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

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

Alex Bosiljevac
Environmental Coordinator

April 26, 2016

CERTIFIED MAIL # 7015 1660 0000 9399 6123

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

RE: G70B Permit Application
EQT Production Company
WEU-49 Natural Gas Production Site
Facility ID No. 017-00150

Dear Mr. Durham,

Enclosed are two electronic copies and one original hard copy of a proposed application for a G70-B General Air Permit for the WEU-49 Natural Gas Production Well Site. The site currently operates under a G70-A General Air Permit (G70-A151). Please note that this application satisfies a requirement in Consent Order CO-R13-E-2016-04, in which EQT Production Company is required to submit an application with the equipment specified in the consent order. A legal advertisement will be published in the next few days and proof of publication will be forwarded as soon as it is received. Please contact me for payment of the application fee by credit card.

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

Sincerely,

Alex Bosiljevac
EQT Corporation

Enclosures

EQT Production Company

G70-B General Permit Registration Application

WEU-49 Natural Gas Production Site

West Union, West Virginia

Prepared By:

ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.
Hurricane, West Virginia

April 2016

INTRODUCTION

EQT Production Company (EQT) is submitting this G70-B General Permit Registration to the WVDEP's Department of Air Quality to receive the authority to operate new units at the WEU-49 facility, currently permitted under G70-A151. The site is located in Doddridge County, West Virginia. This application addresses the operational activities associated with the production of natural gas and condensates at the WEU-49 facility.

FACILITY DESCRIPTION

The EQT WEU-49 natural gas production site operates in Doddridge County, WV and consists of seven (7) permitted natural gas wells. Six (6) wells are in operation and one (1) future well is planned. Natural gas and liquids (including water and condensates) are 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 are stored in storage vessels.

The applicant is currently authorized to operate the following:

- Seven (7) permitted natural gas wells (Six (6) wells are currently operating, one (1) well planned);
- Seven (7) line heaters each rated at 1.00 MMBtu/hr heat input;
- One (1) 140 bbl sand trap blowdown tank for storage of condensate and water;
- Eight (8) 400 barrel (bbl) tanks for storage of produced condensate and water;
- Two (2) thermoelectric generator (TEG) each rated at 0.013 mmBtu/hr heat input; and
- Two (2) enclosed combustion devices each with a capacity of 11.66 MMBtu/hr heat input.

The applicant seeks to authorize the operation of:

- One (1) 110 hp natural gas compressor engine;
- One (1) line heater rated at 0.75 MMBtu/hr heat input; and
- Seven (7) line heaters with the increased heat input rating from 1.0 MMBtu/hr to 1.5 MMBtu/hr.

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

STATEMENT OF AGGREGATION

The WEU-49 pad will be located in Doddridge 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-49 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-49 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-49 pad does share the same SIC codes as the surrounding wells and compressor stations.

EQT Production Company is the sole operator of the WEU-49 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.

The closest EQT owned or operated site is the WEU-1 production site located 0.85 miles (4,400 ft.) northeast of the WEU-49 pad. These facilities 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-49 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-49 and WEU-1 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. Therefore, due to the extended proximity, these facilities are not adjacent properties.

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-49 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-49 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-49 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-49 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

ρNG = 0.042 lb/scf – Density of NG from EPA AP42 – Sections 1.4 and 3.2 (NG combustion)

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

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

F = 5.43 * (0.12 tons per hour)

F = 0.67 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-49 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-49 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-49 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 (NOx), 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 lean burn (4SLB) 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 - NOx, 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 (SO_2) 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-49 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-49 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 lean burn (4SLB) 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.

west virginia department of environmental protection

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

G70-B GENERAL PERMIT REGISTRATION APPLICATION

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

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

SECTION 1. GENERAL INFORMATION

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

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

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

City: **Pittsburgh** | State: **PA** | ZIP Code: **15222**

Facility Name: **WEU-49 Natural Gas Production Facility**

Operating Site Physical Address: **None**
If none available, list road, city or town and zip of facility: **Left Fork Run Road, West Union, WV 26456**

City: **West Union, WV** | Zip Code: **26456** | County: **Doddridge**

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: **39.25473**
Longitude: **-80.78660**

SIC Code: **1311**
NAICS Code: **211111**
DAQ Facility ID No. (For existing facilities): **017-00150**

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@eqt.com** Date: 4-26-2016

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@eqt.com** Date:

OPERATING SITE INFORMATION	
Briefly describe the proposed new operation and/or any change(s) to the facility: **EQT proposes the addition of one (1) 0.75 MMBtu/hr line heater and one (1) low pressure separator to regulate flashing emissions from produced fluids originating from the seven (7) phase separators. The low pressure separator will be installed between the phase separators and produced fluid tanks. A natural gas compressor engine will be installed to compress the natural gas recovered from the low pressure separator and directed to the sales pipeline.**	
Directions to the facility: **From West Union take WV-18S and then turn right to take US-50 W. Follow US-50 W for 2.6 miles, before turning left onto Arnolds Creek Road/Central Station Road/Right Fork Run Road. Continue 0.7 miles, before turning left onto Left Fork Run Road. Travel for 2.1 miles, and turn onto an unnamed access road on the left. The WEU-49 natural gas production site is located alongside this access road.**	
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	
☐ Siting Criteria Waiver (if applicable) – Attachment B	☒ Current Business Certificate – Attachment C
☒ Process Flow Diagram – Attachment D	☒ Process Description – Attachment E
☒ Plot Plan – Attachment F	☒ Area Map – Attachment G
☒ G70-B Section Applicability Form – Attachment H	☒ 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.

Table of Contents

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 **X** 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 A - SINGLE SOURCE DETERMINATION FORM

Answer each question with a detailed explanation to determine contiguous or adjacent properties which are under a common control and any support facilities. This section must be completed in its entirety.

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

Are the facilities owned by the same parent company or a subsidiary of the parent company? Provide the owners identity and the percentage of ownership of each facility.	Yes ☒	No ☐
Does an entity such as a corporation have decision making authority over the operation of a second entity through a contractual agreement or voting interest? Please explain.	Yes ☒	No ☐
Is there a contract for service relationship between the two (2) companies or, a support/dependency relationship that exists between the two (2) companies? Please explain.	Yes ☐	No ☒
Do the facilities share common workforces, plant managers, security forces, corporate executive officers or board executives?	Yes ☒	No ☐
Will managers or other workers frequently shuttle back and forth to be involved actively at both facilities? Manager and other workers will shuttle between WEU-49 and WEU-1.	Yes ☒	No ☐
Do the facilities share common payroll activities, employee benefits, health plans, retirement funds, insurance coverage, or other administrative functions? Please explain.	Yes ☒	No ☐
Does one (1) facility operation support the operation of the other facility?	Yes ☐	No ☒
Is one (1) facility dependent on the other? If one (1) facility shuts down, what are the limitations on the other to pursue outside business? Please explain.	Yes ☐	No ☒
Are there any financial arrangements between the two (2) entities?	Yes ☐	No ☒
Are there any legal or lease agreements between the two (2) facilities?	Yes ☐	No ☒
Do the facilities share products, byproducts, equipment, or other manufacturing or air pollution control device equipment? Please explain.	Yes ☐	No ☒
Do all the pollutant-emitting activities at the facilities belong to the same SIC Code? Please provide the SIC Codes. **1311**	Yes ☒	No ☐
Was the location of the new facility chosen primarily because of its proximity to the existing facility to integrate the operation of the two (2) facilities? Please explain.	Yes ☐	No ☒
Will materials be routinely transferred between the two (2) facilities? Please explain the amount of transfer and how often the transfers take place and what percentages go to the various entities.	Yes ☐	No ☒
Does the facility influence production levels or compliance with environmental regulations at other facilities? Who accepts the responsibility for compliance with air quality requirements? Please explain.	Yes ☐	No ☒

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.

atL006 v.3
L0553297664

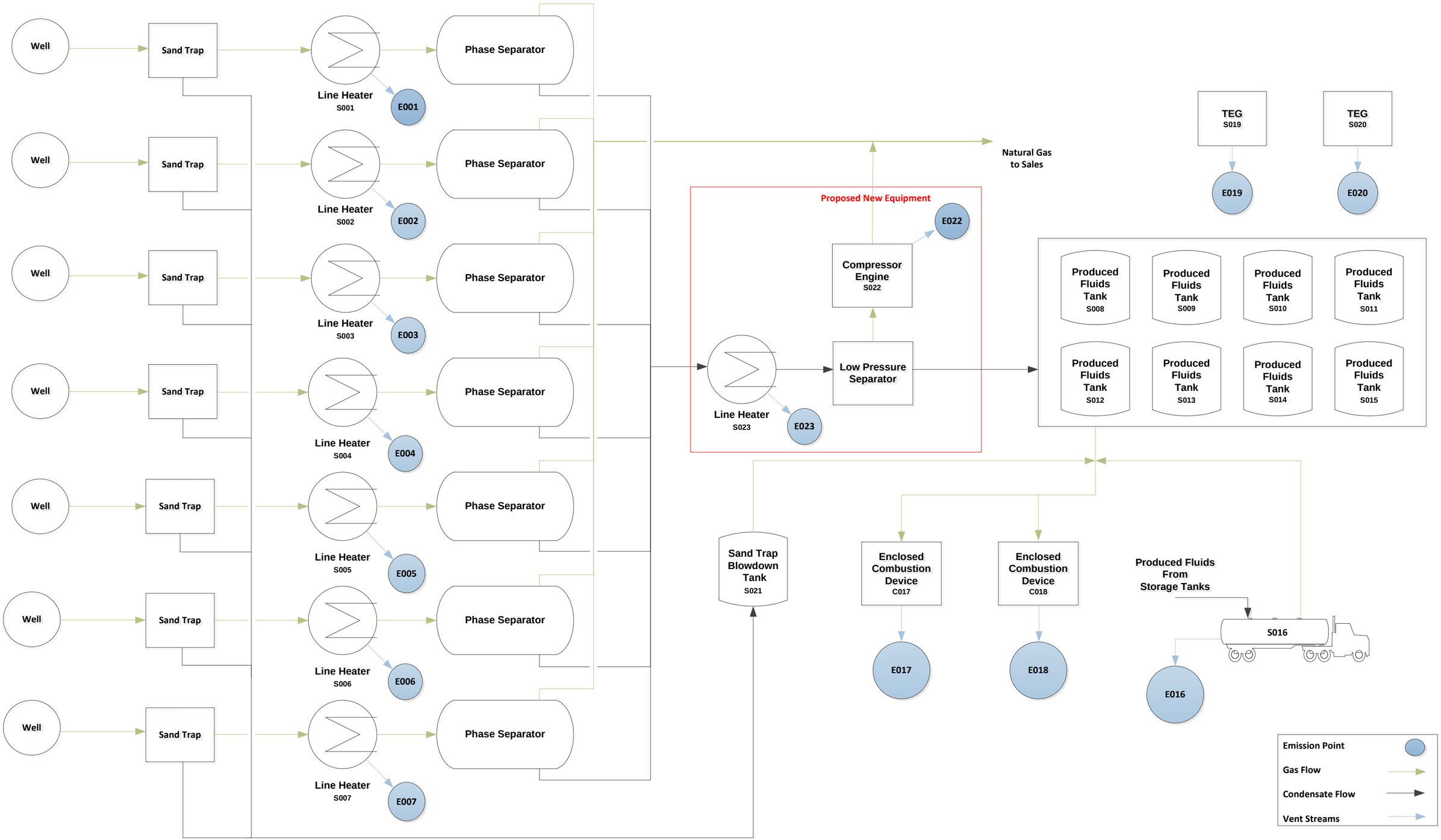
Attachment D

PROCESS FLOW DIAGRAM

Attachment D

WEU 49 Natural Gas Production

Process Flow Diagram



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-49 natural gas production site. Incoming raw natural gas from the seven (7) wells enters the site through a pipeline. The raw gas is first routed through the sand traps to remove sediment. Fluids from these sand traps are manually blowdown to the sand trap blowdown tank (S021), as needed. From the sand traps, raw gas is routed through line heaters (S001-S007) to assist with the phase separation process in the downstream 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 (S023) to further assist in the separation process. At this low pressure separator, produced fluid pressure is reduced from approximately 390 psig to 30 psig. Vapors realized at the low pressure separator are directed to a 110 bhp compressor engine (S022) and routed to the sales pipeline. Produced fluid from the low pressure separator is sent to the produced fluids storage tanks (S008-S015). Emissions from the produced fluids tanks and sand trap blowdown tank are directed to one of the two enclosed combustion units (C017, C018) and burnt. Produced fluids are pumped into a tank truck (S016) on an as-needed basis and are disposed of off-site. Vapors during truck loading will be controlled by either of the two enclosed combustion units.

Two thermoelectric generation units (S019, S020) are operated and provide power to the WEU-49 natural gas production site.

A process flow diagram is included as Attachment D.

