Flow Rate (mSCFD)	Heat Release (MMBTU/hr)
60	30	1	0.0304	92.72	5.79
60	30	2	0.0430	131.12	8.19
60	30	3	0.0526	160.59	10.04
60	30	4	0.0608	185.43	11.59
60	30	5	0.0679	207.32	12.96
60	30	6	0.0744	227.11	14.19
60	30	7	0.0804	245.30	15.33
60	30	8	0.0859	262.24	16.39
60	30	9	0.0912	278.15	17.38
60	30	10	0.0961	293.19	18.32
60	30	11	0.1008	307.50	19.22

Attachment S

EMISSION CALCULATIONS

Line Heaters S001 - S013

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Boiler Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions. (lb/hr)	Max. Annual Emissions. (tpy)
VOC's	5.5	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	<0.01	0.03
Hexane	1.8	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	<0.01	<0.01
Formaldehyde	0.075	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	<0.01	<0.01
Benzene	0.0021	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	<0.01	<0.01
Toluene	0.0034	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	<0.01	<0.01
Pb	0.0005	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	<0.01	<0.01
CO	84	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	0.10	0.45
NOx	100	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	0.12	0.53
PM _{Filterable}	1.9	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	<0.01	0.01
PM _{Condensable}	5.7	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	<0.01	0.03
PM _{Total}	7.6	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	<0.01	0.04
SO ₂	0.6	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.54	1,262	8,760	<0.01	<0.01
CO ₂	53.06	kg CO ₂ / MMBtu	40 CFR Subpart C	1.54	1,088	8,760	180.14	789.03
CH ₄	0.001	kg CO ₂ / MMBtu	40 CFR Subpart C	1.54	1,088	8,760	<0.01	0.01
N ₂ O	0.0001	kg CO ₂ / MMBtu	40 CFR Subpart C	1.54	1,088	8,760	<0.01	<0.01
Total HAPs							<0.01	0.01
Total CO ₂ e							180.33	789.85

Notes:

-Emission rates displayed above represent the max. hourly and max. annual emissions for one line heater. Cumulative emission rates for all 13 line heaters are displayed in the Total Site Emissions Table.

-Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.

-AP-42, Chapter 1.4 references are from the July 1998 revision.

*Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

-CO₂ equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298

Example Equations:

Max. Hourly Emission Rate (lb/hr) = Emission Factor (lb/10⁶ scf) ÷ Heating Value of Natural Gas (Btu/scf) x Boiler Rating (MMBtu/hr)

Thermoelectric Generators S014, S015, & S016

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Boiler Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions. (lb/hr)	Max. Annual Emissions. (tpy)
VOC's	5.5	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
Hexane	1.8	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
Formaldehyde	0.075	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
Benzene	0.0021	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
Toluene	0.0034	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
Pb	0.0005	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
CO	84	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
NOx	100	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
PM _{Filterable}	1.9	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
PM _{Condensable}	5.7	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
PM _{Total}	7.6	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
SO ₂	0.6	lb/10 ⁶ scf	AP-42 Chapter 1.4	0.013	1,262	8,760	<0.01	<0.01
CO ₂	53.06	kg CO ₂ / MMBtu	40 CFR Subpart C	0.013	1,262	8,760	1.52	6.66
CH ₄	0.001	kg CO ₂ / MMBtu	40 CFR Subpart C	0.013	1,262	8,760	<0.01	<0.01
N ₂ O	0.0001	kg CO ₂ / MMBtu	40 CFR Subpart C	0.013	1,262	8,760	<0.01	<0.01
Total HAPs							<0.01	<0.01
Total CO ₂ e							1.52	6.67

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one TEG. Cumulative emission rates for all TEGs are displayed in the Total Site Emissions Table.
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO₂ equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298

Example Equations:

Max. Hourly Emission Rate (lb/hr) = Emission Factor (lb/10⁶ scf) ÷ Heating Value of Natural Gas (Btu/scf) x Boiler Rating (MMBtu/hr)

Line Heaters S017

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Boiler Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions. (lb/hr)	Max. Annual Emissions. (tpy)
VOC's	5.5	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	<0.01	0.02
Hexane	1.8	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	<0.01	<0.01
Formaldehyde	0.075	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	<0.01	<0.01
Benzene	0.0021	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	<0.01	<0.01
Toluene	0.0034	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	<0.01	<0.01
Pb	0.0005	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	<0.01	<0.01
CO	84	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	0.08	0.34
NOx	100	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	0.09	0.40
PM _{Filterable}	1.9	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	<0.01	<0.01
PM _{Condensable}	5.7	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	<0.01	0.02
PM _{Total}	7.6	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	<0.01	0.03
SO ₂	0.6	lb/10 ⁶ scf	AP-42 Chapter 1.4	1.15	1,262	8,760	<0.01	<0.01
CO ₂	53.06	kg CO ₂ / MMBtu	40 CFR Subpart C	1.15	1,262	8,760	134.52	589.21
CH ₄	0.001	kg CO ₂ / MMBtu	40 CFR Subpart C	1.15	1,262	8,760	<0.01	0.01
N ₂ O	0.0001	kg CO ₂ / MMBtu	40 CFR Subpart C	1.15	1,262	8,760	<0.01	<0.01
Total HAPs							<0.01	<0.01
Total CO ₂ e							134.66	589.82

Notes:

-Emission rates displayed above represent the max. hourly and max. annual emissions for one line heater. Cumulative emission rates for this line heaters is displayed in the Total Site Emissions Table.

-Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.

-AP-42, Chapter 1.4 references are from the July 1998 revision.

*Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

-CO₂ equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298

Example Equations:

Max. Hourly Emission Rate (lb/hr) = Emission Factor (lb/10⁶ scf) ÷ Heating Value of Natural Gas (Btu/scf) x Boiler Rating (MMBtu/hr)

Natural Gas Compressor Engine S018

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Engine Rating (bhp)	Fuel Consumption (Btu/bhp-hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
VOC's	1.21	g/bhp-hr	Vendor Guarantee	110.0	6,553	1,262	8,760	0.29	1.29
Formaldehyde	2.05E-02	lb/MMBtu	AP-42 Chapter 3.2	110.0	6,553	1,262	8,760	0.01	0.06
Benzene	1.58E-03	lb/MMBtu	AP-42 Chapter 3.2	110.0	6,553	1,262	8,760	<0.01	<0.01
Toluene	5.58E-04	lb/MMBtu	AP-42 Chapter 3.2	110.0	6,553	1,262	8,760	<0.01	<0.01
Ethylbenze	2.48E-05	lb/MMBtu	AP-42 Chapter 3.2	110.0	6,553	1,262	8,760	<0.01	<0.01
Xylene	1.95E-04	lb/MMBtu	AP-42 Chapter 3.2	110.0	6,553	1,262	8,760	<0.01	<0.01
CO	3.62	g/bhp-hr	Vendor Guarantee	110.0	6,553	1,262	8,760	0.88	3.85
NOx	1.74	g/bhp-hr	Vendor Guarantee	110.0	6,553	1,262	8,760	0.42	1.85
PM _{Filterable}	9.50E-03	lb/MMBtu	AP-42 Chapter 3.2	110.0	6,553	1,262	8,760	<0.01	0.01
PM _{Condensable}	9.91E-03	lb/MMBtu	AP-42 Chapter 3.2	110.0	6,553	1,262	8,760	<0.01	0.03
SO ₂	5.88E-04	lb/MMBtu	AP-42 Chapter 3.2	110.0	6,553	1,262	8,760	<0.01	<0.01
CO ₂	53.06	kg CO ₂ / MMBtu	40 CFR Subpart C	110.0	6,553	1,262	8,760	82.49	361.32
CH ₄	0.001	kg CH ₄ / MMBtu	40 CFR Subpart C	110.0	6,553	1,262	8,760	<0.01	<0.01
N ₂ O	0.0001	kg N ₂ O / MMBtu	40 CFR Subpart C	110.0	6,553	1,262	8,760	<0.01	<0.01
Total HAPs								0.02	0.07
Total CO ₂ e								82.58	361.69

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one NG compressor.
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2, Table 3.2-3 - Uncontrolled Emission Factors for 4-Stroke Rich Burn Engines
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO₂ equivalency solved for using Global Warming Potentials found in 40 CFR 98 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298
- Vendor Guarantee Emissions are listed in Attachment S
- Vendor Guarantee Emissions are converted from g/kW-hr to g/bhp-hr. 1 kW = 1.34 bhp

Example Equations:

Max. Hourly Emission Rate (lb/hr) = Emission Factor (lb/10⁶ scf) ÷ Heating Value of Natural Gas (Btu/scf) x Boiler Rating (MMBtu/hr)

Produced Fluids Tanks S019 - S032

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Annual Emissions using ProMax (tons/yr)
VOCs	214.48	939.42
Total HAPs	11.57	50.69
Hexane	10.32	45.20
Benzene	1.55	6.79
Toluene	0.59	2.60
Ethylbenzene	0.03	0.15
Xylene	0.28	1.24
CO ₂	0.12	0.52
CH ₄	2.65	11.62
Total CO ₂ e	66.42	290.93

Notes:

- Emission rates for Produced Fluid Tanks S019 - S030 were calculated using ProMax software. ProMax output sheets for the WEU-4 Pad are attached.
- The emission rates displayed above are pre-control device emissions.
- CO₂ equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298
- CO₂ and CH₄ emissions solved for using emissions rates (lb/hr) of "4" from the ProMax output sheets.
- For emission calculation purposes, the total throughput for tanks S019 - S030 is modeled as being received through a single tank. The throughput value represents the total throughput for all thirteen (13) 400-barrel tanks. Therefore, emission rates represent a total from all produced fluids tanks located on the well pad. Actual throughput for each tank will vary based on operations.

