August 14, 2015 Reference No. 082715

Mr. Jay Fedczak
Assistant Director of Permitting
Division of Air Quality
WV Department of Environmental Protection
601 57th Street, SE
Charleston, West Virginia 25304

Dear Mr. Jay Fedczak:

Re: General Permit Registration G70-A Modification Application
Fritz Well Pad
Antero Resources Corporation

GHD Services Inc. (GHD) would like to submit this General Permit Modification application that we prepared on behalf of Antero Resources Corporation for an oil and gas facility identified as Fritz Well Pad.

A General Permit Registration Modification is requested due to the following planned operational changes:

1. Increase in condensate production
2. Addition of one well and one gas processing unit
3. Addition of 9 line heaters
4. Addition of 2 condensate tanks
5. Addition of 3 enclosed combustors

Please refer to Table 14 in Attachment I - Emissions Calculations for the summary of changes in emissions of regulated air pollutants that will result from the above operational changes.

Enclosed are the following documents:

- Original copy of the G70-A General Permit Modification Application
- Two CD copies of the G70-A General Permit Modification Application
- The application fee with check no. 421637 in the amount of $1,500.00

GHD Services Inc.
6320 Rothway Suite 100 Houston Texas 77040 USA
T 713 734 3090 **F** 713 734 3391 **W** www.ghd.com

Please let us know if you have any questions or require additional information.

Sincerely,

GHD

Manuel Bautista

MB/ma/216

Encl.

cc: Barry Schatz, Antero Resources Corporation

General Permit Application G70-A Modification

Increase in production, and the addition of 1 well, 2 condensate tanks, 1 gas production unit heater, 9 line heaters, and 3 Cimarron enclosed combustors.

Fritz Well Pad

Antero Resources Corporation

6320 Rothway, Suite 100 Houston Texas 77040

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Table of Contents *

G70-A General Permit Modification

* Note: Attachments which have no changes from previous permit application or not applicable were not included in this submittal. The Attachment letter identifiers consistent with the G70-A application were maintained for easier identification/reference.

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*

APPLICATION FOR GENERAL PERMIT REGISTRATION

CONSTRUCT, MODIFY, RELOCATE OR ADMINISTRATIVELY UPDATE

A STATIONARY SOURCE OF AIR POLLUTANTS

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

CHECK WHICH TYPE OF GENERAL PERMIT REGISTRATION YOU ARE APPLYING FOR:

☐ **G10-D –** Coal Preparation and Handling
☐ **G20-B –** Hot Mix Asphalt
☐ **G30-D –** Natural Gas Compressor Stations
☐ **G33-A –** Spark Ignition Internal Combustion Engines
☐ **G35-A –** Natural Gas Compressor Stations (Flare/Glycol Dehydration Unit)
☐ **G40-C –** Nonmetallic Minerals Processing
☐ **G50-B –** Concrete Batch
☐ **G60-C –** Class II Emergency Generator
☐ **G65-C –** Class I Emergency Generator
☒ **G70-A –** Class II Oil and Natural Gas Production Facility

SECTION I. GENERAL INFORMATION

1. Name of applicant (as registered with the WV Secretary of State's Office):
Antero Resources Corporation

2. Federal Employer ID No. **(FEIN):**
80-0162034

3. Applicant's mailing address:
1615 Wynkoop Street
Denver, CO, 80202

4. Applicant's physical address:
0.43 miles northeast from the intersection of Co Rte 11/3 and Co Rte 21

5. If applicant is a subsidiary corporation, please provide the name of parent corporation: N/A

6. **WV BUSINESS REGISTRATION.** Is the applicant a resident of the State of West Virginia? ☐ **YES** ☒ **NO**

- IF **YES,** provide a copy of the Certificate of **Incorporation/ Organization / Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A**.
- IF **NO,** provide a copy of the **Certificate of Authority / Authority of LLC / Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A**.

SECTION II. FACILITY INFORMATION

7. Type of plant or facility (stationary source) to be constructed, modified, relocated or administratively updated (e.g., coal preparation plant, primary crusher, etc.):
Natural Gas and Oil Production facility

8a. Standard Industrial Classification (SIC) code: 1311

AND

8b. North American Industry System (NAICS) code: 211111

9. DAQ Plant ID No. (for existing facilities only):
017-00107

10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only):
G70-A057

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site:	12A. Address of primary operating site:
Fritz Well Pad	Mailing: N/A Physical: 0.43 miles northeast from the intersection of Co Rte 11/3 and Co Rte 21

13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☒ **YES** ☐ **NO**

- IF **YES**, please explain: Antero is leasing the mineral rights for this site
- IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14A.
- For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;
- For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

From the nearest road:

At the intersection of Harrisville-Pullman Oxford Road/Co Rd 9 and Right-Fork-White Oak Road turn right on Harrisville-Pullman Oxford Road/Co Rd 9 and go for 3.4 miles. Entrance to the Facility will be on the left.

15A. Nearest city or town:	16A. County:	17A. UTM Coordinates:
West Union	Doddridge County	Northing (KM): 4,342.77 Easting (KM): 513.81 Zone: 17N

18A. Briefly describe the proposed new operation or change (s) to the facility:	19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Increase in production, and the addition of 1 well, 2 condensate tanks, 1 gas production unit heater, 9 line heaters, and 3 Cimarron enclosed combustors.	Latitude: 39.23415 Longitude: -80.83998

B: 1ST ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits)

11B. Name of 1st alternate operating site:	12B. Address of 1st alternate operating site:
	Mailing: Physical:

13B. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☐ **YES** ☐ **NO**

- IF **YES**, please explain:
- IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14B.
- For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;
- For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

15B. Nearest city or town:	16B. County:	17B. UTM Coordinates: Northing (KM): _____ Easting (KM): _____ Zone: _____
18B. Briefly describe the proposed new operation or change (s) to the facility:		19B. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: _____ Longitude: _____

C: 2ND ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits):

11C. Name of 2nd alternate operating site: _____ _____	12C. Address of 2nd alternate operating site: Mailing:_____ Physical:_____ _____

13C. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☐ **YES** ☐ **NO**

- IF **YES**, please explain: _____

  _____

- IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14C.
- For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;
- For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

_____

_____

_____

15C. Nearest city or town:	16C. County:	17C. UTM Coordinates: Northing (KM): _____ Easting (KM): _____ Zone: _____
18C. Briefly describe the proposed new operation or change (s) to the facility:		19C. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: _____ Longitude: _____

20. Provide the date of anticipated installation or change: Upon issuance of the permit ☐ If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: : ____/____/____	21. Date of anticipated Start-up if registration is granted: Upon issuance of the permit

22. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application if other than 8760 hours/year. (Note: anything other than 24/7/52 may result in a restriction to the facility's operation).

Hours per day _____ Days per week _____ Weeks per year _____ Percentage of operation _____

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

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

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

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

25. Please check all attachments included with this permit application. Please refer to the appropriate reference document for an explanation of the attachments listed below.

- ☐ ATTACHMENT A : CURRENT BUSINESS CERTIFICATE
- ☒ ATTACHMENT B: PROCESS DESCRIPTION
- ☒ ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS
- ☒ ATTACHMENT D: PROCESS FLOW DIAGRAM
- ☒ ATTACHMENT E: PLOT PLAN
- ☐ ATTACHMENT F: AREA MAP
- ☒ ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM
- ☒ ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS
- ☒ ATTACHMENT I: EMISSIONS CALCULATIONS
- ☒ ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT
- ☐ ATTACHMENT K: ELECTRONIC SUBMITTAL
- ☒ ATTACHMENT L: GENERAL PERMIT REGISTRATION APPLICATION FEE
- ☐ ATTACHMENT M: SITING CRITERIA WAIVER
- ☐ ATTACHMENT N: MATERIAL SAFETY DATA SHEETS (MSDS)
- ☒ ATTACHMENT O: EMISSIONS SUMMARY SHEETS
- ☐ OTHER SUPPORTING DOCUMENTATION NOT DESCRIBED ABOVE (Equipment Drawings, Aggregation Discussion, etc.)

Please mail an original and two copies of the complete General Permit Registration Application with the signature(s) to the DAQ Permitting Section, at the address shown on the front page of this application. Please DO NOT fax permit applications. For questions regarding applications or West Virginia Air Pollution Rules and Regulations, please refer to the website shown on the front page of the application or call the phone number also provided on the front page of the application.

SECTION IV. CERTIFICATION OF INFORMATION

This General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of a Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, Emission Inventory, Certified Emission Statement, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. Any administratively incomplete or improperly signed or unsigned Registration Application will be returned to the applicant.

FOR A CORPORATION (domestic or foreign)

☐ I certify that I am a President, Vice President, Secretary, Treasurer or in charge of a principal business function of the corporation

FOR A PARTNERSHIP

☐ I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

☐ I certify that I am a General Partner or General Manager

FOR AN ASSOCIATION

☐ I certify that I am the President or a member of the Board of Directors

FOR A JOINT VENTURE

☐ I certify that I am the President, General Partner or General Manager

FOR A SOLE PROPRIETORSHIP

☐ I certify that I am the Owner and Proprietor

☐ *I hereby certify that* (please print or type) _____

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

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

Signature _____
(please use blue ink) Responsible Official Date

Name & Title Barry Schatz, Senior Environmental & Regulatory Manager
(please print or type)

Signature Barry Schatz 8-14-2015
(please use blue ink) Authorized Representative (if applicable) Date

Applicant's Name Antero Resources Corporation

Phone & Fax 303-357-7276 303-357-7315
Phone Fax

Email bschatz@anteroresources.com

Attachment R
AUTHORITY OF CORPORATION
OR OTHER BUSINESS ENTITY (DOMESTIC OR FOREIGN)

TO: The West Virginia Department of Environmental Protection, Division of Air Quality

DATE: January 23, 2015

ATTN.: Director

Corporation's / other business entity's Federal Employer I.D. Number 80-0162034

The undersigned hereby files with the West Virginia Department of Environmental Protection, Division of Air Quality, a permit application and hereby certifies that the said name is a trade name which is used in the conduct of an incorporated business or other business entity.

Further, the corporation or the business entity certifies as follows:

(1) Barry Schatz (is/are) the authorized representative(s) and in that capacity may represent the interest of the corporation or the business entity and may obligate and legally bind the corporation or the business entity.

(2) The corporation or the business entity is authorized to do business in the State of West Virginia.

(3) If the corporation or the business entity changes its authorized representative(s), the corporation or the business entity shall notify the Director of the West Virginia Department of Environmental Protection, Division of Air Quality, immediately upon such change.