Attachment F

PLOT PLAN

Attachment F

Plot Plan

EQT WEU 49 (017-00150) Natural Gas Production Site

N

WELL
SAND TRAP
FLOWLINE
LINE HEATER S001
PHASE SEPARATOR

WELL
SAND TRAP
FLOWLINE
LINE HEATER S002
PHASE SEPARATOR

WELL
SAND TRAP
FLOWLINE
LINE HEATER S003
PHASE SEPARATOR

WELL
SAND TRAP
FLOWLINE
LINE HEATER S004
PHASE SEPARATOR

PHASE SEPARATOR
LINE HEATER S005
FLOWLINE
SAND TRAP
WELL

PHASE SEPARATOR
LINE HEATER S006
FLOWLINE
SAND TRAP
WELL

PHASE SEPARATOR
LINE HEATER S007
FLOWLINE
SAND TRAP
WELL

PRODUCED FLUIDS TANK S008
PRODUCED FLUIDS TANK S009
PRODUCED FLUIDS TANK S010
PRODUCED FLUIDS TANK S011
PRODUCED FLUIDS TANK S012
PRODUCED FLUIDS TANK S013
PRODUCED FLUIDS TANK S014
PRODUCED FLUIDS TANK S015
SAND TRAP BLOWDOWN TANK S021

ENCLOSED COMBUSTION DEVICE C017
ENCLOSED COMBUSTION DEVICE C018

COMPRESSOR ENGINE S022

LOW PRESSURE SEPARATOR

TEG S019

TEG S020

LINE HEATER S023

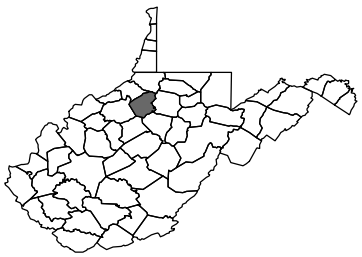
Coordinates
Latitude: 39.25473
Longitude: -80.78660
Elevation: 1,145 ft

Drawn: 12/01/2015

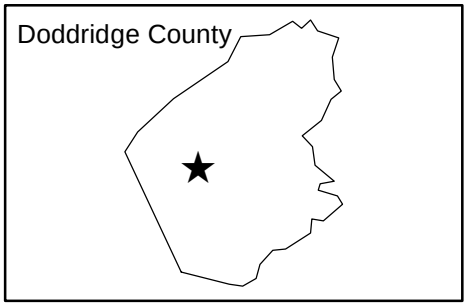
TRUCK ENTRANCE

Attachment G

AREA MAP



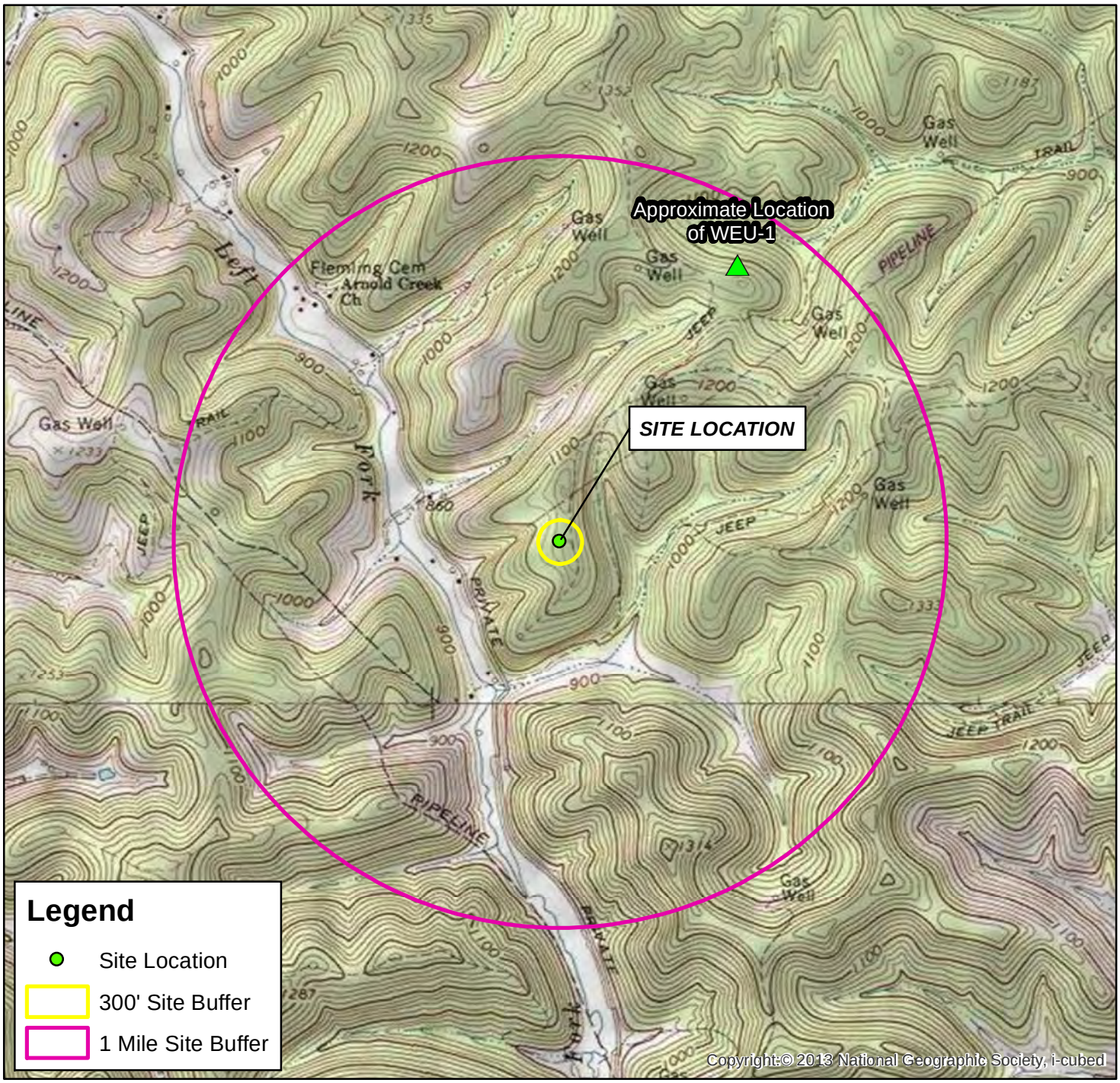
West Virginia



0 1,000 2,000 4,000 Feet

N

LAT. 39.25473 LON. -80.78660
DODDRIDGE COUNTY
WEST VIRGINIA



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

SITE LOCATION MAP

ERM	**EQT PRODUCTION COMPANY** WEU-49 Well Pad West Union, West Virginia	GIS Review: JS CHK'D: JS 0250395
Drawn By: SRV-12/18/15	**Environmental Resources Management**	ATTACHMENT G

J:\GIS\Projects\EQT_MXD\WEU49_Site_Location_Map.mxd - 12/18/2015\SRV

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	
X Section 5.0	Gas Well Affected Facility (NSPS, Subpart OOOO)
X Section 6.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☐Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO)
X Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO and/or NESHAP Subpart HH
X Section 9.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
☐Section 10.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO)
☐Section 11.0	Centrifugal Compressor Affected Facility (NSPS, Subpart OOOO)[2]
☐Section 12.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO)[2]
X Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines, Microturbines
X Section 14.0	Tanker Truck Loading[3]
☐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	2015	2015	1.54 MMBtu/hr	Modification	NA	NA
S002	E002	Line Heater	2015	2015	1.54 MMBtu/hr	Modification	NA	NA
S003	E003	Line Heater	2015	2015	1.54 MMBtu/hr	Modification	NA	NA
S004	E004	Line Heater	2015	2015	1.54 MMBtu/hr	Modification	NA	NA
S005	E005	Line Heater	2015	2015	1.54 MMBtu/hr	Modification	NA	NA
S006	E006	Line Heater	2015	2015	1.54 MMBtu/hr	Modification	NA	NA
S007	E007	Line Heater	2015	2015	1.54 MMBtu/hr	Modification	NA	NA
S008	E017 E018	Produced Fluid Tank	2015	2015	400 bbl	Modification	C017 C018	NA
S009	E017 E018	Produced Fluid Tank	2015	2015	400 bbl	Modification	C017 C018	NA
S010	E017 E018	Produced Fluid Tank	2015	2015	400 bbl	Modification	C017 C018	NA
S011	E017 E018	Produced Fluid Tank	2015	2015	400 bbl	Modification	C017 C018	NA
S012	E017 E018	Produced Fluid Tank	2015	2015	400 bbl	Modification	C017 C018	NA
S013	E017 E018	Produced Fluid Tank	2015	2015	400 bbl	Modification	C017 C018	NA
S014	E017 E018	Produced Fluid Tank	2015	2015	400 bbl	Modification	C017 C018	NA
S015	E017 E018	Produced Fluid Tank	2015	2015	400 bbl	Modification	C017 C018	NA
S016	E016 E017 E018	Tank Truck Loading Rack	2015	2015	145,430 gal/day	Modification	NA	NA
C017	E017	Enclosed Combustion Device	2015	2015	11.66 MMBtu/hr	Modification	NA	NA
C018	E018	Enclosed Combustion Device	2015	2015	11.66 MMBtu/hr	Modification	NA	NA
S019	E019	Thermal Electric Generator	2015	2015	0.013 MMBtu/hr	Existing	NA	NA
S020	E020	Thermal Electric Generator	2015	2015	0.013 MMBtu/hr	Existing	NA	NA
S021	E017 E018	Sand Trap Blowdown Tank	2015	2015	140 bbl	Modification	C017 C018	NA

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]
S022	E022	Compressor Engine	2016	2015	110 hp	New	Selective Catalytic Reduction	NA
S023	E023	Line Heater	2016	2015	0.75 MMBtu/hr	New	NA	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

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

Source/Equipment: **Facility-Wide**

Leak Detection Method Used	☐ Audible, visual, and olfactory (AVO) inspections	☐ Infrared (FLIR) cameras	☒ Other (please describe) **Permittee will follow section 4.1.4 in issued permit.**	☐ 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_2e)
Pumps	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Valves	☐ Yes ☒ No	**271**	**EPA, 40 CFR 98 Subpart W**	☒ Gas ☐ Liquid ☐ Both	**0.61**	**0.34**	**25.99**
Safety Relief Valves	☐ Yes ☒ No	**8**	**EPA, 40 CFR 98 Subpart W**	☒ Gas ☐ Liquid ☐ Both	**0.03**	**0.01**	**1.14**
Open Ended Lines	☐ Yes ☒ No	**20**	**EPA, 40 CFR 98 Subpart W**	☒ Gas ☐ Liquid ☐ Both	**0.10**	**0.06**	**4.22**
Sampling Connections	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Connections (Not sampling)	☐ Yes ☒ No	**1,188**	**EPA, 40 CFR 98 Subpart W**	☒ Gas ☐ Liquid ☐ Both	**0.30**	**0.17**	**12.66**
Compressors	☐ Yes ☒ 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.**	☒ Gas ☐ Liquid ☐ Both			
Flanges	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Other[1]	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ 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

Complete this data sheet if you are the owner or operator of a gas well affected facility for which construction, modification or reconstruction commenced after August 23, 2011. This form must be completed for natural gas well affected facilities regardless of when flowback operations occur (or have occurred).

API Number	Date of Flowback	Date of Well Completion	Green Completion and/or Combustion Device
047-017-06443		9/3/15	Green Completion
047-017-06444		9/3/15	Green Completion
047-017-06445		9/4/15	Green Completion
047-017-06446		9/7/15	Green Completion
047-017-06447		9/7/15	Green Completion
047-017-06448		9/7/15	Green Completion
047-017-06449		TBD	TBD

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-49 Storage Tank Area**	2. Tank Name **Produced Fluid Tanks (S008-S015)**
3. Emission Unit ID number **S008-S015**	4. Emission Point ID number **E017 or E018**
5. Date Installed , Modified or Relocated *(for existing tanks)* **Original Installation 2015** **Anticipated Modification 04/2016** Was the tank manufactured after August 23, 2011? ☒ Yes ☐ No	6. Type of change: ☐ New construction ☐ New stored material ☒ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)* **Addition of low pressure separator.**	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 8-42 below are not required.***	

TANK INFORMATION

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. **16,800 gallons**	
9A. Tank Internal Diameter (ft.) **12**	9B. Tank Internal Height (ft.) **20**
10A. Maximum Liquid Height (ft.) **20**	10B. Average Liquid Height (ft.) **10**
11A. Maximum Vapor Space Height (ft.) **20**	11B. Average Vapor Space Height (ft.) **10**
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume". **16,800 gallons**	
13A. Maximum annual throughput (gal/yr) **53,080,272**	13B. Maximum daily throughput (gal/day) **145,425**
14. Number of tank turnovers per year **3,156**	15. Maximum tank fill rate (gal/min) **101**
16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading	
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): ☒ Fixed Roof ☒ vertical ☐ horizontal ☐ flat roof ☒ cone roof ☐ dome roof ☐ other (describe) ☐ External Floating Roof ☐ pontoon roof ☐ double deck roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting ☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm ☐ Pressurized ☐ spherical ☐ cylindrical ☐ Other (describe)	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket of _____ ☐ Carbon Adsorption[1]

☒ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors)

☒ Conservation Vent (psig) ☐ Condenser[1]

-0.05 Vacuum Setting **14.0 oz** Pressure Setting

☒ Emergency Relief Valve (psig)

-0.5 oz Vacuum Setting **14.4 oz** Pressure Setting

☐ Thief Hatch Weighted ☐ Yes ☒ **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)	**73.84**	**323.43**	**0.01**	**0.04**	**0.10**	**0.42**	**73.95**	**323.89**	**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:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☒ Other (describe) **Welded**

21A. Shell Color: **Green**	21B. Roof Color: **Green**	21C. Year Last Painted: **NA**

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

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

23. Operating Pressure Range (psig):
Must be listed for tanks using VRUs with closed vent system.

24. Is the tank a **Vertical Fixed Roof Tank**? ☒ Yes ☐ No	24A. If yes, for dome roof provide radius (ft): **5 ft**	24B. If yes, for cone roof, provide slop (ft/ft):

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

25A. Year Internal Floaters Installed:

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

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

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

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

25F. Describe deck fittings:

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

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

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

26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:

