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Senior Environmental Coordinator

CERTIFIED MAIL #: 7017 1070 0000 4379 0260

October 4, 2017

William F. Durham, Director
WVDEP, Division of Air Quality
601 57th Street SE
Charleston, WV 25304

**Re: Equitrans, LP – West Union Compressor Station
Facility ID No: 017-00001
Title V Permit R30-01700001-2013
Application for Renewal**

Dear Mr. Durham:

Equitrans, LP (Equitrans) is submitting this Title V permit renewal application for its natural gas compressor station located in Doddridge County, West Virginia ("West Union Compressor Station). This station is currently operating under permit R30-017-00001-2013, issued April 8, 2013. The current permit expires on April 8, 2018 with a renewal application due date of October 8, 2017.

This permit application is being filed to renew the Title V permit at the West Union Compressor Station. The Title V Permit Application Forms and required supporting documents in accordance with the instructions for Title V permit application forms are enclosed as outlined below:

- Section 1: Introduction
- Section 2: Sample Emission Source Calculations;
- Section 3: Regulatory Discussion;
- Section 4: Title V Application Form;
- Attachment A: Area Map;
- Attachment B: Plot Plan;
- Attachment C: Process Flow Diagram;
- Attachment D: Equipment Table;
- Attachment E: Emission Unit Forms;
- Attachment G: Air Pollution Control Device Forms;
- Attachment I: Emissions Calculations

Please contact me at 412-395-3654 or via email at msowa@eqt.com if you have any questions regarding this application.

Sincerely,

A handwritten signature in blue ink that reads "Mark A. Sowa".

Mark A. Sowa
Senior Environmental Coordinator



PROJECT REPORT
Equitrans, LP > West Union Compressor Station

Title V Operating Permit Renewal Application

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September 2017

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ATTACHMENT I: EMISSION CALCULATIONS

1. INTRODUCTION

Equitrans, LP (Equitrans), a subsidiary of EQT Corporation (EQT), operates a natural gas transmission facility in West Union, Doddridge County, West Virginia referred to as the West Union #53 Compressor Station (West Union Station). The West Union Station is currently operating in accordance with West Virginia Department of Environmental Protection (WVDEP) Title V Operating Permit No. R30-01700001-2013 (issued on April 8, 2013).

The current Title V permit expires on April 8, 2018. Equitrans is submitting this timely and complete Title V Operating Permit (TVOP) renewal application by the renewal submission deadline of October 8, 2017 (six months before the expiration of the current permit) in accordance with Series 30, Section 4.1.a.3 of the WVDEP Division of Air Quality (DAQ) Code of State Rules (C.S.R.) §45-30-4.1.a.3.

Presuming WVDEP finds this application administratively complete, Equitrans may continue to operate the West Union Station under the terms of the existing Title V permit until the renewed permit is issued, even if this issuance would occur after the current permit's expiration date.

1.1. FACILITY AND PROJECT DESCRIPTION

The West Union Station is a natural gas transmission facility covered under Standard Industrial Classification (SIC) Code 4922. The station has the potential to operate 24 hours per day, 7 days per week. The West Union Station compresses and dehydrates natural gas and transports downstream along the pipeline system.

The station currently consists of the following equipment:

- > Three (3) Ingersoll Rand compressor engines rated at 1,080 hp (each);
- > Two (2) Waukesha generator engines, rated at 250 hp (each)
- > One (1) 20 million standard cubic feet per day (MMSCFD) triethylene glycol (TEG) dehydration unit equipped with associated reboiler (rated at 0.75 MMBtu/hr) and flare (rated at 0.80 MMBtu/hr);
- > One (1) 15 million standard cubic feet per day (MMSCFD) triethylene glycol (TEG) dehydration unit equipped with associated reboiler (rated at 0.75 MMBtu/hr) and thermal oxidizer (rated at 7.0 MMBtu/hr);
- > One (1) natural gas heating boiler (rated at 1.25 MMBtu/hr); and
- > Seven (7) miscellaneous storage tanks (7,500 gallons or less, each).

A process flow diagram is included as Attachment C.

1.2. SOURCE STATUS

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

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

Other additional pollutant emitting facilities should be aggregated with the West Union Station for air permitting purposes if and only if all three elements of the "stationary source" definition above are fulfilled. The West Union Station has been determined to be a separate stationary source with respect to permitting programs, including Title V and Prevention of Significant Deterioration, and has not been aggregated with other Equitrans assets.

The West Union Station's site-wide potential to emit currently exceeds the Title V major source thresholds for several pollutants. Refer to Section 3 for detailed discussion regarding applicable requirements and compliance demonstration methodology.

1.3. TITLE V APPLICATION ORGANIZATION

This West Virginia Initial Title V permit application is organized as follows:

- > Section 2: Sample Emission Source Calculations;
- > Section 3: Regulatory Discussion;
- > Section 4: Title V Application Form;
- > Attachment A: Area Map;
- > Attachment B: Plot Plan;
- > Attachment C: Process Flow Diagram;
- > Attachment D: Equipment Table;
- > Attachment E: Emission Unit Forms;
- > Attachment F: Schedule of Compliance Forms (*Not applicable*);
- > Attachment G: Air Pollution Control Device Forms;
- > Attachment H: Compliance Assurance Monitoring Forms (*Not applicable*);
- > Attachment I: Emissions Calculations; and
- > Application Fee.

2. SAMPLE EMISSION SOURCE CALCULATIONS

The characteristics of air emissions from the West Union Station, along with the methodology for calculating emissions, are briefly described in this section of the application. Detailed emission calculations are presented in Attachment I of this application.

Emissions from the facility will result from combustion of natural gas in the compressor and generator engines, heating boiler, and reboilers. Emissions will also result from operation of the dehydrators, and fugitive emissions from component leaks. The methods by which emissions from each of these source types are summarized below. There have been no changes at the facility during the permit term. Any changes in potential emissions from the previous application are primarily related to changes in gas composition and heating value.

- > **Compressor Engines:** Potential emissions of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), formaldehyde, and hazardous air pollutants (HAPs) are calculated using U.S. EPA's AP-42 factors for natural gas-fired four stroke lean burn engines.¹ Greenhouse gas (GHG) emissions are calculated according to 40 CFR 98 Subpart C.²
- > **Generator Engines:** Potential emissions of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), formaldehyde, and hazardous air pollutants (HAPs) are calculated using U.S. EPA's AP-42 factors for natural gas-fired four stroke rich burn engines. Greenhouse gas (GHG) emissions are calculated according to 40 CFR 98 Subpart C.
- > **Heating Boiler, Flare and Reboiler:** Potential emissions of criteria pollutants and HAPs are calculated using U.S. EPA's AP-42 factors for natural gas external combustion.³ These calculations assume a site-specific heat content of natural gas. GHG emissions are calculated according to 40 CFR 98 Subpart C.
- > **TEG Dehydration Units:** Potential emissions of HAPs, VOC, and GHGs from the dehydration units are calculated using GRI-GLYCalc v4.0.
- > **Fugitive Emissions:** Emissions from fugitive equipment leaks are calculated using published EPA emission factors and 40 CFR Part 98, Subpart W emission factors. Emissions from blowdown events are calculated using engineering estimates of the amount of gas vented during each event. Site specific gas analyses were used to speciate VOC, HAP, and GHG emissions.

¹ U.S. EPA, AP 42, Fifth Edition, Volume I, Chapter 3.2, *Natural Gas-Fired Reciprocating Engine*, July 2000.

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

³ U.S. EPA, AP 42, Fifth Edition, Volume I, Chapter 1.4, *Natural Gas Combustion*, Supplement D, July 1998.

3. REGULATORY DISCUSSION

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

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

This review is presented to supplement and/or add clarification to the information provided in the Title V operating permit application forms, which fulfill the requirement to include citations and descriptions of applicable statutory and administrative code requirements.

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

3.1. PSD AND NNSR SOURCE CLASSIFICATION

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration and new and modified sources of non-attainment pollutants under Non-Attainment New Source Review. PSD regulations apply when a new source is constructed in which emissions exceed major source thresholds, an existing minor source undergoes a modification in which emission increases exceed PSD major source thresholds, or an existing major source undergoes a modification in which emission increases exceed PSD significant emission rates. The West Union Station is considered an existing major source with respect to PSD, and as such when undertaking modifications may be subject to NSR permit requirements. No new sources are being installed as part of this application and as such, PSD is not triggered.

NNSR regulations only apply in areas designated as non-attainment. The West Union Station is located in Doddridge County, which is designated as attainment/unclassifiable for all criteria pollutants.⁴ Therefore, NNSR regulations do not apply to the West Union Station.

3.2. TITLE V OPERATING PERMIT PROGRAM

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in West Virginia Code of State Regulations (CSR) 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any

⁴ U.S. EPA Greenbook, http://www.epa.gov/airquality/greenbook/anayo_wv.html.

combination of HAP, and 100 tpy of all other regulated pollutants. The potential emissions of NO_x and CO exceed the respective major source thresholds for Title V. Therefore, the West Union Station is a major source with respect to the Title V Program. The West Union Station currently operates under Title V Permit No. R30-01700001-2013. This renewal application is being submitted to meet the requirements of the Title V program.

3.3. COMPLIANCE ASSURANCE MONITORING

Under 40 CFR 64, the Compliance Assurance Monitoring (CAM) regulations, facilities are required to prepare and submit monitoring plans for certain emissions units with the initial or renewal Title V operating permit application. CAM Plans are intended to provide an on-going and reasonable assurance of compliance with emission limits for sources that utilize active control devices. Equitrans addressed CAM applicability in the previous Title V renewal application and has been incorporated into the current Title V permit. There have been no changes since the last renewal application which would trigger a CAM review. As such, no new CAM review is required.

3.4. NEW SOURCE PERFORMANCE STANDARDS

New Source Performance Standards, located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the facility.

3.4.1. NSPS Subparts D, Da, Db, and Dc - Steam Generating Units

These subparts apply to steam generating units of various sizes, all greater than 10 MMBtu/hr. The West Union Station does not include any steam generating units with a heat input greater than 10 MMBtu/hr, therefore the requirements of these subparts do not apply.

3.4.2. NSPS Subparts LLL and KKK - Natural Gas Processing Plants

These subparts apply to affected facilities located at natural gas processing plants (e.g., sweetening units, fugitive components). The West Union Station does not meet the definition of a natural gas processing facility. Therefore, the requirements of these subparts do not apply.

3.4.3. NSPS Subparts IIII - Stationary Compression Ignition Internal Combustion Engines

This subpart applies to manufacturers, owners, and operators of stationary compression ignition internal combustion engines (CI ICE) that have been constructed, reconstructed, or modified after various dates, the earliest of which is July 11, 2005. The Ingersoll Rand compressor engines and Waukesha generator engines at the West Union Station are spark-ignition internal combustion engines. Therefore, the requirements of this subpart do not apply.

3.4.4. NSPS Subpart JJJJ - Stationary Spark Ignition Internal Combustion Engines

New Source Performance Standards 40 CFR Part 60 Subpart JJJJ (NSPS JJJJ) affects owners and operators of stationary spark ignition internal combustion engines (SI ICE) that commence construction, reconstruction or modification after June 12, 2006. Applicability dates are based on the manufacture date for new engines. The applicability dates for new engines range from July 1, 2007 to January 1, 2009, depending upon the engine horsepower and application. The Ingersoll Rand compressor engines (C-001 to C-003) and the Waukesha generator engines (G-001 to G-002) at the West Union Station were manufactured prior to the applicability date of NSPS Subpart JJJJ. Therefore, these units are not subject to this subpart.

3.4.5. NSPS Subparts K, Ka, and Kb - Storage Vessels

These subparts apply to storage tanks of certain sizes constructed, reconstructed, or modified during various time periods. Subpart K applies to storage tanks constructed, reconstructed, or modified prior to 1978, and Subpart Ka applies to those constructed, reconstructed, or modified prior to 1984. Subpart Kb applies to volatile organic liquid (VOL) storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m³ (~19,813 gallons). The storage tanks at the West Union Station were constructed after this date, but do not have a capacity greater than 75 m³. Therefore, Subpart Kb do not apply to the storage tanks at the West Union Station.

3.4.6. NSPS Subparts OOOO and OOOOa – Crude Oil and Natural Gas Facilities

Subparts OOOO and OOOOa – *Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution*, applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011 and before September 18, 2015 for OOOO and after September 18, 2015 for OOOOa. The equipment at the West Union Station was installed prior to the applicability dates of both rules. Therefore, NSPS OOOO and OOOOa are not applicable.

3.4.7. Non-Applicability of All Other NSPS

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

3.5. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Regulatory requirements for facilities subject to NESHAP standards, otherwise known as Maximum Available Control Technology (MACT) Standards for source categories, are contained in 40 CFR Part 63. 40 CFR Part 61 NESHAP standards are defined for specific pollutants while Part 63 NESHAPs are defined for source categories where allowable emission limits are established on the basis of a MACT determination for a particular major source. A major source of HAP is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP. Part 63 NESHAPs apply to sources in specifically regulated industrial source categories (CAA Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type.

The West Union Station is an area source of HAP emissions since its potential emission of HAP are less than the 10/25 tpy major threshold. The potential applicability of specific MACT standards to the West Union Station is discussed below.

3.5.1. NESHAP Subpart HH - Oil and Natural Gas Production Facilities

This MACT standard contains requirements for dehydration units, located at natural gas production facilities. The benzene emissions from the existing production glycol dehydrator vent (Dehy #2) is less than 0.90 megagrams per year (1 tpy), therefore, the West Union Compressor Station is exempt from the requirements of NESHAP Subpart HH pursuant to 40 CFR §63.764(e)(1)(ii), except for the requirement to keep records of the actual average natural gas flow rate or actual average benzene emissions from the dehydrator, per 40 CFR §63.774(d)(1). Equitrans will continue to comply with the requirements of Subpart HH as outlined in the current permit.

3.5.2. NESHAP Subpart HHH - Natural Gas Transmission and Storage Facilities

This MACT subpart applies to facilities which are major sources of HAP that transport or store natural gas prior to entering the transmission pipeline to end users as defined by 40 CFR §63.1271. Specifically, each dehydration unit at

these facilities is subject to this subpart. The transmission dehy (Dehy #1) at the West Union station transports or stores natural gas prior to the transmission line and is potentially subject to this subpart. However, the West Union station is an area source based on the criteria of this MACT. Therefore, the requirements of this subpart do not apply.

3.5.3. NESHAP Subpart ZZZZ - Stationary Reciprocating Internal Combustion Engines

This MACT subpart applies to stationary reciprocating combustion engines (RICE) at major and area sources of HAP. The West Union Station is a minor source of HAP. The Ingersoll Rand compressor engines and the Waukesha generator engines at the West Union Station were installed in 1984 and have not been reconstructed or modified. The Ingersoll Rand compressor engines (C-001 to C-003) are classified as 4-stroke, lean-burn, non-emergency units with ratings of 1,080 hp each, and as such they are subject to the requirements for existing, 4-stroke, lean-burn, non-emergency, spark ignition (SI) units at an area source. The Waukesha generator engines (G-001 to G-002), each rated at 250 hp, are classified as a 4-stroke, rich burn, non-emergency SI units at an area source. The generators are subject to the requirements for existing, non-emergency, SI units less than 500 horsepower at area sources. All of the engines at the West union Facility have been determined to be "Remote Stationary RICE" in accordance with the definition the definitions on 40 CFR §63.6675.

Per 40 CFR §63.6625(h), Equitrans will minimize the engines' time spent at idle and minimize the engines' startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes. Equitrans will also comply with the work practice standards in 40 CFR §63.6603 and maintain records to show these standards have been met. Work practice standards include changing the oil and filter⁵, inspecting spark plugs (and replacing as necessary) and inspecting all hoses and belts (and replacing as necessary) at intervals specified in Table 2d of Subpart ZZZZ.

3.5.4. NESHAP Subpart JJJJJ - Industrial, Commercial, and Institutional Boilers

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

3.6. WEST VIRGINIA SIP REGULATIONS

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

3.6.1. 45 CSR 2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

45 CSR 2 applies to fuel burning units, defined as equipment burning fuel "for the primary purpose of producing heat or power by indirect heat transfer". The reboiler and heating boiler are fuel burning units and therefore must comply with this regulation. Per 45 CSR 2-3, opacity of emissions from units shall not exceed 10 percent, based on a six-minute block average. Per 45 CSR 2-4, PM emissions from the units will not exceed a level measured in lb/hr of 0.09 multiplied by the heat design inputs in MMBtu/hr.

⁵ Equitrans also has the option of implementing an oil analysis program per §63.6625(j) in lieu of replacing the oil at each interval.

3.6.2. 45 CSR 4: To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

According to 45 CSR 4-3:

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

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

3.6.3. 45 CSR 6: Control of Air Pollution from the Combustion of Refuse

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

3.6.4. 45 CSR 10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

This rule potentially applies to fuel burning units, including glycol dehydration unit reboilers and heating boiler. Per 45 CSR 10-10.1, units rated less than 10 MMBtu/hr are exempt from the SO₂ emission limitations and testing, monitoring, recordkeeping, and reporting requirements of this rule. The reboiler and heating boiler at the West Union station are each rated less than 10 MMBtu/hr and as such are exempt from this rule.

3.6.5. 45 CSR 16: Standards of Performance for New Stationary Sources

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

3.6.6. 45 CSR 17: To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage and Other Sources of Fugitive Particulate Matter

According to 45 CSR 17-3.1:

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

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

3.6.7. 45 CSR 21-28: Petroleum Liquid Storage in Fixed Roof Tanks

45 CSR 21-28 applies to any fixed roof petroleum liquid storage tank with a capacity greater than 40,000 gallons located in Putnam County, Kanawha County, Cabell County, Wayne County, and Wood County. The capacity of each

storage tank at West Union is less than 40,000 gallons and the facility is not located in a listed county. Therefore, 45 CSR 21-28 does not apply to the storage tanks at this station.

3.6.8. 45 CSR 34: Emissions Standards for Hazardous Air Pollutants

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

3.6.9. Non-Applicability of Other SIP Rules

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

4. TITLE V APPLICATION FORMS

The WVDEP permit application forms contained in this application include all applicable Title V application forms including the required attachments.



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street SE
Charleston, WV 25304
Phone: (304) 926-0475

www.dep.wv.gov/daq

INITIAL/RENEWAL TITLE V PERMIT APPLICATION - GENERAL FORMS

Section 1: General Information

Form with 10 numbered sections: 1. Name of Applicant (Equitrans, LP), 2. Facility Name (West Union Compressor Station #53), 3. DAQ Plant ID No. (017-00001), 4. Federal Employer ID No. (25-1776875), 5. Permit Application Type (Renewal), 6. Type of Business Entity (Corporation), 7. Is the Applicant the: (Both), 8. Number of onsite employees (0), 9. Governmental Code (Privately owned and operated; 0), 10. Business Confidentiality Claims (No).

11. Mailing Address		
Street or P.O. Box: 625 Liberty Avenue, Suite 1700		
City: Pittsburgh	State: PA	Zip: 15222
Telephone Number: (412) 395-3654	Fax Number:	

12. Facility Location		
Street: Off WV Route 19	City: West Union	County: Doddridge
UTM Easting: 516.465 km	UTM Northing: 4,352.724 km	Zone: <input checked="" type="checkbox"/> 17 or <input type="checkbox"/> 18
Directions: From Fairmont, take Interstate 79 south to the Clarksburg exit. Go to the end of ramp to stop sign and turn right onto U.S. Route 50 west. Follow U.S. Route 50 west approximately 25 miles. Make a right turn onto WV Route 18 north. Go approximately 5 miles and West Union station is on the right		
Portable Source? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Is facility located within a nonattainment area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, for what air pollutants?	
Is facility located within 50 miles of another state? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, name the affected state(s). Ohio, Pennsylvania	
Is facility located within 100 km of a Class I Area ¹ ? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, do emissions impact a Class I Area ¹ ? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, name the area(s). Otter Creek	
¹ Class I areas include Dolly Sods and Otter Creek Wilderness Areas in West Virginia, and Shenandoah National Park and James River Face Wilderness Area in Virginia.		

13. Contact Information		
Responsible Official: Clifford W. Baker		Title: Sr. Vice President - Midstream Field Operations
Street or P.O. Box: 625 Liberty Avenue, Suite 1700		
City: Pittsburgh	State: PA	Zip: 15222
Telephone Number: () -		Fax Number: () -
E-mail address: cBaker@eqt.com		
Environmental Contact: Mark A. Sowa		Title: Sr. Environmental Coordinator
Street or P.O. Box: 625 Liberty Avenue, Suite 1700		
City: Pittsburgh	State: PA	Zip: 15222
Telephone Number: (412) 395-3654		Fax Number: () -
E-mail address: msowa@eqt.com		
Application Preparer: Tom Muscenti		Title: Principal Consultant
Company: Trinity Consultants		
Street or P.O. Box: 4500 Brooktree Road, Suite 103		
City: Wexford	State: PA	Zip: 15090
Telephone Number: (724) 935-2611		Fax Number: () -
E-mail address: tmuscenti@trinityconsultants.com		

14. Facility Description

List all processes, products, NAICS and SIC codes for normal operation, in order of priority. Also list any process, products, NAICS and SIC codes associated with any alternative operating scenarios if different from those listed for normal operation.