President or Other Authorized Officer
(Vice President, Secretary, Treasurer or other official in charge of a principal business function of the corporation or the business entity)

(If not the President, then the corporation or the business entity must submit certified minutes or bylaws stating legal authority of other authorized officer to bind the corporation or the business entity).

Secretary

Name of Corporation or business entity

Attachment B
Process Description

Attachment B

Process Description
Fritz Well Pad
Antero Resources Corporation
Doddridge County, West Virginia

A mixture of condensate, water, and entrained gas from the condensate and gas wells enters the facility through a series of line heaters (LH001-009) and gas production units (H001-H009) which are 3-phase separators where the gas, condensate, and produced water are separated. The line heaters and GPUs are fueled by a slip stream of the separated gas. The separated gas from the three phase separators is metered and sent to the sales gas pipeline. The separated water flow to the produced water storage tanks (TANKPW001-002). The separated condensate is then sent to two phase low pressure separators where gas is further separated from the condensate. The separated gas is routed to the compressor (ENG001), compressed, and sent to the sales gas line. The condensate from the two phase separators flow to the condensate storage tanks (TANKCOND001-010). The line heaters are only used during the first several months from start of production and will be removed once production has normalized.

The facility has ten (10) tanks (TANKCOND001-010) on site to store condensate and two (2) tanks (TANKPW001-002) to store produced water prior to removal from the site. The flashing, working and breathing losses from the tanks are routed to up to four enclosed combustors (EC001-004) to control the emissions. The enclosed combustor(s) that will be used to control emissions are designed to achieve a VOC destruction efficiency of 98 percent.

Condensate and produced water are transported off site on an as needed basis via tanker truck. Truck loading connections are in place to pump condensate (L001) and produced water (L002) from the storage tanks into tanker trucks. Emissions from the loading operations are vented to the atmosphere.

Emissions from the facility's emission sources were calculated using the extended analysis of the condensate and gas from Seaborne No. 1H, one of the wells in Vogt Well Pad. These extended analyses are considered representative of the materials from Fritz Well Pad, being in the same Marcellus rock formation.

Fritz Well Pad calculation of potential to emit included all of the emission sources that belong to the same industrial grouping, are located on contiguous or adjacent properties, and are under the control of the same person. The nearest emission source that belongs to the same industrial grouping and under the control of the same person but not located on contiguous or adjacent property is the Primm Well Pad. This is approximately 0.86 miles northwest of the facility.

Attachment C
Description of Fugitive Emissions

Attachment C

Description of Fugitive Emissions
Fritz Well Pad
Antero Resources Corporation
Doddridge County, West Virginia

Sources of fugitive emissions include loading operations, haul road emissions, equipment leaks, and pneumatic control valves. Fugitive emissions were calculated using AP-42 factors. Routine equipment leaks are assumed to be occurring continuously throughout the year. Loading operations and haul road emissions only occur when tanker trucks are onsite. The fugitives emissions summary is also located in Attachment O.

Equipment Leaks

Equipment includes valves, flanges, and connectors installed in various process equipments such as gas production unit heaters, compressors, pipelines, and separators. Emissions are assumed to be occurring throughout the year. Detailed calculations are shown on Table 4.

Pneumatic Control Valves

Pneumatic control valves are part of the gas production unit heaters. These are intermittent low bleed valves and their emissions are assumed to be occurring throughout the year. Detailed calculations are shown on Table 5.

Loading Operations

Loading emissions occur when condensate and produced water are transferred out of the well site via tanker trucks. Fugitive emissions were estimated using AP-42 loading loss formula, L= 12.46*SPM/T, and Bryan & Engineering (BR&E) software known as Promax. Detailed calculations are shown in Table 8.

Haul Road Emissions

Haul road emissions are emitted when tanker trucks or service vehicles enter the Facility. The Facility is flat and unpaved. Detailed calculations are shown on Table 12.

Attachment C/O: G70-A Emissions Summary Sheet

Fugitive Emissions Data Summary Sheet

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants Chemical Name/CAS 1	Maximum Potential Uncontrolled Emissions 2		Maximum Potential Controlled Emissions 3		Est. Method Used 4
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	n/a					
Unpaved Haul Roads	PM, PM10, PM2.5	0.8294	0.9647	0.4147	0.4823	MB
Loading/Unloading Operations	VOCs	14.4896	9.9172	14.4896	9.9172	MB
	hexane (110543)	0.0389	0.0266	0.0389	0.0266	
	CO2 Equivalent CO2 (124389), CH4	3.8784	3.3320	3.8784	3.3320	
Equipment Leaks (Components)	Toluene (108883)	Does not apply	0.0976	Does not apply	0.0976	MB
	Ethyl benzene (100414)		0.0903		0.0903	
	Hexane (110543)		0.9598		0.9598	
	o,m,p-xylenes (95476,108383,106423)		0.2590		0.2590	
	CO2 Equivalent CO2 (124389)), CH4		331.7077		331.7077	
	VOCs		14.2758		14.2758	
Equipment Leaks (PCVs)	hexane (110543)	5.58E-03	2.45E-02	5.58E-03	2.45E-02	MB
	CO2 Equivalent CO2 (124389)), CH4	8.2261	36.0305	8.2261	36.0305	
	VOCs	0.0871	0.3814	0.0871	0.3814	

1 List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS2, VOCs, H2S, Inorganics, Lead, Organics, O3, NO, NO2, SO2, SO3, all applicable Greenhouse Gases (including CO2 and methane), etc. DO NOT LIST H2, H2O, N2, O2, and Noble Gases.

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

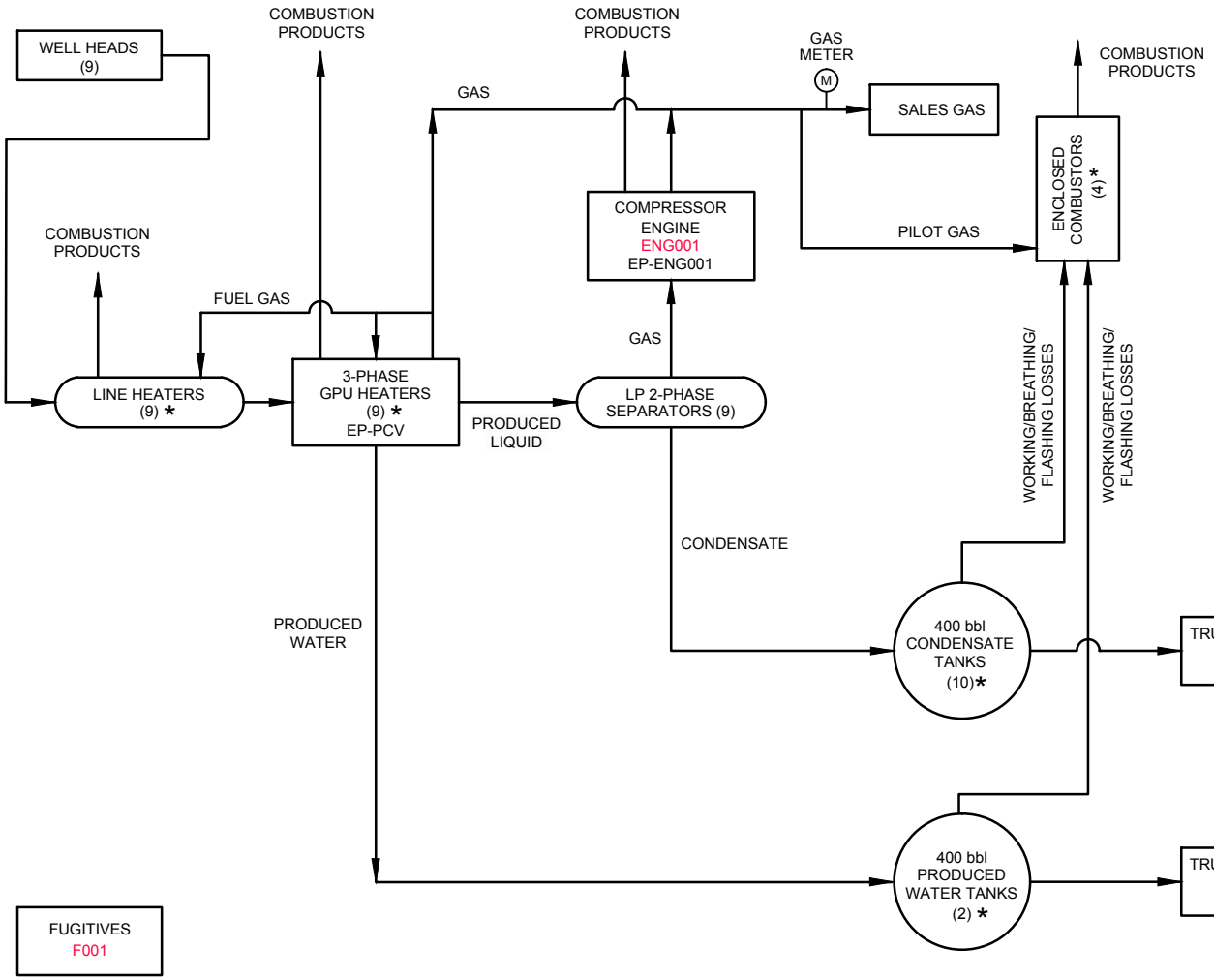
3 Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

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

Attachment C: Leak Source Data Sheet

Source Category	Pollutant	Number of Source Components (1)	Number of Components Monitored by Frequency (2)	Average Time to Repair (days) (3)	Estimated Annual Emission Rate (lb/yr) (4)
Pumps (5)	light liquid VOC [6,7]				
	heavy liquid VOC[8]				
	Non-VOC[9]				
Valves (10)	Gas VOC	450		First attempt within 5 days of detection and final repair within 15 days	6,455.68
	Light Liquid VOC	468		First attempt within 5 days of detection and final repair within 15 days	21,611.85
	Heavy Liquid VOC	--			--
	Non-VOC	--			--
Safety Relief Valves (11)	Gas VOC	See Valves		First attempt within 5 days of detection and final repair within 15 days	see Valves
	Non VOC	See Valves		First attempt within 5 days of detection and final repair within 15 days	see Valves
Open-ended Lines (12)	VOC				
	Non-VOC				
Sampling Connections (13)	VOC				
	Non-VOC				
Compressors	VOC				
	Non-VOC				
Flanges	VOC	117		First attempt within 5 days of detection and final repair within 15 days	145.47
	Non-VOC			First attempt within 5 days of detection and final repair within 15 days	733.91
Other	VOC	531		First attempt within 5 days of detection and final repair within 15 days	338.56
	Non-VOC				1,708.12