Sand Trap Blowdown Tank S033

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Annual Emissions using ProMax (tons/yr)
VOCs	909.98	166.07
Total HAPs	41.08	7.50
Hexane	36.88	6.73
Benzene	5.547	1.012
Toluene	2.00	0.37
Ethylbenzene	0.103	0.019
Xylene	0.853	0.16
CO ₂	1.40	0.26
CH ₄	130.07	23.74
Total CO ₂ e	3,253.12	593.69

Notes:

-Blowdown operations are conducted on the WEU-4 pad daily to allow for the removal of fluids from the sand traps. Based on available operational information, blowdowns are assumed to occur for one hour per day. The ton/year emission calculations is conducted for 365 blowdown events occurring annually.

-Emissions from the Sand Trap Blowdown Tanks are routed to an enclosed ground flare. The values displayed above a pre-control emission rates.

-Emission rates for the Sand Trap Blowdown Tank were calculated using ProMax software. ProMax output sheets for the WEU-4 Pad are attached.

-CO₂ equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1. GWP CO₂=1, GWP CH₄=25, GWP N₂O=298

-CO₂ and CH₄ emissions solved for using emissions rates (lb/hr) of Stream "4" from the ProMax output sheets.

Enclosed Combustion Devices C034

Emissions from Tanks							Gas Composition of Vent Gas		
Input to Enclosed Combustion Device	Pollutant	Amount of Gas Sent to Enclosed Combustion Device (lbs/hr)	Amount of Gas Sent to Enclosed Combustion Device (tons/yr)	Enclosed Combustion Device Combustion Efficiency	Enclosed Combustion Device Max. Hourly Emissions (lb/hr)	Enclosed Combustion Device Max. Yearly Emissions (tons/yr)	Gas Stream	Mole Fraction	
Produced Liquid Tanks S019 - S030	VOCs	214.48	939.42	98%	4.29	18.79	Methane	0.04	
	HAPs	11.57	50.69	98%	0.23	1.01	Ethane	0.12	
	Hexane	10.32	45.20	98%	0.21	0.90	Propane	0.21	
	Benzene	1.55	6.79	98%	0.03	0.14	Butane	0.27	
	Toluene	0.59	2.60	98%	0.01	0.05	Pentanes	0.17	
	Ethylbenzene	0.03	0.15	98%	<0.01	<0.01	Carbon Dioxide	0.001	
	Xylene	0.28	1.24	98%	<0.01	0.02	Vent Gas Properties		
	CO ₂	0.12	0.52	98%	587.04	2571.23	Vent Gas Properties	Mass Flow Rate (lb/hr)	Density (lb/ft³)
CH ₄	2.65	11.62	98%	0.05	0.23	Condensate Tank	239.43	0.13	
Sand Trap Blowdown Tank S031	VOCs	909.98	166.07	98%	18.20	3.32	Blowdown Tank	1259.97	0.10
	HAPs	41.08	7.50	98%	0.82	0.15			
	Hexane	36.88	6.73	98%	0.74	0.13			
	Benzene	5.55	1.01	98%	0.11	0.02			
	Toluene	2.00	0.37	98%	0.04	<0.01			
	Ethylbenzene	0.10	0.02	98%	<0.01	<0.01			
	Xylene	0.85	0.16	98%	0.02	<0.01			
	CO ₂	1.40	0.26	98%	3883.81	17011.07			
CH ₄	130.07	23.74	98%	2.60	0.47				
Truck Loading - S033	VOCs	0.29	1.29	98%	<0.01	<0.01			
	HAPs	<0.001	0.004	98%	<0.01	<0.01			
	CO ₂	<0.001	0.003	98%	0.49	2.15			
	CH ₄	0.00	0.01	98%	<0.01	<0.01			
Totals	VOCs	1124.75	1106.78	--	22.49	22.12			
	HAPs	52.65	58.19	--	1.05	1.16			
	Hexane	47.20	51.93	--	0.94	1.04			
	Benzene	7.10	7.80	--	0.14	0.16			
	Toluene	2.60	2.96	--	0.05	0.06			
	Ethylbenzene	0.14	0.17	--	<0.01	<0.01			
	Xylene	1.14	1.40	--	0.02	0.03			
	CO ₂	1.52	0.78	--	4471.34	19584.45			
	CH ₄	132.72	35.36	--	2.65	0.71			
CO _{2e}	3,319.60	884.89	--	4537.70	19,602.13				

Emissions from Pilot Operations											
Pollutant	Emission Factor (lb/10 ⁶ scf)	Emission Factors (kg X/MMBtu)	Heat Value of Natural Gas (Btu/scf)	Enclosed Ground Flare Pilot Rating (Btu/hr)	Enclosed Ground Flare Burner Rating (Btu/hr)	Pilot Max. Hourly Emissions (lb/hr)	Pilot Max. Hourly Emissions (tons/yr)	Burner Max.Hourly Emissions (lb/hr)	Burner Yearly Emissions (tons/yr)	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	5.5	--	1,262	30,000	19,220,000	<0.01	<0.01	--	--	<0.01	<0.01
Hexane	1.8	--	1,262	30,000	19,220,000	<0.01	<0.01	--	--	<0.01	<0.01
Formaldehyde	0.075	--	1,262	30,000	19,220,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CO	84	--	1,262	30,000	19,220,000	<0.01	<0.01	1.28	5.60	1.28	5.61
NO _x	100	--	1,262	30,000	19,220,000	<0.01	0.01	1.52	6.67	1.53	6.68
PM _{Condensable}	5.7	--	1,262	30,000	19,220,000	<0.01	<0.01	0.09	0.38	0.09	0.38
PM _{Filterable}	1.9	--	1,262	30,000	19,220,000	<0.01	<0.01	0.03	0.13	0.03	0.13
PM _{Total}	7.6	--	1,262	30,000	19,220,000	<0.01	<0.01	0.12	0.51	0.12	0.51
SO ₂	0.6	--	1,262	30,000	19,220,000	<0.01	<0.01	<0.01	0.04	<0.01	0.04
CO ₂	--	52	1,262	30,000	19,220,000	3.44	15.08	2021.66	8854.87	2025.10	8869.95
CH ₄	--	0.001	1,262	30,000	19,220,000	<0.01	<0.01	0.04	0.17	0.04	0.17
N ₂ O	--	<0.001	1,262	30,000	19,220,000	<0.01	<0.01	<0.01	0.02	<0.01	0.02
Total HAPs						<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CO _{2e}						3.45	15.10	2023.79	8864.19	2027.24	8879.29

Total Enclosed Combustion Device Emissions

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	22.49	22.12
HAPs	1.05	1.17
Hexane	0.94	1.04
Formaldehyde	<0.01	<0.01
Benzene	0.14	0.16
Toluene	0.05	0.06
Ethylbenzene	<0.01	<0.01
Xylene	0.02	0.03
CO	1.28	5.61
NOx	1.53	6.68
PM _{Condensable}	0.09	0.38
PM _{Filterable}	0.03	0.13
PM _{Total}	0.12	0.51
SO ₂	<0.01	0.04
CO ₂	6,496.44	28,454.41
CH ₄	2.69	0.88
N ₂ O	<0.01	0.02
CO ₂ e	6,564.93	28,481.42

Notes:

- Emissions from Enclosed Combustion Device Operations from AP-42, Chapter 1.4 references are from the July 1998 revision.
- Greenhouse Gas Emissions from the Enclosed Combustion Device Pilot and Burner calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO₂ equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298

Example Calculations:

Emissions from Tanks VOCs (lb/hr) = Amount of Gas sent to Enclosed Combustion Device (lb/hr) x 0.02 = Max. Hourly Emissions (lb/hr)

Emissions from Enclosed Combustion Device Operations (lb/hr) = Emission factor (lb/106 Btu) x Heat Value of Natural Gas (Btu/scf) ÷ 1,000,000 x Enclosed Combustion Device Pilot Gas Usage (mcf/d) x 1,000 ÷ 24

Emissions from Enclosed Combustion Device Vapor Destruction CO₂ Methodologies shown below sample equation

Emissions from Enclosed Combustion Device Operations CO₂ (tons/yr) = ((Enclosed Combustion Device Pilot Gas Usage (mcf/d) x 1,000 x 365 x Fraction of Gas Combusted by Enclosed Combustion Device x Mole Fraction of Methane x Number of Carbon Atoms in Methane) + (Enclosed Combustion Device Pilot Gas Usage (mcf/d) x 1,000 x 365 x Fraction of Gas Combusted by Enclosed Combustion Device x Mole Fraction of Pentanes-plus x Number of Carbon Atoms in Pentanes-plus)) x .0526 (kg/ft³) CO₂ x .001 x 1.102 tons/tonnes

$$E_{a,CH_4}(un-combusted) = V_a * (1-\eta) * X_{CH_4} \quad (\text{Eq. W-19})$$

$$E_{a,CO_2}(un-combusted) = V_a * X_{CO_2} \quad (\text{Eq. W-20})$$

$$E_{a,CO_2}(combusted) = \sum_{j=1}^5 (\eta * V_a * Y_j * R_j) \quad (\text{Eq. W-21})$$

Where:

Ea,CH₄(un-combusted) = Contribution of annual un-combusted CH₄ emissions from Enclosed Combustion Device stack in cubic feet, under actual conditions.