Process	Products	NAICS	SIC
Natural Gas Transmission Facility	Natural Gas	486210	4922

Provide a general description of operations.

The West Union Station is a natural gas transmission station that compresses and dehydrates natural gas and transports it downstream along the pipeline system. The facility consists of three (3) compressor engines, two (2) generator engines, one (1) TEG dehydration unit with associated reboiler and flare, one (1) TEG dehydration unit with associated reboiler and thermal oxidizer (TO), one (1) natural gas fired heating boiler and seven (7) miscellaneous storage tanks (each 7,500 gallons or less).

15. Provide an Area Map showing plant location as ATTACHMENT A.

16. Provide a Plot Plan(s), e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is located as ATTACHMENT B. For instructions, refer to "Plot Plan - Guidelines."

17. Provide a detailed Process Flow Diagram(s) showing each process or emissions unit as ATTACHMENT C. Process Flow Diagrams should show all emission units, control equipment, emission points, and their relationships.

Section 2: Applicable Requirements

18. Applicable Requirements Summary	
Instructions: Mark all applicable requirements.	
<input checked="" type="checkbox"/> SIP	<input type="checkbox"/> FIP
<input checked="" type="checkbox"/> Minor source NSR (45CSR13)	<input type="checkbox"/> PSD (45CSR14)
<input checked="" type="checkbox"/> NESHAP (45CSR34)	<input type="checkbox"/> Nonattainment NSR (45CSR19)
<input type="checkbox"/> Section 111 NSPS	<input checked="" type="checkbox"/> Section 112(d) MACT standards
<input type="checkbox"/> Section 112(g) Case-by-case MACT	<input type="checkbox"/> 112(r) RMP
<input type="checkbox"/> Section 112(i) Early reduction of HAP	<input type="checkbox"/> Consumer/commercial prod. reqts., section 183(e)
<input type="checkbox"/> Section 129 Standards/Reqts.	<input type="checkbox"/> Stratospheric ozone (Title VI)
<input type="checkbox"/> Tank vessel reqt., section 183(f)	<input type="checkbox"/> Emissions cap 45CSR§30-2.6.1
<input type="checkbox"/> NAAQS, increments or visibility (temp. sources)	<input type="checkbox"/> 45CSR27 State enforceable only rule
<input type="checkbox"/> 45CSR4 State enforceable only rule	<input type="checkbox"/> Acid Rain (Title IV, 45CSR33)
<input type="checkbox"/> Emissions Trading and Banking (45CSR28)	<input checked="" type="checkbox"/> Compliance Assurance Monitoring (40CFR64)
<input type="checkbox"/> CAIR NO _x Annual Trading Program (45CSR39)	<input type="checkbox"/> CAIR NO _x Ozone Season Trading Program (45CSR40)
<input type="checkbox"/> CAIR SO ₂ Trading Program (45CSR41)	

19. Non Applicability Determinations

List all requirements which the source has determined not applicable and for which a permit shield is requested. The listing shall also include the rule citation and the reason why the shield applies.

40 CFR part 60 Subpart Dc – The boilers at the West Union Station are below 10 MMBtu/hr.

40 CFR part 60 Subpart GG – There are no turbines at West Union Station.

40 CFR part 60 Subparts K, Ka – All tanks at the West Union Station are less than 40,000 gallons in capacity.

40 CFR part 60 Subpart KKK – West Union Station is not engaged in the extraction of natural gas liquids from field gas or in the fractionation of mixed natural gas liquids to natural gas products.

40 CFR part 60 Subpart LLL – There are no sweetening units at West Union Station.

40 CFR part 60 Subpart IIII – The engines at West Union Station are not stationary compression ignition (CI) internal combustion engines (ICE).

40 CFR part 60 Subpart JJJJ - This subpart applies to manufacturers, owners, and operators of stationary spark ignition internal combustion engines (ICE) that have been constructed, reconstructed, or modified after various dates, the earliest of which is June 12, 2006. All of the spark ignition ICE engines at the West Union Station, including emergency generators, were installed prior to 2006 (latest installation date is 1974) and have not been modified or reconstructed, and therefore the requirements of this subpart do not apply

40 CFR part 60 Subparts OOOO and OOOOa - This subpart applies to affected facilities that have been constructed, reconstructed, or modified after August 23, 2011, and September 18, 2015, respectively. All emission units at the West Union Station, including tanks, were installed prior to August 23, 2011 and have not been modified or reconstructed, and therefore the requirements of this subpart do not apply

40 CFR part 63 Subpart DDDDD - This MACT standard applies to industrial, commercial, and institutional boilers and process heaters of various sizes and fuel types at major sources of HAP emissions. The West Union Station is an area source of HAP emissions. Therefore, this subpart is not applicable.

40 CFR part 63 Subpart JJJJJJ – This MACT standard applies to industrial, commercial, and institutional boilers at area sources of HAP. All boilers at the West Union Station fire natural gas exclusively. Natural gas fired boilers are exempt from the rule per 40 C.F.R. §63.11195(e). Therefore, this rule is not applicable to boilers at the West Union Station.

Permit Shield

19. Non Applicability Determinations (Continued) - Attach additional pages as necessary.

List all requirements which the source has determined not applicable and for which a permit shield is requested. The listing shall also include the rule citation and the reason why the shield applies.

45 CSR 21: The West Union Compressor Station is not located in Cabell, Kanawha, Putnam, Wayne, nor Wood counties.

45 CSR 27 - Natural gas is included as a petroleum product and contains less than 5% benzene by weight.

45 CSR §27-2.4 exempts equipment "used in the production and distribution of petroleum products providing that such equipment does not produce or contact materials containing more than 5% benzene by weight."

Permit Shield

20. Facility-Wide Applicable Requirements

List all facility-wide applicable requirements. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements).

- 45CSR§6-3.1 Open Burning, R30 Permit Condition 3.1.1.
- 45CSR§6-3.2 Open Burning Exemptions R30 Permit Condition 3.1.2.
- 45CSR§61.145(b) and 45CSR§34 Asbestos, R30 Permit Condition 3.1.3.
- 45CSR§4-3.1 Odor, R30 Permit Condition 3.1.4.
- 45CSR§11-5.2 Standby Plan for Reducing Emissions, R30 Permit Condition 3.1.5.
- 45CSR§17-3-1 Particulate Matter Emissions

Permit Shield

For all facility-wide applicable requirements listed above, provide monitoring/testing / recordkeeping / reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number and/or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

- WV Code §22-5-4(a)(14-15) and 45CSR13 Stack Testing, R30 Permit Condition 3.3.
- Retention of Records, R30 Permit Condition 3.4.2
- 45CSR§4 Odors, R30 Permit Condition 3.4.3.
- Reporting Requirements, R30 Permit Condition 3.5.

Are you in compliance with all facility-wide applicable requirements? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

20. Facility-Wide Applicable Requirements (Continued) - Attach additional pages as necessary.

List all facility-wide applicable requirements. For each applicable requirement, include the rule citation and/or permit with the condition number.

Permit Shield

For all facility-wide applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number and/or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Are you in compliance with all facility-wide applicable requirements? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

Section 3: Facility-Wide Emissions

23. Facility-Wide Emissions Summary [Tons per Year]	
Criteria Pollutants	Potential Emissions
Carbon Monoxide (CO)	108.61
Nitrogen Oxides (NO _x)	480.87
Lead (Pb)	--
Particulate Matter (PM _{2.5}) ¹	1.57
Particulate Matter (PM ₁₀) ¹	1.57
Total Particulate Matter (TSP)	1.57
Sulfur Dioxide (SO ₂)	0.10
Volatile Organic Compounds (VOC)	18.81
Hazardous Air Pollutants²	Potential Emissions
Formaldehyde (HCHO)	6.02
Total HAPs	8.95
Regulated Pollutants other than Criteria and HAP	Potential Emissions

¹PM_{2.5} and PM₁₀ are components of TSP.
²For HAPs that are also considered PM or VOCs, emissions should be included in both the HAPs section and the Criteria Pollutants section.

Section 4: Insignificant Activities

24. Insignificant Activities (Check all that apply)	
<input checked="" type="checkbox"/>	1. Air compressors and pneumatically operated equipment, including hand tools.
<input type="checkbox"/>	2. Air contaminant detectors or recorders, combustion controllers or shutoffs.
<input checked="" type="checkbox"/>	3. Any consumer product used in the same manner as in normal consumer use, provided the use results in a duration and frequency of exposure which are not greater than those experienced by consumer, and which may include, but not be limited to, personal use items; janitorial cleaning supplies, office supplies and supplies to maintain copying equipment.
<input checked="" type="checkbox"/>	4. Bathroom/toilet vent emissions.
<input checked="" type="checkbox"/>	5. Batteries and battery charging stations, except at battery manufacturing plants.
<input type="checkbox"/>	6. Bench-scale laboratory equipment used for physical or chemical analysis, but not lab fume hoods or vents. Many lab fume hoods or vents might qualify for treatment as insignificant (depending on the applicable SIP) or be grouped together for purposes of description.
<input type="checkbox"/>	7. Blacksmith forges.
<input checked="" type="checkbox"/>	8. Boiler water treatment operations, not including cooling towers.
<input checked="" type="checkbox"/>	9. Brazing, soldering or welding equipment used as an auxiliary to the principal equipment at the source.
<input type="checkbox"/>	10. CO ₂ lasers, used only on metals and other materials which do not emit HAP in the process.
<input checked="" type="checkbox"/>	11. Combustion emissions from propulsion of mobile sources, except for vessel emissions from Outer Continental Shelf sources.
<input checked="" type="checkbox"/>	12. Combustion units designed and used exclusively for comfort heating that use liquid petroleum gas or natural gas as fuel.
<input checked="" type="checkbox"/>	13. Comfort air conditioning or ventilation systems not used to remove air contaminants generated by or released from specific units of equipment.
<input type="checkbox"/>	14. Demineralized water tanks and demineralizer vents.
<input type="checkbox"/>	15. Drop hammers or hydraulic presses for forging or metalworking.
<input type="checkbox"/>	16. Electric or steam-heated drying ovens and autoclaves, but not the emissions from the articles or substances being processed in the ovens or autoclaves or the boilers delivering the steam.
<input type="checkbox"/>	17. Emergency (backup) electrical generators at residential locations.
<input type="checkbox"/>	18. Emergency road flares.
<input checked="" type="checkbox"/>	<p>19. Emission units which do not have any applicable requirements and which emit criteria pollutants (CO, NO_x, SO₂, VOC and PM) into the atmosphere at a rate of less than 1 pound per hour and less than 10,000 pounds per year aggregate total for each criteria pollutant from all emission units.</p> <p>Please specify all emission units for which this exemption applies along with the quantity of criteria pollutants emitted on an hourly and annual basis:</p> <p><u>1 – 4200 gallon used oil storage tank</u></p> <p><u>1 – 7500 gallon pipeline condensate storage tank</u></p> <p><u>1 – 4800 gallon new oil storage tank</u></p> <p><u>1 – 1500 gallon ambitol storage tank</u></p> <p><u>2 – 300 gallon used glycol storage tanks</u></p> <p><u>1 – 2000 gallon new glycol storage tank</u></p> <p><u>VOC emissions from leaking valves, compressors, and connectors.</u></p>

24. Insignificant Activities (Check all that apply)	
<input type="checkbox"/>	<p>20. Emission units which do not have any applicable requirements and which emit hazardous air pollutants into the atmosphere at a rate of less than 0.1 pounds per hour and less than 1,000 pounds per year aggregate total for all HAPs from all emission sources. This limitation cannot be used for any source which emits dioxin/furans nor for toxic air pollutants as per 45CSR27.</p> <p>Please specify all emission units for which this exemption applies along with the quantity of hazardous air pollutants emitted on an hourly and annual basis:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<input type="checkbox"/>	21. Environmental chambers not using hazardous air pollutant (HAP) gases.
<input type="checkbox"/>	22. Equipment on the premises of industrial and manufacturing operations used solely for the purpose of preparing food for human consumption.
<input type="checkbox"/>	23. Equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators, and electrical power generating equipment.
<input checked="" type="checkbox"/>	24. Equipment used for quality control/assurance or inspection purposes, including sampling equipment used to withdraw materials for analysis.
<input type="checkbox"/>	25. Equipment used for surface coating, painting, dipping or spray operations, except those that will emit VOC or HAP.
<input checked="" type="checkbox"/>	26. Fire suppression systems.
<input type="checkbox"/>	27. Firefighting equipment and the equipment used to train firefighters.
<input type="checkbox"/>	28. Flares used solely to indicate danger to the public.
<input checked="" type="checkbox"/>	29. Fugitive emission related to movement of passenger vehicle provided the emissions are not counted for applicability purposes and any required fugitive dust control plan or its equivalent is submitted.
<input type="checkbox"/>	30. Hand-held applicator equipment for hot melt adhesives with no VOC in the adhesive formulation.
<input checked="" type="checkbox"/>	31. Hand-held equipment for buffing, polishing, cutting, drilling, sawing, grinding, turning or machining wood, metal or plastic.
<input type="checkbox"/>	32. Humidity chambers.
<input type="checkbox"/>	33. Hydraulic and hydrostatic testing equipment.
<input type="checkbox"/>	34. Indoor or outdoor kerosene heaters.
<input checked="" type="checkbox"/>	35. Internal combustion engines used for landscaping purposes.
<input type="checkbox"/>	36. Laser trimmers using dust collection to prevent fugitive emissions.
<input type="checkbox"/>	37. Laundry activities, except for dry-cleaning and steam boilers.
<input checked="" type="checkbox"/>	38. Natural gas pressure regulator vents, excluding venting at oil and gas production facilities.
<input type="checkbox"/>	39. Oxygen scavenging (de-aeration) of water.
<input type="checkbox"/>	40. Ozone generators.

24. Insignificant Activities (Check all that apply)	
<input checked="" type="checkbox"/>	41. Plant maintenance and upkeep activities (e.g., grounds-keeping, general repairs, cleaning, painting, welding, plumbing, re-tarring roofs, installing insulation, and paving parking lots) provided these activities are not conducted as part of a manufacturing process, are not related to the source's primary business activity, and not otherwise triggering a permit modification. (Cleaning and painting activities qualify if they are not subject to VOC or HAP control requirements. Asphalt batch plant owners/operators must still get a permit if otherwise requested.)
<input checked="" type="checkbox"/>	42. Portable electrical generators that can be moved by hand from one location to another. "Moved by Hand" means that it can be moved without the assistance of any motorized or non-motorized vehicle, conveyance, or device.
<input type="checkbox"/>	43. Process water filtration systems and demineralizers.
<input checked="" type="checkbox"/>	44. Repair or maintenance shop activities not related to the source's primary business activity, not including emissions from surface coating or de-greasing (solvent metal cleaning) activities, and not otherwise triggering a permit modification.
<input checked="" type="checkbox"/>	45. Repairs or maintenance where no structural repairs are made and where no new air pollutant emitting facilities are installed or modified.
<input checked="" type="checkbox"/>	46. Routing calibration and maintenance of laboratory equipment or other analytical instruments.
<input type="checkbox"/>	47. Salt baths using nonvolatile salts that do not result in emissions of any regulated air pollutants. Shock chambers.
<input type="checkbox"/>	48. Shock chambers.
<input type="checkbox"/>	49. Solar simulators.
<input type="checkbox"/>	50. Space heaters operating by direct heat transfer.
<input type="checkbox"/>	51. Steam cleaning operations.
<input type="checkbox"/>	52. Steam leaks.
<input type="checkbox"/>	53. Steam sterilizers.
<input type="checkbox"/>	54. Steam vents and safety relief valves.
<input type="checkbox"/>	55. Storage tanks, reservoirs, and pumping and handling equipment of any size containing soaps, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized.
<input checked="" type="checkbox"/>	56. Storage tanks, vessels, and containers holding or storing liquid substances that will not emit any VOC or HAP. Exemptions for storage tanks containing petroleum liquids or other volatile organic liquids should be based on size limits such as storage tank capacity and vapor pressure of liquids stored and are not appropriate for this list.
<input type="checkbox"/>	57. Such other sources or activities as the Director may determine.
<input type="checkbox"/>	58. Tobacco smoking rooms and areas.
<input checked="" type="checkbox"/>	59. Vents from continuous emissions monitors and other analyzers.

Section 5: Emission Units, Control Devices, and Emission Points

25. Equipment Table
Fill out the Title V Equipment Table and provide it as ATTACHMENT D .
26. Emission Units
For each emission unit listed in the Title V Equipment Table , fill out and provide an Emission Unit Form as ATTACHMENT E .
For each emission unit not in compliance with an applicable requirement, fill out a Schedule of Compliance Form as ATTACHMENT F .
27. Control Devices
For each control device listed in the Title V Equipment Table , fill out and provide an Air Pollution Control Device Form as ATTACHMENT G .
For any control device that is required on an emission unit in order to meet a standard or limitation for which the potential pre-control device emissions of an applicable regulated air pollutant is greater than or equal to the Title V Major Source Threshold Level, refer to the Compliance Assurance Monitoring (CAM) Form(s) for CAM applicability. Fill out and provide these forms, if applicable, for each Pollutant Specific Emission Unit (PSEU) as ATTACHMENT H .

Section 6: Certification of Information

28. Certification of Truth, Accuracy and Completeness and Certification of Compliance

Note: This Certification must be signed by a responsible official. The original, signed in blue ink, must be submitted with the application. Applications without an original signed certification will be considered as incomplete.

a. Certification of Truth, Accuracy and Completeness

I certify that I am a responsible official (as defined at 45CSR§30-2.38) and am accordingly authorized to make this submission on behalf of the owners or operators of the source described in this document and its attachments. I certify under penalty of law that I have personally examined and am familiar with the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine and/or imprisonment.

b. Compliance Certification

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

Responsible official (type or print)

Name: Clifford W. Baker

Title: Sr. Vice President - Midstream Field Operations

Responsible official's signature:

Signature: Clifford W. Baker Signature Date: 10-4-17
 (Must be signed and dated in blue ink)

Note: Please check all applicable attachments included with this permit application:

<input checked="" type="checkbox"/>	ATTACHMENT A: Area Map
<input checked="" type="checkbox"/>	ATTACHMENT B: Plot Plan(s)
<input checked="" type="checkbox"/>	ATTACHMENT C: Process Flow Diagram(s)
<input checked="" type="checkbox"/>	ATTACHMENT D: Equipment Table
<input checked="" type="checkbox"/>	ATTACHMENT E: Emission Unit Form(s)
<input type="checkbox"/>	ATTACHMENT F: Schedule of Compliance Form(s) <i>(Not Applicable)</i>
<input checked="" type="checkbox"/>	ATTACHMENT G: Air Pollution Control Device Form(s)
<input type="checkbox"/>	ATTACHMENT H: Compliance Assurance Monitoring (CAM) Form(s) <i>(Not Applicable)</i>

All of the required forms and additional information can be found and downloaded from, the DEP website at www.dep.wv.gov/dag, requested by phone (304) 926-0475, and/or obtained through the mail.