Attachment D
Process Flow Diagram



* LINE HEATERS (9)

• LH001	EP-LH001	• LH006	EP-LH006
• LH002	EP-LH002	• LH007	EP-LH007
• LH003	EP-LH003	• LH008	EP-LH008
• LH004	EP-LH004	• LH009	EP-LH009
• LH005	EP-LH005		

3-PHASE GPU HEATERS (9)

• H001	EP-H001	• H006	EP-H006
• H002	EP-H002	• H007	EP-H007
• H003	EP-H003	• H008	EP-H008
• H004	EP-H004	• H009	EP-H009
• H005	EP-H005		

CONDENSATE TANKS (10)

• TANKCOND001	• TANKCOND006
• TANKCOND002	• TANKCOND007
• TANKCOND003	• TANKCOND008
• TANKCOND004	• TANKCOND009
• TANKCOND005	• TANKCOND010

PRODUCED WATER TANKS (2)

- TANKPW001
- TANKPW002

ENCLOSED COMBUSTORS (4)

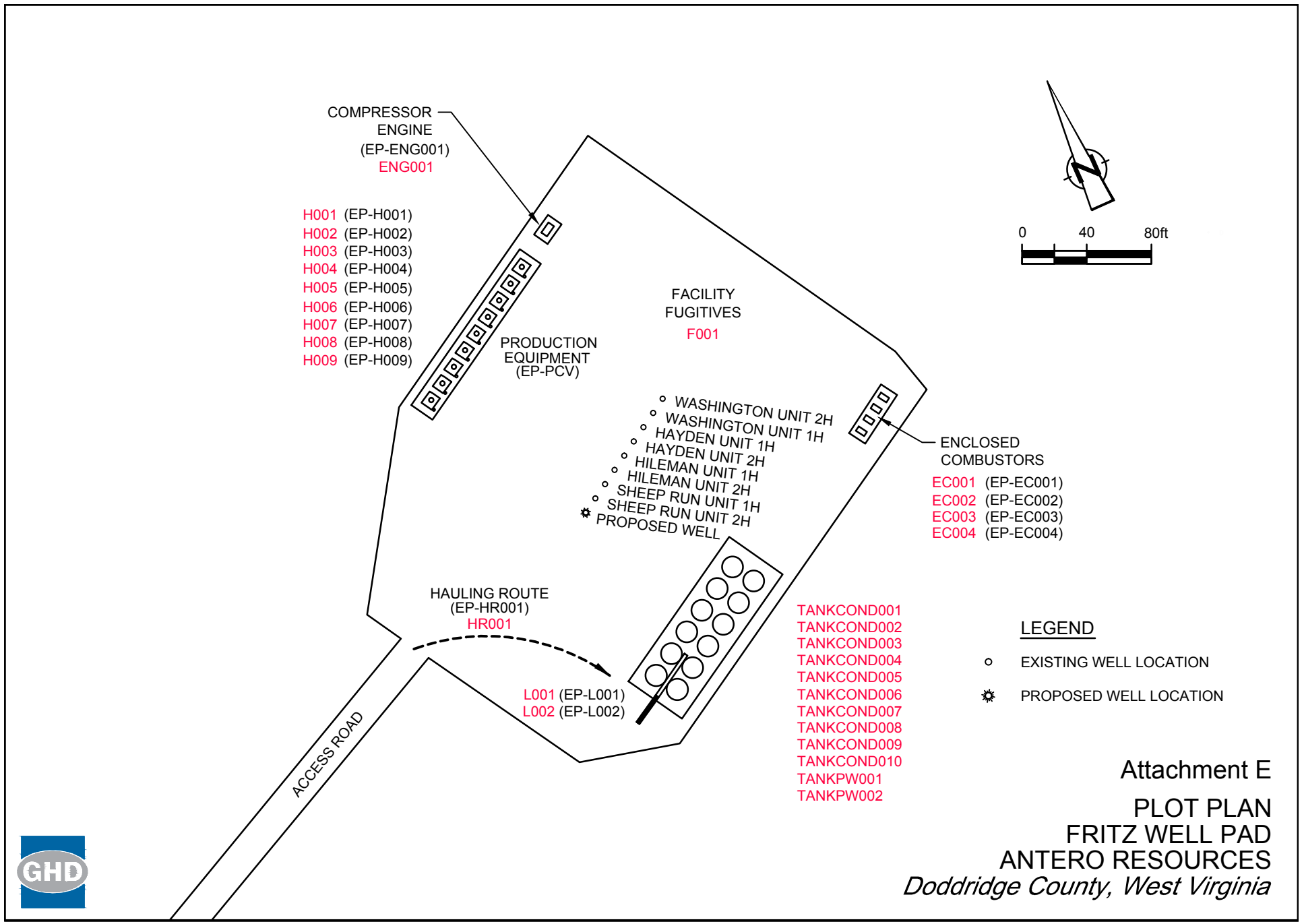
• EC001	EP-EC001	• EC003	EP-EC003
• EC002	EP-EC002	• EC004	EP-EC004

Attachment D

PROCESS FLOW DIAGRAM - ANTERO RESOURCES
FRITZ WELL PAD

Doddridge County, West Virginia

Attachment E
Plot Plan



Attachment E

PLOT PLAN
FRITZ WELL PAD
ANTERO RESOURCES
Doddridge County, West Virginia

82715-00(216)GN-WA002 JUL 22/2015

Attachment G
G70-A Section Applicability Form/ Emission Unit Data Sheets

General Permit G70-A Registration
Section Applicability Form

General Permit G70-A was developed to allow qualified applicants to seek registration for a variety of sources. These sources include natural gas well affected facilities, storage tanks, natural gas-fired compressor engines (RICE), natural gas producing units, natural gas-fired in-line heaters, pneumatic controllers, heater treaters, tank truck loading, glycol dehydration units, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

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

Section 5	Natural Gas Well Affected Facility	☑
Section 6	Storage Vessels*	☑
Section 7	Gas Producing Units, In-Line Heaters, Heater Treaters, and Glycol Dehydration Reboilers	☑
Section 8	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO)	☐
Section 9	*Reserved*	☐
Section 10	Natural gas-fired Compressor Engine(s) (RICE) **	☑
Section 11	Tank Truck Loading Facility ***	☑
Section 12	Standards of Performance for Storage Vessel Affected Facilities (NSPS, Subpart OOOO)	☐
Section 13	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (NSPS, Subpart JJJJ)	☑
Section 14	Control Devices not subject to NSPS, Subpart OOOO	☑
Section 15	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (40CFR63, Subpart ZZZZ)	☑
Section 16	Glycol Dehydration Units	☐
Section 17	Dehydration Units With Exemption from NESHAP Standard, Subpart HH § 63.764(d) (40CFR63, Subpart HH)	☐
Section 18	Dehydration Units Subject to NESHAP Standard, Subpart HH and Not Located Within an UA/UC (40CFR63, Subpart HH)	☐
Section 19	Dehydration Units Subject to NESHAP Standard, Subpart HH and Located Within an UA/UC (40CFR63, Subpart HH)	☐

***** *Applicants that are subject to Section 6 may also be subject to Section 12 if the applicant is subject to the NSPS, Subpart OOOO control requirements or the applicable control device requirements of Section 14.*

****** *Applicants that are subject to Section 10 may also be subject to the applicable RICE requirements of Section 13 and/or Section 15.*

******* *Applicants that are subject to Section 11 may also be subject to control device requirements of Section 14.*

NATURAL GAS WELL AFFECTED FACILITY DATA SHEET

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

Please provide the API number(s) for each NG well at this facility:	
47-017-06370-00	
47-017-06371-00	
47-017-06464-00	
47-017-06465-00	
5 wells not permitted.	

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

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

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

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

Attachment G: Emission Units Data Sheet
(includes all emission units and air pollution control devices
that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
H001, H002, H003, H004, H005, H006, H007, H008, H009	EP-H001, EP-H002, EP-H003, EP-H004, EP-H005, EP-H006, EP-H007, EP-H008, EP-H009	Gas Production Unit Heaters	(1) - 2015; (8) - 2014	1.5 MMBtu/hr (each)	New	N/A
LH001, LH002, LH003, LH004, LH005, LH006, LH007, LH008, LH009	EP-LH001, EP-LH002, EP-LH003, EP-LH004, EP-LH005, EP-LH006, EP-LH007, EP-LH008, EP-LH009	Line Heaters	2015	2.0 MMBtu/hr (each)	New	N/A
F001	F001	Fugitives	2014-2015	N/A	New	N/A
TANKCOND001-010	EP-EC001, EP-EC002, EP-EC003, EP-EC004	Condensate Tank F/W/B	(2) - 2015; (8) - 2014	400 bbl each	New	EC001, EC002, EC003, EC004
TANKPW001-002	EP-EC001, EP-EC002, EP-EC003, EP-EC004	PW Tank F/W/B	2014	400 bbl each	New	EC001, EC002, EC003, EC004
L001	EP-L001	Loading (Condensate)	2014	200 bbl capacity (each)	New	N/A
L002	EP-L002	Loading (Water)	2014	200 bbl capacity (each)	New	N/A
HR001	EP-HR001	Haul Truck	2014	40 ton capacity	New	N/A
EC001, EC002, EC003, EC004	EP-EC001, EP-EC002, EP-EC003, EP-EC004	Enclosed Combustor	(3) - 2015; (1) - 2014	90scf/min	New	EC001, EC002, EC003, EC004
PCV	EP-PCV	Pneumatic CV	2014-2015	6.6 scf/day/PCV	New	N/A
ENG001	EP-ENG001	Compressor Engine	2014	24 HP	New	N/A

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

Attachment G: Storage Vessel Emission Unit Data Sheet (Condensate)

Provide the following information for each new or modified bulk liquid storage tank.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name CONDTANK	2. Tank Name TANKCOND001-010
3. Emission Unit ID number TANKCOND001-010	4. Emission Point ID number EP-EC001, EP-EC002, EP-EC003, EP-EC004
5. Date Installed or Modified *(for existing tanks)* (8) 2014; (2) 2015	6. Type of change: New
7A. Description of Tank Modification *(if applicable) NA*	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* No	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.)	