27. Closed Vent System with VRU? ☐ Yes ☒ No

28. Closed Vent System with Enclosed Combustor? ☒ Yes ☐ 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): **44.0 °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): **108.4**	36A. Minimum (°F): **108.4**	36B. Maximum (°F): **108.4**	
37. Avg. operating pressure range of tank (psig): **Atmospheric**	37A. Minimum (psig): **Atmospheric**	37B. Maximum (psig): **Atmospheric**	
38A. Minimum liquid surface temperature (°F): **108.4**		38B. Corresponding vapor pressure (psia): **0.66**	
39A. Avg. liquid surface temperature (°F): **108.4**		39B. Corresponding vapor pressure (psia): **0.66**	
40A. Maximum liquid surface temperature (°F): **108.4**		40B. Corresponding vapor pressure (psia): **0.66**	
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):	**8.32**		
41D. Liquid molecular weight (lb/lb-mole):	**19.76**		
41E. Vapor molecular weight (lb/lb-mole):	**41.99**		
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.	**110.0 F** **30.0 psig**		

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 **SHR-60 Storage Tank Area**	2. Tank Name **Sand Trap Blowdown Tank (S021)**
3. Emission Unit ID number **S021**	4. Emission Point ID number **E022 or E023**
5. Date Installed , Modified or Relocated *(for existing tanks)* **06/2016 Anticipated Installation** Was the tank manufactured after August 23, 2011? ☒ Yes ☐ No	6. Type of change: ☒ New construction ☐ New stored material ☐ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)* **NA**	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 8-42 below are not required.***	

TANK INFORMATION

8. Design Capacity *(specify barrels or gallons).* 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 *(specify barrels or gallons).* This is also known as "working volume". **5,880 gallons**	
13A. Maximum annual throughput (gal/yr) **306,600**	13B. Maximum daily throughput (gal/day) **840**
14. Number of tank turnovers per year **52**	15. Maximum tank fill rate (gal/min) **4.1**
16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading	
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): ☒ Fixed Roof ☐ vertical ☒ horizontal ☐ flat roof ☐ cone roof ☐ dome roof ☐ other (describe) ☐ External Floating Roof ☐ pontoon roof ☐ double deck roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting ☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm ☐ Pressurized ☐ spherical ☐ cylindrical ☐ Other (describe)	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket of _____ ☐ Carbon Adsorption[1]

☒ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors)

☐ Conservation Vent (psig) ☐ Condenser[1]

Vacuum Setting Pressure Setting

☒ Emergency Relief Valve (psig)

-0.5 oz Vacuum Setting **14.4 oz** Pressure Setting

☐ Thief Hatch Weighted ☒ Yes ☐ **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)	**6.89**	**1.26**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**6.89**	**1.26**	**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:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☒ Other (describe) **WELDED**

21A. Shell Color: **Green**	21B. Roof Color: **Green**	21C. Year Last Painted: **NA**

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

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

23. Operating Pressure Range (psig):
Must be listed for tanks using VRUs with closed vent system.

24. Is the tank a **Vertical Fixed Roof Tank**? ☒ Yes ☐ 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** ☐ Does not apply ☒

25A. Year Internal Floaters Installed:

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

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

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

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

25F. Describe deck fittings:

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

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

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

26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:

27. Closed Vent System with VRU? ☐ Yes ☒ No

28. Closed Vent System with Enclosed Combustor? ☒ Yes ☐ 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): **85.4**	36A. Minimum (°F): **85.4**	36B. Maximum (°F): **85.4**	
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): **85.4**		38B. Corresponding vapor pressure (psia): **0.32**	
39A. Avg. liquid surface temperature (°F): **85.4**		39B. Corresponding vapor pressure (psia): **0.32**	
40A. Maximum liquid surface temperature (°F): **85.4**		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):	**8.03**		
41D. Liquid molecular weight (lb/lb-mole):	**19.28**		
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 307 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	2015	Existing	1.00	1,262
S002	E002	Line Heater	2015	Existing	1.00	1,262
S003	E003	Line Heater	2015	Existing	1.00	1,262
S004	E004	Line Heater	2015	Existing	1.00	1,262
S005	E005	Line Heater	2015	Existing	1.00	1,262
S006	E006	Line Heater	2015	Existing	1.00	1,262
S007	E007	Line Heater	2015	Existing	1.00	1,262
S019	E019	TEG	2015	Existing	0.013	1,262
S020	E020	TEG	2015	Existing	0.013	1,262
S023	E023	Line Heater	2016	New	0.75	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

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

Emission Unit ID#[1]	**S022**		
Engine Manufacturer/Model	**Ford / CSG-637**		
Manufacturers Rated bhp/rpm	**110 / 3200**		
Source Status[2]	**NS**		
Date Installed/ Modified/Removed/Relocated[3]	**04/2016**		
Engine Manufactured /Reconstruction Date[4]	**2015**		
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable)[5]	☒40CFR60 Subpart JJJJ ☒JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources
Engine Type[6]	**4SRB**		
APCD Type[7]	**NSCR**		
Fuel Type[8]	**PQ**		
H_2S (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 ☒ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

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_2e)	**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.

5 Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart IIII/JJJJ? If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance as appropriate.

Provide a manufacturer's data sheet for all engines being registered.

6 Enter the Engine Type designation(s) using the following codes:

2SLB	Two Stroke Lean Burn	4SRB	Four Stroke Rich Burn
4SLB	Four Stroke Lean Burn		

7 Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:

A/F	Air/Fuel Ratio	IR	Ignition Retard
HEIS	High Energy Ignition System	SIPC	Screw-in Precombustion Chambers
PSC	Prestratified Charge	LEC	Low Emission Combustion
NSCR	Rich Burn & Non-Selective Catalytic Reduction	OxCat	Oxidation Catalyst
SCR	Lean Burn & Selective Catalytic Reduction		

8 Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas /Production Gas	D	Diesel

9 Enter the Potential Emissions Data Reference designation using the following codes. Attach all reference data used.

MD	Manufacturer's Data	AP	AP-42	
GR	GRI-HAPCalc™	OT	Other	(please list)

10 Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the *Emissions Summary Sheet*.

11 PTE for engines shall be calculated from manufacturer's data unless unavailable.

Engine Air Pollution Control Device
(Emission Unit ID# E022, 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? ☒Yes ☐ 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 H_2O

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

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.**

EDI Ford Industrial LSI Fuel and Power Figures

CSG637

	Gasoline				LPG				NG				
RPM	Power Cont. [HP]	Power Int. [HP]	BSFC [lb/hp-hr]	Fuel Consumption [gal/hr]	Power Cont. [HP]	Power Int. [HP]	BSFC [lb/hp-hr]	Fuel Consumption [gal/hr]	Power Cont. [HP]	Power Int. [HP]	BSFC [ft^3/hp-hr]	Fuel Consumption [ft^3/hr]	Fuel Consumption [btu/hr]
1500	42.3	47.0	0.48	3.7	52.1	57.9	0.34	4.1	47.8	53.1	6.81	361.8	379,914
1600	47.7	53.0	0.45	3.9	56.8	63.2	0.33	4.3	52.4	58.2	6.54	380.9	399,966
1700	52.2	58.0	0.43	4.1	60.0	66.7	0.33	4.6	54.7	60.8	6.58	400.0	420,019
1800	55.0	61.1	0.43	4.2	63.1	70.2	0.33	4.8	57.0	63.3	6.62	419.1	440,071
1900	58.5	65.0	0.42	4.4	66.3	73.7	0.33	5.0	60.1	66.7	6.57	438.2	460,124
2000	61.2	68.0	0.41	4.6	69.5	77.2	0.33	5.2	63.1	70.2	6.52	457.3	480,176
2100	65.7	73.0	0.40	4.7	73.1	81.2	0.33	5.5	66.0	73.4	6.49	476.4	500,229
2200	70.2	78.0	0.39	4.9	76.7	85.2	0.33	5.7	68.9	76.6	6.47	495.5	520,281
2300	74.7	83.0	0.37	5.0	81.1	90.1	0.32	5.9	73.0	81.1	6.34	514.6	540,334
2400	79.2	88.0	0.36	5.2	85.4	94.9	0.32	6.2	77.1	85.6	6.23	533.7	560,386
2500	82.8	92.0	0.35	5.3	89.4	99.3	0.31	6.4	80.7	89.6	6.17	552.8	580,439
2600	85.5	95.0	0.35	5.4	93.3	103.7	0.31	6.6	84.3	93.6	6.11	571.9	600,491
2700	87.3	97.0	0.35	5.5	95.9	106.6	0.31	6.9	87.0	96.6	6.12	591.0	620,544
2800	88.2	98.0	0.35	5.7	98.6	109.5	0.31	7.1	89.7	99.6	6.12	610.1	640,596
2900	89.1	99.0	0.36	5.8	101.0	112.3	0.32	7.3	92.6	102.9	6.11	629.2	660,649
3000	90.9	101.0	0.36	5.9	103.5	115.0	0.32	7.5	95.5	106.1	6.11	648.3	680,701
3100	93.6	104.0	0.35	6.0	104.8	116.5	0.32	7.8	97.3	108.1	6.17	667.4	700,754
3200	96.3	107.0	0.35	6.1	106.1	117.9	0.33	8.0	99.0	110.0	6.24	686.5	720,806

*Fuel Consumption and BSFC listed is 100% Intermittent Load

*Figures are Gross; Fan losses not accounted for.

Attachment O

TANKER TRUCK LOADING DATA SHEET

ATTACHMENT O – TANKER TRUCK LOADING DATA SHEET

Emission Unit ID#: **S016**	Emission Point ID#: **E016/E017/E018**	Year Installed/Modified: **2015**
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? ☐ Yes ☒ No ☐ 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? ☐ Closed System to tanker truck passing a MACT level annual leak test? ☐ Closed System to tanker truck passing a NSPS level annual leak test? ☒ Closed System to tanker truck not passing an annual leak test and has vapor return?		

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

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	**As needed**	**As needed**	**As needed**	**As needed**
Days/week	**As needed**	**As needed**	**As needed**	**As needed**

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		**Produced Fluids**		
Max. Daily Throughput (1000 gal/day)		**145.43**		
Max. Annual Throughput (1000 gal/yr)		**53,080.28**		
Loading Method[1]		**SP**		
Max. Fill Rate (gal/min)		**100**		
Average Fill Time (min/loading)		**42 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 (C017 or C018)**		
Max. Collection Efficiency (%)		**70 %**		
Max. Control Efficiency (%)		**98 %**		
Max.VOC Emission Rate	Loading (lb/hr)	**0.08**		
	Annual (ton/yr)	**0.35**		
Max.HAP Emission Rate	Loading (lb/hr)	**<0.01**		
	Annual (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#: **C017**	Installation Date: **2015** ☐ New ☒ Modified ☐ Relocated	
Maximum Rated Total Flow Capacity **~7,800** scfh **188,000** scfd	Maximum Design Heat Input (from mfg. spec sheet) **11.66** MMBTU/hr	Design Heat Content **1,262** 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# **S008-S015, S016, S021**)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
S008 - S015	**Produced Fluids Tanks**		
S021	**Sand Trap Blowdown Tank**		
S016	**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?
☐ Steam ☐ Air ☐ Pressure ☒ Non	**~25** feet	**4** feet	☐ Yes ☐ No Provide determination.

Waste Gas Information

Maximum Waste Gas Flow Rate	Heat Value of Waste Gas Stream	Exit Velocity of the Emissions Stream
102.63 (lb/hr)	**Variable** BTU/ft^3	(ft/s)

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

Pilot Gas Information

Number of Pilot Lights	Fuel Flow Rate to Pilot Flame per Pilot	Heat Input per Pilot	Will automatic re-ignition be used?
1	**~30** scfh	**0.03** BTU/hr	☐ Yes ☒ 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? ☒ Yes ☐ No	If Yes, what type? ☒ Thermocouple ☐ Infrared ☐ Ultraviolet ☐ Camera ☐ 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.

VAPOR COMBUSTION
(Including Enclosed Combustors)

General Information

Control Device ID#: **C018**	Installation Date: **2015** ☐ New ☒ Modified ☐ Relocated	
Maximum Rated Total Flow Capacity **~7,800** scfh **188,000** scfd	Maximum Design Heat Input (from mfg. spec sheet) **11.66** MMBTU/hr	Design Heat Content **1,262** 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# **S008-S015, S016, S021**)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
S008-S015	**Produced Fluids Tanks**		
S021	**Sand Trap Blowdown Tank**		
S016	**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?
☐ Steam ☐ Air ☐ Pressure ☒ Non	**~25** feet	**4** feet	☐ Yes ☐ No Provide determination.

Waste Gas Information

Maximum Waste Gas Flow Rate	Heat Value of Waste Gas Stream	Exit Velocity of the Emissions Stream
102.63 (lb/hr)	**Variable** BTU/ft^3	(ft/s)

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

Pilot Gas Information

Number of Pilot Lights	Fuel Flow Rate to Pilot Flame per Pilot	Heat Input per Pilot	Will automatic re-ignition be used?
1	**~30** scfh	**0.03** BTU/hr	☐ Yes ☒ 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? ☒ Yes ☐ No	If Yes, what type? ☒ Thermocouple ☐ Infrared ☐ Ultraviolet ☐ Camera ☐ 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.