ATTACHMENT A

Area Map

ATTACHMENT A - AREA MAP



Figure 1 - Map of West Union Compressor Station Location

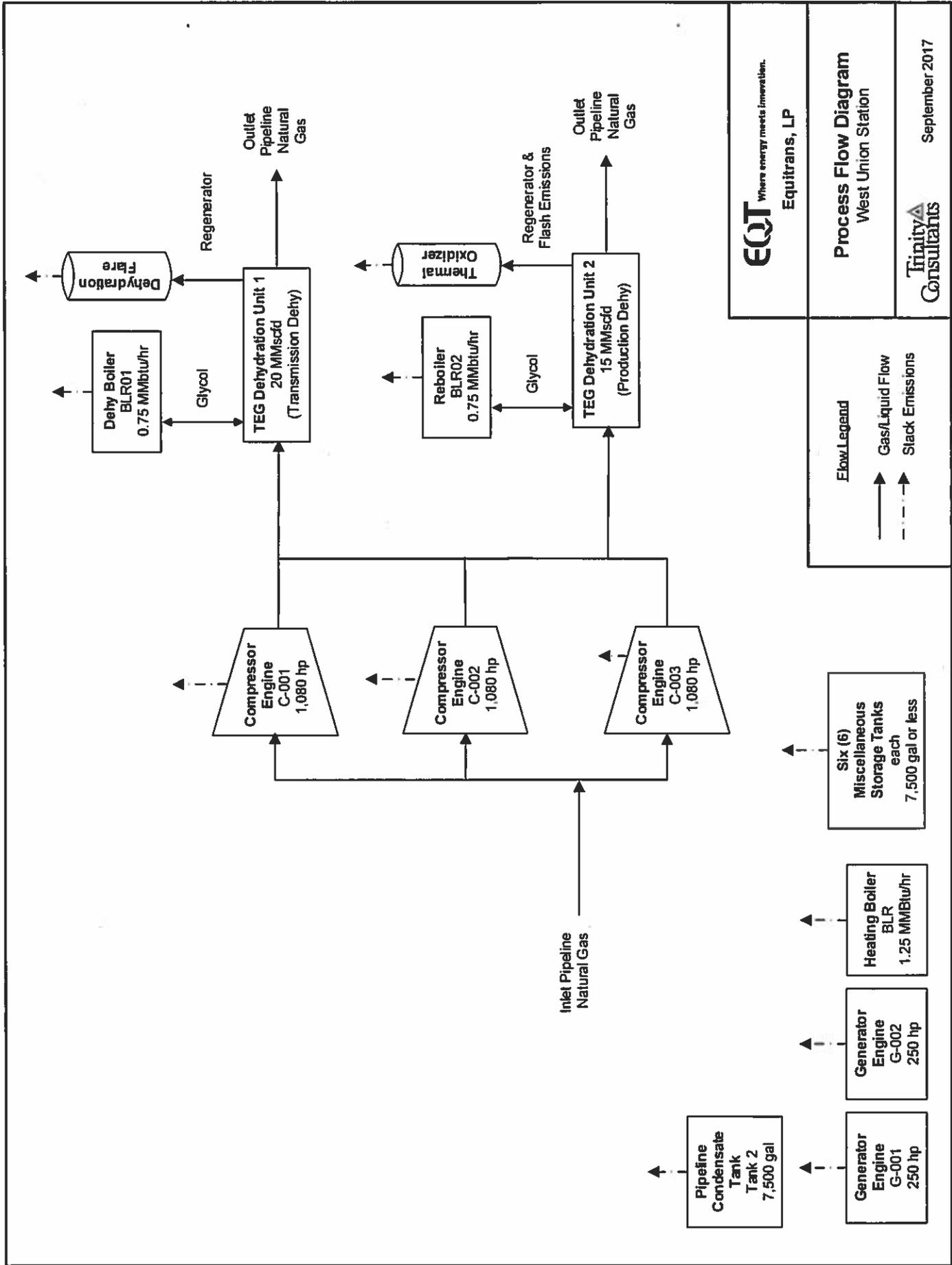
UTM Northing (km)	4,352.724
UTM Easting (km)	516.465
Zone:	17 N
Elevation (m)	255

ATTACHMENT B

Plot Plan

ATTACHMENT C

Process Flow Diagram



EQT Where energy meets innovation.
Equitrans, LP

Process Flow Diagram
West Union Station

Trinity Consultants
September 2017

ATTACHMENT D
Equipment Table

ATTACHMENT D - Title V Equipment Table
 (includes all emission units at the facility except those designated as
 insignificant activities in Section 4, Item 24 of the General Forms)

Emission Point ID ¹	Control Device ¹	Emission Unit ID ¹	Emission Unit Description	Design Capacity	Year Installed/ Modified
C-001	None	C-001	Reciprocating Engine / Integral Compressor Ingersoll-Rand, Model No. 8SVS, Serial No. 125E	1080 HP	1974
C-002	None	C-002	Reciprocating Engine / Integral Compressor Ingersoll-Rand, Model No. 8SVS, Serial No. 124E	1080 HP	1974
C-003	None	C-003	Reciprocating Engine / Integral Compressor Ingersoll-Rand, Model No. 8SVS, Serial No. 123E	1080 HP	1974
G-001	None	G-001	Reciprocating Engine / Air Compressor Waukesha, Model No. H2475	250 HP	1974
G-002	None	G-002	Reciprocating Engine / Air Compressor Waukesha, Model No. H2475	250 HP	1974
BLR	None	BLR	Heating Boiler	1.25 MMBtu/hr	1974
BLR01	None	BLR01	Dehydration Boiler	0.75 MMBtu/hr	1974
Flare	None	Flare	TEG Dehydration Unit #1 Flare	0.80 MMBtu/hr	1996
Dehy 1	Flare	Dehy 1	TEG Dehydration Unit #1	20 MMCFD	1974
BLR02	None	BLR02	TEG Dehydrator Reboiler	0.75 MMBtu/hr	2003
Thermal Oxidizer	None	Thermal Oxidizer	TEG Dehydration Unit #2 Thermal Oxidizer	7 MMBtu/hr	2006
Dehy 2	Thermal Oxidizer	Dehy 2	TEG Dehydration Unit #2	15 MMCFD	2003
Tank 1	None	Tank 1	Used Oil	4200 gal	Unknown
Tank 2	None	Tank 2	Pipeline Condensate	7500 gal	Before 1998
Tank 3	None	Tank 3	New Oil	4800 gal	Unknown
Tank 4	None	Tank 4	Ambitrol	1500 gal	Unknown
Tank 5	None	Tank 5	Used Glycol	300 gal	Unknown
Tank 6	None	Tank 6	Used Glycol	300 gal	Unknown
Tank 7	None	Tank 7	New Glycol	2000 gal	Unknown

¹For 45CSR13 permitted sources, the numbering system used for the emission points, control devices, and emission units should be consistent with the numbering system used in the 45CSR13 permit. For grandfathered sources, the numbering system should be consistent with registrations or emissions inventory previously submitted to DAQ. For emission points, control devices, and emissions units which have not been previously labeled, use the following 45CSR13 numbering system: 1S, 2S, 3S, ... or other appropriate description for emission units; 1C, 2C, 3C, ... or other appropriate designation for control devices; 1E, 2E, 3E, ... or other appropriate designation for emission points.

ATTACHMENT E

Emission Unit Forms

ATTACHMENT E - Emission Unit Form

Emission Unit Description			
Emission unit ID number: BLR	Emission unit name: Heating Boiler	List any control devices associated with this emission unit: None	
Provide a description of the emission unit (type, method of operation, design parameters, etc.): One (1) natural gas fired heating boiler rated at 1.25 MMBtu/hr.			
Manufacturer: Ajax	Model number: WGB-1250-D	Serial number: 84299	
Construction date: 1974	Installation date: 1974	Modification date(s): N/A	
Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 1.25 MMBtu/hr			
Maximum Hourly Throughput: 1,155 scf/hr	Maximum Annual Throughput: 10.12 MMscf/yr	Maximum Operating Schedule: 8,760 hrs/yr	
Fuel Usage Data (fill out all applicable fields)			
Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		If yes, is it? <input checked="" type="checkbox"/> Indirect Fired <input type="checkbox"/> Direct Fired	
Maximum design heat input and/or maximum horsepower rating: 1.25 MMBtu/hr		Type and Btu/hr rating of burners: N/A	
List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each. Natural Gas – 1,155 scf/hr ; 10.12 MMscf/yr			
Describe each fuel expected to be used during the term of the permit.			
Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	Negligible	Negligible	1,080 BTU/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.097	0.425
Nitrogen Oxides (NO _x)	0.116	0.506
Lead (Pb)	N/A	N/A
Particulate Matter (PM _{2.5})	0.01	0.04
Particulate Matter (PM ₁₀)	0.01	0.04
Total Particulate Matter (TSP)	0.01	0.04
Sulfur Dioxide (SO ₂)	<0.01	<0.01
Volatile Organic Compounds (VOC)	0.01	0.03
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ e	146	641
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>Criteria pollutant and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3. Greenhouse gas emission factors from 40 CFR Part 98 Tables C-1 and C-2.</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or **construction permit** with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

No change from current Title V permit conditions

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

See Section 3 of the application report.

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: BLR01	Emission unit name: Dehydration Reboiler #1	List any control devices associated with this emission unit: None
--	---	---

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
One (1) natural gas fired reboiler (rated at 0.75 MMBtu/hr) associated with the dehydration unit

Manufacturer:	Model number:	Serial number:
Construction date: 1974	Installation date: 1974	Modification date(s): N/A

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 0.75 MMBtu/hr

Maximum Hourly Throughput: 693 scf/hr	Maximum Annual Throughput: 6.07 MMscf/yr	Maximum Operating Schedule: 8,760 hrs/yr
---	--	--

Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input checked="" type="checkbox"/> Indirect Fired <input type="checkbox"/> Direct Fired
Maximum design heat input and/or maximum horsepower rating: 0.75 MMBtu/hr	Type and Btu/hr rating of burners: N/A

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas – 693 scf/hr ; 6.07 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	Negligible	Negligible	1,080 BTU/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.06	0.26
Nitrogen Oxides (NO _x)	0.07	0.30
Lead (Pb)	N/A	N/A
Particulate Matter (PM _{2.5})	0.01	0.02
Particulate Matter (PM ₁₀)	0.01	0.02
Total Particulate Matter (TSP)	0.01	0.02
Sulfur Dioxide (SO ₂)	<0.01	<0.01
Volatile Organic Compounds (VOC)	0.004	0.02
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ e	88	384
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>Criteria pollutant and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3. Greenhouse gas emission factors from 40 CFR Part 98 Tables C-1 and C-2.</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

No changes from current Title V permit condition

___ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

See Section 3 of the application report.

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: BLR02	Emission unit name: Dehydration Reboiler #2	List any control devices associated with this emission unit: None
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
One (1) natural gas fired reboiler (rated at 0.75 MMBtu/hr) associated with the dehydration unit

Manufacturer:	Model number:	Serial number:
Construction date: 2003	Installation date: 2003	Modification date(s): N/A

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 0.75 MMBtu/hr

Maximum Hourly Throughput: 693 scf/hr	Maximum Annual Throughput: 6.07 MMscf/yr	Maximum Operating Schedule: 8,760 hrs/yr
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input checked="" type="checkbox"/> Indirect Fired <input type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 0.75 MMBtu/hr	Type and Btu/hr rating of burners: N/A
---	--

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas – 693 scf/hr ; 6.07 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	Negligible	Negligible	1,080 BTU/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.06	0.26
Nitrogen Oxides (NO _x)	0.07	0.30
Lead (Pb)	N/A	N/A
Particulate Matter (PM _{2.5})	0.01	0.02
Particulate Matter (PM ₁₀)	0.01	0.02
Total Particulate Matter (TSP)	0.01	0.02
Sulfur Dioxide (SO ₂)	<0.01	<0.01
Volatile Organic Compounds (VOC)	0.004	0.02
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ e	88	384
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>Criteria pollutant and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3. Greenhouse gas emission factors from 40 CFR Part 98 Tables C-1 and C-2. Note that potential emissions calculated are less than the potential emissions due to changes in the heating content of the most recent gas analysis.</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

No changes from current Title V permit condition

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

See Section 3 of the application report.

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: C-001	Emission unit name: Reciprocating Engine, Ingersoll-Rand 8SVS	List any control devices associated with this emission unit: None
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
One (1) natural gas fired 1,080 HP reciprocating internal combustion engine that drives a compressor for the compression of natural gas

Manufacturer: Ingersoll Rand	Model number: 8SVS	Serial number: 125E
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Construction date: 1974	Installation date: 1974	Modification date(s): N/A
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons):
1,080 HP

Maximum Hourly Throughput: 7,486 scf/hr	Maximum Annual Throughput: 65.58 MMscf/yr	Maximum Operating Schedule: 8,760 hrs/yr
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input checked="" type="checkbox"/> Indirect Fired <input type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 1,080 HP	Type and Btu/hr rating of burners: N/A
--	--

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas – 7,486 scf/hr ; 65.58 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	Negligible	Negligible	1,080 BTU/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	2.57	11.25
Nitrogen Oxides (NO _x)	33.05	144.75
Lead (Pb)	N/A	N/A
Particulate Matter (PM _{2.5})	0.08	0.35
Particulate Matter (PM ₁₀)	0.08	0.35
Total Particulate Matter (TSP)	0.08	0.35
Sulfur Dioxide (SO ₂)	<0.01	0.02
Volatile Organic Compounds (VOC)	0.96	4.19
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.43	1.87
Total HAP	0.59	2.56
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ e	948	4,151
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>Criteria Pollutants factors are based on AP-42 Section 3.2 Table 3.2-2. Greenhouse gas emission factors are based on 40 CFR Part 98, Subpart C, Tables C-1 and C-2 for natural gas combustion.</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or **construction permit** with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

40 CFR 63 Subpart ZZZZ. See regulatory discussion on Section 3 of the report.

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (*Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.*)

See Section 3 of the application report.

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: C-002	Emission unit name: Reciprocating Engine, Ingersoll-Rand 8SVS	List any control devices associated with this emission unit: None	
Provide a description of the emission unit (type, method of operation, design parameters, etc.): One (1) natural gas fired 1,080 HP reciprocating internal combustion engine that drives a compressor for the compression of natural gas			
Manufacturer: Ingersoll Rand	Model number: 8SVS	Serial number: 124E	
Construction date: 1974	Installation date: 1974	Modification date(s): N/A	
Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 1,080 HP			
Maximum Hourly Throughput: 7,486 scf/hr	Maximum Annual Throughput: 65.58 MMscf/yr	Maximum Operating Schedule: 8,760 hrs/yr	
Fuel Usage Data (fill out all applicable fields)			
Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		If yes, is it? <input checked="" type="checkbox"/> Indirect Fired <input type="checkbox"/> Direct Fired	
Maximum design heat input and/or maximum horsepower rating: 1,080 HP		Type and Btu/hr rating of burners: N/A	
List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each. Natural Gas – 7,486 scf/hr ; 65.58 MMscf/yr			
Describe each fuel expected to be used during the term of the permit.			
Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	Negligible	Negligible	1,080 BTU/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	2.57	11.25
Nitrogen Oxides (NO _x)	33.05	144.75
Lead (Pb)	N/A	N/A
Particulate Matter (PM _{2.5})	0.08	0.35
Particulate Matter (PM ₁₀)	0.08	0.35
Total Particulate Matter (TSP)	0.08	0.35
Sulfur Dioxide (SO ₂)	<0.01	0.02
Volatile Organic Compounds (VOC)	0.96	4.19
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.43	1.87
Total HAP	0.59	2.56
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ e	948	4,150
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>Criteria Pollutants factors are based on AP-42 Section 3.2 Table 3.2-2. Greenhouse gas emission factors are based on 40 CFR Part 98, Subpart C, Tables C-1 and C-2 for natural gas combustion.</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or **construction permit** with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

40 CFR 63 Subpart ZZZZ. See regulatory discussion on Section 3 of the report.

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (*Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.*)

See Section 3 of the application report.

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description			
Emission unit ID number: C-003	Emission unit name: Reciprocating Engine, Ingersoll-Rand 8SVS	List any control devices associated with this emission unit: None	
Provide a description of the emission unit (type, method of operation, design parameters, etc.): One (1) natural gas fired 1,080 HP reciprocating internal combustion engine that drives a compressor for the compression of natural gas			
Manufacturer: Ingersoll Rand	Model number: 8SVS	Serial number: 123E	
Construction date: 1974	Installation date: 1974	Modification date(s): N/A	
Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 1,080 HP			
Maximum Hourly Throughput: 7,486 scf/hr	Maximum Annual Throughput: 65.58 MMscf/yr	Maximum Operating Schedule: 8,760 hrs/yr	
Fuel Usage Data (fill out all applicable fields)			
Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		If yes, is it? <input checked="" type="checkbox"/> Indirect Fired <input type="checkbox"/> Direct Fired	
Maximum design heat input and/or maximum horsepower rating: 1,080 HP		Type and Btu/hr rating of burners: N/A	
List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each. Natural Gas – 7,486 scf/hr ; 65.58 MMscf/yr			
Describe each fuel expected to be used during the term of the permit.			
Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	Negligible	Negligible	1,080 BTU/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	2.57	11.25
Nitrogen Oxides (NO _x)	33.05	144.75
Lead (Pb)	N/A	N/A
Particulate Matter (PM _{2.5})	0.08	0.35
Particulate Matter (PM ₁₀)	0.08	0.35
Total Particulate Matter (TSP)	0.08	0.35
Sulfur Dioxide (SO ₂)	<0.01	0.02
Volatile Organic Compounds (VOC)	0.96	4.19
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.43	1.87
Total HAP	0.59	2.56
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ e	948	4,150
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>Criteria Pollutants factors are based on AP-42 Section 3.2 Table 3.2-2. Greenhouse gas emission factors are based on 40 CFR Part 98, Subpart C, Tables C-1 and C-2 for natural gas combustion.</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

40 CFR 63 Subpart ZZZZ. See regulatory discussion on Section 3 of the report.

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

See Section 3 of the application report.

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: Dehy #1	Emission unit name: TEG Dehydrator #1	List any control devices associated with this emission unit: Dehydration Unit #1 Flare
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
20 MMSCFD triethylene glycol dehydration unit with associated reboiler and flare for removing water and impurities from natural gas.

Manufacturer: CE NATCO	Model number:	Serial number:
Construction date: 1974	Installation date: 1974	Modification date(s): N/A

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 20 MMscf/day

Maximum Hourly Throughput: 0.83 MMSCF	Maximum Annual Throughput: 7,300 MMSCF	Maximum Operating Schedule: 8,760 hrs/yr
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input type="checkbox"/> Direct Fired
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Maximum design heat input and/or maximum horsepower rating: N/A	Type and Btu/hr rating of burners:
---	---

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

N/A

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	---	---
Nitrogen Oxides (NO _x)	---	---
Lead (Pb)	---	---
Particulate Matter (PM _{2.5})	---	---
Particulate Matter (PM ₁₀)	---	---
Total Particulate Matter (TSP)	---	---
Sulfur Dioxide (SO ₂)	---	---
Volatile Organic Compounds (VOC)	0.05	0.20
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.03	0.14
Benzene	0.003	0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO _{2e}	1	5
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>GRI-GLYCalc v4.0.</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

No change from existing Title V permit

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

See Section 3 of the application report.

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: Dehy #2	Emission unit name: TEG Dehydrator #2 (Production Dehy)	List any control devices associated with this emission unit: Thermal Oxidizer (1C)
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
15 MMSCFD triethylene glycol dehydration unit with associated reboiler and thermal oxidizer for removing water and impurities from natural gas.

Manufacturer: Q.B Johnson	Model number:	Serial number:
Construction date: 2003	Installation date: 2003	Modification date(s): N/A

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 15 MMscf/day

Maximum Hourly Throughput: 0.63 MMSCF	Maximum Annual Throughput: 5,475 MMSCF	Maximum Operating Schedule: 8,760 hrs/yr
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input type="checkbox"/> Direct Fired
--	--

Maximum design heat input and/or maximum horsepower rating: N/A	Type and Btu/hr rating of burners:
---	---

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

N/A

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
N/A			

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	---	---
Nitrogen Oxides (NO _x)	---	---
Lead (Pb)	---	---
Particulate Matter (PM _{2.5})	---	---
Particulate Matter (PM ₁₀)	---	---
Total Particulate Matter (TSP)	---	---
Sulfur Dioxide (SO ₂)	---	---
Volatile Organic Compounds (VOC)	1.01	4.41
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.09	0.39
Benzene	<0.01	0.02
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ e	2.68	11.75
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>GRI-GLYCalc v4.0.</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

No change from existing Title V permit

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (*Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.*)

See Section 3 of the application report.

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: G-001	Emission unit name: Reciprocating Engine, Generator #1	List any control devices associated with this emission unit: None
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
One (1) natural gas fired 250 HP reciprocating internal combustion engine that drives a an electrical generator to provide electriciy

Manufacturer: Waukesha	Model number: H2475	Serial number:
Construction date: 1974	Installation date: 1974	Modification date(s): N/A

Design Capacity (examples: furnaces - tons/hr, tanks - gallons):
250 HP

Maximum Hourly Throughput: 2,022 scf/hr	Maximum Annual Throughput: 17.7 MMscf/yr	Maximum Operating Schedule: 8,760 hrs/yr
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input checked="" type="checkbox"/> Indirect Fired <input type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 250 HP	Type and Btu/hr rating of burners: N/A
--	--

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas – 2,022 scf/hr ; 17.7 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	Negligible	Negligible	1,080 BTU/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	8.14	35.64
Nitrogen Oxides (NO _x)	4.83	21.17
Lead (Pb)	N/A	N/A
Particulate Matter (PM _{2.5})	0.02	0.09
Particulate Matter (PM ₁₀)	0.02	0.09
Total Particulate Matter (TSP)	0.02	0.09
Sulfur Dioxide (SO ₂)	<0.01	0.01
Volatile Organic Compounds (VOC)	0.06	0.28
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.04	0.20
Total HAP	0.07	0.31
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO _{2e}	256	1,121
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>Criteria Pollutants factors are based on AP-42 Section 3.2 Table 3.2-3. Greenhouse gas emission factors are based on 40 CFR Part 98, Subpart C, Tables C-1 and C-2 for natural gas combustion.</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

40 CFR 63 Subpart ZZZZ. See regulatory discussion on Section 3 of the report.

 Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

See Section 3 of the application report.