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 400bbls	
9A. Tank Internal Diameter (ft.) 12	9B. Tank Internal Height (ft.) 20
10A. Maximum Liquid Height (ft.) 18	10B. Average Liquid Height (ft.) 10
11A. Maximum Vapor Space Height (ft.) 18	11B. Average Vapor Space Height (ft.) 10
12. Nominal Capacity *(specify barrels or gallons)* . This is also known as "working volume." 400bbls	
13A. Maximum annual throughput (gal/yr) 13,797,000	13B. Maximum daily throughput (gal/day) 37,800
14. Number of tank turnovers per year 83	15. Maximum tank fill rate (gal/min) 168
16. Tank fill method: Splash Fill	
17. Is the tank system a variable vapor space system? No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): X Fixed Roof X vertical horizontal X flat roof cone roof dome roof other (describe) External Floating Roof pontoon roof double deck roof Domed External (or Covered) Floating Roof Internal Floating Roof vertical column support self-supporting Variable Vapor Space lifter roof diaphragm Pressurized spherical cylindrical Underground Other (describe)	

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 34 – 39 in section VII

Attachment G: Storage Vessel Emission Unit Data Sheet (Condensate)

Provide the following information for each new or modified bulk liquid storage tank.

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply):

Does Not Apply — Rupture Disc (psig)

Carbon Adsorption[1] — Inert Gas Blanket of _____

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

Conservation Vent (psig

Other[1] (describe) — Vacuum Setting — Pressure Setting Emergency Relief Valve (psig)

[1] Complete appropriate Air Pollution Control Device Sheet

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

Material Name and CAS No.	Flashing Loss		Breathing Loss		Working Loss		Total Emissions		
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
	Please see Tables 6 and 7								

1 EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (spec

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

SECTION VII (required if did not provide TANKS Summary Sheets)

TANK CONSTRUCTION AND OPERATION INFORMATION

19. Tank Shell Construction: Steel

20A. Shell Color: Green	20B. Roof Color: Green	20C. Year Last Painted: (2) - 2015; (8) - 2014

21. Shell Condition (if metal and unlined): No Rust

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

23. Operating Pressure Range (psig): 0

24. Is the tank a **Vertical Fixed Roof Tank**? Yes	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):

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

25A. Year Internal Floaters Installed:

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

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

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

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

25F. Describe deck fittings:

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

26A. Deck Type: Bolted Welded		26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction:			
26D. Deck seam length (ft.):	26E. Area of deck (ft2):	26F. For column supported	26G. For column supported

Attachment G: Storage Vessel Emission Unit Data Sheet (Condensate)

Provide the following information for each new or modified bulk liquid storage tank.

SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: West Union, WV			
28. Daily Avg. Ambient Temperature (°F): 51.7		29. Annual Avg. Maximum Temperature (°F): 63.8	
30. Annual Avg. Minimum Temperature (°F): 39.5		31. Avg. Wind Speed (mph): 5.9	
32. Annual Avg. Solar Insulation Factor (BTU/ft2-day): 1030.235999		33. Atmospheric Pressure (psia): 14.8	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.7	34A. Minimum (°F): 39.5	34B. Maximum (°F): 63.8	
35. Avg. operating pressure range of tank (psig): 0	35A. Minimum (psig): 0	35B. Maximum (psig): 0	
36A. Minimum liquid surface temperature (°F): 39.5		36B. Corresponding vapor pressure (psia):	1.5904
37A. Avg. liquid surface temperature (°F): 51.7		37B. Corresponding vapor pressure (psia):	2.0634
38A. Maximum liquid surface temperature (°F): 63.8		38B. Corresponding vapor pressure (psia):	2.6395
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	Condensate		
39B. CAS number:	mix of HC		
39C. Liquid density (lb/gal):	5.68		
39D. Liquid molecular weight (lb/lb-mole):	87.9		
39E. Vapor molecular weight (lb/lb-mole):	44.29		
39F. Maximum true vapor pressure (psia):	3.1051		
39G. Max Reid vapor pressure (psi):	4.45000		
39H. Months Storage per year. From: To:	year round		

Attachment G: Storage Vessel Emission Unit Data Sheet (Produced Water)

Provide the following information for each new or modified bulk liquid storage tank.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	PWTANK	2. Tank Name	TANKPW001-002
3. Emission Unit ID number	TANKPW001-002	4. Emission Point ID number	EP-EC001, EP-EC002, EP-EC003, EP-EC004
5. Date Installed or Modified *(for existing tanks)*	2014	6. Type of change: New	
7A. Description of Tank Modification *(if applicable)*			
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* No			
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.)			

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 400bbls			
9A. Tank Internal Diameter (ft.) 12		9B. Tank Internal Height (ft.) 20	
10A. Maximum Liquid Height (ft.) 18		10B. Average Liquid Height (ft.) 10	
11A. Maximum Vapor Space Height (ft.) 18		11B. Average Vapor Space Height (ft.) 10	
12. Nominal Capacity *(specify barrels or gallons)* . This is also known as "working volume." 400bbls			
13A. Maximum annual throughput (gal/yr)	27,594,000	13B. Maximum daily throughput (gal/day)	75,600
14. Number of tank turnovers per year	822	15. Maximum tank fill rate (gal/min)	168
16. Tank fill method Splash Fill			
17. Is the tank system a variable vapor space system? No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?			
18. Type of tank (check all that apply): X Fixed Roof X vertical horizontal X flat roof cone roof dome roof other (describe) External Floating Roof pontoon roof double deck roof Domed External (or Covered) Floating Roof Internal Floating Roof vertical column support self-supporting Variable Vapor Space lifter roof diaphragm Pressurized spherical cylindrical Underground Other (describe)			

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 34 – 39 in section VII

Attachment G: Storage Vessel Emission Unit Data Sheet (Produced Water)

Provide the following information for each new or modified bulk liquid storage tank.

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply):

Does Not Apply — Rupture Disc (psig)

Carbon Adsorption[1] — Inert Gas Blanket of _____

X Vent to Vapor Combustion Device1 (vapor combustors, flares, thermal oxidizers) Condenser[1]

Conservation Vent (psig

Other[1] (describe) — Vacuum Setting — Pressure Setting Emergency Relief Valve (psig)

[1] Complete appropriate Air Pollution Control Device Sheet

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

Material Name and CAS No.	Flashing Loss		Breathing Loss		Working Loss		Total Emissions		
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
	Please see Tables 6 and 7								

1 EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (spec

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

SECTION VII (required if did not provide TANKS Summary Sheets)

TANK CONSTRUCTION AND OPERATION INFORMATION		
19. Tank Shell Construction: Steel		
20A. Shell Color: Green	20B. Roof Color: Green	20C. Year Last Painted: 2014
21. Shell Condition (if metal and unlined): No Rust		
22A. Is the tank heated? No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?
23. Operating Pressure Range (psig): 0		
24. Is the tank a **Vertical Fixed Roof Tank**? Yes	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):
25. Complete item 25 for **Floating Roof Tanks** Does not apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type *(check one):* Metallic (mechanical) shoe seal Liquid mounted resilient seal		
25C. Is the Floating Roof equipped with a secondary seal? Yes No		
25D. If yes, how is the secondary seal mounted? *(check one)* Shoe Rim Other (describe):		
25E. Is the floating roof equipped with a weather shield? Yes No		
25F. Describe deck fittings:		
26. Complete the following section for **Internal Floating Roof Tanks** Does not apply		
26A. Deck Type: Bolted Welded	26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction:		
26D. Deck seam length (ft.):	26E. Area of deck (ft2):	26F. For column supported 26G. For column supported

Attachment G: Storage Vessel Emission Unit Data Sheet (Produced Water)

Provide the following information for each new or modified bulk liquid storage tank.

SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: West Union, WV			
28. Daily Avg. Ambient Temperature (°F): 51.7		29. Annual Avg. Maximum Temperature (°F): 63.8	
30. Annual Avg. Minimum Temperature (°F): 39.5		31. Avg. Wind Speed (mph): 5.9	
32. Annual Avg. Solar Insulation Factor (BTU/ft2-day): 1030.235999		33. Atmospheric Pressure (psia): 14.8	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.7	34A. Minimum (°F): 39.5	34B. Maximum (°F): 63.8	
35. Avg. operating pressure range of tank (psig): 0	35A. Minimum (psig): 0	35B. Maximum (psig): 0	
36A. Minimum liquid surface temperature (°F): 39.5		36B. Corresponding vapor pressure (psia):	0.1839
37A. Avg. liquid surface temperature (°F): 51.7		37B. Corresponding vapor pressure (psia):	0.2599
38A. Maximum liquid surface temperature (°F): 63.8		38B. Corresponding vapor pressure (psia):	0.3605
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	Produced Water		
39B. CAS number:	mix of HC and water		
39C. Liquid density (lb/gal):	8.33		
39D. Liquid molecular weight (lb/lb-mole):	18.0157		
39E. Vapor molecular weight (lb/lb-mole):	18.3347		
39F. Maximum true vapor pressure (psia):	0.4472		
39G. Max Reid vapor pressure (psi):	1.02417		
39H. Months Storage per year. From: To:	year round		

Attachment G: Natural Gas Fired Fuel Burning Units

Emission Data Sheet

Complete the information on this data for each Gas Producing Unit(s), Heater Treater(s), and in-line heater(s) at the production pad. Reboiler information should be entered on the Glycol Dehydration Emission Unit Data Sheet.