Ea,CO₂(un-combusted) = Contribution of annual un-combusted CO₂ emissions from Enclosed Combustion Device stack in cubic feet, under actual conditions.

Ea,CO₂(combusted) = Contribution of annual combusted CO₂ emissions from Enclosed Combustion Device stack in cubic feet, under actual conditions.

Va = Volume of gas sent to Enclosed Combustion Device in cubic feet, during the year.

η = Fraction of gas combusted by a burning Enclosed Combustion Device (default is 0.98). For gas sent to an unlit Enclosed Combustion Device, η is zero.

XCH₄ = Mole fraction of CH₄ in gas to the Enclosed Combustion Device.

XCO₂ = Mole fraction of CO₂ in gas to the Enclosed Combustion Device.

Y_j = Mole fraction of gas hydrocarbon constituents j (such as methane, ethane, propane, butane, and pentanes-plus).

R_j = Number of carbon atoms in the gas hydrocarbon constituent j: 1 for methane, 2 for ethane, 3 for propane, 4 for butane, and 5 for pentanes plus).

Tank Unloading Operations S035

Total Emissions from Tank Unloading Operations

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)	Loading Rack Collection Efficiency	Enclosed Combustion Device Combustion Efficiency	Post-Control Max. Yearly Emissions (lb/hr)	Post-Control Max. Yearly Emissions (tons/yr)	Max. Hourly Emissions Not Collected by Loading Rack (lb/hr)	Max. Hourly Emissions Not Collected by Loading Rack (tons/yr)
VOCs	0.29	1.29	70%	98%	<0.01	0.018	0.09	0.39
HAPs	<0.01	<0.01	70%	98%	<0.01	<0.01	<0.01	<0.01
CO ₂	<0.01	<0.01	70%	98%	0.98	4.31	<0.01	<0.01
CH ₄	<0.01	0.01	70%	98%	<0.01	<0.01	<0.01	<0.01
Total CO ₂ e	0.06	0.27	--	--	0.98	4.31	0.02	0.08

-CO₂ and CH₄ emissions solved for using emissions rates (lb/hr) of load out fluids from ProMax summary sheets.

Notes:

-Emission rates for liquid unloading operations were calculated using ProMax software. ProMax summary sheets are attached.

Fugitive Emissions from Unpaved Haul Roads

Constant	Industrial Roads		
	PM	PM-10	PM-2.5
k (lb/VMT)	4.9	1.5	0.15
a	0.7	0.9	0.9
b	0.45	0.45	0.45

where

- k Particle size multiplier¹
- s 4.8 Silt content of road surface material (%)
- p 150 Number of days per year with precipitation

Item Number	Description	Number of Wheels	W	Miles per Trip	Maximum Trips per Year	Control Efficiency (%)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)	PM-2.5 Emissions (tons/yr)
			Mean Vehicle Weight (tons)									
1	Liquids Hauling	14	30	2.00	8,197	NA	8.57	35.11	2.18	8.95	0.22	0.89
2	Employee Vehicles	4	3	2.00	200	NA	3.04	0.30	0.77	0.08	0.08	0.008
Totals:							11.61	35.41	2.96	9.03	0.30	0.90

Notes:

- ¹ - Particle Size Multiplier used from AP-42 13.2.2 - Final Version 11/2006
- ² - Silt Content of Road Surface uses Sand and Gravel Processing Plant Road from AP-42 13.2.2 - Final Version 11/2006
- ³ - Number of days per year with precipitation >0.01 in3 found using AP-42 13.2.2 Figure 13.2.2-1 - Final Version 11/2006

Example Calculations:

Emissions (lb/Vehicle Mile Traveled) - $E = k \times (s/12)^a \times (W/3)^b$ Equation 1a from AP-42 13.2.2 - Final Version 11/2006

Size Specific Emissions (lb/VMT) - $E_{ext} = E[(365-p)/365]$ Equation 2 from AP-42 13.2.2 - Final Version 11/2006

Fugitive Leaks

Default Average Component Counts for Major Onshore Natural Gas Production Equipment ¹				
Facility Equipment Type	Valves	Connectors	Open-ended Lines	Pressure Relief Valves
Wellheads	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

Well Specific Equipment Counts	
Facility Equipment Type	Count on Site
Wellheads	13
Separators	14
Meters/Piping	13
Compressors	1
In-line Heaters	14
Dehydrators	0

¹- Table W-1B to 40CFR98 Subpart W

Gas Composition						
Emissions from Flaring Operations	Propane	Butane	Pentanes	Hexanes +	CO ₂	CH ₄
Mole %	4.00	1.78	0.64	5.76	0.15	78.13
MW	44	58	72	86	44.00	16.00

Fugitive Emissions													
Facility Equipment Type	Total Count	Emission Rate (scf/hr/component) ²	Hours of Operation	VOCs (lbs/hr)	VOCs (tons/yr)	HAPs (lbs/hr)	HAPs (tons/yr)	CO ₂ (lbs/hr)	CO ₂ (tons/yr)	CH ₄ (lbs/hr)	CH ₄ (tons/yr)	Total CO ₂ e (lbs/hr)	Total CO ₂ e (tons/yr)
Valves	482	0.027	8760	0.28	1.21	0.167	0.73	0.002	0.010	0.42	1.85	10.55	46.22
Connectors	2130	0.003	8760	0.14	0.60	0.082	0.36	0.001	0.005	0.21	0.91	5.18	22.69
Open-ended Lines	35	0.06	8760	0.04	0.20	0.027	0.12	<0.001	0.002	0.07	0.30	1.71	7.47
Pressure Relief Valves	14	0.04	8760	0.012	0.05	0.01	0.03	<0.001	<0.001	0.02	0.08	0.45	1.99
Total Emissions:				0.47	2.06	0.28	1.24	<0.01	0.02	0.72	3.13	17.89	78.38

²- Table W-1A to 40CFR98 Subpart W

Notes:

-Gas Composition data for WEU-4 site was unavailable. Gas composition was used to determine fugitive emissions based upon a nearby similar natural gas production site operated by EQT.

Example Equations:

Fugitive Emissions (lb/hr) = Count x Emission Rate x Hours of Operation ÷ 385.5 scf/lbmol x mol VOC's

Total WEU-4 Site Emission Levels

Emission Sources	VOCs		HAPs		CO		NO _x		PM (Total)		PM (Filterable)		PM (Condensable)		SO ₂		CO ₂		CH ₄		N ₂ O		CO ₂ e	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Line Heater (S001)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S002)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S003)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S004)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S005)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S006)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S007)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S008)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S009)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S010)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S011)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S012)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
Line Heater (S013)	<0.01	0.03	<0.01	0.01	0.10	0.45	0.12	0.53	<0.01	0.04	<0.01	0.01	<0.01	0.03	<0.01	<0.01	180.14	789.03	<0.01	0.01	<0.01	<0.01	180.33	789.85
TEG (S014)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.52	6.66	<0.01	<0.01	<0.01	<0.01	1.52	6.67
TEG (S015)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.52	6.66	<0.01	<0.01	<0.01	<0.01	1.52	6.67
TEG (S016)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.52	6.66	<0.01	<0.01	<0.01	<0.01	1.52	6.67
Line Heater (S017)	<0.01	0.02	<0.01	<0.01	0.08	0.34	0.09	0.40	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	134.52	589.21	<0.01	0.01	<0.01	<0.01	134.66	589.82
Compressor Engine (S018)	0.29	1.29	0.02	0.07	0.88	3.85	0.42	1.85	<0.01	0.03	<0.01	0.01	<0.01	0.03	<0.01	<0.01	82.49	361.32	<0.01	<0.01	<0.01	<0.01	82.58	361.69
Enclosed Combustion Unit (C034)	22.49	22.12	1.05	1.17	1.28	5.61	1.53	6.68	0.12	0.51	0.03	0.13	0.09	0.38	<0.01	0.04	6,496.44	28,454.41	2.69	0.88	<0.01	0.02	6,564.93	28,481.42
Tank Truck Loading Activities (S035)	0.09	0.39	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	--	--	0.02	0.08
Haul Roads	--	--	--	--	--	--	--	--	11.61	35.41	11.61	35.41	--	--	--	--	--	--	--	--	--	--	--	--
Fugitives Leaks	0.47	2.06	0.28	1.24	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	0.02	0.72	3.13	--	--	17.89	78.38
Totals	23.34	26.25	1.35	2.61	3.57	15.63	3.62	15.88	11.72	36.51	11.64	35.68	0.09	0.83	<0.01	0.04	9,059.90	39,682.39	3.41	4.22	<0.01	0.02	9,148.96	39,799.44

-Emissions from the produced fluid tanks, sand trap blowdown tanks, and tank truck loading are routed to one enclosed combustion device C032.