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: G-002	Emission unit name: Reciprocating Engine, Generator #2	List any control devices associated with this emission unit: None
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
One (1) natural gas fired 250 HP reciprocating internal combustion engine that drives a an electrical generator to provide electriciy

Manufacturer: Waukesha	Model number: H2475	Serial number:
Construction date: 1974	Installation date: 1974	Modification date(s): N/A

Design Capacity (examples: furnaces - tons/hr, tanks - gallons):
250 HP

Maximum Hourly Throughput: 2,022 scf/hr	Maximum Annual Throughput: 17.7 MMscf/yr	Maximum Operating Schedule: 8,760 hrs/yr
---	--	--

Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input checked="" type="checkbox"/> Indirect Fired <input type="checkbox"/> Direct Fired
Maximum design heat input and/or maximum horsepower rating: 250 HP	Type and Btu/hr rating of burners: N/A

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas – 2,022 scf/hr ; 17.7 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	Negligible	Negligible	1,080 BTU/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	8.14	35.64
Nitrogen Oxides (NO _x)	4.83	21.17
Lead (Pb)	N/A	N/A
Particulate Matter (PM _{2.5})	0.02	0.09
Particulate Matter (PM ₁₀)	0.02	0.09
Total Particulate Matter (TSP)	0.02	0.09
Sulfur Dioxide (SO ₂)	<0.01	0.01
Volatile Organic Compounds (VOC)	0.06	0.28
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.04	0.20
Total HAP	0.07	0.31
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ e	256	1,121
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>Criteria Pollutants factors are based on AP-42 Section 3.2 Table 3.2-3. Greenhouse gas emission factors are based on 40 CFR Part 98, Subpart C, Tables C-1 and C-2 for natural gas combustion.</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

40 CFR 63 Subpart ZZZZ. See regulatory discussion on Section 3 of the report.

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (*Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.*)

See Section 3 of the application report.

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT G

Air Pollution Control Device Forms

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: Flare	List all emission units associated with this control device. Dehydration Unit# 1	
Manufacturer:	Model number:	Installation date: 1996
Type of Air Pollution Control Device:		
<input type="checkbox"/> Baghouse/Fabric Filter	<input type="checkbox"/> Venturi Scrubber	<input type="checkbox"/> Multiclone
<input type="checkbox"/> Carbon Bed Adsorber	<input type="checkbox"/> Packed Tower Scrubber	<input type="checkbox"/> Single Cyclone
<input type="checkbox"/> Carbon Drum(s)	<input type="checkbox"/> Other Wet Scrubber	<input type="checkbox"/> Cyclone Bank
<input type="checkbox"/> Catalytic Incinerator	<input type="checkbox"/> Condenser	<input type="checkbox"/> Settling Chamber
<input type="checkbox"/> Thermal Incinerator	<input checked="" type="checkbox"/> Flare	<input type="checkbox"/> Other (describe) _____
<input type="checkbox"/> Wet Plate Electrostatic Precipitator		<input type="checkbox"/> Dry Plate Electrostatic Precipitator
List the pollutants for which this device is intended to control and the capture and control efficiencies.		
Pollutant	Capture Efficiency	Control Efficiency
VOC	100%	98%
HAPs	100%	98%
Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).		
Elevated flare which controls emissions from TEG dehydration regenerator		
Is this device subject to the CAM requirements of 40 C.F.R. 64? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
If Yes, Complete ATTACHMENT H		
If No, Provide justification. CAM was already addressed in the initial Title V renewal application.		
Describe the parameters monitored and/or methods used to indicate performance of this control device. <ul style="list-style-type: none"> • Perform visual emission inspections. • Continuously monitor for presence of flame 		

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: Thermal Oxidizer (1C)	List all emission units associated with this control device. Dehydration Unit #2																			
Manufacturer:	Model number:	Installation date: 2003																		
Type of Air Pollution Control Device:																				
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"><input type="checkbox"/> Baghouse/Fabric Filter</td> <td style="width: 33%;"><input type="checkbox"/> Venturi Scrubber</td> <td style="width: 33%;"><input type="checkbox"/> Multiclone</td> </tr> <tr> <td><input type="checkbox"/> Carbon Bed Adsorber</td> <td><input type="checkbox"/> Packed Tower Scrubber</td> <td><input type="checkbox"/> Single Cyclone</td> </tr> <tr> <td><input type="checkbox"/> Carbon Drum(s)</td> <td><input type="checkbox"/> Other Wet Scrubber</td> <td><input type="checkbox"/> Cyclone Bank</td> </tr> <tr> <td><input type="checkbox"/> Catalytic Incinerator</td> <td><input type="checkbox"/> Condenser</td> <td><input type="checkbox"/> Settling Chamber</td> </tr> <tr> <td><input checked="" type="checkbox"/> Thermal Incinerator</td> <td><input type="checkbox"/> Flare</td> <td><input type="checkbox"/> Other (describe) _____</td> </tr> <tr> <td><input type="checkbox"/> Wet Plate Electrostatic Precipitator</td> <td colspan="2"><input type="checkbox"/> Dry Plate Electrostatic Precipitator</td> </tr> </table>			<input type="checkbox"/> Baghouse/Fabric Filter	<input type="checkbox"/> Venturi Scrubber	<input type="checkbox"/> Multiclone	<input type="checkbox"/> Carbon Bed Adsorber	<input type="checkbox"/> Packed Tower Scrubber	<input type="checkbox"/> Single Cyclone	<input type="checkbox"/> Carbon Drum(s)	<input type="checkbox"/> Other Wet Scrubber	<input type="checkbox"/> Cyclone Bank	<input type="checkbox"/> Catalytic Incinerator	<input type="checkbox"/> Condenser	<input type="checkbox"/> Settling Chamber	<input checked="" type="checkbox"/> Thermal Incinerator	<input type="checkbox"/> Flare	<input type="checkbox"/> Other (describe) _____	<input type="checkbox"/> Wet Plate Electrostatic Precipitator	<input type="checkbox"/> Dry Plate Electrostatic Precipitator	
<input type="checkbox"/> Baghouse/Fabric Filter	<input type="checkbox"/> Venturi Scrubber	<input type="checkbox"/> Multiclone																		
<input type="checkbox"/> Carbon Bed Adsorber	<input type="checkbox"/> Packed Tower Scrubber	<input type="checkbox"/> Single Cyclone																		
<input type="checkbox"/> Carbon Drum(s)	<input type="checkbox"/> Other Wet Scrubber	<input type="checkbox"/> Cyclone Bank																		
<input type="checkbox"/> Catalytic Incinerator	<input type="checkbox"/> Condenser	<input type="checkbox"/> Settling Chamber																		
<input checked="" type="checkbox"/> Thermal Incinerator	<input type="checkbox"/> Flare	<input type="checkbox"/> Other (describe) _____																		
<input type="checkbox"/> Wet Plate Electrostatic Precipitator	<input type="checkbox"/> Dry Plate Electrostatic Precipitator																			
List the pollutants for which this device is intended to control and the capture and control efficiencies.																				
Pollutant	Capture Efficiency	Control Efficiency																		
VOC	100%	98%																		
HAPs	100%	98%																		
Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).																				
Thermal oxidizer which controls all emissions from the TEG dehydration still and flash tank vent																				
Is this device subject to the CAM requirements of 40 C.F.R. 64? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																				
If Yes, Complete ATTACHMENT H																				
If No, Provide justification. CAM was already addressed in the initial Title V renewal application.																				
Describe the parameters monitored and/or methods used to indicate performance of this control device.																				
<ul style="list-style-type: none"> • Perform visual emission inspections. • Continuously monitor for presence of flame 																				

ATTACHMENT I

Emission Calculations

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

West Union Station													West Union Station Potential Emissions						
Pollutant	# of Emission Units	Operating Hours (hrs)	Unit	Capacity	Feed Type	Ingersoll Rand Compressor Engine ASVS		Waukesha H2475 Generator Engine		Waukesha H2475 Generator Engine		Dehydration Unit #1 Thermal Oxidizer	Heating Boiler	TEG Duty Boiler 1		TEG Duty Boiler 2		Fugitives & Blankets	
						Engine ASVS	Engine ASVS	Generator Engine	Generator Engine	Dehydration Unit #1	Dehydration Unit #2			Natural Gas	Natural Gas	Natural Gas	Natural Gas		Natural Gas
PM ₁₀	1	1,080	HP	1,080	Natural Gas	0.35	0.35	0.09	0.09	0.09	0.09	0.22	0.04	0.02	0.02	0.02	0.02	0.02	1.37
PM _{2.5}	1	1,080	HP	1,080	Natural Gas	0.35	0.35	0.09	0.09	0.09	0.09	0.22	0.04	0.02	0.02	0.02	0.02	0.02	1.37
SO _x	1	1,080	HP	1,080	Natural Gas	0.02	0.02	0.01	0.01	0.01	0.01	1.70E-02	3.04E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03	0.10
CO	1	1,080	HP	1,080	Natural Gas	11.25	11.25	35.64	35.64	35.64	35.64	2.38	0.43	0.26	0.26	0.26	0.26	0.26	108.61
NO _x	1	1,080	HP	1,080	Natural Gas	144.75	144.75	21.17	21.17	21.17	21.17	2.83	0.51	0.30	0.30	0.30	0.30	0.30	480.87
VOC	1	1,080	HP	1,080	Natural Gas	4.19	4.19	0.28	0.28	0.28	0.28	0.16	0.03	0.02	0.02	0.02	0.02	0.02	18.81
CO ₂	1	1,080	HP	1,080	Natural Gas	4,150	4,150	1,121	1,121	1,121	1,121	3,586	641	384	384	384	384	384	20,999
CH ₄	1	1,080	HP	1,080	Natural Gas	0.08	0.08	0.02	0.02	0.02	0.02	0.07	0.01	0.01	0.01	0.01	0.01	0.01	39
N ₂ O	1	1,080	HP	1,080	Natural Gas	0.01	0.01	0.01	0.01	0.01	0.01	6.76E-03	1.21E-03	7.2E-04	7.2E-04	7.2E-04	7.2E-04	7.2E-04	0.04
CO ₂ e ¹	1	1,080	HP	1,080	Natural Gas	4,154	4,154	1,122	1,122	1,122	1,122	3,590	641	385	385	385	385	385	21,093
Formaldehyde	1	1,080	HP	1,080	Natural Gas	1.87	1.87	0.20	0.20	0.20	0.20	2.13E-03	3.80E-04	2.28E-04	2.28E-04	2.28E-04	2.28E-04	2.28E-04	6.82
Benzene	1	1,080	HP	1,080	Natural Gas	0.02	0.02	0.02	0.02	0.02	0.02	5.93E-05	1.06E-05	6.38E-06	6.38E-06	6.38E-06	6.38E-06	6.38E-06	0.09
Toluene	1	1,080	HP	1,080	Natural Gas	0.01	0.01	0.01	0.01	0.01	0.01	9.63E-05	1.72E-05	1.03E-05	1.03E-05	1.03E-05	1.03E-05	1.03E-05	0.08
Ethylbenzene	1	1,080	HP	1,080	Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	---	---	---	---	---	---	---	0.05
Xylene	1	1,080	HP	1,080	Natural Gas	0.01	0.01	0.00	0.00	0.00	0.00	---	---	---	---	---	---	---	0.08
n-Heptane	1	1,080	HP	1,080	Natural Gas	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.20
Total HAPs (including HCHO)	1	1,080	HP	1,080	Natural Gas	2.56	2.56	0.31	0.31	0.31	0.31	0.05	0.01	0.01	0.01	0.01	0.01	0.01	8.95

1. Conversion to CO₂e based on CH₄ GWP = 25 and N₂O GWP = 298, per 40 CFR 98.

2. VOC includes Formaldehyde.

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Ingersoll Rand Emission Calculations - C-001

Source Designation:	
Manufacturer:	Ingersoll-Rand
Model No.:	8SVS
Serial No	125E
Stroke Cycle:	4
Type of Burn:	Lean Burn
Year Installed/Date Manufactured	1974
Fuel Used:	Natural Gas
Fuel High Heating Value (HHV) (Btu/scf):	1,082
Rated Horsepower (bhp):	1,080
Specific Fuel Consumption (Btu/bhp-hr)	7,500
Maximum Fuel Consumption at 100% Load (scf/hr)	7,486
Heat Input (MMBtu/hr)	8.10
Stack Designation:	C-001

Operational Details:

Potential Annual Hours of Operation (hr/yr)	8,760
Potential Fuel Consumption (MMscf/yr):	65.58

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors ^a	Units
NO _x	4.08	lb/MMBtu
CO	0.32	lb/MMBtu
SO ₂	5.88E-04	lb/MMBtu
PM ₁₀ (Filterable)	7.71E-05	lb/MMBtu
PM _{2.5} (Filterable)	7.71E-05	lb/MMBtu
PM Condensable	9.91E-03	lb/MMBtu
PM Total	9.99E-03	lb/MMBtu
VOC	0.12	lb/MMBtu
CO ₂	53.06	kg/MMBtu
CH ₄	0.001	kg/MMBtu
N ₂ O	0.0001	kg/MMBtu

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	33.05	144.75
CO	2.57	11.25
SO ₂	0.00	0.02
PM ₁₀ (Filterable)	0.00	0.00
PM _{2.5} (Filterable)	0.00	0.00
PM Condensable	0.08	0.35
PM Total	0.08	0.35
VOC	0.96	4.19
CO ₂	947.51	4150.08
CH ₄	0.02	0.08
N ₂ O	0.00	0.01

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Ingersoll Rand Emission Calculations - C-001
Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMBtu) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
Acetaldehyde	8.36E-03	6.77E-02	2.97E-01
Acrolein	5.14E-03	4.16E-02	1.82E-01
Benzene	4.40E-04	3.56E-03	1.56E-02
Butadiene (1,3-)	2.67E-04	2.16E-03	9.47E-03
Carbon Tetrachloride	3.67E-05	2.97E-04	1.30E-03
Chlorobenzene	3.04E-05	2.46E-04	1.08E-03
Chloroethane	0.00E+00	0.00E+00	0.00E+00
Chloroform	2.85E-05	2.31E-04	1.01E-03
Dichloropropene (1,3-)	2.64E-05	2.14E-04	9.37E-04
Ethylbenzene	3.97E-05	3.22E-04	1.41E-03
Ethylene Dibromide	4.43E-05	3.59E-04	1.57E-03
Formaldehyde	5.28E-02	4.28E-01	1.87E+00
Hexane, n-	1.11E-03	8.99E-03	3.94E-02
Methanol	2.50E-03	2.03E-02	8.87E-02
Methylene Chloride	2.00E-05	1.62E-04	7.10E-04
Methylnaphthalene (2-)	3.32E-05	2.69E-04	1.18E-03
Naphthalene	7.44E-05	6.03E-04	2.64E-03
PAH	2.69E-05	2.18E-04	9.54E-04
Phenol	2.40E-05	1.94E-04	8.51E-04
Pyrene	1.36E-06	1.10E-05	4.83E-05
Styrene	2.36E-05	1.91E-04	8.37E-04
Tetrachloroethane	2.48E-06	2.01E-05	8.80E-05
Toluene	4.08E-04	3.30E-03	1.45E-02
Trichloroethane (1,1,2-)	3.18E-05	2.58E-04	1.13E-03
Trimethylpentane (2,2,4-)	2.50E-04	2.03E-03	8.87E-03
Vinyl Chloride	1.49E-05	1.21E-04	5.29E-04
Xylene	1.84E-04	1.49E-03	6.53E-03
Tetrachloroethane (1,1,2,2-)	4.00E-05	3.24E-04	1.42E-03
Acenaphthene	1.25E-06	1.01E-05	4.43E-05
Acenaphthylene	5.53E-06	4.48E-05	1.96E-04
Benzo(b)fluoranthene	1.66E-07	1.34E-06	5.89E-06
Benzo(e)pyrene	4.15E-07	3.36E-06	1.47E-05
Benzo(g,h,i)perylene	4.14E-07	3.35E-06	1.47E-05
Biphenyl	2.12E-04	1.72E-03	7.52E-03
Chrysene	6.93E-07	5.61E-06	2.46E-05
Fluoranthene	1.11E-06	8.99E-06	3.94E-05
Phenanthrene	1.04E-05	8.42E-05	3.69E-04
Total HAP		5.85E-01	2.56E+00

^a Criteria and HAP emission factors from AP-42 Section 3.2, Table 3.2-2 "Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines," July 2000. Greenhouse gas emission factors are based on 40 CFR Part 98, Subpart C, Tables C-1 and C-2 for natural gas combustion.

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr) * Emission Factor (lb/MMBtu).

^c Annual Emissions (tons/yr)^{Potential} = (lb/hr)^{Emissions} * (Maximum Allowable Operating Hours, 8,760 hr/yr) * (1 ton/2000 lb).

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Ingersoll Rand Emission Calculations - C-002

Source Designation:	
Manufacturer:	Ingersoll-Rand
Model No.:	8SVS
Serial No.:	124E
Stroke Cycle:	4
Type of Burn:	Lean Burn
Year Installed/Date Manufactured:	1974
Fuel Used:	Natural Gas
Fuel High Heating Value (HHV) (Btu/scf):	1,082
Rated Horsepower (bhp):	1,080
Specific Fuel Consumption (Btu/bhp-hr):	7,500
Maximum Fuel Consumption at 100% Load (scf/hr):	7,486
Heat Input (MMBtu/hr):	8.10
Stack Designation:	C-002

Operational Details:

Potential Annual Hours of Operation (hr/yr):	8,760
Potential Fuel Consumption (MMscf/yr):	65.58

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors ^a	Units
NO _x	4.08	lb/MMBtu
CO	0.32	lb/MMBtu
SO ₂	5.88E-04	lb/MMBtu
PM ₁₀ (Filterable)	7.71E-05	lb/MMBtu
PM _{2.5} (Filterable)	7.71E-05	lb/MMBtu
PM Condensable	9.91E-03	lb/MMBtu
PM Total	9.99E-03	lb/MMBtu
VOC	0.12	lb/MMBtu
CO ₂	53.06	kg/MMBtu
CH ₄	1.00E-03	kg/MMBtu
N ₂ O	1.00E-04	kg/MMBtu

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	33.05	144.75
CO	2.57	11.25
SO ₂	0.00	0.02
PM ₁₀ (Filterable)	0.00	0.00
PM _{2.5} (Filterable)	0.00	0.00
PM Condensable	0.08	0.35
PM Total	0.08	0.35
VOC	0.96	4.19
CO ₂	947.51	4150.08
CH ₄	0.02	0.08
N ₂ O	0.00	0.01

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Ingersoll Rand Emission Calculations - C-002
Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMBtu) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
Acetaldehyde	8.36E-03	6.77E-02	2.97E-01
Acrolein	5.14E-03	4.16E-02	1.82E-01
Benzene	4.40E-04	3.56E-03	1.56E-02
Butadiene (1,3-)	2.67E-04	2.16E-03	9.47E-03
Carbon Tetrachloride	3.67E-05	2.97E-04	1.30E-03
Chlorobenzene	3.04E-05	2.46E-04	1.08E-03
Chloroethane	0.00E+00	0.00E+00	0.00E+00
Chloroform	2.85E-05	2.31E-04	1.01E-03
Dichloropropene (1,3-)	2.64E-05	2.14E-04	9.37E-04
Ethylbenzene	3.97E-05	3.22E-04	1.41E-03
Ethylene Dibromide	4.43E-05	3.59E-04	1.57E-03
Formaldehyde	5.28E-02	4.28E-01	1.87E+00
Hexane, n-	1.11E-03	8.99E-03	3.94E-02
Methanol	2.50E-03	2.03E-02	8.87E-02
Methylene Chloride	2.00E-05	1.62E-04	7.10E-04
Methylnaphthalene (2-)	3.32E-05	2.69E-04	1.18E-03
Naphthalene	7.44E-05	6.03E-04	2.64E-03
PAH	2.69E-05	2.18E-04	9.54E-04
Phenol	2.40E-05	1.94E-04	8.51E-04
Pyrene	1.36E-06	1.10E-05	4.83E-05
Styrene	2.36E-05	1.91E-04	8.37E-04
Tetrachloroethane	2.48E-06	2.01E-05	8.80E-05
Toluene	4.08E-04	3.30E-03	1.45E-02
Trichloroethane (1,1,2-)	3.18E-05	2.58E-04	1.13E-03
Trimethylpentane (2,2,4-)	2.50E-04	2.03E-03	8.87E-03
Vinyl Chloride	1.49E-05	1.21E-04	5.29E-04
Xylene	1.84E-04	1.49E-03	6.53E-03
Tetrachloroethane (1,1,2,2-)	4.00E-05	3.24E-04	1.42E-03
Acenaphthene	1.25E-06	1.01E-05	4.43E-05
Acenaphthylene	5.53E-06	4.48E-05	1.96E-04
Benzo(b)fluoranthene	1.66E-07	1.34E-06	5.89E-06
Benzo(e)pyrene	4.15E-07	3.36E-06	1.47E-05
Benzo(g,h,i)perylene	4.14E-07	3.35E-06	1.47E-05
Biphenyl	2.12E-04	1.72E-03	7.52E-03
Chrysene	6.93E-07	5.61E-06	2.46E-05
Fluoranthene	1.11E-06	8.99E-06	3.94E-05
Phenanthrene	1.04E-05	8.42E-05	3.69E-04
Total HAP		5.85E-01	2.56E+00

^a Criteria and HAP emission factors from AP-42 Section 3.2, Table 3.2-2 "Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines," July 2000. Greenhouse gas emission factors are based on 40 CFR Part 98, Subpart C, Tables C-1 and C-2 for natural gas combustion.