Emission Unit ID #[1]	Emission Point ID#[2]	Emission Unit Description (Manufacturer / Model #)	Year Installed/ Modified	Type[3] and Date of Change	Control Device[4]	Design Heat Input (mmBtu/hr)[5]	Fuel Heating Value (Btu/scf)[6]
H001	EP-H001	Gas Production Unit Heater	2014	New	--	1.50	1,218.95
H002	EP-H002	Gas Production Unit Heater	2014	New	--	1.50	1,218.95
H003	EP-H003	Gas Production Unit Heater	2014	New	--	1.50	1,218.95
H004	EP-H004	Gas Production Unit Heater	2014	New	--	1.50	1,218.95
H005	EP-H005	Gas Production Unit Heater	2014	New	--	1.50	1,218.95
H006	EP-H006	Gas Production Unit Heater	2014	New	--	1.50	1,218.95
H007	EP-H007	Gas Production Unit Heater	2014	New	--	1.50	1,218.95
H008	EP-H008	Gas Production Unit Heater	2014	New	--	1.50	1,218.95
H009	EP-H009	Gas Production Unit Heater	2015	New	--	1.50	1,218.95
LH001	EP-LH001	Line Heater	2015	New	--	2.00	1,218.95
LH002	EP-LH002	Line Heater	2015	New	--	2.00	1,218.95
LH003	EP-LH003	Line Heater	2015	New	--	2.00	1,218.95
LH004	EP-LH004	Line Heater	2015	New	--	2.00	1,218.95
LH005	EP-LH005	Line Heater	2015	New	--	2.00	1,218.95
LH006	EP-LH006	Line Heater	2015	New	--	2.00	1,218.95
LH007	EP-LH007	Line Heater	2015	New	--	2.00	1,218.95
LH008	EP-LH008	Line Heaters	2015	New	--	2.00	1,218.95
LH009	EP-LH009	Line Heaters	2015	New	--	2.00	1,218.95
ENG001	EP-ENG001	Compressor Engine (Kubota)	2014	New	--	24HP	1,218.95
EC001	EP-EC001	Enclosed Combustor (Cimarron 48")	2014	New	EC001	6.6	1,218.95
EC002	EP-EC002	Enclosed Combustor (Cimarron 48")	2015	New	EC002	6.6	1,218.95
EC003	EP-EC003	Enclosed Combustor (Cimarron 48")	2015	New	EC003	6.6	1,218.95
EC004	EP-EC004	Enclosed Combustor (Cimarron 48")	2015	New	EC004	6.6	1,218.95

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

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

3 New, modification, removal.
4 Complete appropriate air pollution control device sheet for any control device.
5 Enter design heat input capacity in mmBtu/hr.
6 Enter the fuel heating value in Btu/standard cubic foot.

Attachment G: Natural Gas-Fired Compressor Engine (RICE)

Emission Unit Data Sheet

Complete this section for any natural gas-fired reciprocating internal combustion engine.

Emission Unit (Source) ID No.		ENG001	
Emission Point ID No.		EP-ENG001	
Engine Manufacturer and Model		Engine (Kubota DG972-E2)	
Manufacturer's Rated bhp/rpm		24 HP @ 3600 rpm	
Source Status		NS	
Date Installed/Modified/Removed		2014	
Engine Manufactured/Reconstruction Date		2013	
Is this engine subject to 40CFR60, Subpart JJJJ?		Yes	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60, Subpart JJJJ? (Yes or No)		Yes	
Is this engine subject to 40CFR63, Subpart ZZZZ? (yes or no)		Yes	
Engine, Fuel and Combustion Data	Engine Type	RB4S	
	APCD Type	-	
	Fuel Type	RG	
	H2S (gr/100 scf)	0	
	Operating bhp/rpm	16.5 HP @ 2400 rpm	
	BSFC (Btu/bhp-hr)	9773	
	Fuel throughput (ft^3/hr)	193	
	Fuel throughput ($MMft^3$/yr)	1.6907	
	Operation (hrs/yr)	8760	
Reference	Potential Emissions	lbs/hr	tons/yr
MD	NO_X	0.3158	1.3831
MD	CO	5.6445	24.7228
AP	VOC	0.0071	0.0311
AP	SO_2	0.0001	0.0006
AP	PM_{10}	0.0024	0.0104
AP	Formaldehyde	0.0049	0.0215
MRR	Proposed Monitoring:	Monitor engine setting adjustments to ensure these are consistent with manufacturer's instructions.	
	Proposed Recordkeeping:	1) Maintain records of maintenance performed on engines. 2) Documentation from manufacturer that engine is certified to meet emission standards	
	Proposed Reporting:	N/A	

Attachment G: Tank Truck Loading

Emissions Unit Data Sheet

Furnish the following information for each new or modified bulk liquid transfer area or loading rack at the natural gas proc
This form is to be used for bulk liquid transfer operations to tank trucks.

1. Emission Unit ID: L001, L002	2. Emission Point ID: EP-L001, EP-L002	3. Year Installed/ Modified: 2014

4. Emission Unit Description: CONDENSATE AND PRODUCED WATER

5. Loading Area Data

5A. Number of pumps: 2	5B. Number of liquids loaded: 2	5C. Maximum number of tank trucks loading at one time: 2

6. Describe cleaning location, compounds and procedure for tank trucks: For hire tank trucks are used and are cleaned at the operator's dispatch terminal. These trucks are in dedicated service and cleaned only prior to repair or leak tests. Cleaning materials include water, steam, detergent, and solvents which are applied using hand held pressurized spray nozzles.

7. Are tank trucks pressure tested for leaks at this or any other location?
X Yes No
If YES, describe: Tank trucks are pressure tested for leaks at the location of the leak testing company. Trucks are tested using EPA Method 27-internal vapor valve test and issued certification that DOT requirements are met.

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

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	6	6	6	6
days/week	7	7	7	7

9. Bulk Liquid Data *(add pages as necessary)*

Liquid Name		Condensate	Produced Water	
Max. daily throughput (1000 gal/day)		37.8	75.6	
Max. annual throughput (1000 gal/yr)		13,797.00	27,594.00	
Loading Method [1]		BF	BF	
Max. Fill Rate (gal/min)		168	168	
Average Fill Time (min/loading)		50	50	
Max. Bulk Liquid Temperature (^{o}F)		72.1	72.1	
True Vapor Pressure [2]		3.11	0.45	
Cargo Vessel Condition [3]		U	U	
Control Equipment or Method [4]		None	None	
Minimum collection efficiency (%)		0	0	
Minimum control efficiency (%)		0	0	
Maximum Emission Rate	Loading (lb/hr)	19.49	1.16	
	Annual (ton/yr)	13.34	1.59	
Estimation Method [5]		Promax	Promax	

Notes:

1 BF = Bottom SP = Splash Fill SUB = Submerged Fill

2 At maximum bulk liquid temperature

3 B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

4 List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets as Attachment "H"*):
CA = Carbon Adsorption
VB = Dedicated Vapor Balance (closed system) ECD = Enclosed Combustion Device
F = Flare
TO = Thermal Oxidation or Incineration

5 EPA = EPA Emission Factor as stated in AP-42

10. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**

MONITORING	RECORDKEEPING
1) Visual inspection to ensure that loading connections from storage tanks to trucks are leak-free.	1) Maintain records of condensate transferred from storage tanks. 2) Maintain records of produced water transferred from storage tanks.
REPORTING N/A	TESTING N/A

11. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty: N/A

Attachment H
Air Pollution Control Device Data Sheet

Attachment H: Air Pollution Control Device

Vapor Combustion Control Device Sheet

Complete this vapor combustion control device sheet for each enclosed combustion device, flare, thermal oxidizer, or completion combustion device that is located at the natural gas production pad for the purpose of thermally destructing waste gas to control emissions of regulated pollutants to the atmosphere.

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.			
General Information			
1. Control Device ID#: EC001, EC002, EC003, EC004		2. Installation Date: (1) 2014; (3) 2015	
3. Maximum Rated Total Flow Capacity: 131,000 scfd	4. Maximum Design Heat Input: 6.6 MMBtu/hr	5. Design Heat Content: 2300BTU/scf	
Control Device Information			
6. Select the type of vapor combustion control device being used: Enclosed Combustor			
7. Manufacturer: Model No. Cimarron, Model No. 48" HV ECD		8. Hours of operation per year: 8760	
9. List the emission units whose emissions are controlled by this vapor combustion control device: (Emission Point ID#:)			
10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
TANKCOND001-010	Condensate Tank		
TANKPW001-002	PW Tanks		
If this vapor combustor controls emissions from more than six emission units, please attach additional pages.			

11. Assist Type	12. Flare Height (ft)	13. Tip Diameter (ft)	14. Was the design per §60.18?
Steam - Air - Pressure - X Non -	25ft	3.33	Yes

Waste Gas Information			
15. Maximum waste gas flow rate (scfm):	16. Heat value of waste gas stream (BTU/ft3)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (ft/s)
70.69	2,234.11	900	1.35E-01
19. Provide an attachment with the characteristics of the waste gas stream to be burned.			

Pilot Information				
20. Type/Grade of pilot fuel:	21. Number of pilot lights:	22. Fuel flow rate to pilot flame per pilot (scf/hr):	23. Heat input per pilot (BTU/hr):	24. Will automatic re-ignition be used?
Natural Gas	1	12.6	12800	Yes
25. If automatic re-ignition will be used, describe the method: Based on a monitoring system				
26. Describe the method of controlling flame: Flame Rectification, a thermocouple equivalent				
27. Is pilot flame equipped with a monitor to detect the presence of the flame? Yes	28. If yes, what type? Thermocouple			

29. Pollutant(s) Controlled	30. % Capture Efficiency	31. Manufacturer's Guaranteed Control Efficiency (%)
F/W/B Emissions from TANKCOND	98	98
F/W/B Emissions from TANKPW	98	98

Attachment H: Air Pollution Control Device

Vapor Combustion Control Device Sheet

Complete this vapor combustion control device sheet for each enclosed combustion device, flare, thermal oxidizer, or completion combustion device that is located at the natural gas production pad for the purpose of thermally destructing waste gas to control emissions of regulated pollutants to the atmosphere.

32. Has the control device been tested by the manufacturer and certified? Yes, see spec sheet.

33. Describe all operating ranges and maintenance procedures required by the manufacturer to maintain warranty: See spec sheet for operating ranges.

MONITORING

1) Report any period when visible emissions exceeded 5 minutes during any two-hour period.
2) Monitor the presence of pilot flame at all times with the Flame rectification system, a thermocouple equivalent.
3) Monitor visible emissions from the vapor combustor.
4) Monitor throughput to the vapor combustor.

RECORDKEEPING

1) Record the times and duration of periods when the pilot flame was not present.
2) Records of throughput to the vapor combustor.
3) Records of vapor combustor malfunction or shutdown which resulted in excess emissions.
4) Records of vapor combustor inspection and maintenance activities conducted.