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

GENERAL

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

PROCESS DATA

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

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

DESIGN DATA

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

EQUIPMENT SPECIFICATION

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

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

EQUIPMENT SPECIFICATION

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

FABRICATION AND INSPECTION

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

Additional Notes:

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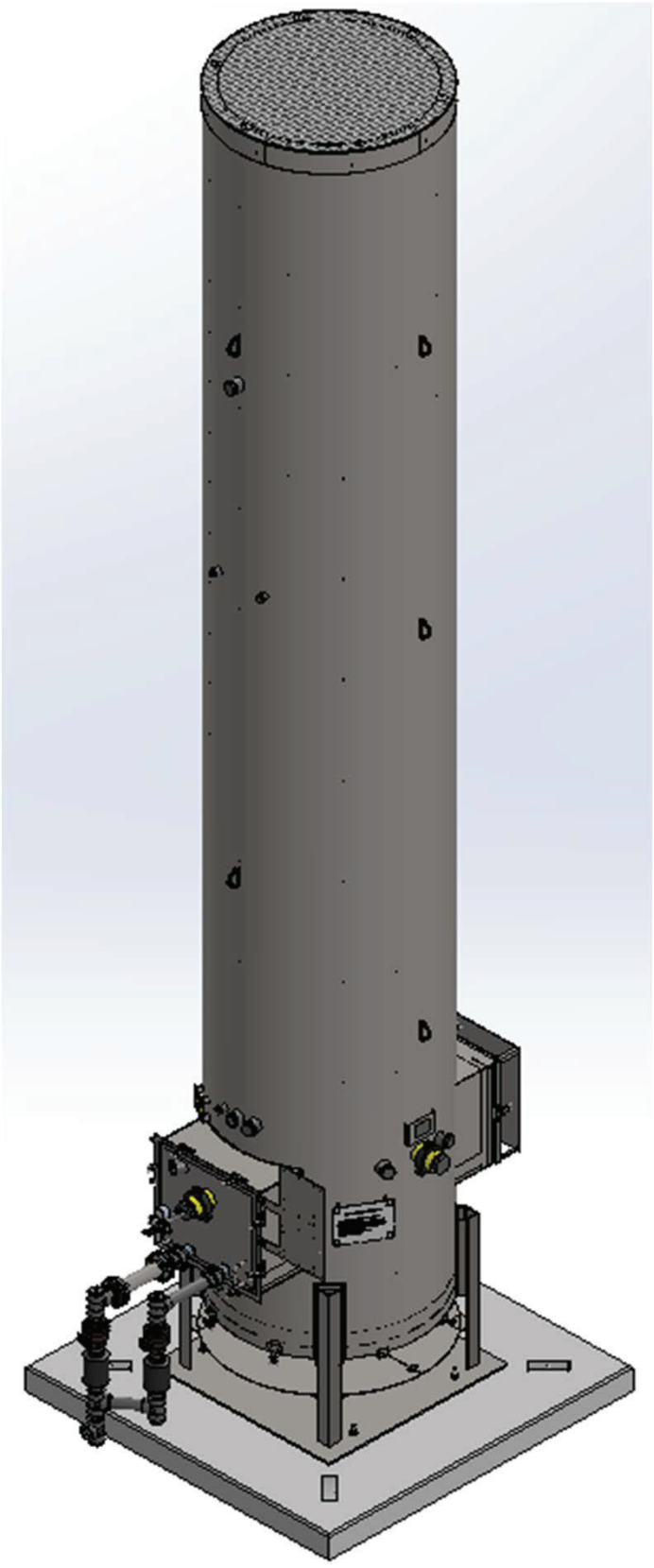
		Project:		Date:	27 February 2014		
				By:	JS		
Environmental Control Equipment Data Sheet		P.O. No.:	-	Checked:	SG		
		RFQ No.:	-	Approved:	MS		
Client:		Ref. P&ID:	-				
Site:				Supplier:	LEED FABRICATION		
Unit/Lease:		Remarks:	-	Model No.:	L30-0011-00		

GENERAL ARRANGEMENT



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

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

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

Attachment S

EMISSION CALCULATIONS

Line Heaters S001 - S007

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
NO_x	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	40CFR98 Subpart C	1.54	1,262	8,760	180.14	789.03
CH_4	0.001	kg CH_4 / MMBtu	40CFR98 Subpart C	1.54	1,262	8,760	<0.01	0.015
N_2O	0.0001	kg N_2O / MMBtu	40CFR98 Subpart C	1.54	1,262	8,760	<0.01	<0.01
Total HAPs							<0.01	0.01
Total CO_2e							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 9 line heaters are diplayed 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.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating (**MMBtu/hr)**

Line Heaters S023

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	0.75	1,262	8,760	<0.01	0.01
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	0.75	1,262	8,760	<0.01	<0.01
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	0.75	1,262	8,760	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	0.75	1,262	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	0.75	1,262	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	0.75	1,262	8,760	<0.01	<0.01
CO	84	lb/10^6 scf	AP-42 Chapter 1.4	0.75	1,262	8,760	0.05	0.22
NO_x	100	lb/10^6 scf	AP-42 Chapter 1.4	0.75	1,262	8,760	0.06	0.26
$PM_{Filterable}$	1.9	lb/10^6 scf	AP-42 Chapter 1.4	0.75	1,262	8,760	<0.01	<0.01
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	0.75	1,262	8,760	<0.01	0.01
PM_{Total}	7.6	lb/10^6 scf	AP-42 Chapter 1.4	0.75	1,262	8,760	<0.01	0.02
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	0.75	1,262	8,760	<0.01	<0.01
CO_2	53.06	kg CO_2 / MMBtu	40CFR98 Subpart C	0.75	1,262	8,760	87.73	384.27
CH_4	0.001	kg CH_4 / MMBtu	40CFR98 Subpart C	0.75	1,262	8,760	<0.01	<0.01
N_2O	0.0001	kg N_2O / MMBtu	40CFR98 Subpart C	0.75	1,262	8,760	<0.01	<0.01
Total HAPs							<0.01	<0.01
Total CO_2e							87.82	384.67

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one line heater. Cumulative emission rates for all 9 line heaters are diplayed 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.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating (**MMBtu/hr)**

Thermoelectric Generators S019 & S020

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
NO_x	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	40CFR98 Subpart C	0.013	1,262	8,760	1.52	6.66
CH_4	0.001	kg CH_4 / MMBtu	40CFR98 Subpart C	0.013	1,262	8,760	<0.01	<0.01
N_2O	0.0001	kg N_2O / MMBtu	40CFR98 Subpart C	0.013	1,262	8,760	<0.01	<0.01
Total HAPs							<0.01	<0.01
Total CO_2e							1.52	6.67

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one TEG. Cumulative emission rates for both TEGs are diplayed 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.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating (**MMBtu/hr)**

Natural Gas Compressor Engine S022

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_2O	0.0001	kg N_2O / 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_2e								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.

-CO_2 equivalency solved for using Global Warming Potentials found in 40 CFR 98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=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/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating (**MMBtu/hr)**

Produced Fluids Tanks S008 - S015

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Yearly Emissions using ProMax (tons/yr)
VOCs	73.95	323.89
HAPs	5.72	25.06
Hexane	5.39	23.60
Benzene	0.08	0.36
Toluene	0.15	0.65
Ethylbenzene	0.03	0.13
Xylene	0.08	0.33
CO_2	0.70	3.05
CH_4	4.69	20.54
Total CO_2e	117.92	516.48

Notes:

- Emission rates for Produced Fluid Tanks S008 - S015 were calculated using ProMax software. ProMax output sheets for the WEU-49 Pad are attached.
- The emission rates displayed above are pre-control device emissions.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298
- CO_2 and CH_4 emissions solved for using emissions rates (lb/hr) of "4" from the ProMax output sheets.
- For emission calculation purposes, the total throughput for tanks S009 - S016 is modeled as being received through a single tank. The throughput value represents the total throughput for all eight (8) 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 Blow Tank S021

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Yearly Emissions using ProMax (tons/yr)
VOCs	1.78	7.79
HAPs	0.13	0.56
Hexane	<0.01	0.01
Benzene	<0.01	<0.01
Toluene	0.11	0.47
Ethylbenzene	<0.01	<0.01
Xylene	<0.01	<0.01
CO_2	0.03	0.11
CH_4	0.62	2.70
Total CO_2e	15.45	67.68

Notes:

- Blowdown operations are conducted on the WEU-49 pad daily to allow for the removal of fluids from the sand traps. Based on available operational information, blowdowns are assummed to occur for one hour per day.
- Emissions from the Sand Trap Blowdown Tank are routed to an enclosed combustion device. 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-49 Pad are attached.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1. GWP CO_2=1, GWP CH_4=25, GWP N_2O=298
- CO_2 and CH_4 emissions solved for using emissions rates (lb/hr) of Stream "4" from the ProMax output sheets.

Tank Unloading Operations S016

Total Emissions from Tank Unloading Operations

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)	Loading Rack Collection Efficiency	Enclosed Combustion Device Combusion 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	0.27	1.17	70%	98%	<0.01	0.02	0.08	0.35
HAPs	<0.01	<0.01	70%	98%	<0.01	<0.01	<0.01	<0.01
CO_2	0.13	0.58	70%	98%	1.44	6.32	0.04	0.17
CH_4	0.14	0.59	70%	98%	<0.01	<0.01	0.04	0.18
Total CO_2e	3.51	15.37	--	--	1.49	6.53	1.05	4.61

- CO_2 and CH_4 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.
- Vapors from tank unloading operations are vapor-balanced to the produced fluid tanks and realized at one of the two enclosed combustion devices. AP-42 calculation methods were used to estimate the collection efficiency from tank unloading operations. Emissions that are not collected during the unloading events are realized at the Loading Rack Emission Point, E020.

Enclosed Ground Flares C017 - C018

Emissions from Tanks

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/year)	Enclosed Combustion Device Combustion Efficiency	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
Produced Fluids Tanks S008 - S015	VOCs	36.97	161.94	98%	0.74	3.24
	HAPs	2.86	12.53	98%	0.06	0.25
	Hexane	2.69	11.80	98%	0.05	0.24
	Benzene	0.04	0.18	98%	<0.01	<0.01
	Toluene	0.07	0.32	98%	<0.01	<0.01
	Ethylbenzene	0.02	0.07	98%	<0.01	<0.01
	Xylene	0.04	0.17	98%	<0.01	<0.01
	CO_2	0.35	1.52	98%	262.98	1,151.87
	CH_4	2.34	10.27	98%	0.05	0.21
Sand Trap Blowdown Tank - S016	VOCs	0.89	3.90	98%	0.02	0.08
	HAPs	0.06	0.28	98%	<0.01	<0.01
	Hexane	<0.01	<0.01	98%	<0.01	<0.01
	Benzene	<0.01	<0.01	98%	<0.01	<0.01
	Toluene	0.05	0.23	98%	<0.01	<0.01
	Ethylbenzene	<0.01	<0.01	98%	<0.01	<0.01
	Xylene	<0.01	<0.01	98%	<0.01	<0.01
	CO_2	0.01	0.06	98%	5.21	22.83
	CH_4	0.31	1.35	98%	<0.01	0.03
Truck Loading - S017	VOCs	0.13	0.59	98%	<0.01	<0.01
	HAPs	<0.01	<0.01	98%	<0.01	<0.01
	CO_2	0.07	0.29	98%	0.72	3.16
	CH_4	0.07	0.30	98%	<0.01	<0.01
Totals	VOCs	38.00	166.43	--	0.76	3.33
	HAPs	2.92	12.81	--	0.06	0.26
	Hexane	2.70	11.80	--	0.05	0.24
	Benzene	0.04	0.18	--	<0.01	<0.01
	Toluene	0.13	0.56	--	<0.01	0.01
	Ethylbenzene	0.02	0.07	--	<0.01	<0.01
	Xylene	0.04	0.17	--	<0.01	<0.01
	CO_2	0.43	1.87	--	268.92	1,177.86
	CH_4	2.72	11.92	--	0.05	0.24
	CO2e	68.44	299.77	--	270.27	1,183.77

Gas Composition of Vent Gas

Gas Stream	Mole Fraction
Methane	0.12
Ethane	0.25
Propane	0.25
Butane	0.16
Pentanes	0.06
Carbon Dioxide	0.007

Vent Gas Properties

Vent Gas Properties	Mass Flow Rate (lb/hr)	Density (lb/ft^3)
Produced Fluids Tank	101.30	0.10
Blowdown Tank	1.63	0.08

Emissions from Pilot Operations

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factors (kg XX/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/yr)	Pilot Max. Hourly Emissions (tons/yr)	Burner Max.Hourly Emissions (lb/hr)	Burner Max.Hourly Emissions (tons/hr)	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	5.50	--	1,262	30,000	11,660,000	<0.01	<0.01	--	--	<0.01	<0.01
Hexane	1.80	--	1,262	30,000	11,660,000	<0.01	<0.01	--	--	<0.01	<0.01
Formaldehyde	0.075	--	1,262	30,000	11,660,000	<0.01	<0.01	--	--	<0.01	<0.01
CO	84	--	1,262	30,000	11,660,000	<0.01	0.01	0.90	3.94	0.90	3.95
NO_x	100	--	1,262	30,000	11,660,000	<0.01	0.01	1.07	4.69	1.07	4.71
$PM_{Condensable}$	5.70	--	1,262	30,000	11,660,000	<0.01	<0.01	0.06	0.27	0.06	0.27
$PM_{Filterable}$	1.90	--	1,262	30,000	11,660,000	<0.01	<0.01	0.02	0.09	0.02	0.09
PM_{Total}	7.60	--	1,262	30,000	11,660,000	<0.01	<0.01	0.08	0.36	0.08	0.36
SO_2	0.60	--	1,262	30,000	11,660,000	<0.01	<0.01	<0.01	0.03	<0.01	0.03
CO_2	120,000	53.06	1,262	30,000	11,660,000	3.51	15.37	1,363.95	5,974.12	1,367.46	5,989.49
CH_4	2.3	0.001	1,262	30,000	11,660,000	<0.01	<0.01	0.03	0.11	0.03	0.11
N_2O	2.2	<0.001	1,262	30,000	11,660,000	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Total HAPs										<0.01	<0.01
CO_2e										1,368.88	5,995.67

Total Enclosed Combustion Device Emissions

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	0.76	3.33
HAPs	0.06	0.26
CO	0.90	3.95
NO_x	1.07	4.71
$PM_{Condensable}$	0.06	0.27
$PM_{Filterable}$	0.02	0.09
PM_{Total}	0.08	0.36
SO_2	<0.01	0.03
CO_2	1,636.38	7,167.34
CH_4	0.08	0.35
N_2O	<0.01	0.01
CO_2e	1,639.14	7,179.44

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.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=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 (mcfd) 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 (mcfd) 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 (mcfd) 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

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

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

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

Where:

Ea,CH_4(un-combusted) = Contribution of annual un-combusted CH4 emissions from Enclosed Combustion Device stack in cubic feet, under actual conditions.