Total WEU-4 Site Emission Levels - HAP Speciation

Emission Sources	Total HAPs		Formaldehyde		Hexane		Benzene		Toluene		Ethylbenzene		Xylene	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Line Heater (S001)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S002)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S003)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S004)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S005)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S006)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S007)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S008)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S009)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S010)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S011)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S012)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S013)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TEG (S014)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TEG (S015)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TEG (S016)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S017)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Compressor Engine (S018)	0.02	0.07	0.01	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Enclosed Combustion Unit (C034)	1.05	1.17	<0.01	<0.01	0.94	1.04	0.07	0.16	0.03	0.06	<0.01	<0.01	0.01	0.02
Tank Truck Loading Activities (S035)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Haul Roads	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fugitives Leaks	0.28	1.24	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Totals	1.35	2.61	0.01	0.06	0.94	1.04	0.07	0.16	0.03	0.06	<0.01	<0.01	0.01	0.02

-Emissions from the produced fluid tanks, sand trap blowdown tanks, and tank truck loading are routed to one enclosed combustion device C032.



Certificate of Analysis
 Number: 2030-14070266-001A

Carencro Laboratory
 4790 NE Evangeline Thruway
 Carencro, LA 70520

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

July 31, 2014

Field: EQT
 Station Name: 513764
 Sample Point: Submeter
 Cylinder No: GAS
 Analyzed: 07/30/2014 08:31:58 by CC

Sampled By: RM-GAS
 Sample Of: Liquid Spot
 Sample Date: 07/22/2014
 Sample Conditions: 380 psig
 Method: GPA 2186

Analytical Data

Components	Mol. %	Wt. %	L.V. %
Nitrogen	NIL	NIL	NIL
Methane	13.840	3.113	6.497
Carbon Dioxide	0.056	0.035	0.027
Ethane	11.604	4.893	8.595
Propane	10.834	6.699	8.267
Iso-Butane	3.233	2.635	2.930
n-Butane	8.093	6.596	7.066
Iso-Pentane	4.712	4.767	4.773
n-Pentane	5.407	5.470	5.428
i-Hexanes	4.842	5.784	5.428
n-Hexane	3.864	4.673	4.407
Benzene	0.148	0.162	0.113
Cyclohexane	0.738	0.870	0.693
i-Heptanes	5.670	7.847	7.003
n-Heptane	3.019	4.242	3.858
Toluene	0.609	0.787	0.563
i-Octanes	7.648	11.620	9.856
n-Octane	1.980	3.172	2.808
Ethylbenzene	0.081	0.121	0.086
Xylenes	0.882	1.313	0.947
i-Nonanes	3.369	5.896	4.861
n-Nonane	1.210	2.176	1.885
i-Decanes	4.357	8.333	6.598
n-Decane	0.790	1.577	1.342
Undecanes	1.371	2.995	2.495
Dodecanes	0.834	1.991	1.651
Tridecanes	0.255	0.660	0.542
Tetradecanes Plus	0.554	1.573	1.281
	100.000	100.000	100.000

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: 2030-14070266-001A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

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

July 31, 2014

Field: EQT
Station Name: 513764
Sample Point: Submeter
Cylinder No: GAS
Analyzed: 07/30/2014 08:31:58 by CC

Sampled By: RM-GAS
Sample Of: Liquid Spot
Sample Date: 07/22/2014
Sample Conditions: 380 psig
Method: GPA 2186

Analytical Data

Components	Mol. %	Wt. %	L.V. %
Nitrogen	NIL	NIL	NIL
Carbon Dioxide	0.056	0.035	0.027
Methane	13.840	3.113	6.497
Ethane	11.604	4.893	8.595
Propane	10.834	6.699	8.267
Iso-Butane	3.233	2.635	2.930
n-Butane	8.093	6.596	7.066
Iso-Pentane	4.712	4.767	4.773
n-Pentane	5.407	5.470	5.428
Hexanes Plus	42.221	65.792	56.417
	100.000	100.000	100.000

Physical Properties

	Total	C6+
Molecular Weight	71.314	111.126
BTU / Cu. Ft. @ 14.73 psia DRY	3927.0	5996.3
BTU / LB.	20847.0	20426.0
BTU / GAL.	108847.0	124418.0
Cu. Ft. Vapor per Gallon @ 14.73 psia	27.705	20.734
Pounds per Gallon (in Vacuum)	5.218	6.086
Pounds per Gallon (in Air)	5.213	6.079
Specific Gravity at 60°F	0.6259	0.7299
API Gravity at 60°F	94.57	62.35
Specific Gravity as a vapor	2.4620	3.8370

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: 2030-14070266-001A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

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

July 31, 2014

Field: EQT
Station Name: 513764
Sample Point: Submeter
Cylinder No: GAS
Analyzed: 07/30/2014 08:31:58 by CC

Sampled By: RM-GAS
Sample Of: Liquid Spot
Sample Date: 07/22/2014
Sample Conditions: 380 psig
Method: GPA 2186

Analytical Data

Components	Mol. %	Wt. %	L.V. %
Nitrogen	NIL	NIL	NIL
Carbon Dioxide	0.056	0.035	0.027
Methane	13.840	3.113	6.497
Ethane	11.604	4.893	8.595
Propane	10.834	6.699	8.267
Iso-Butane	3.233	2.635	2.930
n-Butane	8.093	6.596	7.066
Iso-Pentane	4.712	4.767	4.773
n-Pentane	5.407	5.470	5.428
Hexanes	8.706	10.457	9.835
Heptanes Plus	33.515	55.335	46.582
	100.000	100.000	100.000

Physical Properties

	Total	C7+
Molecular Weight	71.314	117.749
BTU / Cu. Ft. @ 14.73 psia DRY	3927.0	6325.4
BTU / LB.	20847.0	20338.6
BTU / GAL.	108847.0	126192.2
Cu. Ft. Vapor per Gallon @ 14.73 psia	27.705	19.929
Pounds per Gallon (in Vacuum)	5.218	6.198
Pounds per Gallon (in Air)	5.213	6.191
Specific Gravity at 60°F	0.6259	0.7434
API Gravity at 60°F	94.57	58.83
Specific Gravity as a vapor	2.4620	4.0655

Hydrocarbon Laboratory Manager

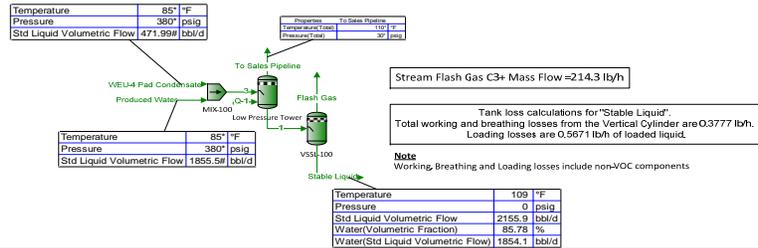
Quality Assurance:

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

Flowsheet1 Plant Schematic

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	
Flowsheet:	Flowsheet1	

EQT WEU-4 Well Pad
100% Contingency



* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	
Flowsheet:	Flowsheet1	

Connections

	Flash Gas	Produced Water	Stable Liquid	To Sales Pipeline	WEU-4 Pad Condensate
From Block	VSSL-100	--	VSSL-100	Low Pressure Tower	--
To Block	--	MIX-100	--	--	MIX-100

Stream Composition

Mole Fraction	Flash Gas %	Produced Water %	Stable Liquid %	To Sales Pipeline %	WEU-4 Pad Condensate %
Nitrogen	0	0 *	0	0	0 *
Methane	3.67014	0 *	0.000395942	30.5355	13.84 *
Carbon Dioxide	0.0591291	0 *	3.43293E-05	0.114019	0.056 *
Ethane	11.5753	0 *	0.00573072	23.8239	11.604 *
Propane	21.4215	0 *	0.0329321	18.8018	10.834 *
Isobutane	7.76886	0 *	0.0279424	4.31306	3.233 *
n-Butane	19.1741	0 *	0.095563	9.34361	8.093 *
Isopentane	8.42999	0 *	0.100556	3.28019	4.712 *
n-Pentane	8.37158	0 *	0.130104	3.12619	5.407 *
Isohexane	4.24178	0 *	0.149022	1.45558	4.842 *
n-Hexane	2.66216	0 *	0.125516	0.899797	3.864 *
Benzene	0.0973025	0 *	0.00484476	0.0330876	0.148 *
Cyclohexane	0.409259	0 *	0.0248483	0.13765	0.738 *
Heptane	2.39785	0 *	0.313717	0.798023	8.689 *
Toluene	0.143192	0 *	0.0222058	0.0474554	0.609 *
Octane	0.971272	0 *	0.362131	0.324472	9.628 *
Ethylbenzene	0.00703278	0 *	0.00305644	0.0023489	0.081 *
o-Xylene	0.0594208	0 *	0.0334287	0.0198933	0.882 *
Nonane	0.168977	0 *	0.174756	0.0565999	4.579 *
Decane	0.0691803	0 *	0.197469	0.0237683	5.147 *
C11	0.00619923	0 *	0.0527066	0.00216185	1.371 *
C12	0.00159868	0 *	0.0320814	0.000565368	0.834 *
C13	0.000158662	0 *	0.00981201	5.74621E-05	0.255 *
C14	0.000109838	0 *	0.0213192	4.06913E-05	0.554 *
Water	8.29397	100 *	98.0798	2.86025	0 *