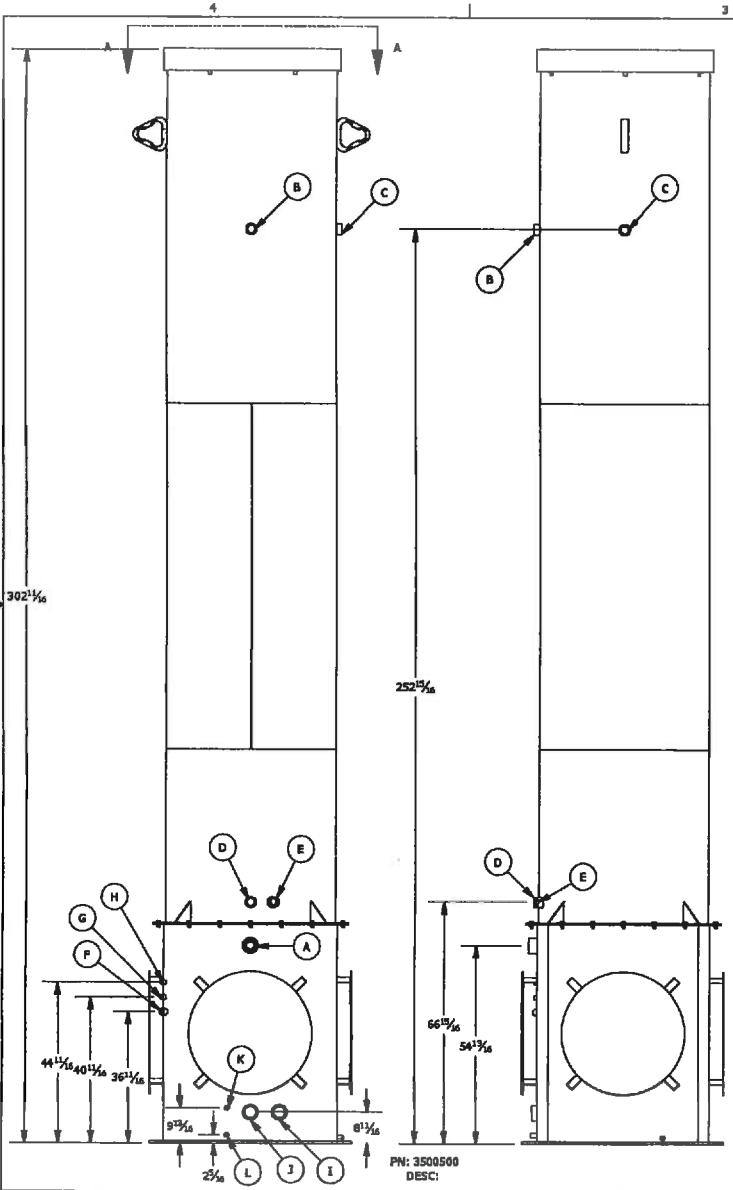
REPORTING

1) Report any period when visible emissions exceeded 5 minutes during any two-hour period.

34. Additional Information Attached? **YES**

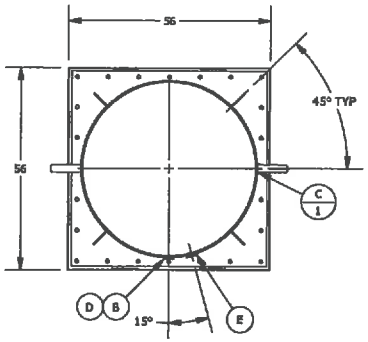
Please attach a copy of manufacturer's data sheet. Please attach a copy of manufacturer's drawing.
Please attach a copy of the manufacturer's performance testing.

If any of the requested information is not available, please contact the manufacturer.



48" DIA x 302 5/8" HEIGHT, 88 ORIFICES EMISSION CONTROL DEVICE

* >98% TVOC DRE, CERTIFIED USEPA 40 CFR 60, APPENDIX A, SOURCE EMMISIONS TEST METHODS REFERENCED. MEETS ALL EPA & CDPHE REGULATIONS.
* DESTROYS OIL/CONDENSATE PRODUCTION TANK VAPORS W/ NO VISIBLE FLAME.
* EXCELLENT OPACITY AND SMOKELESS OPERATION.
* RELIABLE AND CUSTOMIZABLE IGNITION.
* VERY LOW CAPITAL AND OPERATING COST.
* EASY TO OPERATE AND MAINTAIN.
* FIELD TESTED TO DESTROY UP TO 119.5 MDSCFD (131 MCFD) @ 10 oz/in^2; 2300 BTU/CF WASTE GAS (SG 1.45)
* STRUCTURE CERTIFIED FOR 90 MPH 3-SEC WIND GUST PER ASCE 7-05 & IBC 2006 STANDARDS. HIGHER WIND LOAD RATED STRUCTURES AVAILABLE.



VIEW A-A

PN: 3500500
DESC:

SCHEDULE OF NOZZLES				
MARK	QTY	DESCRIPTION	SERIES	SERVICE
A	1	3" HALF COUPLING	2000#	BURNER WASTE GAS IN
B	1	2" FULL COUPLING	3000#	FLOW TEST/AUTOMATION
C	1	2" FULL COUPLING	3000#	FLOW TEST/AUTOMATION
D	1	2" FULL COUPLING	3000#	SIGHT GLASS
E	1	2" FULL COUPLING	3000#	MANUAL LIGHTING
F	1	1" FULL COUPLING	3000#	PILOT GAS IN
G	1	1/2" FULL COUPLING	3000#	IGNITOR CABLE
H	1	1/2" FULL COUPLING	3000#	AUTOMATION
I	1	3" HALF COUPLING	3000#	DRIP TANK WASTE GAS IN
J	1	3" HALF COUPLING	3000#	DRIP TANK WASTE GAS OUT
K	1	1/2" FULL COUPLING	3000#	AUTOMATION
L	1	1/2" FULL COUPLING	3000#	LIQUID DRAIN

UNLESS OTHERWISE SPECIFIED

1. REMOVE ALL BURRS AND SHARP CORNERS.
2. COR. RAD .03
3. DO NOT SCALE DRAWING.
4. ALL DIMENSIONS ARE IN INCHES.
5. MACHINE FIN.
6. FABRICATION
   .X = ± 0.25
   .XX = ± 0.125
   .XXX = ± 0.06
   ANGLES ± 3°
7. MACHINE
   .X = ±0.030
   .XX = ±0.015
   .XXX = ±0.005
   ANGLES ±1/2°
   CONTRICITY WITHIN 0.010 TIR

APPROVED FOR A.S.M.E CODE, SECTION VIII DIV 1
_____ED,_____ ADDENDA BY_____ DATE_____

CIMARRON
Energy Inc.

TITLE:
48" HIGH VOLUME ECD

DATE:	WO No.:	SHEET: 1 OF 1

DRAWN BY: TDS | REV. | DRAW NO.: 3500500

Attachment I
Emission Calculations

Table 1

Facility Information
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Oil and Gas Site General Information

Administrative Information	
Company Name	Antero Resources Corporation
Facility/Well Name	Fritz Well Pad
Nearest City/Town	West Union
API Number/SIC Code	1311
Latitude/Longitude	39.234154, -80.839975
County	Doddridge County

Technical Information	
Max Condensate Site Throughput (bbl/day):	900
Max Produced Water Site Throughput (bbl/day):	1,800
Are there any sour gas streams at this site?	No
Is this site currently operational/producing?	Yes

Equipment/Processes at Site	
Equipment/Process Types	**How many for this site?**
Fugitives	9
IC Engines	1
Gas Production Unit Heaters	9
Line Heaters	9
Condensate Tanks	10
Produced Water Tanks	2
Loading Jobs	2
Enclosed Combustors	4

Table 2

Uncontrolled/Controlled Emissions Summary
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Emission Source	VOC		NO_X		CO_{2e}		CO		SO_2		$PM_{2.5}$		PM_{10}		Lead		Total HAPs		Benzene		Xylenes		Formaldehyde	
	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)
UNCONTROLLED (Fugitives, Storage Tanks, Gas Production Unit Heaters, Line Heaters)																								
Fugitive Emissions (Component Count, PCV and Hauling)[1]	3.3464	14.6572			83.958	367.74							0.3732	0.4341			0.3339	1.4625	0.0072	0.0314	5.91E-02	2.59E-01		
Flashing, Working and Breathing (F/W/B) Losses[2]	359.02	1,572.5															15.791	69.164	0.5950	2.6062	0.3633	1.5912		
Engine Emissions[3]	0.0069	0.0304	0.3158	1.3831	25.80	113.01	5.6445	24.7228	0.0001	0.0006	0.0023	0.0102	0.0022	0.0098			0.0054	0.0236	0.0004	0.0016	4.57E-05	2.00E-04	0.0048	0.0211
Gas Production Unit Heater Emissions[4]	0.0609	0.2668	1.1075	4.8509	1,329.01	5,821.09	0.9303	4.0748	0.0066	0.0291	0.0842	0.3687	0.0842	0.3687	5.54E-06	2.43E-05	2.08E-02	9.13E-02	2.33E-05	1.02E-04			0.0008	0.0036
Line Heater Emissions[4]	0.0812	0.3557	1.4767	6.4679	1,772.02	7,761.45	1.2404	5.4330	0.0089	0.0388	0.1122	0.4916	0.1122	0.4916	7.38E-06	3.23E-05	2.78E-02	1.22E-01	3.10E-05	1.36E-04			0.0011	0.0049
TOTALS:	**362.5150**	**1587.8156**	**2.9000**	**12.7019**	**3210.7948**	**14063.2813**	**7.8152**	**34.2306**	**0.0156**	**0.0685**	**0.1987**	**0.8704**	**0.5718**	**1.3041**	**0.0000**	**0.0001**	**16.1789**	**70.8634**	**0.6026**	**2.6394**	**0.4225**	**1.8504**	**0.0067**	**0.0296**
UNCONTROLLED (Truck Loading Emissions)																								
Truck Loading Emissions[5]	14.490	9.917			3.878	3.332											0.0481	0.0329	1.33E-03	9.16E-04	0.0039	0.0027		
CONTROLLED EMISSIONS																								
Enclosed Combustor Emissions (from F/W/B losses)[6]	7.1807	31.4513	0.4292	1.8798	1649.6063	7225.2756	0.3605	1.5790	3.02E-05	1.32E-04	0.0245	0.1071	0.0326	7.05E-05	2.15E-06	9.40E-06	0.3159	1.3837	1.19E-02	5.21E-02	0.0073	0.0318	3.78E-06	1.66E-05
Controlled Fugitive Emissions from Hauling													0.1866	0.2171										
TOTALS:	**7.1807**	**31.4513**	**0.4292**	**1.8798**	**1649.6063**	**7225.2756**	**0.3605**	**1.5790**	**3.02E-05**	**1.32E-04**	**0.0245**	**0.1071**	**0.2192**	**0.2171**	**2.15E-06**	**9.40E-06**	**0.3159**	**1.3837**	**0.0119**	**0.0521**	**0.0073**	**0.0318**	**3.78E-06**	**1.66E-05**
POTENTIAL TO EMIT[7]	**10.6761**	**56.6787**	**3.3292**	**14.5817**	**4860.4011**	**21291.8889**	**8.1757**	**35.8096**	**0.0157**	**0.0686**	**0.2232**	**0.9776**	**0.4179**	**1.0871**	**1.51E-05**	**6.60E-05**	**0.7038**	**3.1157**	**0.0195**	**0.0863**	**0.0664**	**0.2937**	**0.0068**	**0.0296**

Enter any notes here:	1 - See Tables 4 and 5 for fugitive emission calculations; Table 12 for PM emissions from hauling. 2 - See Tables 6 and 7 for tanks emission calculations 3 - See Table 13 for engine emissions 4 - See Table 9 for gas production unit heater and line heaters emission calculations 5 - The maximum emission was calculated based on tank truck capacity of 200 barrels and actual fill rate of 50 minutes per tank truck. At a production rate of 900 barrels per day, VOC emissions would be 14.4896 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 2.2642 pound per hour. 6 - See Table 10 and 11 for enclosed combustion emission calculations. 7 - The hourly potential to emit is the sum of emissions from gas production unit heaters, line heaters, engine, storage tanks, fugitives and enclosed combustors. Does not include emissions from loading (see footnote 5). The total TPY PTE is the sum of all emissions. PM 10 TPY is the sum of uncontrolled hauling and other PM10 sources.