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr) * Emission Factor (lb/MMBtu).

^c Annual Emissions (tons/yr)_{potential} = (lb/hr)_{Emissions} * (Maximum Allowable Operating Hours, 8,760 hr/yr) * (1 ton/2000 lb).

Company Name: Equitrans, LP
Facility Name: West Union Compressor Station
Project Description: Title V Renewal Application

Ingersoll Rand Emission Calculations - C-003

Source Designation:	
Manufacturer:	Ingersoll-Rand
Model No.:	8SVS
Serial No.:	123E
Stroke Cycle:	4
Type of Burn:	Lean Burn
Year Installed/Date Manufactured	1974
Fuel Used:	Natural Gas
Fuel High Heating Value (HHV) (Btu/scf):	1,082
Rated Horsepower (bhp):	1,080
Specific Fuel Consumption (Btu/bhp-hr)	7,500
Maximum Fuel Consumption at 100% Load (scf/hr):	7,486
Heat Input (MMBtu/hr)	8.10
Stack Designation:	C-003

Operational Details:

Potential Annual Hours of Operation (hr/yr):	8,760
Potential Fuel Consumption (MMscf/yr)	65.58

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors ^a	Units
NO _x	4.08	lb/MMBtu
CO	0.32	lb/MMBtu
SO ₂	5.88E-04	lb/MMBtu
PM ₁₀ (Filterable)	7.71E-05	lb/MMBtu
PM _{2.5} (Filterable)	7.71E-05	lb/MMBtu
PM Condensable	9.91E-03	lb/MMBtu
PM Total	9.99E-03	lb/MMBtu
VOC	0.12	lb/MMBtu
CO ₂	53.06	kg/MMBtu
CH ₄	0.001	kg/MMBtu
N ₂ O	0.0001	kg/MMBtu

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	33.05	144.75
CO	2.57	11.25
SO ₂	0.00	0.02
PM ₁₀ (Filterable)	0.00	0.00
PM _{2.5} (Filterable)	0.00	0.00
PM Condensable	0.08	0.35
PM Total	0.08	0.35
VOC	0.96	4.19
CO ₂	947.51	4150.08
CH ₄	0.02	0.08
N ₂ O	0.00	0.01

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Ingersoll Rand Emission Calculations - C-003
Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMBtu) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
Acetaldehyde	8.36E-03	6.77E-02	2.97E-01
Acrolein	5.14E-03	4.16E-02	1.82E-01
Benzene	4.40E-04	3.56E-03	1.56E-02
Butadiene (1,3-)	2.67E-04	2.16E-03	9.47E-03
Carbon Tetrachloride	3.67E-05	2.97E-04	1.30E-03
Chlorobenzene	3.04E-05	2.46E-04	1.08E-03
Chloroethane	0.00E+00	0.00E+00	0.00E+00
Chloroform	2.85E-05	2.31E-04	1.01E-03
Dichloropropene (1,3-)	2.64E-05	2.14E-04	9.37E-04
Ethylbenzene	3.97E-05	3.22E-04	1.41E-03
Ethylene Dibromide	4.43E-05	3.59E-04	1.57E-03
Formaldehyde	5.28E-02	4.28E-01	1.87E+00
Hexane, n-	1.11E-03	8.99E-03	3.94E-02
Methanol	2.50E-03	2.03E-02	8.87E-02
Methylene Chloride	2.00E-05	1.62E-04	7.10E-04
Methylnaphthalene (2-)	3.32E-05	2.69E-04	1.18E-03
Naphthalene	7.44E-05	6.03E-04	2.64E-03
PAH	2.69E-05	2.18E-04	9.54E-04
Phenol	2.40E-05	1.94E-04	8.51E-04
Pyrene	1.36E-06	1.10E-05	4.83E-05
Styrene	2.36E-05	1.91E-04	8.37E-04
Tetrachloroethane	2.48E-06	2.01E-05	8.80E-05
Toluene	4.08E-04	3.30E-03	1.45E-02
Trichloroethane (1,1,2-)	3.18E-05	2.58E-04	1.13E-03
Trimethylpentane (2,2,4-)	2.50E-04	2.03E-03	8.87E-03
Vinyl Chloride	1.49E-05	1.21E-04	5.29E-04
Xylene	1.84E-04	1.49E-03	6.53E-03
Tetrachloroethane (1,1,2,2-)	4.00E-05	3.24E-04	1.42E-03
Acenaphthene	1.25E-06	1.01E-05	4.43E-05
Acenaphthylene	5.53E-06	4.48E-05	1.96E-04
Benzo(b)fluoranthene	1.66E-07	1.34E-06	5.89E-06
Benzo(e)pyrene	4.15E-07	3.36E-06	1.47E-05
Benzo(g,h,i)perylene	4.14E-07	3.35E-06	1.47E-05
Biphenyl	2.12E-04	1.72E-03	7.52E-03
Chrysene	6.93E-07	5.61E-06	2.46E-05
Fluoranthene	1.11E-06	8.99E-06	3.94E-05
Phenanthrene	1.04E-05	8.42E-05	3.69E-04
Total HAP		5.85E-01	2.56E+00

^a Criteria and HAP emission factors from AP-42 Section 3.2, Table 3.2-2 "Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines," July 2000. Greenhouse gas emission factors are based on 40 CFR Part 98, Subpart C, Tables C-1 and C-2 for natural gas combustion.

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr) × Emission Factor (lb/MMBtu)

^c Annual Emissions (tons/yr)_{potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8,760 hr/yr) × (1 ton/2000 lb)

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Waukesha H2475 Emission Calculations - G-001

Source Designation:	
Manufacturer:	Waukesha
Model No.:	H2475
Year Installed:	1974
Type of Engine:	4SRB
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,082
Rated Horsepower (bhp):	250
Heat Input (MMBtu/hr):	2.19
Specific Fuel Consumption (Btu/bhp-hr):	8,750
Maximum Fuel Consumption at 100% Load (MMscf/hr):	0.00202
Maximum Fuel Consumption at 100% Load (MMscf/yr):	17.7
Stack Designation:	G-001

Operational Details:

Potential Annual Hours of Operation (hr/yr):	8,760
Potential Fuel Consumption (MMBtu/yr):	19,163

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors ^a	Units
NO _x	2.21	lb/MMBtu
CO	3.72	lb/MMBtu
SO ₂	5.88E-04	lb/MMBtu
Total Particulate Matter (TSP)	9.50E-03	lb/MMBtu
PM (Filterable)	9.50E-03	lb/MMBtu
PM ₁₀ (Filterable + Condensable)	9.91E-03	lb/MMBtu
PM _{2.5} (Filterable + Condensable)	1.94E-02	lb/MMBtu
VOC	0.03	lb/MMBtu
CO ₂	53.06	kg/MMBtu
CH ₄	0.001	kg/MMBtu
N ₂ O	0.0001	kg/MMBtu

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	4.83	21.17
CO	8.14	35.64
SO ₂	0.00	0.01
Total Particulate Matter (TSP)	0.02	0.09
PM (Filterable)	0.02	0.09
PM ₁₀ (Filterable + Condensable)	0.02	0.09
PM _{2.5} (Filterable + Condensable)	0.04	0.19
VOC	0.06	0.28
CO ₂	255.89	1120.78
CH ₄	0.00	0.02
N ₂ O	0.00	0.00

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Waukesha H2475 Emission Calculations - G-001

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMBtu)^a	Potential Emissions (lb/hr)^b	Potential Emissions (tons/yr)^c
HAPs:			
Acetaldehyde	2.79E-03	6.10E-03	2.67E-02
Acrolein	2.63E-03	5.75E-03	2.52E-02
Benzene	1.58E-03	3.46E-03	1.51E-02
1,3-Butadiene	6.63E-04	1.45E-03	6.35E-03
Carbon Tetrachloride	1.77E-05	3.87E-05	1.70E-04
Chlorobenzene	1.29E-05	2.82E-05	1.24E-04
Chloroform	1.37E-05	3.00E-05	1.31E-04
1,3-Dichloropropene	1.27E-05	2.78E-05	1.22E-04
Ethylbenzene	2.48E-05	5.43E-05	2.38E-04
Ethylene Dibromide	2.13E-05	4.66E-05	2.04E-04
Formaldehyde	2.05E-02	0.04	0.20
Methanol	3.06E-03	6.69E-03	2.93E-02
Methylene Chloride	4.12E-05	9.01E-05	3.95E-04
Styrene	1.19E-05	2.60E-05	1.14E-04
Toluene	5.58E-04	1.22E-03	5.35E-03
1,1,2,2-Tetrachloroethane	2.53E-05	5.53E-05	2.42E-04
1,1,2-Trichloroethane	1.53E-05	3.35E-05	1.47E-04
Vinyl Chloride	7.18E-06	1.57E-05	6.88E-05
Xylene	1.95E-04	4.27E-04	1.87E-03
Polycyclic Organic Matter:			
Naphthalene	9.71E-05	2.12E-04	9.30E-04
PAH	1.41E-04	3.08E-04	1.35E-03
Total HAP		7.09E-02	3.11E-01

^a Criteria pollutant and HAP emission factors from AP-42 Section 3.2, "Natural Gas-fired Reciprocating Engines", Table 3.2-3 for 4-Stroke Rich Burn Engines, July 2000. Greenhouse gas emission factors are from 40 CFR Part 98 for natural gas combustion.

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr) × Emission Factor (lb/MMBtu)

^c Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8,760 hr/yr) × (1 ton/2000 lb)

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Waukesha H2475 Emission Calculations - G-002

Source Designation:	
Manufacturer:	Waukesha
Model No.:	H2475
Year Installed:	1974
Type of Engine:	4SRB
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,082
Rated Horsepower (bhp):	250
Heat Input (MMBtu/hr)	2.19
Specific Fuel Consumption (Btu/bhp-hr)	8,750
Maximum Fuel Consumption at 100% Load (MMscf/hr):	0.00202
Maximum Fuel Consumption at 100% Load (MMscf/yr)	17.7
Stack Designation	G-002

Operational Details:

Potential Annual Hours of Operation (hr/yr):	8,760
Potential Fuel Consumption (MMBtu/yr)	19,163

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors ^a	Units
NO _x	2.21	lb/MMBtu
CO	3.72	lb/MMBtu
SO ₂	5.88E-04	lb/MMBtu
Total Particulate Matter (TSP)	9.50E-03	lb/MMBtu
PM (Filterable)	9.50E-03	lb/MMBtu
PM ₁₀ (Filterable + Condensable)	9.91E-03	lb/MMBtu
PM _{2.5} (Filterable + Condensable)	1.94E-02	lb/MMBtu
VOC	0.03	lb/MMBtu
CO ₂	53.06	kg/MMBtu
CH ₄	0.001	kg/MMBtu
N ₂ O	0.0001	kg/MMBtu

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	4.83	21.17
CO	8.14	35.64
SO ₂	0.00	0.01
Total Particulate Matter (TSP)	0.02	0.09
PM (Filterable)	0.02	0.09
PM ₁₀ (Filterable + Condensable)	0.02	0.09
PM _{2.5} (Filterable + Condensable)	0.04	0.19
VOC	0.06	0.28
CO ₂	255.89	1120.78
CH ₄	0.00	0.02
N ₂ O	0.00	0.00

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Waukesha H2475 Emission Calculations - G-002

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMBtu) ^a	Potential Emissions (lb/hr) ^b	Potential Emissions (tons/yr) ^c
HAPs:			
Acetaldehyde	2.79E-03	6.10E-03	2.67E-02
Acrolein	2.63E-03	5.75E-03	2.52E-02
Benzene	1.58E-03	3.46E-03	1.51E-02
1,3-Butadiene	6.63E-04	1.45E-03	6.35E-03
Carbon Tetrachloride	1.77E-05	3.87E-05	1.70E-04
Chlorobenzene	1.29E-05	2.82E-05	1.24E-04
Chloroform	1.37E-05	3.00E-05	1.31E-04
1,3-Dichloropropene	1.27E-05	2.78E-05	1.22E-04
Ethylbenzene	2.48E-05	5.43E-05	2.38E-04
Ethylene Dibromide	2.13E-05	4.66E-05	2.04E-04
Formaldehyde	2.05E-02	4.48E-02	1.96E-01
Methanol	3.06E-03	6.69E-03	2.93E-02
Methylene Chloride	4.12E-05	9.01E-05	3.95E-04
Styrene	1.19E-05	2.60E-05	1.14E-04
Toluene	5.58E-04	1.22E-03	5.35E-03
1,1,2,2-Tetrachloroethane	2.53E-05	5.53E-05	2.42E-04
1,1,2-Trichloroethane	1.53E-05	3.35E-05	1.47E-04
Vinyl Chloride	7.18E-06	1.57E-05	6.88E-05
Xylene	1.95E-04	4.27E-04	1.87E-03
Polycyclic Organic Matter:			
Naphthalene	9.71E-05	2.12E-04	9.30E-04
PAH	1.41E-04	3.08E-04	1.35E-03
Total HAP		7.09E-02	3.11E-01

Criteria pollutant and HAP emission factors from AP-42 Section 3.2, "Natural Gas-fired Reciprocating Engines", Table 3.2-3 for 4-Stroke Rich Burn Engines, July 2000. Greenhouse gas emission factors are from 40 CFR Part 98 for natural gas combustion.

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr) × Emission Factor (lb/MMBtu)

^c Annual Emissions (tons/yr)^{potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8,760 hr/yr) × (1 ton/2000 lb)

Company Name: Equitrans, LP
Facility Name: West Union Compressor Station
Project Description: Title V Renewal Application

TEG Dehydration Unit #1 Emissions Calculations

GRI-GlyCalc Version 4.0 - CONTROLLED EMISSIONS SUMMARY			
EMISSION RATES			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon Dioxide	0.2430	5.832	1.0643
Methane	0.0355	0.852	0.1555
Ethane	0.0421	1.010	0.1844
Propane	0.0037	0.090	0.0164
Isobutane	0.0004	0.009	0.0016
n-Butane	0.0011	0.026	0.0048
Isopentane	0.0003	0.008	0.0015
n-Pentane	0.0005	0.012	0.0023
n-Hexane	0.0008	0.019	0.0034
Cyclohexane	0.0007	0.016	0.0030
Other Hexanes	0.0008	0.019	0.0034
Heptanes	0.0029	0.070	0.0128
2,2,4-Trimethylpentane	0.0008	0.019	0.0035
Benzene	0.0030	0.073	0.0133
Toluene	0.0057	0.138	0.0250
Ethylbenzene	0.0099	0.238	0.0434
Xylenes	0.0125	0.301	0.0549
C8 + Heavier Hydrocarbons	0.0018	0.044	0.0080
Total Emissions	0.1227	2.945	0.5375
Total Hydrocarbon Emissions	0.1227	2.945	0.5375
Total VOC Emissions	0.0451	1.083	0.1976
Total HAP Emissions	0.0328	0.788	0.1437

* Based on GRI GlyCalc 4.0 runs at emission scenario of maximum rated dry gas flowrate of 20 MMscf/day and average actual operating conditions of T and P of 58°F and 400 psig, respectively and worst-case gas analysis available for West Union Station (dated 12/4/2014).

**Using 0.0005% for all NIL compounds reported on extended gas analysis.

Company Name: Equitrans, LP
Facility Name: West Union Compressor Station
Project Description: Title V Renewal Application

TEG Dehydration Unit #2 Emissions Calculations

GRI-GLYCalc Version 4.0 - CONTROLLED EMISSIONS SUMMARY			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon dioxide	0.4330	10.392	1.89654
Methane	0.0293	0.704	0.1285
Ethane	0.0679	1.629	0.2973
Propane	0.0071	0.171	0.0312
Isobutane	0.0008	0.018	0.0033
n-Butane	0.0023	0.055	0.0100
Isopentane	0.0007	0.017	0.0032
n-Pentane	0.0011	0.027	0.0049
n-Hexane	0.0017	0.042	0.0076
Cyclohexane	0.0015	0.037	0.0067
Other Hexanes	0.0017	0.042	0.0076
Heptanes	0.0066	0.159	0.0291
2,2,4-Trimethylpentane	0.0019	0.046	0.0084
Benzene	0.0047	0.114	0.0207
Toluene	0.0079	0.189	0.0345
Ethylbenzene	0.0119	0.286	0.0522
Xylenes	0.0134	0.322	0.0587
C8 + Heavier Hydrocarbons	0.0095	0.228	0.0416
Total Emissions	0.1703	4.086	0.7457
Total Hydrocarbon Emissions	0.1703	4.086	0.7457
Total VOC Emissions	0.0730	1.753	0.3199
Total HAP Emissions	0.0416	0.998	0.1822

* Based on GRI GlyCalc 4.0 runs at emission scenario of maximum rated dry gas flowrate of 15 MMscf/day and average actual operating conditions of T and P of 80°F and 230 psig, respectively and worst-case gas analysis available for West Union Station (dated 12/4/2014).

**Using 0.0005% for all NIL compounds reported on extended gas analysis.

*** Potential emissions in the facility-wide summary are equal to permit limits. This summary is for informational purposes.

Company Name: Equitrans, LP
Facility Name: West Union Compressor Station
Project Description: Title V Renewal Application

TEG Dehydration Unit #2 Emissions Calculations

GRI-GLYCalc Version 4.0 - FLASH TANK EMISSIONS SUMMARY			
EMISSION RATES			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon dioxide	0.0693	1.6632	0.3035
Methane	0.0579	1.389	0.2534
Ethane	0.0358	0.860	0.1569
Propane	0.0018	0.044	0.0081
Isobutane	0.0001	0.003	0.0006
n-Butane	0.0003	0.007	0.0013
Isopentane	0.0001	0.002	0.0003
n-Pentane	0.0001	0.002	0.0004
n-Hexane	0.0001	0.002	0.0003
Cyclohexane	0.0001	0.001	0.0001
Other Hexanes	0.0001	0.003	0.0005
Heptanes	0.0001	0.003	0.0006
2,2,4-Trimethylpentane	0.0001	0.002	0.0004
Benzene	0.0001	0.001	0.0001
Toluene	0.0001	0.001	0.0001
Ethylbenzene	0.0001	0.001	0.0001
Xylenes	0.0001	0.001	0.0001
C8 + Heavier Hydrocarbons	0.0001	0.001	0.0001
Total Emissions	0.0966	2.318	0.4231
Total Hydrocarbon Emissions	0.0966	2.318	0.4231
Total VOC Emissions	0.0029	0.070	0.0128
Total HAP Emissions	0.0002	0.005	0.0001

* Based on GRI GlyCalc 4.0 runs at emission scenario of maximum rated dry gas flowrate of 15 MMscf/day and average actual operating conditions of T and P of 80°F and 230 psig, flash tank operating conditions of 80 psig and 121°F respectively and worst-case gas analysis available for West Union Station (dated 12/4/2014).

**Using 0.0005% for all NIL compounds reported on extended gas analysis.

*** Potential emissions in the facility-wide summary are equal to permit limits. This summary is for informational purposes.