Mass Fraction	Flash Gas %	Produced Water %	Stable Liquid %	To Sales Pipeline %	WEU-4 Pad Condensate %
Nitrogen	0	0 *	0	0	0 *
Methane	1.1061	0 *	0.000322842	13.2402	3.073 *
Carbon Dioxide	0.0488867	0 *	7.6789E-05	0.135627	0.0341107 *
Ethane	6.53873	0 *	0.00875823	19.3621	4.82929 *
Propane	17.7455	0 *	0.0738078	22.4086	6.61211 *
Isobutane	8.48286	0 *	0.0825457	6.7756	2.60078 *
n-Butane	20.9363	0 *	0.282306	14.6783	6.5104 *
Isopentane	11.4261	0 *	0.368745	6.39657	4.70533 *
n-Pentane	11.3469	0 *	0.477098	6.09627	5.39935 *
Isohexane	6.86711	0 *	0.652711	3.39032	5.77516 *
n-Hexane	4.30982	0 *	0.549757	2.09579	4.60868 *
Benzene	0.142785	0 *	0.0192343	0.0698557	0.160005 *
Cyclohexane	0.647059	0 *	0.106289	0.313111	0.859638 *
Heptane	4.51378	0 *	1.59772	2.16128	12.0504 *
Toluene	0.247858	0 *	0.103991	0.11818	0.77663 *
Octane	2.08429	0 *	2.10246	1.00178	15.2218 *
Ethylbenzene	0.0140266	0 *	0.0164925	0.00674008	0.119021 *
o-Xylene	0.118512	0 *	0.18038	0.0570833	1.296 *
Nonane	0.407141	0 *	1.13919	0.196205	8.12833 *
Decane	0.184916	0 *	1.42802	0.0914042	10.1358 *
C11	0.0182038	0 *	0.418731	0.0091333	2.96603 *
C12	0.00511573	0 *	0.277744	0.00260288	1.96619 *

* User Specified Values
 ? Extrapolated or Approximate Values

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Process Streams Report					
All Streams					
Tabulated by Total Phase					

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	
Flowsheet:	Flowsheet1	

Mass Fraction	Flash Gas %	Produced Water %	Stable Liquid %	To Sales Pipeline %	WEU-4 Pad Condensate %
C13	0.000549522	0 *	0.0919425	0.000286333	0.650678 *
C14	0.000409366	0 *	0.214968	0.000218191	1.52118 *
Water	2.80702	100 *	89.8067	1.39272	0 *

Mass Flow	Flash Gas lb/h	Produced Water lb/h	Stable Liquid lb/h	To Sales Pipeline lb/h	WEU-4 Pad Condensate lb/h
Nitrogen	0	0 *	0	0	0 *
Methane	2.64832	0 *	0.0972477	128.072	130.817 *
Carbon Dioxide	0.117048	0 *	0.0231306	1.31191	1.45209 *
Ethane	15.6555	0 *	2.63818	187.289	205.582 *
Propane	42.4875	0 *	22.2326	216.757	281.477 *
Isobutane	20.3103	0 *	24.8647	65.54	110.715 *
n-Butane	50.1273	0 *	85.0372	141.983	277.147 *
Isopentane	27.3573	0 *	111.075	61.8737	200.306 *
n-Pentane	27.1677	0 *	143.713	58.9689	229.85 *
Isohexane	16.4417	0 *	196.612	32.7943	245.848 *
n-Hexane	10.3189	0 *	165.6	20.2724	196.191 *
Benzene	0.341867	0 *	5.79383	0.675711	6.81141 *
Cyclohexane	1.54924	0 *	32.0167	3.0287	36.5947 *
Heptane	10.8072	0 *	481.272	20.9059	512.985 *
Toluene	0.593441	0 *	31.3245	1.14315	33.0611 *
Octane	4.99036	0 *	633.311	9.69016	647.991 *
Ethylbenzene	0.0335834	0 *	4.96792	0.0651964	5.0667 *
o-Xylene	0.28375	0 *	54.3348	0.552163	55.1707 *
Nonane	0.974807	0 *	343.149	1.89788	346.022 *
Decane	0.44274	0 *	430.154	0.884148	431.481 *
C11	0.0435849	0 *	126.132	0.0883459	126.264 *
C12	0.0122485	0 *	83.6631	0.0251775	83.7005 *
C13	0.00131571	0 *	27.6952	0.00276968	27.6993 *
C14	0.000980134	0 *	64.7535	0.00211055	64.7566 *
Water	6.72079	27072.1 *	27051.9	13.4717	0 *

Stream Properties						
--------------------------	--	--	--	--	--	--

Property	Units	Flash Gas	Produced Water	Stable Liquid	To Sales Pipeline	WEU-4 Pad Condensate
Temperature	°F	108.615	85 *	108.615	110 *	85 *
Pressure	psia	14.6959 *	394.696 *	14.6959	44.6959 *	394.696 *
Mole Fraction Vapor	%	100	0	0	100	6.42126
Mole Fraction Light Liquid	%	0	100	1.92024	0	93.5787
Mole Fraction Heavy Liquid	%	0	0	98.0798	0	0
Molecular Weight	lb/lbmol	53.2301	18.0153	19.6749	36.9982	72.251
Mass Density	lb/ft^3	0.130862	62.1448	59.0615	0.278794	27.4167
Molar Flow	lbmol/h	4.49797	1502.73	1531.01	26.1444	58.9194
Mass Flow	lb/h	239.428	27072.1	30122.3	967.294	4256.99
Vapor Volumetric Flow	ft^3/h	1829.62	435.629	510.016	3469.57	155.27
Liquid Volumetric Flow	gpm	228.109	54.3122	63.5865	432.569	19.3583
Std Vapor Volumetric Flow	MMSCFD	0.0409659	13.6863	13.9438	0.238113	0.536616
Std Liquid Volumetric Flow	sgpm	0.841337	54.119 *	62.8815	4.16262	13.7665 *
Compressibility		0.980194	0.019575	0.00080274	0.970236	0.177948
Specific Gravity		1.83789	0.996405	0.946969	1.27745	
API Gravity			9.96572	16.2585		
Enthalpy	Btu/h	-256794	-1.84433E+08	-1.86483E+08	-1.15263E+06	-4.29253E+06
Mass Enthalpy	Btu/lb	-1072.53	-6812.66	-6190.85	-1191.6	-1008.35
Mass Cp	Btu/(lb*°F)	0.422311	0.981553	0.935208	0.444787	0.535379
Ideal Gas CpCv Ratio		1.09766	1.32512	1.29244	1.13978	1.0736
Dynamic Viscosity	cP	0.008382	0.833673	0.600726	0.00957378	
Kinematic Viscosity	cSt	3.99866	0.837472	0.630715	2.14377	
Thermal Conductivity	Btu/(h*ft*°F)	0.0106756	0.353848	0.321483	0.0138943	

* User Specified Values
 ? Extrapolated or Approximate Values

Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Flash Gas	Produced Water	Stable Liquid	To Sales Pipeline	WEU-4 Pad Condensate
Surface Tension	lbf/ft		0.00492858	0.00425354 ?		
Net Ideal Gas Heating Value	Btu/ft ³	2678.12	0	101.646	1925.4	3700.05
Net Liquid Heating Value	Btu/lb	18910.6	-1059.76	992.607	19599.6	19280.3
Gross Ideal Gas Heating Value	Btu/ft ³	2906.45	50.31	158.889	2098.98	3998.81
Gross Liquid Heating Value	Btu/lb	20538.4	0	2096.7	21379.9	20849.4

Remarks

Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	
Flowsheet:	Flowsheet1	

Connections

	1	3			
From Block	Low Pressure Tower	MIX-100			
To Block	VSSL-100	Low Pressure Tower			

Stream Composition

Mole Fraction	1 %	3 %			
Nitrogen	0	0			
Methane	0.0111458	0.52217			
Carbon Dioxide	0.000207437	0.00211283			
Ethane	0.0396215	0.437808			
Propane	0.0955858	0.408756			
Isobutane	0.050618	0.121978			
n-Butane	0.15145	0.305341			
Isopentane	0.124956	0.177779			
n-Pentane	0.154246	0.204001			
Isohexane	0.161011	0.182684			
n-Hexane	0.132947	0.145785			
Benzene	0.0051156	0.00558389			
Cyclohexane	0.0259744	0.027844			
Heptane	0.319822	0.327827			
Toluene	0.0225602	0.022977			
Octane	0.363915	0.363255			
Ethylbenzene	0.00306809	0.00305605			
o-Xylene	0.0335049	0.033277			
Nonane	0.174739	0.172761			
Decane	0.197093	0.194191			
C11	0.0525704	0.0517265			
C12	0.0319921	0.031466			
C13	0.00978373	0.0096209			
C14	0.0212571	0.0209019			
Water	97.8168	96.2271			

Mass Fraction	1 %	3 %			
Nitrogen	0	0			
Methane	0.00904283	0.417559			
Carbon Dioxide	0.000461695	0.00463496			
Ethane	0.0602524	0.656203			
Propane	0.213163	0.898453			
Isobutane	0.148789	0.353394			
n-Butane	0.44518	0.884632			
Isopentane	0.455941	0.63936			
n-Pentane	0.562816	0.733663			
Isohexane	0.701717	0.784728			
n-Hexane	0.579408	0.626227			
Benzene	0.0202086	0.0217415			
Cyclohexane	0.110553	0.116807			
Heptane	1.62072	1.63741			
Toluene	0.105125	0.105528			
Octane	2.10232	2.06834			
Ethylbenzene	0.016473	0.0161725			
o-Xylene	0.179893	0.176101			
Nonane	1.13341	1.10448			
Decane	1.41822	1.37726			
C11	0.415573	0.403024			
C12	0.275594	0.267166			
C13	0.0912217	0.0884141			
C14	0.213276	0.206698			