Table 3

Permits Summary

Fritz Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Pollutant		Emissions			Threshold Exceeded?	
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	362.5150	10.6761	6	**Yes**	**Yes**
	tons/yr	1597.7329	56.6787	10	**Yes**	**Yes**
NO_X	lbs/hr	2.9000	3.3292	6		
	tons/yr	12.7019	14.5817	10	**Yes**	**Yes**
CO	lbs/hr	7.8152	8.1757	6	**Yes**	**Yes**
	tons/yr	34.2306	35.8096	10	**Yes**	**Yes**
SO_2	lbs/hr	0.0156	0.0157	6		
	tons/yr	0.0685	0.0686	10		
$PM_{2.5}$	lbs/hr	1.99E-01	2.23E-01	6		
	tons/yr	8.70E-01	9.78E-01	10		
PM_{10}	lbs/hr	0.5718	0.4179	6		
	tons/yr	1.3041	1.0871	10		
Lead	lbs/hr	1.29E-05	1.51E-05	6		
	tons/yr	5.66E-05	6.60E-05	10		
Total HAPs	lbs/hr	16.1789	0.7038	2	**Yes**	
	tons/yr	70.8963	3.1157	5	**Yes**	
Total TAPs	lbs/hr	0.6093	0.0262	1.14		
n-Hexane	lbs/hr	14.4226	0.5543			
	tons/yr	63.1974	2.4546			
Toluene	lbs/hr	0.5435	0.0328			
	tons/yr	2.3821	0.1455			
Ethylbenzene	lbs/hr	0.1857	0.0286			
	tons/yr	0.8142	0.1264			
Xylenes	lbs/hr	0.4224	0.0664			
	tons/yr	1.8529	0.2935			
Benzene	lbs/hr	0.6022	0.0191			
	tons/yr	2.6387	0.0847			

Enter any notes here:	1. Emissions are based on 98% Enclosed Combustor DRE operating 100% of the time. 2. Please see Attachment C/O- Fugitive Emissions Data Summary Sheet and Attachment O – Emission Points Data Summary Sheet for sitewide sources and breakdown of emission quantities.

Table 4

Fugitive Emissions
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

VOC Type:	Condensate VOC
Emission Type:	Steady State (continuous)

Gas Weight Fraction From Analysis:	VOC frac	0.165
	Benzene frac	0.000
	Toluene	0.000
	Ethylbenzene	0.000
	Xylenes	0.000
	n-Hexane	0.011
	Methane	0.625

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
450	Valves	Gas VOC	0.004500	0.33	6,455.68
		Non VOC	0.004500	1.69	32,570.12
531	Connectors	VOC	0.000200	0.02	338.56
		Non-VOC	0.000200	0.09	1,708.12
117	Flanges	VOC	0.000390	0.01	145.47
		Non-VOC	0.000390	0.04	733.91
			Total VOCs:	0.36	6,939.72
			Total THC:	2.18	41,951.87

Light Liquid Weight Fraction From Analysis:	VOC frac	0.958
	Benzene frac	0.003
	Toluene	0.009
	Ethylbenzene	0.008
	Xylenes	0.023
	n-hexane	0.065
	Methane	0.014

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
468	Valves	Light Liquid VOC	0.002500	1.12	21,611.85
		Light Liquid Non-VOC		0.05	936.39
			Total VOC:	1.12	21,611.85
			Total THC:	1.17	22,548.24

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	28,551.57	3.26	14.28
Ethylbenzene		0.02	0.09
Toluene		0.02	0.10
Xylenes		0.06	0.26
n-Hexane		0.22	0.96
TAPs (Benzene)		0.01	0.03
HAPs		0.33	1.44
CO_{2e}	663,415.41	75.73	331.71

Enter Notes Here:	Fugitive emissions based on an estimated component count Global Warming Potentials from EPA site Reference to Emission factors used: 1. Emission factors are for oil and gas production facilities (not refineries) come from the EPA's "Protocol for Equipment Leak Emission Estimates" November 1995, EPA 4531, R-95-017, Table 2-4. 2. Percent of speciated VOCs used in fugitive calculations are based on the total hydrocarbons, not of the total sample.

Table 5

Pneumatic Control Valve Emissions
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Number of PCVs	36
Bleed Rate (scf/day/PCV)	6.6
Total Bleed Rate (scf/day)	237.6

Component	Mol%	Molecular Weight (lb/lb-mole)	Component Flow (scf/day)	Component Moles (lb-moles)	Component Emissions (lbs/day)	(lbs/hr)	(tons/year)
H2S	0	34.08	0	0.00	0.00	0.00	0.00
Nitrogen	0.564	14.01	1.340064	0.00	0.05	0.00	0.01
Carbon Dioxide	0.1647	44.01	0.3913272	0.00	0.05	0.00	0.01
Methane	78.61509	16.04	186.7894538	0.49	7.90	0.33	1.44
Ethane	14.0689	30.07	33.4277064	0.09	2.65	0.11	0.48
Propane	4.2164	44.1	10.0181664	0.03	1.16	0.05	0.21
Isobutane	0.5041	58.12	1.1977416	0.00	0.18	0.01	0.03
n-Butane	1.0298	58.12	2.4468048	0.01	0.37	0.02	0.07
Isopentane	0.2618	72.15	0.6220368	0.00	0.12	0.00	0.02
n-Pentane	0.2553	72.15	0.6065928	0.00	0.12	0.00	0.02
2-Methylpentane	0	86.18	0	0.00	0.00	0.00	0.00
3-Methylpentane	0	86.18	0	0.00	0.00	0.00	0.00
n-Hexane	0.2484	86.18	0.5901984	0.00	0.13	0.01	0.02
Methylcyclopentane	0	84.16	0	0.00	0.00	0.00	0.00
Benzene	0	78.11	0	0.00	0.00	0.00	0.00
2-Methylhexane	0	100.2	0	0.00	0.00	0.00	0.00
3-Methylhexane	0	100.2	0	0.00	0.00	0.00	0.00
Heptane	0	100.21	0	0.00	0.00	0.00	0.00
Methylcyclohexane	0	98.186	0	0.00	0.00	0.00	0.00
Toluene	0	92.14	0	0.00	0.00	0.00	0.00
Octane	0	114.23	0	0.00	0.00	0.00	0.00
Ethylbenzene	0	106.17	0	0.00	0.00	0.00	0.00
m & p-Xylene	0	106.16	0	0.00	0.00	0.00	0.00
o-Xylene	0	106.16	0	0.00	0.00	0.00	0.00
Nonane	0	128.2	0	0.00	0.00	0.00	0.00
C10+	0	174.28	0	0.00	0.00	0.00	0.00

	lb/hr	tpy
VOC Emissions	0.0871	0.3814
Benzene Emissions	0.0000	0.0000
Toluene Emissions	0.0000	0.0000
Ethylbenzene Emissions	0.0000	0.0000
Xylene Emissions	0.0000	0.0000
n-Hexane Emissions	0.0056	0.0245
HAPs Emissions	0.0056	0.0245
TAPs Emissions	0.0000	0.0000
CO_{2e} emissions	8.2261	36.0305

Enter any notes here:	1. PCV bleed rate obtained from the user manual for PCV http://issuu.com/rmcprocesscontrols/docs/mizer-pilot-operation--parts---installation-manual 2. Emissions per hour= Mol % x no. of PCV x bleed rate x MW / 379.48 / 24

Table 6

Uncontrolled Flashing Emissions

Fritz Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

# Hours Operational	8760

	Condensate Tank Flashing Losses			Produced Water Tank Flashing Losses		
	Vapor Mass Fraction	Flashing Losses		Vapor Mass Fraction	Flashing Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
Water	0.0577	0.2528	1.1072	2.7125	0.0000	0.0000
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0054	0.0239	0.1045	0.5737	0.0811	0.3552
Carbon Dioxide	0.0797	0.3493	1.5299	2.1362	0.3019	1.3225
Methane	2.8455	12.4734	54.6334	60.8682	8.6034	37.6830
Ethane	19.4548	85.2798	373.5253	20.8724	2.9502	12.9219
Propane	30.9237	135.5536	593.7248	8.9098	1.2594	5.5160
Isobutane	7.4225	32.5365	142.5100	0.4297	0.0607	0.2660
n-Butane	17.0168	74.5926	326.7155	1.8370	0.2597	1.1373
Isopentane	5.4852	24.0444	105.3143	0.3378	0.0477	0.2091
n-Pentane	5.9027	25.8743	113.3296	0.3451	0.0488	0.2136
2-Methylpentane	1.7860	7.8291	34.2914	0.0461	0.0065	0.0285
3-Methylpentane	1.1488	5.0359	22.0571	0.0795	0.0112	0.0492
n-Hexane	3.2157	14.0958	61.7397	0.0653	0.0092	0.0404
Methylcyclopentane	0.4700	2.0604	9.0245	0.0967	0.0137	0.0599
Benzene	0.1288	0.5646	2.4730	0.2039	0.0288	0.1262
2-Methylhexane	0.7221	3.1653	13.8640	0.0163	0.0023	0.0101
3-Methylhexane	0.5675	2.4875	10.8951	0.0134	0.0019	0.0083
Heptane	0.9703	4.2535	18.6303	0.0240	0.0034	0.0148
Methylcyclohexane	0.6171	2.7051	11.8485	0.0826	0.0117	0.0511
Toluene	0.1128	0.4946	2.1662	0.1666	0.0236	0.1032
Octane	0.7732	3.3895	14.8458	0.0113	0.0016	0.0070
Ethylbenzene	0.0346	0.1514	0.6633	0.0500	0.0071	0.0310
m & p-Xylene	0.0386	0.1693	0.7414	0.0555	0.0078	0.0343
o-Xylene	0.0395	0.1732	0.7584	0.0593	0.0084	0.0367
Nonane	0.1560	0.6839	2.9956	0.0035	0.0005	0.0022
C10+	0.0247	0.1085	0.4752	0.0035	0.0005	0.0022
Total VOCs	77.557	339.97	1,489.1	12.837	1.8144	7.9473
Total CO_{2e}		312.18	1,367.4		215.39	943.4
Total TAPs (Benzene)		0.5646	2.4730		0.0288	0.1262
Toluene		0.4946	2.1662		0.0236	0.1032
Ethylbenzene		0.1514	0.6633		0.0071	0.0310
Xylenes		0.3424	1.4998		0.0162	0.0711
n-Hexane		14.096	61.740		0.0092	0.0404
Total HAPs		15.649	68.542		0.0849	0.3719
Total	100.00	438.35	1,920.0	100.00	13.751	60.23