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

TEG Dehydrator Unit# 1 Flare Emission Calculations

Source Designation:	
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,082
Heat Input (MMBtu/hr)	0.80
Fuel Consumption (mmscf/hr)	7.39E-04
Fuel Consumption (scf/hr):	739
Fuel Consumption (mmscf/yr)	6.48
Potential Annual Hours of Operation (hr/yr):	8,760

From design analysis

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
NO _x	100	0.07	0.32
CO	84	0.06	0.27
SO ₂	0.6	0.00	0.00
PM Total	7.6	0.01	0.02
PM Condensable	5.7	0.00	0.02
PM ₁₀ (Filterable)	1.9	0.00	0.01
PM _{2.5} (Filterable)	1.9	0.00	0.01
VOC	5.5	0.00	0.02
CO ₂ ^d (Natural Gas Firing)	53.06	94	410
CH ₄ ^d (Natural Gas Firing)	0.001	1.8E-03	0.01
N ₂ O ^d (Natural Gas Firing)	0.0001	1.8E-04	7.7E-04

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

TEG Dehydrator Unit# 1 Flare Emission Calculations

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
3-Methylchloranthrene	1.80E-06	1.33E-09	5.83E-09
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.18E-08	5.18E-08
Acenaphthene	1.80E-06	1.33E-09	5.83E-09
Acenaphthylene	1.80E-06	1.33E-09	5.83E-09
Anthracene	2.40E-06	1.77E-09	7.77E-09
Benz(a)anthracene	1.80E-06	1.33E-09	5.83E-09
Benzene	2.10E-03	1.55E-06	6.80E-06
Benzo(a)pyrene	1.20E-06	8.87E-10	3.89E-09
Benzo(b)fluoranthene	1.80E-06	1.33E-09	5.83E-09
Benzo(g,h,i)perylene	1.20E-06	8.87E-10	3.89E-09
Benzo(k)fluoranthene	1.80E-06	1.33E-09	5.83E-09
Chrysene	1.80E-06	1.33E-09	5.83E-09
Dibenzo(a,h)anthracene	1.20E-06	8.87E-10	3.89E-09
Dichlorobenzene	1.20E-03	8.87E-07	3.89E-06
Fluoranthene	3.00E-06	2.22E-09	9.72E-09
Fluorene	2.80E-06	2.07E-09	9.07E-09
Formaldehyde	7.50E-02	5.55E-05	2.43E-04
Hexane	1.80E+00	1.33E-03	5.83E-03
Indo(1,2,3-cd)pyrene	1.80E-06	1.33E-09	5.83E-09
Phenanthrene	1.70E-05	1.26E-08	5.51E-08
Pyrene	5.00E-06	3.70E-09	1.62E-08
Toluene	3.40E-03	2.51E-06	1.10E-05
Arsenic	2.00E-04	1.48E-07	6.48E-07
Beryllium	1.20E-05	8.87E-09	3.89E-08
Cadmium	1.10E-03	8.13E-07	3.56E-06
Chromium	1.40E-03	1.04E-06	4.53E-06
Cobalt	8.40E-05	6.21E-08	2.72E-07
Lead	5.00E-04	3.70E-07	1.62E-06
Manganese	3.80E-04	2.81E-07	1.23E-06
Mercury	2.60E-04	1.92E-07	8.42E-07
Nickel	2.10E-03	1.55E-06	6.80E-06
Selenium	2.40E-05	1.77E-08	7.77E-08
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	1.77E-08	7.77E-08
Naphthalene	6.10E-04	4.51E-07	1.98E-06
Total HAP		1.40E-03	6.12E-03

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

^b Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf)

^c Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb)

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

Company Name: Equitrans, LP
Facility Name: West Union Compressor Station
Project Description: Title V Renewal Application

TEG Dehydrator Unit# 2 Thermal Oxidizer Emission Calculations

Source Designation:	
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,082
Heat Input (MMBtu/hr)	7.00
Fuel Consumption (mmscf/hr)	6.47E-03
Fuel Consumption (scf/hr)	6,470
Fuel Consumption (mmscf/yr)	56.67
Potential Annual Hours of Operation (hr/yr):	8,760

From design analysis

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
NO _x	100	0.65	2.83
CO	84	0.54	2.38
SO ₂	0.6	0.00	0.02
PM Total	7.6	0.05	0.22
PM Condensable	5.7	0.04	0.16
PM ₁₀ (Filterable)	1.9	0.01	0.05
PM _{2.5} (Filterable)	1.9	0.01	0.05
VOC	5.5	0.04	0.16
CO ₂ ^d (Natural Gas Firing)	53.06	819	3586
CH ₄ ^d (Natural Gas Firing)	0.001	1.5E-02	0.07
N ₂ O ^d (Natural Gas Firing)	0.0001	1.5E-03	6.8E-03

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

TEG Dehydrator Unit# 2 Thermal Oxidizer Emission Calculations

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
3-Methylchloranthrene	1.80E-06	1.16E-08	5.10E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.04E-07	4.53E-07
Acenaphthene	1.80E-06	1.16E-08	5.10E-08
Acenaphthylene	1.80E-06	1.16E-08	5.10E-08
Anthracene	2.40E-06	1.55E-08	6.80E-08
Benz(a)anthracene	1.80E-06	1.16E-08	5.10E-08
Benzene	2.10E-03	1.36E-05	5.95E-05
Benzo(a)pyrene	1.20E-06	7.76E-09	3.40E-08
Benzo(b)fluoranthene	1.80E-06	1.16E-08	5.10E-08
Benzo(g,h,i)perylene	1.20E-06	7.76E-09	3.40E-08
Benzo(k)fluoranthene	1.80E-06	1.16E-08	5.10E-08
Chrysene	1.80E-06	1.16E-08	5.10E-08
Dibenzo(a,h)anthracene	1.20E-06	7.76E-09	3.40E-08
Dichlorobenzene	1.20E-03	7.76E-06	3.40E-05
Fluoranthene	3.00E-06	1.94E-08	8.50E-08
Fluorene	2.80E-06	1.81E-08	7.93E-08
Formaldehyde	7.50E-02	4.85E-04	2.13E-03
Hexane	1.80E+00	1.16E-02	5.10E-02
Indo(1,2,3-cd)pyrene	1.80E-06	1.16E-08	5.10E-08
Phenanthrene	1.70E-05	1.10E-07	4.82E-07
Pyrene	5.00E-06	3.23E-08	1.42E-07
Toluene	3.40E-03	2.20E-05	9.63E-05
Arsenic	2.00E-04	1.29E-06	5.67E-06
Beryllium	1.20E-05	7.76E-08	3.40E-07
Cadmium	1.10E-03	7.12E-06	3.12E-05
Chromium	1.40E-03	9.06E-06	3.97E-05
Cobalt	8.40E-05	5.43E-07	2.38E-06
Lead	5.00E-04	3.23E-06	1.42E-05
Manganese	3.80E-04	2.46E-06	1.08E-05
Mercury	2.60E-04	1.68E-06	7.37E-06
Nickel	2.10E-03	1.36E-05	5.95E-05
Selenium	2.40E-05	1.55E-07	6.80E-07
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	1.55E-07	6.80E-07
Naphthalene	6.10E-04	3.95E-06	1.73E-05
Total HAP		1.22E-02	5.35E-02

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

^b Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf)

^c Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb)

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

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Fugitive Emissions Calculations

Fugitive Component Information:

Component Type	Estimated Component Count	Gas Leak Emission Factor		Average Gas Leak Rate (lb/hr)	Max Gas Leak Rate (tpy)	Potential VOC Emissions (tpy)	Potential HAP Emissions (tpy)
		(lb/hr/component)	Factor Source				
Connectors	750	0.0004	EPA Protocol, Table 2-4	0.33	1.74	0.02	0.00
Flanges	500	0.001	EPA Protocol, Table 2-4	0.43	2.26	0.03	0.00
Open-Ended Lines	7	0.004	EPA Protocol, Table 2-4	0.03	0.16	0.00	0.00
Pump Seals	0	0.005	EPA Protocol, Table 2-4	<0.01	<0.01	<0.01	<0.01
Valves	100	0.010	EPA Protocol, Table 2-4	0.99	5.21	0.06	2.5E-03
Other	75	0.019	EPA Protocol, Table 2-4	1.46	7.65	0.09	0.00
Total				3.24	17.02	0.21	0.01

Notes:

1. The component type "Other" includes any equipment type other than connectors, flanges, open-ended lines, pumps and valves that have fugitive emissions
2. The component count is based on engineering estimates for the design of the West Union Station.
3. Table 2-4: Oil & Gas Production Operations Average Emission Factors, Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995
4. Assumes maximum leak rate 20% greater than measured average leak rate

GHG Fugitive Emissions from Component Leaks:

Component Type	Estimated Component Count	GHG Emission Factor		GHG Emissions (tpy)	CO ₂ Emissions (tpy)	CO ₂ e Emissions (tpy)
		(scf/hr/component)	Factor Source			
Connectors	750	0.004	40 CFR 98, Table W-1A	0.47	3.2E-03	11.82
Flanges	500	0.004	40 CFR 98, Table W-1A	0.32	2.1E-03	7.88
Open-Ended Lines	7	0.061	40 CFR 98, Table W-1A	0.07	4.6E-04	1.68
Pump Seals	0	13.3	40 CFR 98, Table W-1A	<0.01	<0.01	<0.01
Valves	100	0.03	40 CFR 98, Table W-1A	0.43	2.9E-03	10.64
Other	0	0.04	40 CFR 98, Table W-1A	<0.01	<0.01	<0.01
Total				1.28	0.01	32.02

Notes:

1. The component count is based on engineering estimates for the design of the West Union Station
2. Table W-1 of Subpart W - Default Whole Gas Emission Factors for Onshore Production, 40 CFR 98, Subpart W, Pre-publication version, November 8, 2010.
3. Calculated in accordance with Equations W-31, W-35 and W-36 in Subpart W of 40 CFR 98.
4. GHG (CO₂e) is carbon dioxide equivalent, which is the summation of CO₂ (GWP = 1) + CH₄ (GWP = 25) + N₂O (GWP = 298).

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Fugitive Emissions Calculations

VOC and HAP Vented Blowdown Emissions

Blowdown Emissions Sources	Number of Units	Vented Gas Volume Per Blowdown Event (scf)	Number of Blowdown Events per year	Total Volume NG Emitted (scf/yr)	Potential VOC Emissions (tpy)	Potential HAP Emissions (tpy)
Station ESD Vent	1	500,000	1	500,000	0.15	0.01
Filler Vessels	3	4,510	1	13,530	0.00	0.00
Dehy Contactor	2	45,000	1	90,000	0.03	0.00
Compressors	3	7,000	12	252,000	0.08	0.00
Total					0.26	0.010

Notes:

1. Density of natural gas 0.05 lb/ft³ @ STP (www.engineeringtoolbox.com)

GHG Vented Blowdown Emissions

Blowdown Emissions Sources	Number of Units	Vented Gas Volume Per Blowdown Event (scf)	Number of Blowdown Events per year	Total Volume NG Emitted (scf/yr)	Potential CH ₄ Emissions ¹ (tpy)	Potential CO ₂ Emissions ¹ (tpy)	Potential CO ₂ e Emissions (tpy)
Station ESD Vent	1	500,000	1	500,000	9.0	0.06	22.5
Filler Vessels	3	4,510	1	13,530	0.2	0.00	6
Dehy Contactor	2	45,000	1	90,000	1.6	0.01	40
Compressors	3	7,000	12	252,000	4.5	0.03	113
Total					15.4	0.104	385

1. Calculated in accordance with Equations W-35, and W-36 in Subpart W of 40 CFR 98.

Rod Packing Emissions

Number of Compressors	Number of Rods Per Compressor	Leak Rate (scf/hr/rod)	Total Volume NG Emitted (scf/yr)	Potential VOC Emissions (tpy)	Potential HAP Emissions (tpy)	Potential CO ₂ Emissions (tpy)	Potential CH ₄ Emissions (tpy)	Potential CO ₂ e Emissions (tpy)
3	4	11.5	1,208,880	0.37	0.01	0.15	21.86	546.60
Total				0.37	0.01	0.15	21.86	546.60

Notes:

- Assumes a density of natural gas of 0.05 lb/scf
- Leak rate from https://www2.epa.gov/gasstar/documents/ll_rodpack.pdf

Fugitive Component Emissions Data:

Pollutant	Emissions Estimation Method	
	Atmospheric Emissions (lb/yr)	tpy
VOC	0.19	0.84
HAPs	0.01	0.03
GHG (CO ₂ e)	220	963

EPA Protocol, Table 2-4 & Site-Specific Gas Analysis
 EPA Protocol, Table 2-4 and Site-Specific Gas Analysis
 40 CFR 98, Table W-1A and Site-Specific Gas Analysis

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Heating Boiler Emission Calculations - BLR

Source Designation:	
Year Installed	1974
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf)	1,082
Heat Input (MMBtu/hr)	1.25
Fuel Consumption (mmscf/hr)	1.16E-03
Maximum Fuel Consumption at 100% Load (MMscf/yr)	10.12
Potential Annual Hours of Operation (hr/yr)	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
NO _x	100	0.116	0.506
CO	84	0.097	0.425
SO ₂	0.6	0.0007	0.0030
PM Total	7.6	0.0088	0.0385
PM Condensable	5.7	0.007	0.029
PM ₁₀ (Filterable)	1.9	0.002	0.010
PM _{2.5} (Filterable)	1.9	0.002	0.010
VOC	5.5	0.006	0.028
CO ₂ ^d (Natural Gas Firing)	126,591	146	641
CH ₄ ^d (Natural Gas Firing)	2.4	0.0028	0.0121
N ₂ O ^d (Natural Gas Firing)	0.24	0.00028	0.00121

Company Name:
 Facility Name:
 Project Description:

Equitrans, LP
West Union Compressor Station
Title V Renewal Application

Heating Boiler Emission Calculations - B1.R
Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
3-Methylchloranthrene	1.80E-06	2.08E-09	9.11E-09
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.85E-08	8.10E-08
Acenaphthene	1.80E-06	2.08E-09	9.11E-09
Acenaphthylene	1.80E-06	2.08E-09	9.11E-09
Anthracene	2.40E-06	2.77E-09	1.21E-08
Benz(a)anthracene	1.80E-06	2.08E-09	9.11E-09
Benzene	2.10E-03	2.43E-06	1.06E-05
Benzo(a)pyrene	1.20E-06	1.39E-09	6.07E-09
Benzo(b)fluoranthene	1.80E-06	2.08E-09	9.11E-09
Benzo(g,h,i)perylene	1.20E-06	1.39E-09	6.07E-09
Benzo(k)fluoranthene	1.80E-06	2.08E-09	9.11E-09
Chrysene	1.80E-06	2.08E-09	9.11E-09
Dibenzo(a,h) anthracene	1.20E-06	1.39E-09	6.07E-09
Dichlorobenzene	1.20E-03	1.39E-06	6.07E-06
Fluoranthene	3.00E-06	3.47E-09	1.52E-08
Fluorene	2.80E-06	3.23E-09	1.42E-08
Formaldehyde	7.50E-02	8.66E-05	3.80E-04
Hexane	1.80E+00	2.08E-03	9.11E-03
Indo(1,2,3-cd)pyrene	1.80E-06	2.08E-09	9.11E-09
Phenanthrene	1.70E-05	1.96E-08	8.60E-08
Pyrene	5.00E-06	5.78E-09	2.53E-08
Toluene	3.40E-03	3.93E-06	1.72E-05
Arsenic	2.00E-04	2.31E-07	1.01E-06
Beryllium	1.20E-05	1.39E-08	6.07E-08
Cadmium	1.10E-03	1.27E-06	5.57E-06
Chromium	1.40E-03	1.62E-06	7.08E-06
Cobalt	8.40E-05	9.70E-08	4.25E-07
Lead	5.00E-04	5.78E-07	2.53E-06
Manganese	3.80E-04	4.39E-07	1.92E-06
Mercury	2.60E-04	3.00E-07	1.32E-06
Nickel	2.10E-03	2.43E-06	1.06E-05
Selenium	2.40E-05	2.77E-08	1.21E-07
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	2.77E-08	1.21E-07
Naphthalene	6.10E-04	7.05E-07	3.09E-06
Total HAP		2.18E-03	9.56E-03

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

^b Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) * Emission Factor (lb/MMscf)

^c Annual Emissions (tons/yr)_{potential} = (lb/hr)_{emissions} * (Maximum Allowable Operating Hours, 8760 hr/yr) * (1 ton/2000 lb)

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

Company Name: Equitrans, LP
Facility Name: West Union Compressor Station
Project Description: Title V Renewal Application

TEG Dehydrator Reboiler Emission Calculations - BLR01

Source Designation:	
Year Installed	1974
Fuel Used	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,082
Heat Input (MMBtu/hr)	0.75
Fuel Consumption (mmscf/hr):	6.93E-04
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)^a	Potential Emissions	
		(lb/hr)^b	(tons/yr)^c
NO _x	100	0.069	0.304
CO	84	0.058	0.255
SO ₂	0.6	0.0004	0.0018
PM Total	7.6	0.0053	0.0231
PM Condensable	5.7	0.004	0.017
PM ₁₀ (Filterable)	1.9	0.001	0.006
PM _{2.5} (Filterable)	1.9	0.001	0.006
VOC	5.5	0.004	0.017
CO ₂ ^d (Natural Gas Firing)	126.591	88	384
CH ₄ ^d (Natural Gas Firing)	2.4	0.0017	0.0072
N ₂ O ^d (Natural Gas Firing)	0.24	0.00017	0.00072

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

TEG Dehydrator Reboiler Emission Calculations - BLR01

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
3-Methylchloranthrene	1.80E-06	1.25E-09	5.46E-09
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.11E-08	4.86E-08
Acenaphthene	1.80E-06	1.25E-09	5.46E-09
Acenaphthylene	1.80E-06	1.25E-09	5.46E-09
Anthracene	2.40E-06	1.66E-09	7.29E-09
Benz(a)anthracene	1.80E-06	1.25E-09	5.46E-09
Benzene	2.10E-03	1.46E-06	6.38E-06
Benzo(a)pyrene	1.20E-06	8.32E-10	3.64E-09
Benzo(b)fluoranthene	1.80E-06	1.25E-09	5.46E-09
Benzo(g,h,i)perylene	1.20E-06	8.32E-10	3.64E-09
Benzo(k)fluoranthene	1.80E-06	1.25E-09	5.46E-09
Chrysene	1.80E-06	1.25E-09	5.46E-09
Dibenzo(a,h)anthracene	1.20E-06	8.32E-10	3.64E-09
Dichlorobenzene	1.20E-03	8.32E-07	3.64E-06
Fluoranthene	3.00E-06	2.08E-09	9.11E-09
Fluorene	2.80E-06	1.94E-09	8.50E-09
Formaldehyde	7.50E-02	5.20E-05	2.28E-04
Hexane	1.80E+00	1.25E-03	5.46E-03
Indo(1,2,3-cd)pyrene	1.80E-06	1.25E-09	5.46E-09
Phenanthrene	1.70E-05	1.18E-08	5.16E-08
Pyrene	5.00E-06	3.47E-09	1.52E-08
Toluene	3.40E-03	2.36E-06	1.03E-05
Arsenic	2.00E-04	1.39E-07	6.07E-07
Beryllium	1.20E-05	8.32E-09	3.64E-08
Cadmium	1.10E-03	7.62E-07	3.34E-06
Chromium	1.40E-03	9.70E-07	4.25E-06
Cobalt	8.40E-05	5.82E-08	2.55E-07
Lead	5.00E-04	3.47E-07	1.52E-06
Manganese	3.80E-04	2.63E-07	1.15E-06
Mercury	2.60E-04	1.80E-07	7.89E-07
Nickel	2.10E-03	1.46E-06	6.38E-06
Selenium	2.40E-05	1.66E-08	7.29E-08
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	1.66E-08	7.29E-08
Naphthalene	6.10E-04	4.23E-07	1.85E-06
Total HAP		1.31E-03	5.73E-03

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

^b Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf)

^c Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb)

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

Company Name: Equitrans, LP
Facility Name: West Union Compressor Station
Project Description: Title V Renewal Application

TEG Dehydrator Reboiler Emission Calculations - BLR02

Source Designation:	
Year Installed	2003
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,082
Heat Input (MMBtu/hr)	0.75
Fuel Consumption (mmscf/hr):	6.93E-04
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)^a	Potential Emissions	
		(lb/hr)^b	(tons/yr)^c
NO _x	100	0.069	0.304
CO	84	0.058	0.255
SO ₂	0.6	0.0004	0.0018
PM Total	7.6	0.0053	0.0231
PM Condensable	5.7	0.004	0.017
PM ₁₀ (Filterable)	1.9	0.001	0.006
PM _{2.5} (Filterable)	1.9	0.001	0.006
VOC	5.5	0.004	0.017
CO ₂ ^d (Natural Gas Firing)	126.591	88	384
CH ₄ ^d (Natural Gas Firing)	2.4	0.0017	0.0072
N ₂ O ^d (Natural Gas Firing)	0.24	0.00017	0.00072