Ea,CO_2(un-combusted) = Contribution of annual un-combusted CO2 emissions from Enclosed Combustion Device stack in cubic feet, under actual conditions.

Ea,CO_2(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).

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 multiplier [1]
s	4.8	Silt content of road surface material (%) [2]
p	150	Number of days per year with precipitation >0.01 in. [3]

Item Number	Description	Number of Wheels	W Mean Vehicle Weight (tons)	Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	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)
1	Liquids Hauling	14	30	10	1.72	1	1,826	NA	NA	7.37	6.73	1.88	1.71	0.19	0.171
2	Employee Vehicles	4	3	10	1.72	1	200	NA	NA	2.61	0.26	0.67	0.07	0.07	<0.01
									Totals:	**9.98**	**6.99**	**2.54**	**1.78**	**0.25**	**0.178**

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 in[3] 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

[1]- Table W-1B to 40CFR98 Subpart W

Well Specific Equipment Counts	
Facility Equipment Type	Count on Site
Wellheads	7
Separators	7
Meters/Piping	8
Compressors	1
In-line Heaters	8
Dehydrators	0

Gas Composition						
Emissions from Flaring Operations	Propane	Butane	Pentanes	Hexanes +	CO_2	CH_4
Mole %	4.00	1.78	0.64	0.58	0.15	78.13
MW	44	58	72	86.00	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_2e (lbs/hr)	Total CO_2e (tons/yr)
Valves	271	0.027	8760	0.14	0.61	0.08	0.34	<0.01	<0.01	0.24	1.04	5.93	25.99
Connectors	1188	0.003	8760	0.07	0.30	0.04	0.17	<0.01	<0.01	0.12	0.51	2.89	12.66
Open-ended Lines	19.5	0.061	8760	0.02	0.10	0.01	0.06	<0.01	<0.01	0.04	0.17	0.96	4.22
Pressure Relief Valves	8	0.040	8760	<0.01	0.03	<0.01	0.01	<0.01	<0.01	0.01	0.05	0.26	1.14
			Total Emissions:	**0.24**	**1.04**	**0.13**	**0.58**	**<0.01**	**<0.01**	**0.40**	**1.76**	**10.05**	**44.01**

[2]- Table W-1A to 40CFR98 Subpart W

Notes:
-A gas sample from the WEU-49 Site is included with this submittal

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

Total WEU 49 Site Emission Levels

	VOCs		HAPs		CO		NO_x		PM_{Total}		$PM_{Filterable}$		$PM_{Condensable}$		SO_2		CO_2		CH_4		N_2O		CO_2e	
Emission Sources	**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 (E001)	<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 (E002)	<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 (E003)	<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 (E004)	<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 (E005)	<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 (E006)	<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 (E007)	<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 (E023)	<0.01	0.01	<0.01	<0.01	0.05	0.22	0.06	0.26	<0.01	0.02	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	87.73	384.27	<0.01	<0.01	<0.01	<0.01	87.82	384.67
TEG (E019)	<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 (E020)	<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
Compressor Engine (E022)	0.29	1.29	0.00	0.00	0.42	1.85	<0.01	0.01	<0.01	0.04	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.016	0.072	82.58	361.69	0.00	0.00
Enclosed Combustion Unit (E017)	0.76	3.33	0.06	0.26	0.90	3.95	1.07	4.71	0.08	0.36	0.02	0.09	0.06	0.27	<0.01	0.03	1,636.38	7,167.34	0.08	0.35	<0.01	0.01	1,639.14	7,179.44
Enclosed Combustion Unit (E018)	0.76	3.33	0.06	0.26	0.90	3.95	1.07	4.71	0.08	0.36	0.02	0.09	0.06	0.27	<0.01	0.03	1,636.38	7,167.34	0.08	0.35	<0.01	0.01	1,639.14	7,179.44
*Tank Truck Loading Operations (E016)	0.08	0.35	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--	--	<0.01	<0.01	0.04	0.17	0.04	0.18	<0.01	<0.01	1.05	4.61
Haul Roads	--	--	--	--	--	--	--	--	9.98	6.99	9.98	6.99	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--
Fugitives Leaks	0.24	1.04	0.13	0.58	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	0.40	1.76	--	--	10.05	44.01
Totals	**2.19**	**9.57**	**0.27**	**1.20**	**3.10**	**13.57**	**3.19**	**13.97**	**92.72**	**8.08**	**10.05**	**7.28**	**0.18**	**0.80**	**0.02**	**0.09**	**4,804.73**	**21,044.74**	**0.65**	**2.83**	**82.59**	**361.73**	**4,822.90**	**21,124.30**

-Two enclosed combustion devices are being included in this application. Emissions from the produced fluids tanks, sand trap blowdown tanks, and truck loading are routed to either C017 or C018. For the permitting of these sources, it is assumed that vapors are being evenly distributed between the two enclosed combustion devices. For this reason, the emissions from the combustion of vent gases between C017 and C018 are additive.

*Emissions from Tank Truck Loading Operations are routed to the enclosed combustion devices. The collection efficiency of the vapors has been calculated using AP-42 methodologies. Emissions that are not collected and routed the enclosed combustion devices are realized at the Tank Truck Loading Operations Emission Point.

Total WEU-49 Site Emission Levels - HAP Speciation

	Total HAPs		Formaldehyde		Hexane		Benzene		Toluene		Ethylbenzene		Xylene	
Emission Sources	**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 (E001)	<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 (E002)	<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 (E003)	<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 (E004)	<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 (E005)	<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 (E006)	<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 (E007)	<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 (E023)	<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 (E019)	<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 (E020)	<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 (E022)	0.00	0.00	0.01	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.878	3.846
Enclosed Combustion Unit (E017)	0.06	0.26	<0.01	<0.01	0.05	0.24	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Enclosed Combustion Unit (E018)	0.06	0.26	<0.01	<0.01	0.05	0.24	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tank Truck Loading Activities (E016)	<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	0.13	0.58	<0.01	<0.01	0.13	0.58	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Totals	**0.27**	**1.20**	**0.02**	**0.07**	**0.26**	**1.13**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**

-Two enclosed combustion devices are being included in this application. Emissions from the produced fluids tanks, sand trap blowdown tanks, and truck loading are routed to either C017 or C018. For the permitting of these sources, it is assumed that vapors are being evenly distributed between the two enclosed combustion devices. For this reason, the emissions from the combustion of vent gases between C017 and C018 are additive.

Legacy Measurement Solutions

Tulsa, OK

918-827-5770

Customer	: 01 - GAS ANALYTICAL SERVICES-MOUNDS	**Date Sampled**	: 09/08/2015
Station Id	: 514395	**Date Analyzed**	: 09/21/2015
Cylinder Id	: 1	**Effective Date**	: 10/01/2015
Producer	: EQT PRODUCTION	**Line Pressure**	: 0.00000
Lease	: WEV 49	**Cyl Pressure**	: 1000.00000
Area	: MGMD	**Temp**	: 80.00000
Sample By	: BOB GUM	**Cylinder Type**	: Spot
Property Cd	:	**Formation**	:

COMPONENT		Mole Percent	WT. Percent	Liq Vol Percent
Methane	C1	11.8315	1.9289	4.4466
Ethane	C2	8.4266	2.5749	4.9959
Propane	C3	6.1620	2.7614	3.7630
Iso-Butane	IC4	1.5078	0.8906	1.0933
Normal-Butane	NC4	3.6167	2.1363	2.5274
Iso-Pentane	IC5	1.7562	1.2877	1.4236
Normal-Pentane	NC5	2.0125	1.4756	1.6167
Nitrogen	N2	0.0344	0.0097	0.0080
Carbon-Dioxide	CO2	0.1923	0.0860	0.0726
BENZENE	BENZENE	0.0848	0.0673	0.0524
TOLUENE	TOLUENE	0.3790	0.3548	0.2806
ETHYLBENZENE	E-BENZENE	0.1864	0.2010	0.1590
M-XYLENE/P-XYLENE	M-XYLENE/P-XYLENE	0.5373	0.5797	0.4604
C6's	C6's	4.7644	4.1723	4.3508
C7's	C7's	10.4765	15.9296	14.7673
C8's	C8's	8.1255	8.9914	8.6988
C9's	C9's	6.8140	8.5181	7.8540
C10's	C10's	14.0291	18.3440	17.0186
C11's	C11's	5.7368	7.9853	6.8834
C12's	C12's	10.4668	16.3477	14.6596
C13's	C13's	2.8594	5.3576	4.8679
TOTAL		100.0000	100.0000	100.0000

	Totals
SPECIFIC GRAVITY @ 60 DEG. F. (WATER = 1)	0.6909
MOLECULAR WEIGHT	98.4038

Comments: EXTENDED CONDENSATE SAMPLE

POUNDS/GALLON (ABSOLUTE DENSITY)	5.7605
CALC. VAPOR PRESSURE @ 14.65 PSIA, 100 Deg. F.	664.2658
CUFT. VAPOR / GALLON @ 14.65 PSIA, 60 Deg. G.	22.3543
BTU / CUFT. DRY GAS @ 14.65 PSIA, 60 Deg. F.	5,058.5392
BTU / GALLON LIQUID	118,482.0797
BTU / POUND	20,439.7146

Comments: EXTENDED CONDENSATE SAMPLE

GAS ANALYTICAL SERVICES

C6+ Gas Analysis Report

Gas Analytical

Report Date: Sep 14, 2015 9:23a

Client:	Equitable Production	Date Sampled:	Sep 8, 2015 11:00a
Site:	514394	Analysis Date:	Sep 11, 2015 2:17p
Field No:	9998	Collected By:	J. Brown
Meter:	514394	Date Effective:	Sep 8, 2015 12:00a
Source Laboratory	Clarksburg (Bridgeport), WV	Sample Pressure (PSI):	70.0
Lab File No:	**X_CH1-6024.CHR**	Sample Temp (°F):	
Sample Type:	Spot	Field H2O:	No Test
Reviewed By:		Field H2S:	No Test

Component	Mol %	Gal/MSCF
Methane	78.1311	
Ethane	14.2559	3.79
Propane	4.0036	1.10
I-Butane	0.5947	0.19
N-Butane	1.1890	0.37
I-Pentane	0.3163	0.12
N-Pentane	0.3248	0.12
Nitrogen	0.4544	
Oxygen	<MDL	
Carbon Dioxide	0.1535	
Hexanes+	0.5767	0.24
TOTAL	100.0000	5.93

Analytical Results at Base Conditions (Real)	
BTU/SCF (Dry):	1,262.4954 BTU/ft³
BTU/SCF (Saturated):	1,241.4002 BTU/ft³
PSIA:	14.730 PSI
Temperature (°F):	60.00 °F
Z Factor (Dry):	0.99644
Z Factor (Saturated):	0.99604

Analytical Results at Contract Conditions (Real)	
BTU/SCF (Dry):	1,262.4954 BTU/ft³
BTU/SCF (Saturated):	1,241.4002 BTU/ft³
PSIA:	14.730 PSI
Temperature (°F):	60.00 °F
Z Factor (Dry):	0.99644
Z Factor (Saturated):	0.99604

Calculated Specific Gravities			
Ideal Gravity:	0.7188	Real Gravity:	0.7211
Molecular Wt:	20.8177 lb/lbmol		

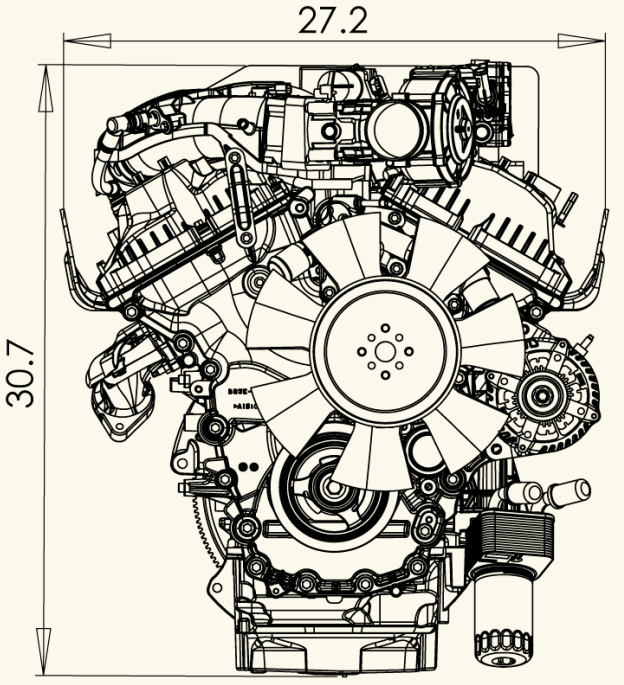
Gross Heating Values are Based on:
GPA 2145-09, 2186
Compressibility is Calculated using AGA-8.