* User Specified Values

? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	
Flowsheet:	Flowsheet1	

Mass Fraction	1 %	3 %			
Water	89.1206	86.412			

Mass Flow	1 lb/h	3 lb/h			
Nitrogen	0	0			
Methane	2.74556	130.817			
Carbon Dioxide	0.140179	1.45209			
Ethane	18.2937	205.582			
Propane	64.7202	281.477			
Isobutane	45.175	110.715			
n-Butane	135.164	277.147			
Isopentane	138.432	200.306			
n-Pentane	170.881	229.85			
Isohexane	213.054	245.848			
n-Hexane	175.918	196.191			
Benzene	6.1357	6.81141			
Cyclohexane	33.566	36.5947			
Heptane	492.079	512.985			
Toluene	31.9179	33.0611			
Octane	638.301	647.991			
Ethylbenzene	5.0015	5.0667			
o-Xylene	54.6185	55.1707			
Nonane	344.124	346.022			
Decane	430.597	431.481			
C11	126.175	126.264			
C12	83.6753	83.7005			
C13	27.6965	27.6993			
C14	64.7544	64.7566			
Water	27058.6	27072.1			

Stream Properties

Property	Units	1	3		
Temperature	°F	110	85.0917		
Pressure	psia	44.6959	394.696		
Mole Fraction Vapor	%	0	0.188433		
Mole Fraction Light Liquid	%	2.17967	3.53245		
Mole Fraction Heavy Liquid	%	97.8203	96.2791		
Molecular Weight	lb/lbmol	19.7732	20.0615		
Mass Density	lb/ft ³	58.7428	53.9837		
Molar Flow	lbmol/h	1535.5	1561.65		
Mass Flow	lb/h	30361.8	31329.1		
Vapor Volumetric Flow	ft ³ /h	516.859	580.343		
Liquid Volumetric Flow	gpm	64.4396	72.3544		
Std Vapor Volumetric Flow	MMSCFD	13.9848	14.2229		
Std Liquid Volumetric Flow	sgpm	63.7229	67.8855		
Compressibility		0.00246095	0.0250896		
Specific Gravity		0.941859			
API Gravity		16.9512			
Enthalpy	Btu/h	-1.8674E+08	-1.88725E+08		
Mass Enthalpy	Btu/lb	-6150.48	-6023.97		
Mass Cp	Btu/(lb*°F)	0.932626	0.92157		
Ideal Gas CpCv Ratio		1.29061	1.28798		
Dynamic Viscosity	cP	0.584524			
Kinematic Viscosity	cSt	0.6148			
Thermal Conductivity	Btu/(h*ft*°F)	0.318476			
Surface Tension	lbf/ft	0.00419673	?		
Net Ideal Gas Heating Value	Btu/ft ³	109.193	139.599		
Net Liquid Heating Value	Btu/lb	1133.91	1704.04		
Gross Ideal Gas Heating Value	Btu/ft ³	166.937	199.283		
Gross Liquid Heating Value	Btu/lb	2242.13	2833.01		

* User Specified Values

? Extrapolated or Approximate Values

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Process Streams Report		
All Streams		
Tabulated by Total Phase		
Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	
Flowsheet:	Flowsheet1	
Remarks		

Energy Stream Report	
Client Name:	EQT
Location:	WEU-4 100% Contingency
Flowsheet:	Flowsheet1
Energy Streams	
Energy Stream	Energy Rate
Q-1	833267 Btu/h
	327.486 hp
	--
	Low Pressure Tower
Remarks	

Blocks
Low Pressure Tower
 Separator Report

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	Modified: 9:42 AM, 1/21/2016
Flowsheet:	Flowsheet1	Status: Solved 9:39 AM, 2/24/2016

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
3	Inlet	MIX-100	To Sales Pipeline	Vapor Outlet	
1	Light Liquid Outlet	VSSL-100	Q-1	Energy	

Block Parameters

Pressure Drop	350	psi	Main Liquid Phase	Light Liquid
Mole Fraction Vapor	1.67415	%	Heat Duty	833267 Btu/h
Mole Fraction Light Liquid	2.14318	%	Heat Release Curve Type	Plug Flow
Mole Fraction Heavy Liquid	96.1827	%	Heat Release Curve Increments	5

Remarks

	Blocks MIX-100 Mixer/Splitter Report	
--	--	--

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	Modified: 2:14 PM, 7/24/2014
Flowsheet:	Flowsheet1	Status: Solved 9:39 AM, 2/24/2016

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

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Water	Inlet		WEU-4 Pad Condensate	Inlet	
3	Outlet	Low Pressure Tower			

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

Pressure Drop	0 psi	Fraction to PStream 3	100 %
---------------	-------	-----------------------	-------

Remarks

Blocks					
VSSL-100					
Separator Report					
Client Name:	EQT			Job: Low Pressure Tower	
Location:	WEU-4 100% Contingency			Modified: 12:29 PM, 12/3/2015	
Flowsheet:	Flowsheet1			Status: Solved 9:39 AM, 2/24/2016	
Connections					
Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
1	Inlet	Low Pressure Tower	Flash Gas	Vapor Outlet	
Stable Liquid	Light Liquid Outlet				
Block Parameters					
Pressure Drop	30	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0.292931	%	Heat Duty	0	Btu/h
Mole Fraction Light Liquid	1.91462	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	97.7925	%	Heat Release Curve Increments	5	
Remarks					

Flowsheet Environment Environment1					
Client Name:	EQT			Job: Low Pressure Tower	
Location:	WEU-4 100% Contingency				
Flowsheet:	Flowsheet1				
Environment Settings					
Number of Poynting Intervals	0	Freeze Out Temperature Threshold Difference	10 °F		
Gibbs Excess Model Evaluation Temperature	77 °F	Phase Tolerance	1 %		
Components					
Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Nitrogen	False	False	Heptane	False	False
Methane	False	False	Toluene	False	False
Carbon Dioxide	False	False	Octane	False	False
Ethane	False	False	Ethylbenzene	False	False
Propane	False	False	o-Xylene	False	False
Isobutane	False	False	Nonane	False	False
n-Butane	False	False	Decane	False	False
Isopentane	False	False	C11	False	False
n-Pentane	False	False	C12	False	False
Isohexane	False	False	C13	False	False
n-Hexane	False	False	C14	False	False
Benzene	False	False	Water	False	True
Cyclohexane	False	False			
Physical Property Method Sets					
Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson		
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson		
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson		
Remarks					

Calculator Report

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	

Simple Solver 1

Source Code

Residual Error (for CV1) = TP / 786913 - 1

Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!WEU-4 Pad Condensate!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	471.993
Unit	bb/d

Measured Variable [TP]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Stable Liquid!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	786918
Unit	bb/yr

Solver Properties

Status: Solved

Error	5.93104E-06	Iterations	7
Calculated Value	13.7665 sgpm	Max Iterations	20
Lower Bound	sgpm	Weighting	1
Upper Bound	sgpm	Priority	0
Step Size	sgpm	Solver Active	Active
Is Minimizer	False	Group	
Algorithm	Default	Skip Dependency Check	False

Remarks

Simple Solver 2

Source Code

Residual Error (for CV1) = LF / 86 - 1

Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Water!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	1855.51
Unit	bb/d

Measured Variable [LF]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Stable Liquid!Phases!Total!Composition!Std. Liquid Volumetric Fraction!Water
Value	86.0009
Unit	%

Solver Properties

Status: Solved

Error	9.89538E-06	Iterations	7
Calculated Value	54.119 sgpm	Max Iterations	20
Lower Bound	sgpm	Weighting	1
Upper Bound	sgpm	Priority	0
Step Size	sgpm	Solver Active	Active
Is Minimizer	False	Group	
Algorithm	Default	Skip Dependency Check	False

Remarks

User Value Sets Report

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	

Cn+ Flow/Frac.

User Value [CnPlusSum]

* Parameter	214.286 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

Remarks

This User Value Set was programmatically generated. GUID={E867C485-3D3C-49CB-BC24-EA16096DB2B1}

Tank Losses

User Value [ShellLength]

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

User Value [ShellDiam]

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

User Value [BreatherVP]

* Parameter	0.03 psig	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [BreatherVacP]

* Parameter	-0.03 psig	Upper Bound	
Lower Bound		* 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	
Lower Bound		* 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	2152.8 bbl/day	Upper Bound	
* Lower Bound	0 bbl/day	* Enforce Bounds	False

User Value [OREff]

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

User Value [AtmPressure]

* Parameter	14.1085 psia	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value Sets Report

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU-4 100% Contingency	

User Value [TVP]

* Parameter	0.35501 psia	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

* Parameter	57.7675 °F	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [MaxLiqSurfaceT]

* Parameter	66.3119 °F	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [TotalLosses]

* Parameter	0.377744 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	0.11352 ton/yr	Upper Bound	
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	0.024357 ton/yr	Upper Bound	
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]

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

User Value [WithdrawalLoss]

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

User Value [LoadingLosses]

* Parameter	0.567094 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

User Value [DeckFittingLosses]

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

User Value [DeckSeamLosses]

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

User Value [FlashingLosses]

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

User Value [GasMoleWeight]

* Parameter	0.0293467 kg/mol	Upper Bound	
Lower Bound		* Enforce Bounds	False

Remarks

This User Value Set was programmatically generated. GUID={B57AFC7E-AAE8-4873-921B-7B4031991004}

Flowsheet1 Plant Schematic

Client Name:	EQT	Job: Blowdown Tank
Location:	WEU-4 Well Pad	
Flowsheet:	Flowsheet1	

EQT WEU-4 Well Pad
Blowdown Tank

Temperature	85°	°F
Pressure	380°	psig
Std Liquid Volumetric Flow	471.99°	bbbl/d

WEU-4 Pad Condensate
Produced Water
MIX-100

Temperature	85°	°F
Pressure	380°	psig
Std Liquid Volumetric Flow	1855.5°	bbbl/d

Stream 4 C3+ Mass Flow =910 lb/h

VSS-100

Temperature	79.3	°F
Pressure	0	psig
Std Liquid Volumetric Flow	89.608	bbbl/hr
Water(Volumetric Fraction)	86.192	%

Tank loss calculations for "5".
Total working and breathing losses from the Horizontal Cylinder are 0.009659 lb/h.
Loading losses are 0.005861 lb/h of loaded liquid.