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

TEG Dehydrator Reboiler Emission Calculations - BLR02

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
3-Methylchloranthrene	1.80E-06	1.25E-09	5.46E-09
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.11E-08	4.86E-08
Acenaphthene	1.80E-06	1.25E-09	5.46E-09
Acenaphthylene	1.80E-06	1.25E-09	5.46E-09
Anthracene	2.40E-06	1.66E-09	7.29E-09
Benz(a)anthracene	1.80E-06	1.25E-09	5.46E-09
Benzene	2.10E-03	1.46E-06	6.38E-06
Benzo(a)pyrene	1.20E-06	8.32E-10	3.64E-09
Benzo(b)fluoranthene	1.80E-06	1.25E-09	5.46E-09
Benzo(g,h,i)perylene	1.20E-06	8.32E-10	3.64E-09
Benzo(k)fluoranthene	1.80E-06	1.25E-09	5.46E-09
Chrysene	1.80E-06	1.25E-09	5.46E-09
Dibenzo(a,h)anthracene	1.20E-06	8.32E-10	3.64E-09
Dichlorobenzene	1.20E-03	8.32E-07	3.64E-06
Fluoranthene	3.00E-06	2.08E-09	9.11E-09
Fluorene	2.80E-06	1.94E-09	8.50E-09
Formaldehyde	7.50E-02	5.20E-05	2.28E-04
Hexane	1.80E+00	1.25E-03	5.46E-03
Indo(1,2,3-cd)pyrene	1.80E-06	1.25E-09	5.46E-09
Phenanthrene	1.70E-05	1.18E-08	5.16E-08
Pyrene	5.00E-06	3.47E-09	1.52E-08
Toluene	3.40E-03	2.36E-06	1.03E-05
Arsenic	2.00E-04	1.39E-07	6.07E-07
Beryllium	1.20E-05	8.32E-09	3.64E-08
Cadmium	1.10E-03	7.62E-07	3.34E-06
Chromium	1.40E-03	9.70E-07	4.25E-06
Cobalt	8.40E-05	5.82E-08	2.55E-07
Lead	5.00E-04	3.47E-07	1.52E-06
Manganese	3.80E-04	2.63E-07	1.15E-06
Mercury	2.60E-04	1.80E-07	7.89E-07
Nickel	2.10E-03	1.46E-06	6.38E-06
Selenium	2.40E-05	1.66E-08	7.29E-08
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	1.66E-08	7.29E-08
Naphthalene	6.10E-04	4.23E-07	1.85E-06
Total HAP		1.31E-03	5.73E-03

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

^b Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf)

^c Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb)

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

Company Name: Equitrans, LP
 Facility Name: West Union Compressor Station
 Project Description: Title V Renewal Application

Site-Specific Gas Analysis

Sample Location: West Union Gas Analysis
 Sample Date: 12/4/2014
 HHV (Btu/scf): 1,082

Constituent	Natural Gas Stream Speciation (Vol. %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.2100%	44.01	9.24E-02	0.01	0.51%
Nitrogen	1.6580%	28.01	4.64E-01	0.03	2.548%
Methane	84.9910%	16.04	1.36E+01	0.75	74.789%
Ethane	12.6910%	30.07	3.82E+00	0.21	20.936%
Propane	0.3600%	44.10	1.59E-01	0.01	0.871%
Isobutane	0.0160%	58.12	9.30E-03	0.00	0.051%
n-Butane	0.0340%	58.12	1.98E-02	0.00	0.108%
Isopentane	0.0070%	72.15	5.05E-03	0.00	0.028%
n-Pentane	0.0080%	72.15	5.77E-03	0.00	0.032%
Cyclopentane	0.0000%	70.18	0.00E+00	0.00	0.000%
n-Hexane	0.0050%	86.18	4.31E-03	0.00	0.024%
Cyclohexane	0.0010%	84.16	8.42E-04	0.00	0.005%
Other Hexanes	0.0070%	86.18	6.03E-03	0.00	0.033%
Heptanes	0.0070%	100.21	7.01E-03	0.00	0.038%
Methylcyclohexane	0.0000%	98.19	0.00E+00	0.00	0.000%
2,2,4-Trimethylpentane	0.0040%	114.23	4.57E-03	0.00	0.025%
Benzene	0.0000%	78.11	0.00E+00	0.00	0.000%
Toluene	0.0000%	92.14	0.00E+00	0.00	0.000%
Ethylbenzene	0.0000%	106.17	0.00E+00	0.00	0.000%
Xylenes	0.0000%	106.16	0.00E+00	0.00	0.000%
C8 + Heavies	0.0010%	114.23	1.14E-03	0.00	0.006%
Totals			18.23	1.00	100%
TOC (Total)	98.13%				96.95%
VOC (Total)	0.45%				1.22%
HAP (Total)	0.01%				0.05%

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: West Union TEG Dehydration Unit #1
 File Name: Z:\Client\EQT Corporation\West Virginia\WestUnion\Projects\173901.00XX West
 Union Title V Renewal\Attachment I - Emission calcs\20170517_West Union TEG dehy with
 Flare PTE.ddf
 Date: July 05, 2017

DESCRIPTION:

Description: PTE Calculations - Title V Renewal

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0355	0.852	0.1555
Ethane	0.0421	1.010	0.1844
Propane	0.0037	0.090	0.0164
Isobutane	0.0004	0.009	0.0016
n-Butane	0.0011	0.026	0.0048
Isopentane	0.0003	0.008	0.0015
n-Pentane	0.0005	0.012	0.0023
n-Hexane	0.0008	0.019	0.0034
Cyclohexane	0.0007	0.016	0.0030
Other Hexanes	0.0008	0.019	0.0034
Heptanes	0.0029	0.070	0.0128
2,2,4-Trimethylpentane	0.0008	0.019	0.0035
Benzene	0.0030	0.073	0.0133
Toluene	0.0057	0.138	0.0252
Ethylbenzene	0.0099	0.238	0.0434
Xylenes	0.0125	0.301	0.0549
C8+ Heavies	0.0018	0.044	0.0080
Total Emissions	0.1227	2.945	0.5375
Total Hydrocarbon Emissions	0.1227	2.945	0.5375
Total VOC Emissions	0.0451	1.083	0.1976
Total HAP Emissions	0.0328	0.788	0.1437
Total BTEX Emissions	0.0312	0.749	0.1368

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	1.7753	42.607	7.7758
Ethane	2.1046	50.511	9.2183
Propane	0.1868	4.482	0.8180
Isobutane	0.0185	0.443	0.0809
n-Butane	0.0552	1.324	0.2416
Isopentane	0.0168	0.403	0.0735
n-Pentane	0.0259	0.622	0.1135
n-Hexane	0.0392	0.940	0.1715
Cyclohexane	0.0342	0.822	0.1500
Other Hexanes	0.0393	0.944	0.1723

Heptanes	0.1465	3.517	0.6419
2,2,4-Trimethylpentane	0.0401	0.963	0.1757
Benzene	0.1524	3.657	0.6674
Toluene	0.2875	6.900	1.2592
Ethylbenzene	0.4953	11.886	2.1692
Xylenes	0.6263	15.031	2.7431
C8+ Heavies	0.0915	2.196	0.4008

Total Emissions	6.1353	147.247	26.8727

Total Hydrocarbon Emissions	6.1353	147.247	26.8727
Total VOC Emissions	2.2554	54.129	9.8785
Total HAP Emissions	1.6407	39.376	7.1862
Total BTEX Emissions	1.5614	37.474	6.8390

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0355	0.852	0.1555
Ethane	0.0421	1.010	0.1844
Propane	0.0037	0.090	0.0164
Isobutane	0.0004	0.009	0.0016
n-Butane	0.0011	0.026	0.0048
Isopentane	0.0003	0.008	0.0015
n-Pentane	0.0005	0.012	0.0023
n-Hexane	0.0008	0.019	0.0034
Cyclohexane	0.0007	0.016	0.0030
Other Hexanes	0.0008	0.019	0.0034
Heptanes	0.0029	0.070	0.0128
2,2,4-Trimethylpentane	0.0008	0.019	0.0035
Benzene	0.0030	0.073	0.0133
Toluene	0.0057	0.138	0.0252
Ethylbenzene	0.0099	0.238	0.0434
Xylenes	0.0125	0.301	0.0549
C8+ Heavies	0.0018	0.044	0.0080

Total Emissions	0.1227	2.945	0.5375

Total Hydrocarbon Emissions	0.1227	2.945	0.5375
Total VOC Emissions	0.0451	1.083	0.1976
Total HAP Emissions	0.0328	0.788	0.1437
Total BTEX Emissions	0.0312	0.749	0.1368

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction
Methane	7.7758	0.1555	98.00
Ethane	9.2183	0.1844	98.00
Propane	0.8180	0.0164	98.00
Isobutane	0.0809	0.0016	98.00
n-Butane	0.2416	0.0048	98.00
Isopentane	0.0735	0.0015	98.00
n-Pentane	0.1135	0.0023	98.00
n-Hexane	0.1715	0.0034	98.00
Cyclohexane	0.1500	0.0030	98.00

Other Hexanes	0.1723	0.0034	98.00
Heptanes	0.6419	0.0128	98.00
2,2,4-Trimethylpentane	0.1757	0.0035	98.00
Benzene	0.6674	0.0133	98.00
Toluene	1.2592	0.0252	98.00
Ethylbenzene	2.1692	0.0434	98.00
Xylenes	2.7431	0.0549	98.00
C8+ Heavies	0.4008	0.0080	98.00

Total Emissions	26.8727	0.5375	98.00

Total Hydrocarbon Emissions	26.8727	0.5375	98.00
Total VOC Emissions	9.8785	0.1976	98.00
Total HAP Emissions	7.1862	0.1437	98.00
Total BTEX Emissions	6.8390	0.1368	98.00

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 60.00 deg. F
 Excess Oxygen: 15.00 %
 Combustion Efficiency: 98.00 %
 Supplemental Fuel Requirement: 3.84e-002 MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	2.00%	98.00%
Isobutane	2.00%	98.00%
n-Butane	2.00%	98.00%
Isopentane	2.00%	98.00%
n-Pentane	2.00%	98.00%
n-Hexane	2.00%	98.00%
Cyclohexane	2.00%	98.00%
Other Hexanes	2.00%	98.00%
Heptanes	2.00%	98.00%
2,2,4-Trimethylpentane	2.00%	98.00%
Benzene	2.00%	98.00%
Toluene	2.00%	98.00%
Ethylbenzene	2.00%	98.00%
Xylenes	2.00%	98.00%
C8+ Heavies	2.00%	98.00%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
 Calculated Dry Gas Dew Point: 1.08 lbs. H2O/MMSCF

Temperature: 58.0 deg. F
 Pressure: 400.0 psig
 Dry Gas Flow Rate: 20.0000 MMSCF/day
 Glycol Losses with Dry Gas: 0.0115 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 31.36 lbs. H2O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 5.94 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	3.45%	96.55%
Carbon Dioxide	99.88%	0.12%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.97%	0.03%
Propane	99.95%	0.05%
Isobutane	99.91%	0.09%
n-Butane	99.87%	0.13%
Isopentane	99.85%	0.15%
n-Pentane	99.80%	0.20%
n-Hexane	99.59%	0.41%
Cyclohexane	98.15%	1.85%
Other Hexanes	99.70%	0.30%
Heptanes	99.05%	0.95%
2,2,4-Trimethylpentane	99.60%	0.40%
Benzene	82.24%	17.76%
Toluene	71.59%	28.41%
Ethylbenzene	57.52%	42.48%
Xylenes	46.28%	53.72%
C8+ Heavies	97.55%	2.45%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	35.80%	64.20%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.50%	99.50%
n-Pentane	0.50%	99.50%
n-Hexane	0.50%	99.50%
Cyclohexane	3.20%	96.80%
Other Hexanes	1.00%	99.00%
Heptanes	0.50%	99.50%
2,2,4-Trimethylpentane	1.50%	98.50%
Benzene	5.00%	95.00%
Toluene	7.90%	92.10%
Ethylbenzene	10.41%	89.59%
Xylenes	12.91%	87.09%
C8+ Heavies	12.04%	87.96%

STREAM REPORTS:

WET GAS STREAM

Temperature: 58.00 deg. F
 Pressure: 414.70 psia
 Flow Rate: 8.34e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.61e-002	2.62e+001
Carbon Dioxide	2.10e-001	2.03e+002
Nitrogen	1.66e+000	1.02e+003
Methane	8.49e+001	2.99e+004
Ethane	1.27e+001	8.38e+003
Propane	3.60e-001	3.49e+002
Isobutane	1.60e-002	2.04e+001
n-Butane	3.40e-002	4.34e+001
Isopentane	7.00e-003	1.11e+001
n-Pentane	7.99e-003	1.27e+001
n-Hexane	5.00e-003	9.46e+000
Cyclohexane	9.99e-004	1.85e+000
Other Hexanes	7.00e-003	1.32e+001
Heptanes	7.00e-003	1.54e+001
2,2,4-Trimethylpentane	4.00e-003	1.00e+001
Benzene	5.00e-004	8.58e-001
Toluene	5.00e-004	1.01e+000
Ethylbenzene	5.00e-004	1.17e+000
Xylenes	5.00e-004	1.17e+000
C8+ Heavies	9.99e-004	3.74e+000
Total Components	100.00	4.01e+004

DRY GAS STREAM

Temperature: 58.00 deg. F
 Pressure: 414.70 psia
 Flow Rate: 8.33e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.28e-003	9.01e-001
Carbon Dioxide	2.10e-001	2.03e+002
Nitrogen	1.66e+000	1.02e+003
Methane	8.50e+001	2.99e+004
Ethane	1.27e+001	8.38e+003
Propane	3.60e-001	3.49e+002
Isobutane	1.60e-002	2.04e+001
n-Butane	3.40e-002	4.33e+001
Isopentane	6.99e-003	1.11e+001
n-Pentane	7.98e-003	1.27e+001
n-Hexane	4.98e-003	9.43e+000
Cyclohexane	9.82e-004	1.81e+000
Other Hexanes	6.98e-003	1.32e+001
Heptanes	6.93e-003	1.53e+001
2,2,4-Trimethylpentane	3.98e-003	1.00e+001

Benzene	4.11e-004	7.05e-001
Toluene	3.58e-004	7.24e-001
Ethylbenzene	2.88e-004	6.71e-001
Xylenes	2.31e-004	5.40e-001
C8+ Heavies	9.76e-004	3.65e+000

Total Components	100.00	4.00e+004
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LEAN GLYCOL STREAM

Temperature: 58.00 deg. F
Flow Rate: 2.50e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.90e+001	1.39e+003
Water	1.00e+000	1.41e+001
Carbon Dioxide	1.73e-012	2.43e-011
Nitrogen	4.53e-013	6.38e-012
Methane	4.24e-018	5.96e-017
Ethane	7.06e-008	9.93e-007
Propane	5.40e-010	7.60e-009
Isobutane	3.93e-011	5.54e-010
n-Butane	9.71e-011	1.37e-009
Isopentane	5.99e-006	8.44e-005
n-Pentane	9.25e-006	1.30e-004
n-Hexane	1.40e-005	1.97e-004
Cyclohexane	8.04e-005	1.13e-003
Other Hexanes	2.82e-005	3.97e-004
Heptanes	5.23e-005	7.36e-004
2,2,4-Trimethylpentane	4.34e-005	6.11e-004
Benzene	5.70e-004	8.02e-003
Toluene	1.75e-003	2.47e-002
Ethylbenzene	4.09e-003	5.75e-002
Xylenes	6.59e-003	9.28e-002
C8+ Heavies	8.90e-004	1.25e-002
Total Components	100.00	1.41e+003

RICH GLYCOL STREAM

Temperature: 58.00 deg. F
Pressure: 414.70 psia
Flow Rate: 2.56e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.68e+001	1.39e+003
Water	2.73e+000	3.93e+001
Carbon Dioxide	1.69e-002	2.43e-001
Nitrogen	4.43e-003	6.38e-002
Methane	1.23e-001	1.78e+000
Ethane	1.46e-001	2.10e+000
Propane	1.30e-002	1.87e-001
Isobutane	1.28e-003	1.85e-002
n-Butane	3.83e-003	5.52e-002
Isopentane	1.17e-003	1.69e-002

n-Pentane	1.81e-003	2.60e-002
n-Hexane	2.73e-003	3.94e-002
Cyclohexane	2.46e-003	3.54e-002
Other Hexanes	2.76e-003	3.97e-002
Heptanes	1.02e-002	1.47e-001
2,2,4-Trimethylpentane	2.83e-003	4.07e-002
Benzene	1.11e-002	1.60e-001
Toluene	2.17e-002	3.12e-001
Ethylbenzene	3.84e-002	5.53e-001
Xylenes	5.00e-002	7.19e-001
C8+ Heavies	7.23e-003	1.04e-001

Total Components	100.00	1.44e+003

REGENERATOR OVERHEADS STREAM

 Temperature: 212.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 6.13e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)

Water	8.68e+001	2.53e+001
Carbon Dioxide	3.42e-001	2.43e-001
Nitrogen	1.41e-001	6.38e-002
Methane	6.85e+000	1.78e+000
Ethane	4.33e+000	2.10e+000
Propane	2.62e-001	1.87e-001
Isobutane	1.97e-002	1.85e-002
n-Butane	5.87e-002	5.52e-002
Isopentane	1.44e-002	1.68e-002
n-Pentane	2.22e-002	2.59e-002
n-Hexane	2.81e-002	3.92e-002
Cyclohexane	2.52e-002	3.42e-002
Other Hexanes	2.82e-002	3.93e-002
Heptanes	9.05e-002	1.47e-001
2,2,4-Trimethylpentane	2.17e-002	4.01e-002
Benzene	1.21e-001	1.52e-001
Toluene	1.93e-001	2.87e-001
Ethylbenzene	2.89e-001	4.95e-001
Xylenes	3.65e-001	6.26e-001
C8+ Heavies	3.32e-002	9.15e-002

Total Components	100.00	3.17e+001

COMBUSTION DEVICE OFF GAS STREAM

 Temperature: 1000.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 1.56e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)

Methane	5.37e+001	3.55e-002
Ethane	3.40e+001	4.21e-002
Propane	2.06e+000	3.74e-003
Isobutane	1.54e-001	3.69e-004
n-Butane	4.61e-001	1.10e-003

Isopentane	1.13e-001	3.36e-004
n-Pentane	1.74e-001	5.18e-004
n-Hexane	2.21e-001	7.83e-004
Cyclohexane	1.97e-001	6.85e-004
Other Hexanes	2.21e-001	7.87e-004
Heptanes	7.10e-001	2.93e-003
2,2,4-Trimethylpentane	1.70e-001	8.02e-004
Benzene	9.47e-001	3.05e-003
Toluene	1.51e+000	5.75e-003
Ethylbenzene	2.26e+000	9.91e-003
Xylenes	2.86e+000	1.25e-002
C8+ Heavies	2.61e-001	1.83e-003
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Total Components	100.00	1.23e-001

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: West Union Dehydration Unit 2

File Name: Z:\Client\EQT Corporation\West Virginia\WestUnion\Projects\173901.00XX West Union Title V Renewal\Attachment I - Emission calcs\20170705_WestUnion TEG dehy with TO PTE.ddf

Date: July 05, 2017

DESCRIPTION:

Description: Title V Renewal

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0293	0.704	0.1285
Ethane	0.0679	1.629	0.2973
Propane	0.0071	0.171	0.0312
Isobutane	0.0008	0.018	0.0033
n-Butane	0.0023	0.055	0.0100
Isopentane	0.0007	0.017	0.0032
n-Pentane	0.0011	0.027	0.0049
n-Hexane	0.0017	0.042	0.0076
Cyclohexane	0.0015	0.037	0.0067
Other Hexanes	0.0017	0.042	0.0076
Heptanes	0.0066	0.159	0.0291
2,2,4-Trimethylpentane	0.0019	0.046	0.0084
Benzene	0.0047	0.114	0.0207
Toluene	0.0079	0.189	0.0345
Ethylbenzene	0.0119	0.286	0.0522
Xylenes	0.0134	0.322	0.0587
C8+ Heavies	0.0095	0.228	0.0416
Total Emissions	0.1703	4.086	0.7457
Total Hydrocarbon Emissions	0.1703	4.086	0.7457
Total VOC Emissions	0.0730	1.753	0.3199
Total HAP Emissions	0.0416	0.998	0.1822
Total BTEX Emissions	0.0379	0.911	0.1662

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	1.4674	35.219	6.4274
Ethane	3.3934	81.442	14.8632
Propane	0.3566	8.559	1.5621
Isobutane	0.0378	0.907	0.1656
n-Butane	0.1146	2.751	0.5020
Isopentane	0.0362	0.868	0.1584
n-Pentane	0.0556	1.334	0.2434
n-Hexane	0.0867	2.080	0.3795
Cyclohexane	0.0768	1.844	0.3365
Other Hexanes	0.0873	2.096	0.3825