Source	Date	Notes
Gas Analytical	Sep 11, 2015	results to Bob Gum

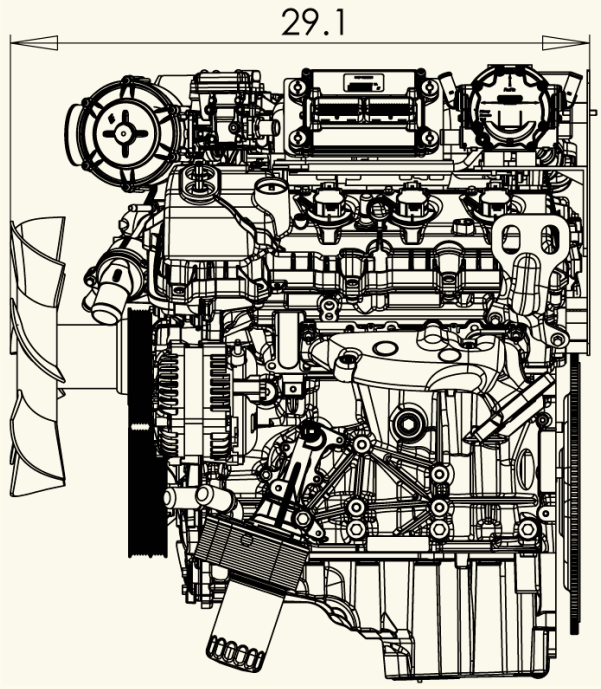
<MDL = Less than Method Detection Limits, NG = Not Given, NT = Not Tested

Installation Drawings

Front End View

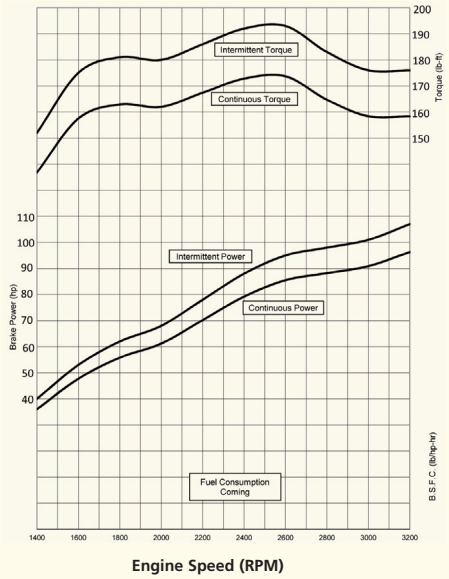


Left Side View

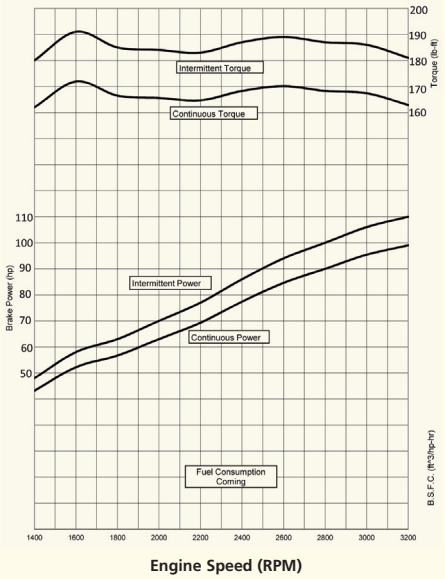


Power Curves (corrected per SAE J1349)

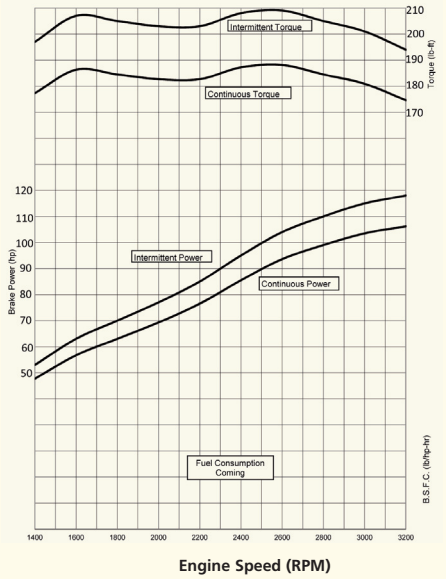
Gasoline



Natural Gas



Liquefied Petroleum Gas



Ford Power Products

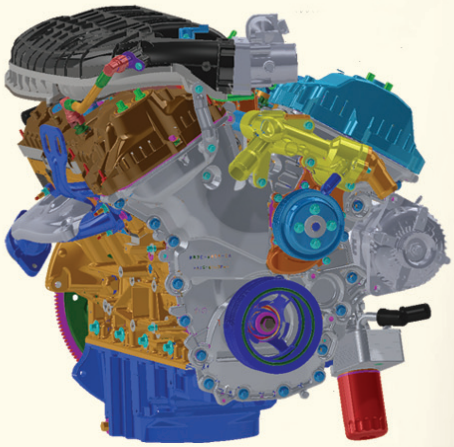
Powertrain Assemblies & Components Provided By Ford Component Sales

For additional information Contact:

ENGINE DISTRIBUTORS INC.
400 University Ct • Blackwood NJ 08012
856/228-7298 • Fax:856/228-5531
www.edi-dist.com

CSG-637 EFI

3.7 Liter
6-Cylinder



Options

Engine Cooling Fans
- 14" (355mm) diameter suction
- 14" (355mm) diameter pusher

Flywheels
- 11.5" (292mm) SAE over-center clutch
- flat face flywheel

Flywheel Housings
- SAE #3

Exhaust Manifold
- rear dump down

Power Steering Pump
Air Conditioning
Wiring Harnesses
Discrete Speed Switch
Variable Speed Hand Throttle
Variable Speed Foot Pedal
Engine Mounts
- Automotive with insulators
- Open power unit

Electronic Instrument Panel, Gauges
Three Way Catalyst / Muffler Standard

Transmissions

6R80 electronic shift

Emissions Information

California Air Resources Board (CARB)
Environmental Protection Agency (EPA)
Emission Certified Packages

Warranty

Contact Engine Distributors, Inc
for warranty details.

Power Products

Powertrain Assemblies
& Components
Provided By Ford
Component Sales

Specifications

Engine Type	V-6
Bore and Stroke	3.7"x 3.4" (94mm x 86mm)
Displacement	3.7L Liter (225.7 CID)
Compression Ratio	10.5:1
Oil Capacity	6 qts. including filter
Net Weight	355 Lbs. with accessories (161 Kgs.)
Dimensions	L 25.4" x W 29.5" x H 29.4" (646 mm x 751 mm x 748 mm)

Gasoline (corrected per SAE J1349)

Unleaded 87 or 89 octane

Intermittent Power	107 [HP] @ 3200rpm	(80 [kW] @ 3200rpm)
Continuous Power	96 [HP] @ 3200rpm	(72 [kW] @ 3200rpm)
Intermittent Torque	193 [ft-lbs] @ 2600rpm	(261 [N-m] @ 2600rpm)
Continuous Torque	173 [ft-lbs] @ 2600rpm	(235 [N-m] @ 3200rpm)

Natural Gas (corrected per SAE J1349)

Fuel Specification	1050 BTU/FT3	
Intermittent Power	110 [HP] @ 3200rpm	(82 [kW] @ 3200rpm)
Continuous Power	99 [HP] @ 3200rpm	(74 [kW] @ 3200rpm)
Intermittent Torque	191 [ft-lbs] @1600rpm	(259 [N-m] @ 1600rpm)
Continuous Torque	172 [ft-lbs] @1600rpm	(233 [N-m] @ 1600rpm)

Liquefied Petroleum Gas (corrected per SAE J1349)

Fuel Specification	HD-5	
Intermittent Power	118 [HP] @ 3200rpm	(88 [kW] @ 3200rpm)
Continuous Power	106 [HP] @ 3200rpm	(79 [kW] @ 3200rpm)
Intermittent Torque	209 [ft-lbs] @ 2600rpm	(284 [N-m] @ 2600rpm)
Continuous Torque	188 [ft-lbs] @ 2600rpm	(255 [N-m] @ 2600rpm)

Standard Features / Benefits

Set-for-life valvetrain

Deep skirted, ribbed cylinder block casting for rigidity

150 AMP Alternator

Aluminum cylinder block and heads.

Chain driven dual camshafts with automatic tensioning system

Structural front cover and deep sump oil pan

Alternate fuel ready valvetrain components

Individual coil on plug electronic ignition

Four main bolts with side bolts through block for strength and durability

Gasoline Sequential Port Fuel Injection

Closed loop fuel control for all fuels

Electronic engine management system with built-in engine protection against detonation, high coolant temperature, low oil pressure, over speed shutdown and starter lockout

Next generation governing – discrete speeds, variable speeds, drive by wire – using the highest quality components.

Variable CAM Timing for intake camshafts - advances or retards timing to maximize engine power and fuel efficiency

Forged steel crankshaft

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2015 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Engine Distributors, Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: FEDIB03.7CSG-006

Effective Date: 06/08/2015

Expiration Date: 12/31/2015

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 06/08/2015

Revision Date: N/A

Manufacturer: Engine Distributors, Inc.
Engine Family: FEDIB03.7CSG
Mobile/Stationary Certification Type: Mobile and Stationary
Fuel : LPG/Propane
Gasoline (up to and including 10% Ethanol)
Natural Gas (CNG/LNG)
Emission Standards :
Mobile Part 1048
HC + NOx (g/kW-hr) : 0.8
NMHC + NOx (g/kW-hr) : 0.8
CO (g/kW-hr) : 20.6
Part 60 Subpart JJJ Table 1
NOx (g/kW-hr) : 1.3
HC + NOx (g/kW-hr) : 0.8
CO (g/kW-hr) : 2.7
CO (g/kW-hr) : 20.6
VOC (g/kW-hr) : 0.9
Emergency Use Only : N

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 40 CFR Part 1048, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60, 40 CFR Part 1048 and produced in the stated model year.

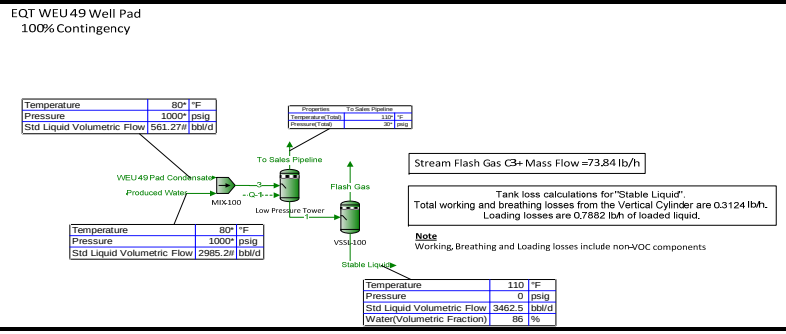
This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60, 40 CFR Part 1048 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60, 40 CFR Part 1048. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60, 40 CFR Part 1048. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60, 40 CFR Part 1048.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Flowsheet1
Plant Schematic

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU 49 100% Contingency	
Flowsheet:	Flowsheet1	



Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU 49 100% Contingency	
Flowsheet:	Flowsheet1	

Connections

	Flash Gas	Produced Water	Stable Liquid	To Sales Pipeline	WEU 49 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 49 Pad Condensate %
Methane	12.1035	0 *	0.00112811	44.2173	11.8315 *
Ethane	25.2724	0 *	0.0105681	26.9913	8.4266 *
Propane	25.2282	0 *	0.0325237	14.3222	6.162 *
Isobutane	5.28741	0 *	0.0159354	2.27965	1.5078 *
n-Butane	11.0638	0 *	0.0456282	4.46596	3.6167 *
Isopentane	3.06638	0 *	0.0305574	1.11095	1.7562 *
n-Pentane	2.87609	0 *	0.0370936	1.02312	2.0125 *
Nitrogen	0.0146536	0 *	5.19944E-07	0.132513	0.0344 *
Carbon Dioxide	0.650956	0 *	0.000368728	0.581411	0.1923 *
Benzene	0.043173	0 *	0.0018042	0.014746	0.0848 *
Toluene	0.0662762	0 *	0.00843967	0.0225241	0.379 *
Ethylbenzene	0.0118994	0 *	0.00421178	0.00407194	0.1864 *
m-Xylene	0.029449	0 *	0.0121548	0.0100905	0.5373 *
C6	2.59038	0 *	0.100869	0.88638	4.7644 *
C7	2.1572	0 *	0.232314	0.736413	10.4765 *
C8	0.596454	0 *	0.183363	0.20489	8.1255 *
C9	0.180394	0 *	0.154717	0.0623709	6.814 *
C10	0.133406	0 *	0.319248	0.0468344	14.0291 *
C11	0.0183097	0 *	0.130656	0.00649953	5.7368 *
C12	0.0139762	0 *	0.238441	0.00501085	10.4668 *
C13	0.0012438	0 *	0.0651471	0.000452458	2.8594 *
Water	8.59444	100 *	98.3748	2.87539	0 *

Mass Fraction	Flash Gas %	Produced Water %	Stable Liquid %	To Sales Pipeline %	WEU 49 Pad Condensate %
Methane	4.62475	0 *	0.000915697	23.8473	1.92156 *
Ethane	18.0997	0 *	0.0160785	27.2847	2.56517 *
Propane	26.4963	0 *	0.0725646	21.2315	2.75081 *
Isobutane	7.31964	0 *	0.0468635	4.45437	0.887216 *
n-Butane	15.3162	0 *	0.134185	8.72636	2.12813 *
Isopentane	5.26939	0 *	0.111551	2.69464	1.28276 *
n-Pentane	4.94237	0 *	0.135412	2.48161	1.46997 *
Nitrogen	0.00977718	0 *	7.36972E-07	0.124796	0.00975591 *
Carbon Dioxide	0.682343	0 *	0.000821073	0.860213	0.085678 *
Benzene	0.0803218	0 *	0.00713066	0.0387228	0.0670589 *
Toluene	0.145446	0 *	0.0393455	0.0697693	0.353528 *
Ethylbenzene	0.0300891	0 *	0.0226243	0.0145331	0.200342 *
m-Xylene	0.0744657	0 *	0.0652918	0.036014	0.577487 *
C6	5.31681	0 *	0.439815	2.56791	4.15657 *
C7	5.14838	0 *	1.17782	2.4807	10.6276 *
C8	1.62277	0 *	1.05978	0.786811	9.39655 *
C9	0.551064	0 *	1.00402	0.268926	8.8475 *
C10	0.452093	0 *	2.2983	0.224022	20.208 *
C11	0.068166	0 *	1.03334	0.0341539	9.07811 *
C12	0.0567019	0 *	2.05501	0.028694	18.0493 *
C13	0.00546167	0 *	0.607707	0.0028043	5.33689 *
Water	3.68777	100 *	89.6714	1.74146	0 *