Note
Working, Breathing and Loading losses include non-VOC components

Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	EQT	Job: Blowdown Tank
Location:	WEU-4 Well Pad	
Flowsheet:	Flowsheet1	

Connections

	Produced Water	WEU-4 Pad Condensate	3	4	5
From Block	--	--	MIX-100	VSSL-100	VSSL-100
To Block	MIX-100	MIX-100	VSSL-100	--	--

Stream Composition

	Produced Water %	WEU-4 Pad Condensate %	3 %	4 %	5 %
Nitrogen	0 *	0 *	0	0	0
Methane	0 *	13.84 *	0.522169	26.0064	0.00304729
Carbon Dioxide	0 *	0.056 *	0.00211282	0.102139	7.52549E-05
Ethane	0 *	11.604 *	0.437807	21.2937	0.012967
Propane	0 *	10.834 *	0.408756	18.5595	0.0390196
Isobutane	0 *	3.233 *	0.121978	4.85037	0.0256591
n-Butane	0 *	8.093 *	0.30534	11.1573	0.0842828
Isopentane	0 *	4.712 *	0.177779	4.54931	0.0887296
n-Pentane	0 *	5.407 *	0.204	4.47274	0.117045
Isohexane	0 *	4.842 *	0.182684	2.22234	0.141135
n-Hexane	0 *	3.864 *	0.145785	1.37291	0.120788
Benzene	0 *	0.148 *	0.00558389	0.0508012	0.0046628
Cyclohexane	0 *	0.738 *	0.027844	0.211402	0.0241048
Heptane	0 *	8.689 *	0.327827	1.15957	0.310884
Toluene	0 *	0.609 *	0.0229769	0.0696893	0.0220254
Octane	0 *	9.628 *	0.363254	0.429668	0.361902
Ethylbenzene	0 *	0.081 *	0.00305605	0.0031246	0.00305465
o-Xylene	0 *	0.882 *	0.0332769	0.0257698	0.0334299
Nonane	0 *	4.579 *	0.172761	0.0680628	0.174894
Decane	0 *	5.147 *	0.194191	0.0253729	0.19763
C11	0 *	1.371 *	0.0517264	0.00205531	0.0527382
C12	0 *	0.834 *	0.031466	0.000492283	0.0320969
C13	0 *	0.255 *	0.00962089	4.35145E-05	0.00981598
C14	0 *	0.554 *	0.0209018	2.68781E-05	0.0213271
Water	100 *	0 *	96.2271	3.36716	98.1187

	Produced Water %	WEU-4 Pad Condensate %	3 %	4 %	5 %
Nitrogen	0 *	0 *	0	0	0
Methane	0 *	3.073 *	0.417559	10.3232	0.00248822
Carbon Dioxide	0 *	0.0341107 *	0.00463495	0.111224	0.000168572
Ethane	0 *	4.82929 *	0.656203	15.8428	0.0198456
Propane	0 *	6.61211 *	0.898452	20.2499	0.0875756
Isobutane	0 *	2.60078 *	0.353393	6.97554	0.0759081
n-Butane	0 *	6.5104 *	0.884631	16.0458	0.249337
Isopentane	0 *	4.70533 *	0.639359	8.12149	0.325839
n-Pentane	0 *	5.39935 *	0.733662	7.98478	0.429821
Isohexane	0 *	5.77516 *	0.784727	4.73865	0.619047
n-Hexane	0 *	4.60868 *	0.626226	2.92743	0.529799
Benzene	0 *	0.160005 *	0.0217415	0.0981866	0.0185382
Cyclohexane	0 *	0.859638 *	0.116807	0.440224	0.103255
Heptane	0 *	12.0504 *	1.63741	2.87497	1.58555
Toluene	0 *	0.77663 *	0.105528	0.158879	0.103293
Octane	0 *	15.2218 *	2.06834	1.21442	2.10412
Ethylbenzene	0 *	0.119021 *	0.0161725	0.00820798	0.0165062
o-Xylene	0 *	1.296 *	0.176101	0.0676944	0.180643
Nonane	0 *	8.12833 *	1.10448	0.215996	1.1417
Decane	0 *	10.1358 *	1.37725	0.0893263	1.43122
C11	0 *	2.96603 *	0.403023	0.00794915	0.419578
C12	0 *	1.96619 *	0.267165	0.00207482	0.278273
C13	0 *	0.650678 *	0.088414	0.000198502	0.0921104

* User Specified Values
 ? Extrapolated or Approximate Values

ProMax 3.2.12198.0
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Process Streams Report All Streams Tabulated by Total Phase

Client Name:	EQT	Job: Blowdown Tank
Location:	WEU-4 Well Pad	
Flowsheet:	Flowsheet1	

	Produced Water %	WEU-4 Pad Condensate %	3 %	4 %	5 %
Mass Fraction					
C14	0 *	1.52118 *	0.206698	0.000131939	0.215353
Water	100 *	0 *	86.412	1.50095	89.97

	Produced Water lb/h	WEU-4 Pad Condensate lb/h	3 lb/h	4 lb/h	5 lb/h
Mass Flow					
Nitrogen	0 *	0 *	0	0	0
Methane	0 *	130.817 *	130.817	130.068	0.748182
Carbon Dioxide	0 *	1.45208 *	1.45208	1.40139	0.0506879
Ethane	0 *	205.581 *	205.581	199.614	5.96736
Propane	0 *	281.475 *	281.475	255.142	26.333
Isobutane	0 *	110.714 *	110.714	87.8895	22.8248
n-Butane	0 *	277.145 *	277.145	202.172	74.9728
Isopentane	0 *	200.304 *	200.304	102.328	97.9761
n-Pentane	0 *	229.848 *	229.848	100.606	129.243
Isohexane	0 *	245.846 *	245.846	59.7054	186.141
n-Hexane	0 *	196.19 *	196.19	36.8846	159.305
Benzene	0 *	6.81137 *	6.81137	1.23712	5.57425
Cyclohexane	0 *	36.5944 *	36.5944	5.54667	31.0478
Heptane	0 *	512.981 *	512.981	36.2236	476.758
Toluene	0 *	33.0608 *	33.0608	2.00183	31.059
Octane	0 *	647.987 *	647.987	15.3013	632.686
Ethylbenzene	0 *	5.06666 *	5.06666	0.103418	4.96325
o-Xylene	0 *	55.1703 *	55.1703	0.852927	54.3174
Nonane	0 *	346.02 *	346.02	2.72147	343.298
Decane	0 *	431.478 *	431.478	1.12548	430.353
C11	0 *	126.263 *	126.263	0.100157	126.163
C12	0 *	83.6999 *	83.6999	0.026142	83.6738
C13	0 *	27.6991 *	27.6991	0.00250106	27.6966
C14	0 *	64.7561 *	64.7561	0.00166239	64.7545
Water	27071.9 *	0 *	27071.9	18.9115	27053

Stream Properties

Property	Units	Produced Water	WEU-4 Pad Condensate	3	4	5
Temperature	°F	85 *	85 *	85.0917	79.2662	79.2662
Pressure	psia	394.696 *	394.696 *	394.696	14.6959 *	14.6959
Mole Fraction Vapor	%	0	6.42126	0.188433	100	0
Mole Fraction Light Liquid	%	100	93.5787	3.53245	0	1.87959
Mole Fraction Heavy Liquid	%	0	0	96.2791	0	98.1204
Molecular Weight	lb/lbmol	18.0153	72.251	20.0615	40.4147	19.6469
Mass Density	lb/ft^3	62.1448	27.4167	53.9837	0.10409	59.5747
Molar Flow	lbmol/h	1502.72	58.919	1561.64	31.176	1530.46
Mass Flow	lb/h	27071.9	4256.96	31328.9	1259.97	30068.9
Vapor Volumetric Flow	ft^3/h	435.627	155.269	580.339	12104.6	504.726
Liquid Volumetric Flow	gpm	54.3119	19.3582	72.354	1509.15	62.9269
Std Vapor Volumetric Flow	MMSCFD	13.6862	0.536613	14.2228	0.283939	13.9389
Std Liquid Volumetric Flow	sgpm	54.1188 *	13.7664 *	67.8851	5.15969	62.7254
Compressibility		0.019575	0.177948	0.0250896	0.986571	0.00083792
Specific Gravity		0.996405			1.39541	0.955197
API Gravity		9.96572				16.0576
Enthalpy	Btu/h	-1.84432E+08	-4.2925E+06	-1.88724E+08	-1.46112E+06	-1.87263E+08
Mass Enthalpy	Btu/lb	-6812.66	-1008.35	-6023.97	-1159.65	-6227.8
Mass Cp	Btu/(lb*°F)	0.981553	0.535379	0.92157	0.418772	0.93451
Ideal Gas CpCv Ratio		1.32512	1.0736	1.28798	1.13392	1.29553
Dynamic Viscosity	cP	0.833673			0.00877488	0.825917
Kinematic Viscosity	cSt	0.837472			5.26276	0.85576
Thermal Conductivity	Btu/(h*ft*°F)	0.353848			0.0120335	0.312661
Surface Tension	lbf/ft	0.00492858				0.00447425 ?