Heptanes	0.3317	7.961	1.4529
2,2,4-Trimethylpentane	0.0964	2.312	0.4220
Benzene	0.2366	5.679	1.0364
Toluene	0.3938	9.452	1.7250
Ethylbenzene	0.5960	14.304	2.6105
Xylenes	0.6706	16.095	2.9374
C8+ Heavies	0.4749	11.398	2.0802

Total Emissions	8.5126	204.302	37.2852

Total Hydrocarbon Emissions	8.5126	204.302	37.2852
Total VOC Emissions	3.6517	87.641	15.9945
Total HAP Emissions	2.0801	49.923	9.1109
Total BTEX Emissions	1.8971	45.531	8.3093

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr

Methane	0.0579	1.389	0.2534
Ethane	0.0358	0.860	0.1569
Propane	0.0018	0.044	0.0081
Isobutane	0.0001	0.003	0.0006
n-Butane	0.0003	0.007	0.0013
Isopentane	0.0001	0.002	0.0003
n-Pentane	0.0001	0.002	0.0004
n-Hexane	0.0001	0.002	0.0003
Cyclohexane	<0.0001	<0.001	0.0001
Other Hexanes	0.0001	0.003	0.0005
Heptanes	0.0001	0.003	0.0006
2,2,4-Trimethylpentane	0.0001	0.002	0.0004
Benzene	<0.0001	<0.001	<0.0001
Toluene	<0.0001	<0.001	<0.0001
Ethylbenzene	<0.0001	<0.001	<0.0001
Xylenes	<0.0001	<0.001	<0.0001
C8+ Heavies	<0.0001	<0.001	0.0001

Total Emissions	0.0966	2.318	0.4231

Total Hydrocarbon Emissions	0.0966	2.318	0.4231
Total VOC Emissions	0.0029	0.070	0.0128
Total HAP Emissions	0.0002	0.005	0.0008
Total BTEX Emissions	<0.0001	0.001	0.0001

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr

Methane	2.8928	69.428	12.6706
Ethane	1.7914	42.993	7.8463
Propane	0.0925	2.219	0.4050
Isobutane	0.0063	0.151	0.0276
n-Butane	0.0145	0.348	0.0635
Isopentane	0.0039	0.094	0.0171
n-Pentane	0.0048	0.114	0.0208
n-Hexane	0.0040	0.096	0.0175
Cyclohexane	0.0008	0.020	0.0037
Other Hexanes	0.0053	0.128	0.0233
Heptanes	0.0072	0.172	0.0314

2,2,4-Trimethylpentane	0.0042	0.101	0.0184
Benzene	0.0004	0.009	0.0016
Toluene	0.0004	0.009	0.0017
Ethylbenzene	0.0003	0.008	0.0014
Xylenes	0.0003	0.006	0.0011
C8+ Heavies	0.0009	0.021	0.0038

Total Emissions	4.8299	115.917	21.1548

Total Hydrocarbon Emissions	4.8299	115.917	21.1548
Total VOC Emissions	0.1457	3.496	0.6380
Total HAP Emissions	0.0095	0.229	0.0417
Total BTEX Emissions	0.0013	0.032	0.0058

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr

Methane	0.0872	2.093	0.3820
Ethane	0.1037	2.489	0.4542
Propane	0.0090	0.216	0.0393
Isobutane	0.0009	0.021	0.0039
n-Butane	0.0026	0.062	0.0113
Isopentane	0.0008	0.019	0.0035
n-Pentane	0.0012	0.029	0.0053
n-Hexane	0.0018	0.044	0.0079
Cyclohexane	0.0016	0.037	0.0068
Other Hexanes	0.0019	0.044	0.0081
Heptanes	0.0068	0.163	0.0297
2,2,4-Trimethylpentane	0.0020	0.048	0.0088
Benzene	0.0047	0.114	0.0208
Toluene	0.0079	0.189	0.0345
Ethylbenzene	0.0119	0.286	0.0522
Xylenes	0.0134	0.322	0.0588
C8+ Heavies	0.0095	0.228	0.0417

Total Emissions	0.2668	6.404	1.1688

Total Hydrocarbon Emissions	0.2668	6.404	1.1688
Total VOC Emissions	0.0759	1.823	0.3326
Total HAP Emissions	0.0418	1.003	0.1831
Total BTEX Emissions	0.0380	0.911	0.1663

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction

Methane	19.0980	0.3820	98.00
Ethane	22.7095	0.4542	98.00
Propane	1.9671	0.0393	98.00
Isobutane	0.1932	0.0039	98.00
n-Butane	0.5655	0.0113	98.00
Isopentane	0.1755	0.0035	98.00
n-Pentane	0.2642	0.0053	98.00
n-Hexane	0.3970	0.0079	98.00
Cyclohexane	0.3402	0.0068	98.00
Other Hexanes	0.4058	0.0081	98.00

Heptanes	1.4843	0.0297	98.00
2,2,4-Trimethylpentane	0.4404	0.0088	98.00
Benzene	1.0380	0.0208	98.00
Toluene	1.7266	0.0345	98.00
Ethylbenzene	2.6120	0.0522	98.00
Xylenes	2.9385	0.0598	98.00
C8+ Heavies	2.0841	0.0417	98.00

Total Emissions	58.4400	1.1688	98.00
Total Hydrocarbon Emissions	58.4400	1.1688	98.00
Total VOC Emissions	16.6325	0.3326	98.00
Total HAP Emissions	9.1526	0.1831	98.00
Total BTEX Emissions	8.3152	0.1663	98.00

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 60.00 deg. F
 Excess Oxygen: 15.00 %
 Combustion Efficiency: 98.00 %
 Supplemental Fuel Requirement: 6.42e-002 MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	2.00%	98.00%
Isobutane	2.00%	98.00%
n-Butane	2.00%	98.00%
Isopentane	2.00%	98.00%
n-Pentane	2.00%	98.00%
n-Hexane	2.00%	98.00%
Cyclohexane	2.00%	98.00%
Other Hexanes	2.00%	98.00%
Heptanes	2.00%	98.00%
2,2,4-Trimethylpentane	2.00%	98.00%
Benzene	2.00%	98.00%
Toluene	2.00%	98.00%
Ethylbenzene	2.00%	98.00%
Xylenes	2.00%	98.00%
C8+ Heavies	2.00%	98.00%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
 Calculated Dry Gas Dew Point: 2.03 lbs. H2O/MMSCF
 Temperature: 80.0 deg. F
 Pressure: 230.0 psig

Dry Gas Flow Rate: 15.0000 MMSCF/day
 Glycol Losses with Dry Gas: 0.0294 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 105.43 lbs. H₂O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 9.28 gal/lb H₂O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	1.92%	98.08%
Carbon Dioxide	99.67%	0.33%
Nitrogen	99.98%	0.02%
Methane	99.98%	0.02%
Ethane	99.92%	0.08%
Propane	99.83%	0.17%
Isobutane	99.71%	0.29%
n-Butane	99.60%	0.40%
Isopentane	99.52%	0.48%
n-Pentane	99.37%	0.63%
n-Hexane	98.72%	1.28%
Cyclohexane	94.40%	5.60%
Other Hexanes	99.07%	0.93%
Heptanes	97.07%	2.93%
2,2,4-Trimethylpentane	98.66%	1.34%
Benzene	63.17%	36.83%
Toluene	48.07%	51.93%
Ethylbenzene	31.82%	68.18%
Xylenes	23.29%	76.71%
C8+ Heavies	83.04%	16.96%

FLASH TANK

Flash Control: Combustion device
 Flash Control Efficiency: 98.00 %
 Flash Temperature: 121.0 deg. F
 Flash Pressure: 80.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	100.00%	0.00%
Carbon Dioxide	86.21%	13.79%
Nitrogen	33.50%	66.50%
Methane	33.65%	66.35%
Ethane	65.45%	34.55%
Propane	79.41%	20.59%
Isobutane	85.70%	14.30%
n-Butane	88.77%	11.23%
Isopentane	90.29%	9.71%
n-Pentane	92.15%	7.85%
n-Hexane	95.62%	4.38%
Cyclohexane	98.96%	1.04%
Other Hexanes	94.31%	5.69%
Heptanes	97.89%	2.11%
2,2,4-Trimethylpentane	95.89%	4.11%
Benzene	99.85%	0.15%
Toluene	99.91%	0.09%
Ethylbenzene	99.95%	0.05%
Xylenes	99.97%	0.03%
C8+ Heavies	99.84%	0.16%

REGENERATOR

 No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	30.31%	69.69%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.55%	99.45%
n-Pentane	0.54%	99.46%
n-Hexane	0.52%	99.48%
Cyclohexane	3.23%	96.77%
Other Hexanes	1.06%	98.94%
Heptanes	0.51%	99.49%
2,2,4-Trimethylpentane	1.56%	98.44%
Benzene	5.01%	94.99%
Toluene	7.91%	92.09%
Ethylbenzene	10.41%	89.59%
Xylenes	12.91%	87.09%
C8+ Heavies	12.04%	87.96%

STREAM REPORTS:

WET GAS STREAM

 Temperature: 80.00 deg. F
 Pressure: 244.70 psia
 Flow Rate: 6.27e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.22e-001	6.61e+001
Carbon Dioxide	2.10e-001	1.52e+002
Nitrogen	1.65e+000	7.65e+002
Methane	8.48e+001	2.25e+004
Ethane	1.27e+001	6.29e+003
Propane	3.59e-001	2.62e+002
Isobutane	1.60e-002	1.53e+001
n-Butane	3.39e-002	3.26e+001
Isopentane	6.98e-003	8.32e+000
n-Pentane	7.98e-003	9.51e+000
n-Hexane	4.99e-003	7.10e+000
Cyclohexane	9.98e-004	1.39e+000
Other Hexanes	6.98e-003	9.94e+000
Heptanes	6.98e-003	1.16e+001
2,2,4-Trimethylpentane	3.99e-003	7.53e+000
Benzene	4.99e-004	6.43e-001

Toluene	4.99e-004	7.59e-001
Ethylbenzene	4.99e-004	8.75e-001
Xylenes	4.99e-004	8.75e-001
C8+ Heavies	9.98e-004	2.81e+000

Total Components	100.00	3.01e+004
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DRY GAS STREAM

Temperature: 80.00 deg. F
 Pressure: 244.70 psia
 Flow Rate: 6.25e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	4.28e-003	1.27e+000
Carbon Dioxide	2.09e-001	1.52e+002
Nitrogen	1.66e+000	7.65e+002
Methane	8.50e+001	2.25e+004
Ethane	1.27e+001	6.28e+003
Propane	3.59e-001	2.61e+002
Isobutane	1.60e-002	1.53e+001
n-Butane	3.39e-002	3.24e+001
Isopentane	6.97e-003	8.28e+000
n-Pentane	7.95e-003	9.45e+000
n-Hexane	4.94e-003	7.01e+000
Cyclohexane	9.44e-004	1.31e+000
Other Hexanes	6.94e-003	9.85e+000
Heptanes	6.80e-003	1.12e+001
2,2,4-Trimethylpentane	3.95e-003	7.43e+000
Benzene	3.16e-004	4.06e-001
Toluene	2.40e-004	3.65e-001
Ethylbenzene	1.59e-004	2.78e-001
Xylenes	1.17e-004	2.04e-001
C8+ Heavies	8.31e-004	2.33e+000
Total Components	100.00	3.00e+004

LEAN GLYCOL STREAM

Temperature: 80.00 deg. F
 Flow Rate: 1.00e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.95e+001	5.61e+003
Water	5.00e-001	2.82e+001
Carbon Dioxide	8.92e-013	5.03e-011
Nitrogen	2.71e-013	1.53e-011
Methane	2.60e-018	1.47e-016
Ethane	4.34e-008	2.45e-006
Propane	3.24e-010	1.83e-008
Isobutane	2.35e-011	1.32e-009
n-Butane	5.68e-011	3.20e-009
Isopentane	3.57e-006	2.01e-004
n-Pentane	5.38e-006	3.03e-004
n-Hexane	8.08e-006	4.55e-004
Cyclohexane	4.56e-005	2.57e-003
Other Hexanes	1.66e-005	9.36e-004

Heptanes	3.02e-005	1.70e-003
2,2,4-Trimethylpentane	2.72e-005	1.53e-003
Benzene	2.21e-004	1.25e-002
Toluene	6.00e-004	3.38e-002
Ethylbenzene	1.23e-003	6.92e-002
Xylenes	1.76e-003	9.94e-002
C8+ Heavies	1.15e-003	6.50e-002

Total Components	100.00	5.64e+003

RICH GLYCOL STREAM

Temperature: 80.00 deg. F
 Pressure: 244.70 psia
 Flow Rate: 1.02e+001 gpm
 NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.81e+001	5.61e+003
Water	1.63e+000	9.30e+001
Carbon Dioxide	8.80e-003	5.03e-001
Nitrogen	2.67e-003	1.53e-001
Methane	7.63e-002	4.36e+000
Ethane	9.07e-002	5.18e+000
Propane	7.86e-003	4.49e-001
Isobutane	7.72e-004	4.41e-002
n-Butane	2.26e-003	1.29e-001
Isopentane	7.05e-004	4.03e-002
n-Pentane	1.06e-003	6.06e-002
n-Hexane	1.59e-003	9.11e-002
Cyclohexane	1.40e-003	8.02e-002
Other Hexanes	1.64e-003	9.36e-002
Heptanes	5.96e-003	3.41e-001
2,2,4-Trimethylpentane	1.79e-003	1.02e-001
Benzene	4.37e-003	2.49e-001
Toluene	7.49e-003	4.28e-001
Ethylbenzene	1.16e-002	6.66e-001
Xylenes	1.35e-002	7.70e-001
C8+ Heavies	9.47e-003	5.41e-001

Total Components	100.00	5.71e+003

FLASH TANK OFF GAS STREAM

Temperature: 121.00 deg. F
 Pressure: 94.70 psia
 Flow Rate: 9.41e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.97e-002	3.11e-003
Carbon Dioxide	6.35e-001	6.93e-002
Nitrogen	1.46e+000	1.01e-001
Methane	7.27e+001	2.89e+000
Ethane	2.40e+001	1.79e+000
Propane	8.45e-001	9.25e-002

Isobutane	4.37e-002	6.31e-003
n-Butane	1.01e-001	1.45e-002
Isopentane	2.18e-002	3.91e-003
n-Pentane	2.66e-002	4.76e-003
n-Hexane	1.87e-002	3.99e-003
Cyclohexane	3.99e-003	8.33e-004
Other Hexanes	2.49e-002	5.32e-003
Heptanes	2.88e-002	7.17e-003
2,2,4-Trimethylpentane	1.48e-002	4.19e-003
Benzene	1.90e-003	3.69e-004
Toluene	1.67e-003	3.82e-004
Ethylbenzene	1.24e-003	3.26e-004
Xylenes	9.77e-004	2.57e-004
C8+ Heavies	2.07e-003	8.75e-004

Total Components	100.00	5.00e+000

FLASH TANK GLYCOL STREAM

 Temperature: 121.00 deg. F
 Flow Rate: 1.01e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)

TEG	9.82e+001	5.61e+003
Water	1.63e+000	9.30e+001
Carbon Dioxide	7.59e-003	4.33e-001
Nitrogen	8.96e-004	5.11e-002
Methane	2.57e-002	1.47e+000
Ethane	5.94e-002	3.39e+000
Propane	6.25e-003	3.57e-001
Isobutane	6.62e-004	3.78e-002
n-Butane	2.01e-003	1.15e-001
Isopentane	6.37e-004	3.64e-002
n-Pentane	9.79e-004	5.59e-002
n-Hexane	1.53e-003	8.71e-002
Cyclohexane	1.39e-003	7.94e-002
Other Hexanes	1.55e-003	8.83e-002
Heptanes	5.84e-003	3.33e-001
2,2,4-Trimethylpentane	1.71e-003	9.79e-002
Benzene	4.36e-003	2.49e-001
Toluene	7.49e-003	4.28e-001
Ethylbenzene	1.17e-002	6.65e-001
Xylenes	1.35e-002	7.70e-001
C8+ Heavies	9.46e-003	5.40e-001

Total Components	100.00	5.71e+003

FLASH GAS EMISSIONS

 Flow Rate: 3.24e+002 scfh
 Control Method: Combustion Device
 Control Efficiency: 98.00

Component	Conc. (vol%)	Loading (lb/hr)

Water	6.33e+001	9.75e+000
Carbon Dioxide	3.57e+001	1.34e+001

Nitrogen	4.24e-001	1.01e-001
Methane	4.22e-001	5.79e-002
Ethane	1.39e-001	3.58e-002
Propane	4.91e-003	1.85e-003
Isobutane	2.54e-004	1.26e-004
n-Butane	5.84e-004	2.90e-004
Isopentane	1.27e-004	7.82e-005
n-Pentane	1.54e-004	9.52e-005
n-Hexane	1.08e-004	7.99e-005
Cyclohexane	2.32e-005	1.67e-005
Other Hexanes	1.45e-004	1.06e-004
Heptanes	1.67e-004	1.43e-004
2,2,4-Trimethylpentane	8.59e-005	8.39e-005
Benzene	1.10e-005	7.37e-006
Toluene	9.69e-006	7.63e-006
Ethylbenzene	7.19e-006	6.52e-006
Xylenes	5.67e-006	5.15e-006
C8+ Heavies	1.20e-005	1.75e-005

Total Components	100.00	2.34e+001

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 1.46e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)

Water	9.33e+001	6.48e+001
Carbon Dioxide	2.55e-001	4.33e-001
Nitrogen	4.74e-002	5.11e-002
Methane	2.37e+000	1.47e+000
Ethane	2.93e+000	3.39e+000
Propane	2.10e-001	3.57e-001
Isobutane	1.69e-002	3.78e-002
n-Butane	5.12e-002	1.15e-001
Isopentane	1.30e-002	3.62e-002
n-Pentane	2.00e-002	5.56e-002
n-Hexane	2.61e-002	8.67e-002
Cyclohexane	2.37e-002	7.68e-002
Other Hexanes	2.63e-002	8.73e-002
Heptanes	8.59e-002	3.32e-001
2,2,4-Trimethylpentane	2.19e-002	9.64e-002
Benzene	7.86e-002	2.37e-001
Toluene	1.11e-001	3.94e-001
Ethylbenzene	1.46e-001	5.96e-001
Xylenes	1.64e-001	6.71e-001
C8+ Heavies	7.23e-002	4.75e-001

Total Components	100.00	7.38e+001

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 1.86e+000 scfh

Component	Conc.	Loading
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	(vol%)	(lb/hr)
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Methane	3.73e+001	2.93e-002
Ethane	4.60e+001	6.79e-002
Propane	3.30e+000	7.13e-003
Isobutane	2.65e-001	7.56e-004
n-Butane	8.04e-001	2.29e-003
Isopentane	2.04e-001	7.23e-004
n-Pentane	3.14e-001	1.11e-003
n-Hexane	4.10e-001	1.73e-003
Cyclohexane	3.72e-001	1.54e-003
Other Hexanes	4.13e-001	1.75e-003
Heptanes	1.35e+000	6.63e-003
2,2,4-Trimethylpentane	3.44e-001	1.93e-003
Benzene	1.23e+000	4.73e-003
Toluene	1.74e+000	7.88e-003
Ethylbenzene	2.29e+000	1.19e-002
Xylenes	2.57e+000	1.34e-002
C8+ Heavies	1.14e+000	9.50e-003
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Total Components	100.00	1.70e-001



Certificate of Analysis

Number: 2030-14120108-003A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

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

Dec. 15, 2014

Field: EQT
Station Name: West Union Station
Sample Point: Master Meter
Cylinder No: 10112
Analyzed: 12/11/2014 07:40:05 by GR2

Sampled By: PK-GAS
Sample Of: Gas Spot
Sample Date: 12/04/2014 15:30
Sample Conditions:
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia		
Nitrogen	1.658	2.548		GPM TOTAL C2+	3.532
Carbon Dioxide	0.210	0.507		GPM TOTAL C3+	0.130
Methane	84.991	74.792		GPM TOTAL iC5+	0.015
Ethane	12.691	20.933	3.402		
Propane	0.360	0.871	0.099		
Iso-Butane	0.016	0.051	0.005		
n-Butane	0.034	0.108	0.011		
Iso-Pentane	0.007	0.028	0.003		
n-Pentane	0.008	0.032	0.003		
Hexanes	0.012	0.052	0.004		
Heptanes Plus	0.013	0.078	0.005		
	100.000	100.000	3.532		

Physical Properties	Total	C7+
Relative Density Real Gas	0.6308	3.5015
Calculated Molecular Weight	18.23	101.41
Compressibility Factor	0.9974	
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.73 psia & 60°F		
Real Gas Dry BTU	1101	5467
Water Sat. Gas Base BTU	1082	5371
Comments: H2O Mol% : 1.740 ; Wt% : 1.720		

Hydrocarbon Laboratory Manager

Quality Assurance:

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