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU 49 100% Contingency	
Flowsheet:	Flowsheet1	

Mass Flow	Flash Gas lb/h	Produced Water lb/h	Stable Liquid lb/h	To Sales Pipeline lb/h	WEU 49 Pad Condensate lb/h
Methane	4.68476	0 *	0.444651	101.127	106.256 *
Ethane	18.3346	0 *	7.80754	115.703	141.845 *
Propane	26.8402	0 *	35.2365	90.0341	152.111 *
Isobutane	7.41462	0 *	22.7564	18.8891	49.0601 *
n-Butane	15.5149	0 *	65.1587	37.0049	117.679 *
Isopentane	5.33776	0 *	54.168	11.4268	70.9326 *
n-Pentane	5.00651	0 *	65.7545	10.5235	81.2845 *
Nitrogen	0.00990405	0 *	0.000357865	0.529208	0.53947 *
Carbon Dioxide	0.691197	0 *	0.398703	3.64781	4.73771 *
Benzene	0.0813641	0 *	3.46256	0.164208	3.70813 *
Toluene	0.147334	0 *	19.1057	0.295863	19.5489 *
Ethylbenzene	0.0304796	0 *	10.9861	0.061629	11.0782 *
m-Xylene	0.075432	0 *	31.7049	0.152721	31.9331 *
C6	5.38581	0 *	213.569	10.8894	229.844 *
C7	5.21519	0 *	571.937	10.5196	587.672 *
C8	1.64382	0 *	514.617	3.33654	519.598 *
C9	0.558215	0 *	487.539	1.14041	489.237 *
C10	0.45796	0 *	1116.03	0.949983	1117.43 *
C11	0.0690506	0 *	501.775	0.144833	501.989 *
C12	0.0574376	0 *	997.889	0.121679	998.068 *
C13	0.00553255	0 *	295.095	0.0118919	295.113 *
Water	3.73562	43554.5 *	43543.4	7.38483	0 *

Stream Properties

Property	Units	Flash Gas	Produced Water	Stable Liquid	To Sales Pipeline	WEU 49 Pad Condensate
Temperature	°F	109.682	80 *	109.682	110 *	80 *
Pressure	psia	14.6959 *	1014.7 *	14.6959	44.6959 *	1014.7 *
Mole Fraction Vapor	%	100	0	0	100	0
Mole Fraction Light Liquid	%	0	100	1.62477	0	100
Mole Fraction Heavy Liquid	%	0	0	98.3752	0	0
Molecular Weight	lb/lbmol	41.9851	18.0153	19.7638	29.7457	98.7771
Mass Density	lb/ft^3	0.102267	62.2329	59.2878	0.221743	43.2606
Molar Flow	lbmol/h	2.4127	2417.64	2456.96	14.2562	55.9813
Mass Flow	lb/h	101.298	43554.5	48558.8	424.059	5529.67
Vapor Volumetric Flow	ft^3/h	990.525	699.864	819.036	1912.39	127.822
Liquid Volumetric Flow	gpm	123.494	87.2557	102.114	238.427	15.9363
Std Vapor Volumetric Flow	MMSCFD	0.021974	22.019	22.377	0.12984	0.509857
Std Liquid Volumetric Flow	sgpm	0.401364	87.0686 *	100.99	2.04766	16.3702 *
Compressibility		0.987448	0.0507183	0.000801786	0.98074	0.400043
Specific Gravity		1.44963	0.997817	0.950597	1.02704	0.693624
API Gravity			9.89088	15.699		69.6259
Enthalpy	Btu/h	-123538	-2.9686E+08	-3.00117E+08	-579053	-5.26079E+06
Mass Enthalpy	Btu/lb	-1219.55	-6815.83	-6180.49	-1365.5	-951.375
Mass Cp	Btu/(lb*°F)	0.428649	0.980687	0.934021	0.456784	0.509282
Ideal Gas CpCv Ratio		1.12484	1.32536	1.29056	1.17382	1.05352
Dynamic Viscosity	cP	0.00917122	0.891684	0.616407	0.0102566	0.426355
Kinematic Viscosity	cSt	5.59851	0.89448	0.652695	2.88756	0.615259
Thermal Conductivity	Btu/(h*ft*°F)	0.0121793	0.351656	0.322914	0.0155598	0.0715561
Surface Tension	lbf/ft		0.0049665	0.00426974 ?		0.000809098 ?
Net Ideal Gas Heating Value	Btu/ft^3	2104.22	0	103.259	1551.6	5017.75
Net Liquid Heating Value	Btu/lb	18835.7	-1059.76	1016.12	19660.9	19123.1
Gross Ideal Gas Heating Value	Btu/ft^3	2291.26	50.31	160.723	1698.18	5412.42
Gross Liquid Heating Value	Btu/lb	20526.3	0	2119.48	21530.9	20639.4

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU 49 100% 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 %			
Methane	0.0130009	0.267762			
Ethane	0.0353506	0.190705			
Propane	0.0572413	0.139454			
Isobutane	0.0211069	0.0341234			
n-Butane	0.0564373	0.0818505			
Isopentane	0.0335356	0.0397451			
n-Pentane	0.0398787	0.0455454			
Nitrogen	1.4895E-05	0.000778516			
Carbon Dioxide	0.00100697	0.00435199			
Benzene	0.00184478	0.00191913			
Toluene	0.00849641	0.00857725			
Ethylbenzene	0.00421932	0.00421847			
m-Xylene	0.0121718	0.0121598			
C6	0.103311	0.107824			
C7	0.234202	0.237097			
C8	0.183769	0.18389			
C9	0.154742	0.15421			
C10	0.319065	0.317496			
C11	0.130546	0.129831			
C12	0.238221	0.236877			
C13	0.0650844	0.0647119			
Water	98.2868	97.7369			

Mass Fraction	1 %	3 %			
Methane	0.0105413	0.216477			
Ethane	0.0537239	0.288984			
Propane	0.127572	0.309898			
Isobutane	0.0620035	0.099951			
n-Butane	0.16579	0.239748			
Isopentane	0.122288	0.144512			
n-Pentane	0.145419	0.165602			
Nitrogen	2.1089E-05	0.00109907			
Carbon Dioxide	0.00223982	0.00965221			
Benzene	0.00728302	0.00755464			
Toluene	0.0395664	0.0398273			
Ethylbenzene	0.0226399	0.0225698			
m-Xylene	0.0653109	0.0650578			
C6	0.449968	0.468266			
C7	1.18609	1.19727			
C8	1.06095	1.05859			
C9	1.00307	0.996731			
C10	2.29445	2.27656			
C11	1.03133	1.02271			
C12	2.05085	2.03338			
C13	0.606453	0.601238			
Water	89.4924	88.7343			

Mass Flow	1 lb/h	3 lb/h			
Methane	5.12941	106.256			

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job: Low Pressure Tower	
Location:	WEU 49 100% Contingency		
Flowsheet:	Flowsheet1		

Mass Flow	1 lb/h	3 lb/h			
Ethane	26.1421	141.845			
Propane	62.0767	152.111			
Isobutane	30.171	49.0601			
n-Butane	80.6736	117.679			
Isopentane	59.5057	70.9326			
n-Pentane	70.761	81.2845			
Nitrogen	0.0102619	0.53947			
Carbon Dioxide	1.0899	4.73771			
Benzene	3.54393	3.70813			
Toluene	19.2531	19.5489			
Ethylbenzene	11.0166	11.0782			
m-Xylene	31.7804	31.9331			
C6	218.955	229.844			
C7	577.153	587.672			
C8	516.261	519.598			
C9	488.097	489.237			
C10	1116.48	1117.43			
C11	501.844	501.989			
C12	997.946	998.068			
C13	295.101	295.113			
Water	43547.1	43554.5			

Stream Properties

Property	Units	1	3			
Temperature	°F	110	80.0337			
Pressure	psia	44.6959	1014.7			
Mole Fraction Vapor	%	0	0			
Mole Fraction Light Liquid	%	1.70862	2.20512			
Mole Fraction Heavy Liquid	%	98.2914	97.7949			
Molecular Weight	lb/lbmol	19.7856	19.843			
Mass Density	lb/ft^3	59.199	59.3185			
Molar Flow	lbmol/h	2459.37	2473.62			
Mass Flow	lb/h	48660.1	49084.2			
Vapor Volumetric Flow	ft^3/h	821.976	827.468			
Liquid Volumetric Flow	gpm	102.48	103.165			
Std Vapor Volumetric Flow	MMSCFD	22.399	22.5288			
Std Liquid Volumetric Flow	sgpm	101.391	103.439			
Compressibility		0.00244352	0.0586049			
Specific Gravity		0.949173	0.951089			
API Gravity		15.8906	16.6509			
Enthalpy	Btu/h	-3.00241E+08	-3.02121E+08			
Mass Enthalpy	Btu/lb	-6170.17	-6155.16			
Mass Cp	Btu/(lb*°F)	0.933375	0.928095			
Ideal Gas CpCv Ratio		1.29015	1.29181			
Dynamic Viscosity	cP	0.609776	0.819251			
Kinematic Viscosity	cSt	0.645256	0.851885			
Thermal Conductivity	Btu/(h*ft*°F)	0.322032	0.308067			
Surface Tension	lbf/ft	0.00425286	0.00432531 ?			
Net Ideal Gas Heating Value	Btu/ft^3	105.222	113.558			
Net Liquid Heating Value	Btu/lb	1053.22	1213.98			
Gross Ideal Gas Heating Value	Btu/ft^3	162.813	171.662			
Gross Liquid Heating Value	Btu/lb	2157.8	2325.17			

Remarks

Energy Stream Report

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU 49 100% Contingency	
Flowsheet:	Flowsheet1	

Energy Streams

Energy Stream	Energy Rate	Power	From Block	To Block
Q-1	1.30077E+06 Btu/h	511.221 hp	--	Low Pressure Tower

Remarks

Blocks
Low Pressure Tower
Separator Report

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU 49 100% Contingency	Modified: 9:36 AM, 1/21/2016
Flowsheet:	Flowsheet1	Status: Solved 10:20 AM, 2/4/2016

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	970	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0.576327	%	Heat Duty	1.30077E+06	Btu/h
Mole Fraction Light Liquid	1.69877	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	97.7249	%	Heat Release Curve Increments	5	

Remarks

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	EQT	Job: Low Pressure Tower	
Location:	WEU 49 100% Contingency	Modified: 2:14 PM, 7/24/2014	
Flowsheet:	Flowsheet1	Status: Solved 10:20 AM, 2/4/2016	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Water	Inlet		WEU 49 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 49 100% Contingency	Modified: 12:59 PM, 12/3/2015	
Flowsheet:	Flowsheet1	Status: Solved 10:20 AM, 2/4/2016	

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	0.0981026	%	Heat Duty	0	Btu/h
Mole Fraction Light Liquid	1.62318	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	98.2787	%	Heat Release Curve Increments	5	

Remarks

Flowsheet Environment
Environment1

Client Name:	EQT	Job: Low Pressure Tower
Location:	WEU 49 100% 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
Methane	False	False	Ethylbenzene	False	False
Ethane	False	False	m-Xylene	False	False
Propane	False	False	C6	False	False
Isobutane	False	False	C7	False	False
n-Butane	False	False	C8	False	False
Isopentane	False	False	C9	False	False
n-Pentane	False	False	C10	False	False
Nitrogen	False	False	C11	False	False
Carbon Dioxide	False	False	C12	False	False
Benzene	False	False	C13	False	False
Toluene	False	False	Water	False	True

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 49 100% Contingency	

Simple Solver 1

Source Code

Residual Error (for CV1) = TP / 1263816 - 1

Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!WEU 49 Pad Condensate!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	561.265
Unit	bbl/d

Measured Variable [TP]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Stable Liquid!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	1.26382E+06
Unit	bbl/yr

Solver Properties

Status: Solved

Error	-3.72017E-07		Iterations	13
Calculated Value	16.3702	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) = Water/86 - 1

Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Water!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	2985.21
Unit	bbl/d

Measured Variable [Water]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Stable Liquid!Phases!Total!Composition!Volumetric Fraction!Water
Value	85.9996
Unit	%

Solver Properties

Status: Solved

Error	-5.09198E-06		Iterations	13
Calculated Value	87.0686	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 49 100% Contingency	

Cn+ Flow/Frac.