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	EQT	Job: Blowdown Tank
Location:	WEU-4 Well Pad	
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Produced Water	WEU-4 Pad Condensate	3	4	5
Net Ideal Gas Heating Value	Btu/ft ³	0	3700.05	139.599	2090.15	99.8658
Net Liquid Heating Value	Btu/lb	-1059.76	19280.3	1704.04	19471.2	959.546
Gross Ideal Gas Heating Value	Btu/ft ³	50.31	3998.81	199.283	2275.6	156.987
Gross Liquid Heating Value	Btu/lb	0	20849.4	2833.01	21212.6	2062.86

Remarks

Blocks					
MIX-100					
Mixer/Splitter Report					
Client Name:	EQT			Job: Blowdown Tank	
Location:	WEU-4 Well Pad			Modified: 2:14 PM, 7/24/2014	
Flowsheet:	Flowsheet1			Status: Solved 9:46 AM, 2/24/2016	
Connections					
Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Water	Inlet		WEU-4 Pad Condensate	Inlet	
3	Outlet	VSSL-100			
Block Parameters					
Pressure Drop		0 psi	Fraction to PStream 3		100 %
Remarks					

Blocks
VSSL-100
Separator Report

Client Name:	EQT	Job: Blowdown Tank
Location:	WEU-4 Well Pad	Modified: 1:11 PM, 7/17/2014
Flowsheet:	Flowsheet1	Status: Solved 9:46 AM, 2/24/2016

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
3	Inlet	MIX-100	4	Vapor Outlet	
5	Light Liquid Outlet				

Block Parameters

Pressure Drop	380 psi	Main Liquid Phase	Light Liquid
Mole Fraction Vapor	1.99636 %	Heat Duty	0 Btu/h
Mole Fraction Light Liquid	1.84206 %	Heat Release Curve Type	Plug Flow
Mole Fraction Heavy Liquid	96.1616 %	Heat Release Curve Increments	5

Remarks

Flowsheet Environment Environment1					
Client Name:	EQT			Job: Blowdown Tank	
Location:	WEU-4 Well Pad				
Flowsheet:	Flowsheet1				
Environment Settings					
Number of Poynting Intervals	0		Freeze Out Temperature Threshold Difference	10 °F	
Gibbs Excess Model Evaluation Temperature	77 °F		Phase Tolerance	1 %	
Components					
Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Nitrogen	False	False	Heptane	False	False
Methane	False	False	Toluene	False	False
Carbon Dioxide	False	False	Octane	False	False
Ethane	False	False	Ethylbenzene	False	False
Propane	False	False	o-Xylene	False	False
Isobutane	False	False	Nonane	False	False
n-Butane	False	False	Decane	False	False
Isopentane	False	False	C11	False	False
n-Pentane	False	False	C12	False	False
Isohexane	False	False	C13	False	False
n-Hexane	False	False	C14	False	False
Benzene	False	False	Water	False	True
Cyclohexane	False	False			
Physical Property Method Sets					
Liquid Molar Volume	COSTALD		Overall Package	Peng-Robinson	
Stability Calculation	Peng-Robinson		Vapor Package	Peng-Robinson	
Light Liquid Package	Peng-Robinson		Heavy Liquid Package	Peng-Robinson	
Remarks					

User Value Sets Report

Client Name:	EQT	Job: Blowdown Tank
Location:	WEU-4 Well Pad	

Cn+ Flow/Frac.

User Value [CnPlusSum]

* Parameter	909.972 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

Remarks

This User Value Set was programmatically generated. GUID={E867C485-3D3C-49CB-BC24-EA16096DB2B1}

Tank Losses

User Value [ShellLength]

* Parameter	10 ft	Upper Bound	
* Lower Bound	0 ft	* Enforce Bounds	False

User Value [ShellDiam]

* Parameter	10 ft	Upper Bound	
* Lower Bound	0 ft	* Enforce Bounds	False

User Value [BreatherVP]

* Parameter	0.03 psig	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [BreatherVacP]

* Parameter	-0.03 psig	Upper Bound	
Lower Bound		* 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	
Lower Bound		* 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	19.8551 bbl/day	Upper Bound	
* Lower Bound	0 bbl/day	* Enforce Bounds	False

User Value [OREff]

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

User Value [AtmPressure]

* Parameter	14.1085 psia	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value Sets Report

Client Name:	EQT	Job: Blowdown Tank
Location:	WEU-4 Well Pad	

User Value [TVP]

* Parameter	0.408512 psia	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

* Parameter	57.7675 °F	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [MaxLiqSurfaceT]

* Parameter	66.3119 °F	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [TotalLosses]

* Parameter	0.00965878 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	0.0211527 ton/yr	Upper Bound	
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

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

User Value [RimSealLosses]

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

User Value [WithdrawalLoss]

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

User Value [LoadingLosses]

* Parameter	0.00586115 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

User Value [DeckFittingLosses]

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

User Value [DeckSeamLosses]

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

User Value [FlashingLosses]

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

User Value [GasMoleWeight]

* Parameter	0.0285797 kg/mol	Upper Bound	
Lower Bound		* Enforce Bounds	False

Remarks

This User Value Set was programmatically generated. GUID={B57AFC7E-AAE8-4873-921B-7B4031991004}

Attachment T

FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

ATTACHMENT T – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

Emission Point ID#	NO _x		CO		VOC		SO ₂		PM ₁₀		PM _{2.5}		GHG (CO ₂ e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Line Heater (S001)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S002)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S003)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S004)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S005)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S006)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S007)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S008)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S009)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S010)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S011)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S012)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
Line Heater (S013)	0.12	0.53	0.10	0.45	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.01	180.33	789.85
TEG (S014)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	52	6.67
TEG (S015)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.52	6.67
TEG (S016)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.52	6.67
Line Heater (S017)	0.09	0.40	0.08	0.34	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	134.66	589.82
Compressor Engine (S018)	0.42	1.85	0.88	3.85	0.29	1.29	<0.01	<0.01	<0.01	0.01	<0.01	0.01	82.58	361.69
Enclosed Combustion Unit (C034)	1.53	6.68	1.28	5.61	22.49	22.12	<0.01	0.04	0.03	0.13	0.03	0.13	6,564.93	28,481.42
Tank Truck Loading Activities (E035)	--	--	--	--	0.09	0.39	--	--	--	--	--	--	0.02	0.08
TOTAL	3.62	15.88	3.57	15.63	22.87	24.20	<0.01	0.04	0.03	0.27	0.03	0.27	9,131.06	39,721.06

ATTACHMENT T – FACILITY-WIDE HAP CONTROLLED EMISSIONS SUMMARY SHEET

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Line Heater (S001)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S002)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S003)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S004)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S005)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S006)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S007)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S008)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S009)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S010)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S011)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S012)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Line Heater (S013)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
TEG (S014)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TEG (S015)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TEG (S016)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (S017)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Compressor Engine (S018)	0.01	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.07
Enclosed Combustion Unit (C034)	<0.01	<0.01	0.07	0.16	0.03	0.06	<0.01	<0.01	0.01	0.02	0.94	1.04	1.05	1.17
Tank Truck Loading Activities (E035)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TOTAL	0.01	0.06	0.07	0.16	0.03	0.06	<0.01	<0.01	0.01	0.02	0.94	1.04	1.07	1.37

Attachment U

CLASS I LEGAL ADVERTISEMENT

AIR QUALITY PERMIT NOTICE

Notice of Application

Notice is given that EQT Production Company has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-B General Permit Registration for the WEU-4 natural gas production facility located in Shirley, Tyler County, West Virginia. The latitude and longitude coordinates are: 39.36648 and -80.82080.

The applicant estimates the increased potential to discharge the following regulated air pollutants on a facility-wide basis will be:

Carbon Monoxide (CO) = 15.63 tpy
Nitrogen Oxides (NO_x) = 15.88 tpy
Particulate Matter (PM) = 36.51 tpy
Sulfur Dioxide (SO₂) = 0.04 tpy
Volatile Organic Compounds (VOC) = 26.25 tpy
Formaldehyde = 0.06 tpy
Hexane = 1.04 tpy
Benzene = 0.16 tpy
Toluene = 0.06 tpy
Xylene = 0.02 tpy
Hazardous Air Pollutants (HAPs) = 2.61 tpy
Carbon Dioxide Equivalents (CO₂e) = 39,799.44 tpy

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

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

Dated this the XXth day of March, 2016.

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