User Value [CnPlusSum]

* Parameter	73.8416	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	3457.98	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 49 100% Contingency	

User Value [TVP]

* Parameter	0.352046 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	0.312395 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	0 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 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	0.0256078 kg/mol	Upper Bound	
Lower Bound		* Enforce Bounds	False

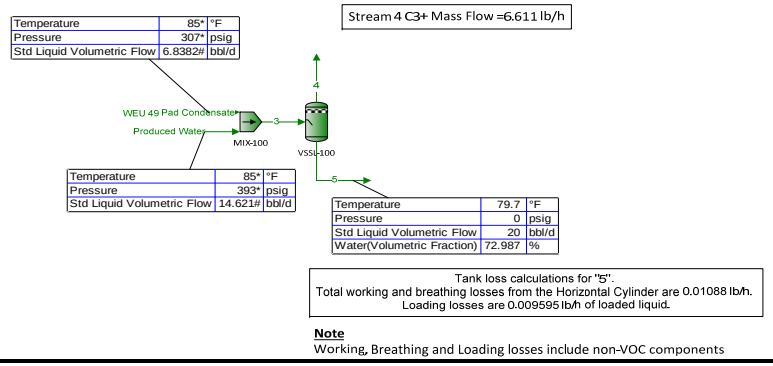
Remarks

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

Flowsheet1
Plant Schematic

Client Name:	EQT	Job:
Location:	WEU 49 Blowdown Tank	
Flowsheet:	Flowsheet1	

EQT WEU 49 Well Pad
Blowdown Tank



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

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job:	
Location:	WEU 49 Blowdown Tank		
Flowsheet:	Flowsheet1		

Connections

	Produced Water	WEU 49 Pad Condensate	3	4	5
From Block	--	--	MIX-100	VSSL-100	VSSL-100
To Block	MIX-100	MIX-100	VSSL-100	--	--

Stream Composition

Mole Fraction	Produced Water %	WEU 49 Pad Condensate %	3 %	4 %	5 %
Nitrogen	0 *	0 *	0	0	0
Methane	0 *	11.09 *	0.681199	31.7665	0.00738634
Carbon Dioxide	0 *	0.102 *	0.00626531	0.281957	0.000289342
Ethane	0 *	8.288 *	0.509087	22.623	0.0297413
Propane	0 *	7.164 *	0.440046	17.0913	0.0791094
i-Butane	0 *	2.232 *	0.1371	4.20264	0.048974
n-Butane	0 *	5.433 *	0.33372	8.92652	0.14746
i-Pentane	0 *	3.677 *	0.225858	3.56227	0.153537
n-Pentane	0 *	3.866 *	0.237467	3.0488	0.176528
Isohexane	0 *	4.668 *	0.28673	1.80814	0.253751
n-Hexane	0 *	4.11 *	0.252455	1.19369	0.232053
2,2,4-Trimethylpentane	0 *	0.031 *	0.00190416	0.00344008	0.00187087
Benzene	0 *	0.234 *	0.0143734	0.0659843	0.0132546
Heptane	0 *	12.522 *	0.769159	1.28232	0.758035
Toluene	0 *	0.939 *	0.0576777	0.0829813	0.0571292
Octane	0 *	14.608 *	0.89729	0.487975	0.906163
Ethylbenzene	0 *	0.127 *	0.00780092	0.00362186	0.00789151
o-Xylene	0 *	1.159 *	0.0711911	0.0249805	0.0721928
Nonane	0 *	7.352 *	0.451594	0.08128	0.459621
Decane	0 *	12.398 *	0.761542	0.0451694	0.77707
Water	100 *	0 *	93.8575	3.41746	95.8179

Mass Fraction	Produced Water %	WEU 49 Pad Condensate %	3 %	4 %	5 %
Nitrogen	0 *	0 *	0	0	0
Methane	0 *	2.12587 *	0.495623	13.6495	0.00545611
Carbon Dioxide	0 *	0.0536389 *	0.0125053	0.332358	0.000586327
Ethane	0 *	2.97785 *	0.694253	18.2199	0.0411777
Propane	0 *	3.77472 *	0.880034	20.1858	0.160622
i-Butane	0 *	1.55013 *	0.361397	6.54246	0.131066
n-Butane	0 *	3.77324 *	0.879691	13.8963	0.394639
i-Pentane	0 *	3.16997 *	0.739045	6.88386	0.510065
n-Pentane	0 *	3.33291 *	0.777033	5.89162	0.586443
Isohexane	0 *	4.8067 *	1.12063	4.17343	1.00687
n-Hexane	0 *	4.23212 *	0.986674	2.75519	0.920772
2,2,4-Trimethylpentane	0 *	0.0423126 *	0.00986472	0.0105249	0.00984012
Benzene	0 *	0.218407 *	0.0509192	0.138049	0.0476723
Heptane	0 *	14.9928 *	3.49541	3.4415	3.49742
Toluene	0 *	1.03381 *	0.241021	0.204785	0.242371
Octane	0 *	19.9388 *	4.64851	1.49296	4.7661
Ethylbenzene	0 *	0.161108 *	0.0375607	0.0102989	0.0385766
o-Xylene	0 *	1.47027 *	0.342778	0.0710329	0.352905
Nonane	0 *	11.2671 *	2.62681	0.279213	2.71429
Decane	0 *	21.0782 *	4.91416	0.172135	5.09087
Water	100 *	0 *	76.6861	1.649	79.4823

Mass Flow	Produced Water lb/h	WEU 49 Pad Condensate lb/h	3 lb/h	4 lb/h	5 lb/h
Nitrogen	0 *	0 *	0	0	0
Methane	0 *	1.37868 *	1.37868	1.36405	0.0146321

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job:
Location:	WEU 49 Blowdown Tank	
Flowsheet:	Flowsheet1	

Mass Flow	Produced Water lb/h	WEU 49 Pad Condensate lb/h	3 lb/h	4 lb/h	5 lb/h
Carbon Dioxide	0 *	0.0347863 *	0.0347863	0.0332139	0.0015724
Ethane	0 *	1.93121 *	1.93121	1.82078	0.11043
Propane	0 *	2.448 *	2.448	2.01725	0.430754
i-Butane	0 *	1.0053 *	1.0053	0.653813	0.351491
n-Butane	0 *	2.44705 *	2.44705	1.38872	1.05833
i-Pentane	0 *	2.05581 *	2.05581	0.687931	1.36788
n-Pentane	0 *	2.16148 *	2.16148	0.588772	1.57271
Isohexane	0 *	3.11728 *	3.11728	0.417067	2.70021
n-Hexane	0 *	2.74464 *	2.74464	0.275337	2.46931
2,2,4-Trimethylpentane	0 *	0.0274408 *	0.0274408	0.0010518	0.026389
Benzene	0 *	0.141643 *	0.141643	0.0137958	0.127847
Heptane	0 *	9.72324 *	9.72324	0.343923	9.37932
Toluene	0 *	0.670452 *	0.670452	0.0204649	0.649987
Octane	0 *	12.9308 *	12.9308	0.149198	12.7816
Ethylbenzene	0 *	0.104483 *	0.104483	0.00102921	0.103454
o-Xylene	0 *	0.953512 *	0.953512	0.00709859	0.946413
Nonane	0 *	7.30704 *	7.30704	0.0279028	7.27913
Decane	0 *	13.6698 *	13.6698	0.0172021	13.6526
Water	213.319 *	0 *	213.319	0.164791	213.154

Stream Properties

Property	Units	Produced Water	WEU 49 Pad Condensate	3	4	5
Temperature	°F	85 *	85 *	85.2654	79.6854	79.6854
Pressure	psia	407.696 *	321.696 *	321.696	14.6959 *	14.6959
Mole Fraction Vapor	%	0	4.04224	0.206284	100	0
Mole Fraction Light Liquid	%	100	95.9578	5.89431	0	4.1814
Mole Fraction Heavy Liquid	%	0	0	93.8994	0	95.8186
Molecular Weight	lb/lbmol	18.0153	83.6887	22.0492	37.3356	21.7179
Mass Density	lb/ft^3	62.1455	31.188	51.2531	0.0958949	57.1012
Molar Flow	lbmol/h	11.841	0.774928	12.6159	0.267664	12.3483
Mass Flow	lb/h	213.319	64.8527	278.172	9.99339	268.178
Vapor Volumetric Flow	ft^3/h	3.43257	2.07941	5.4274	104.212	4.69654
Liquid Volumetric Flow	gpm	0.427957	0.259252	0.676663	12.9927	0.585543
Std Vapor Volumetric Flow	MMSCFD	0.107843	0.00705775	0.114901	0.00243778	0.112463
Std Liquid Volumetric Flow	sgpm	0.42644 *	0.199448 *	0.625888	0.0425526	0.583335
Compressibility		0.0202195	0.147682	0.0236652	0.988522	0.000965675
Specific Gravity		0.996417			1.2891	0.915538
API Gravity		9.96415				22.2694
Enthalpy	Btu/h	-1.45326E+06	-62878.5	-1.51614E+06	-12145.5	-1.50399E+06
Mass Enthalpy	Btu/lb	-6812.63	-969.559	-5450.38	-1215.35	-5608.19
Mass Cp	Btu/(lb*°F)	0.981529	0.522577	0.875159	0.423509	0.884263
Ideal Gas CpCv Ratio		1.32512	1.0633	1.25922	1.14462	1.26452
Dynamic Viscosity	cP	0.833816			0.00903325	0.765717
Kinematic Viscosity	cSt	0.837605			5.88068	0.821429
Thermal Conductivity	Btu/(h*ft*°F)	0.353848			0.0126736	0.275946
Surface Tension	lbf/ft	0.00492858				0.00399843 ?
Net Ideal Gas Heating Value	Btu/ft^3	0	4265.11	261.983	1932.24	225.778
Net Liquid Heating Value	Btu/lb	-1059.76	19184.8	3660.04	19489.1	3070.18
Gross Ideal Gas Heating Value	Btu/ft^3	50.31	4603.87	330.01	2106.31	291.507
Gross Liquid Heating Value	Btu/lb	0	20720.9	4830.84	21258.4	4218.69

Remarks

* User Specified Values
? Extrapolated or Approximate Values

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	EQT	Job:	
Location:	WEU 49 Blowdown Tank	Modified: 2:14 PM, 7/24/2014	
Flowsheet:	Flowsheet1	Status: Solved 12:02 PM, 2/18/2015	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Water	Inlet		WEU 49 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:	
Location:	WEU 49 Blowdown Tank	Modified:	1:11 PM, 7/17/2014
Flowsheet:	Flowsheet1	Status:	Solved 12:02 PM, 2/18/2015

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	307	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	2.12163	%	Heat Duty	0	Btu/h
Mole Fraction Light Liquid	4.09268	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	93.7857	%	Heat Release Curve Increments	5	

Remarks

Flowsheet Environment
Environment1

Client Name:	EQT	Job:	
Location:	WEU 49 Blowdown Tank		
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	2,2,4-Trimethylpentane	False	False
Methane	False	False	Benzene	False	False
Carbon Dioxide	False	False	Heptane	False	False
Ethane	False	False	Toluene	False	False
Propane	False	False	Octane	False	False
i-Butane	False	False	Ethylbenzene	False	False
n-Butane	False	False	o-Xylene	False	False
i-Pentane	False	False	Nonane	False	False
n-Pentane	False	False	Decane	False	False
Isohexane	False	False	Water	False	True
n-Hexane	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:
Location:	WEU 49 Blowdown Tank	

Simple Solver 1

Source Code

Residual Error (for CV1) = TP / 20 - 1

Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!WEU 49 Pad Condensate!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	6.83823
Unit	bbl/d

Measured Variable [TP]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!5!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	20.0001
Unit	bbl/d

Solver Properties

Status: Solved

Error	3.66029E-06		Iterations	8
Calculated Value	0.199448	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 /73 - 1

Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Water!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	14.6208
Unit	bbl/d

Measured Variable [LF]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!5!Phases!Total!Composition!Std. Liquid Volumetric Fraction!Water
Value	73.0472
Unit	%

Solver Properties

Status: Solved

Error	0.000646915		Iterations	8
Calculated Value	0.42644	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:
Location:	WEU 49 Blowdown Tank	

Cn+ Flow/Frac.

User Value [CnPlusSum]

* Parameter	6.61055	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:
Location:	WEU 49 Blowdown Tank	

User Value [TVP]

* Parameter	0.596697 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	0.010877 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	0.0476412 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	0.00959524 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	0.0320318 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

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

Emission Point ID#	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		GHG (CO_2e)	
	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
Truck Liquids Unloading (S016)	--	--	--	--	0.08	0.38	--	--	--	--	--	--	1.05	4.61
TEG (S019)	<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 (S020)	<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
Enclosed Combustion Unit (C017)	1.07	4.71	0.90	3.95	0.76	3.33	<0.01	0.03	0.02	0.09	0.02	0.09	1,639.14	7,719.44
Enclosed Combustion Unit (C018)	1.07	4.71	0.90	3.95	0.76	3.33	<0.01	0.03	0.02	0.09	0.02	0.09	1,639.14	7,719.44
Compressor Engine (S022)	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
Line Heater (S023)	0.06	0.26	0.05	0.22	<0.01	0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	87.82	384.67
TOTAL	**3.19**	**13.95**	**3.20**	**14.01**	**1.89**	**8.44**	**<0.01**	**0.06**	**0.04**	**0.18**	**0.04**	**0.18**	**4,272.47**	**18,713.42**

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

ATTACHMENT T – FACILITY-WIDE HAP CONTROLLED EMISSIONS SUMMARY SHEET

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

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
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
Truck Liquids Unloading (S016)	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01
TEG (S019)	<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 (S020)	<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
Enclosed Combustion Unit (C017)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.24	0.06	0.26
Enclosed Combustion Unit (C018)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.24	0.06	0.26
Compressor Engine (S022)	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
Line Heater (S023)	<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	**0.04**	**0.17**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.11**	**0.47**	**0.16**	**0.69**

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

Attachment U

CLASS I LEGAL ADVERTISEMENT

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-49 natural gas production facility located in West Union, Doddridge County, West Virginia. The latitude and longitude coordinates are: 39.25473 and -80.78660.

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

Carbon Monoxide (CO) = 13.57 tpy
Nitrogen Oxides (NO_x) = 13.97 tpy
Particulate Matter (PM) = 8.08 tpy
Sulfur Dioxide (SO_2) = 0.09 tpy
Volatile Organic Compounds (VOC) = 9.57 tpy
Formaldehyde = 0.07 tpy
Hexane = 1.13 tpy
Hazardous Air Pollutants (HAPs) = 1.20 tpy
Carbon Dioxide Equivalents (CO_2e) = 21,124.30 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 February, 2016.

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