Enter any notes here:	Vapor mass fractions and Flashing losses from Promax output

Table 7

Uncontrolled Working and Breathing Losses

Fritz Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Condensate Tank Information	
Number of Tanks	10
Maximum Working Losses (lbs/hr)	10.1852
Maximum Breathing Losses (lbs/hr)	12.9977

	Condensate Tank W/B Losses						
	Vapor Mass Fraction	Working Losses		Breathing Losses		Max W/B Losses	
	wt%	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0002	0.0000	0.0001	0.0000	0.0001	0.0000	0.0002
Carbon Dioxide	0.0804	0.0082	0.0358	0.0104	0.0457	0.0186	0.0816
Methane	0.5896	0.0601	0.2630	0.0766	0.3357	0.1367	0.5987
Ethane	24.9816	2.5444	11.1446	3.2470	14.2220	5.7915	25.3666
Propane	33.3884	3.4007	14.8950	4.3397	19.0079	7.7404	33.9030
Isobutane	7.4802	0.7619	3.3370	0.9722	4.2585	1.7341	7.5955
n-Butane	16.9959	1.7311	7.5821	2.2091	9.6757	3.9401	17.2578
Isopentane	5.1509	0.5246	2.2979	0.6695	2.9324	1.1941	5.2302
n-Pentane	5.4846	0.5586	2.4468	0.7129	3.1224	1.2715	5.5691
2-Methylpentane	1.6311	0.1661	0.7277	0.2120	0.9286	0.3781	1.6563
3-Methylpentane	1.0489	0.1068	0.4679	0.1363	0.5972	0.2432	1.0651
n-Hexane	0.1996	0.0203	0.0890	0.0259	0.1136	0.0463	0.2027
Methylcyclopentane	0.4002	0.0408	0.1785	0.0520	0.2279	0.0928	0.4064
Benzene	0.0068	0.0007	0.0030	0.0009	0.0039	0.0016	0.0069
2-Methylhexane	0.0417	0.0042	0.0186	0.0054	0.0237	0.0097	0.0424
3-Methylhexane	0.4949	0.0504	0.2208	0.0643	0.2817	0.1147	0.5025
Heptane	0.7789	0.0793	0.3475	0.1012	0.4434	0.1806	0.7909
Methylcyclohexane	0.5073	0.0517	0.2263	0.0659	0.2888	0.1176	0.5151
Toluene	0.0127	0.0013	0.0057	0.0017	0.0072	0.0029	0.0129
Octane	0.5792	0.0590	0.2584	0.0753	0.3298	0.1343	0.5881
Ethylbenzene	0.0074	0.0008	0.0033	0.0010	0.0042	0.0017	0.0075
m & p-Xylene	0.0106	0.0011	0.0047	0.0014	0.0060	0.0025	0.0108
o-Xylene	0.0094	0.0010	0.0042	0.0012	0.0054	0.0022	0.0096
Nonane	0.1059	0.0108	0.0472	0.0138	0.0603	0.0245	0.1075
C10+	0.0135	0.0014	0.0060	0.0018	0.0077	0.0031	0.0137
Total VOCs	74.348	7.5726	33.168	9.6635	42.3263	17.2361	75.494
Total CO_{2e}		1.5095	6.6114	1.9263	8.4370	3.4357	15.048
Total TAPs (Benzene)		0.0007	0.0030	0.0009	0.0039	0.0016	0.0069
Toluene		0.0013	0.0057	0.0017	0.0072	0.0029	0.0129
Ethylbenzene		0.0008	0.0033	0.0010	0.0042	0.0017	0.0075
Xylenes		0.0020	0.0089	0.0026	0.0114	0.0046	0.0204
n-Hexane		0.0203	0.0890	0.0259	0.1136	0.0463	0.2027
Total HAPs		0.0251	0.1100	0.0320	0.1404	0.0572	0.2504
Total	100.00	10.1852	44.6114	12.9977	56.9297	23.1829	101.541

Table 7

Uncontrolled Working and Breathing Losses

Fritz Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Produced Water Tank Information	
Number of Tanks	2
Maximum Working Losses (lbs/hr)	0.0893
Maximum Breathing Losses (lbs/hr)	0.0082

	Produced Water Tank W/B Losses						
	Vapor Mass Fraction	Working Losses		Breathing Losses		Max W/B Losses	
	wt%	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0112	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide	2.8056	0.0025	0.0110	0.0002	0.0010	0.0027	0.0120
Methane	3.2969	0.0029	0.0129	0.0003	0.0012	0.0032	0.0141
Ethane	1.0434	0.0009	0.0041	0.0001	0.0004	0.0010	0.0045
Propane	0.1086	0.0001	0.0004	0.0000	0.0000	0.0001	0.0005
Isobutane	0.0007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Butane	0.0042	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Isopentane	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Methylpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Methylpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Methylcyclopentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Methylhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Methylhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heptane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Methylcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Octane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethylbenzene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m & p-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
o-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nonane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C10+	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total VOCs	0.1143	0.0001	0.0004	0.0000	0.0000	0.0001	0.0005
Total CO_{2e}		0.0761	0.3334	0.0070	0.0307	0.0831	0.3640
Total TAPs (Benzene)		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethylbenzene		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Xylenes		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total HAPs		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	100.00	0.0893	0.3911	0.0082	0.0360	0.0975	0.4271

Enter any notes here:	Vapor mass fractions, working losses and breathing losses from Promax output

Table 8

Loading Emissions

Fritz Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	4.45	1.0242
Annual Average Temp (F)	72.1	72.1
S (saturation factor)	0.6	0.6
P (true vapor pressure)	3.11	0.45
M (MW of vapor)	44.29	18.33
Collection Efficiency (%)	0	0
Loading Loss (lb/10^3 gal)*	1.93	0.12
Maximum Throughput (gallons/hr)	10,080	10,080
Average Throughput (gallons/yr)	13,797,000	27,594,000
Loading Emissions (lbs/hr)	19.49	1.16
Loading Emissions (tpy)	13.34	1.59

	Condensate Tank Loading Losses			Produced Water Tank Loading Losses		
	Vapor Mass Fraction	Loading Losses		Vapor Mass Fraction	Loading Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
H2S	0.0000	0.00	0.00	0.0000	0.00E+00	0.00E+00
Nitrogen	0.0002	0.00	0.00	0.0112	1.30E-04	1.78E-04
Carbon Dioxide	0.0804	0.02	0.01	2.8056	3.26E-02	4.46E-02
Methane	0.5896	0.11	0.08	3.2969	3.83E-02	5.24E-02
Ethane	24.9816	4.87	3.33	1.0434	1.21E-02	1.66E-02
Propane	33.3884	6.51	4.45	0.1086	1.26E-03	1.73E-03
Isobutane	7.4802	1.46	1.00	0.0007	7.62E-06	1.04E-05
n-Butane	16.9959	3.31	2.27	0.0042	4.90E-05	6.71E-05
Isopentane	5.1509	1.00	0.69	0.0002	2.26E-06	3.09E-06
n-Pentane	5.4846	1.07	0.73	0.0001	1.68E-06	2.30E-06
2-Methylpentane	1.6311	0.32	0.22	0.0000	4.29E-08	5.88E-08
3-Methylpentane	1.0489	0.20	0.14	0.0000	1.79E-07	2.46E-07
n-Hexane	0.1996	0.04	0.03	0.0000	2.36E-09	3.23E-09
Methylcyclopentane	0.4002	0.08	0.05	0.0000	4.70E-07	6.43E-07
Benzene	0.0068	0.00	0.00	0.0003	3.04E-06	4.16E-06
2-Methylhexane	0.0417	0.01	0.01	0.0000	2.48E-10	3.40E-10
3-Methylhexane	0.4949	0.10	0.07	0.0000	3.06E-09	4.19E-09
Heptane	0.7789	0.15	0.10	0.0000	4.02E-09	5.51E-09
Methylcyclohexane	0.5073	0.10	0.07	0.0000	8.57E-08	1.17E-07
Toluene	0.0127	0.00	0.00	0.0001	1.20E-06	1.64E-06
Octane	0.5792	0.11	0.08	0.0000	3.71E-10	5.08E-10
Ethylbenzene	0.0074	0.00	0.00	0.0000	2.02E-07	2.77E-07
m & p-Xylene	0.0106	0.00	0.00	0.0000	2.50E-07	3.42E-07
o-Xylene	0.0094	0.00	0.00	0.0000	2.80E-07	3.83E-07
Nonane	0.1059	0.02	0.01	0.0000	5.39E-11	7.38E-11
C10+	0.0135	0.00	0.00	0.0000	1.67E-11	2.29E-11
Total VOCs	74.3482	14.488	9.915	0.1143	1.33E-03	1.82E-03
Total CO_{2e}		2.888	1.9765		0.9904	1.3556
Total TAPs (Benzene)		0.0013	0.0009		0.0000	0.0000
Toluene		0.0025	0.0017		0.0000	0.0000
Ethylbenzene		0.0014	0.0010		0.0000	0.0000
Xylenes		0.0039	0.0027		0.0000	0.0000
n-Hexane		0.0389	0.0266		0.0000	0.0000
Total HAPs		0.0481	0.0329		0.0000	0.0000
Total	100.0000	19.4870	13.3364	100.0000	1.1620	1.5905

Enter any notes here

Vapor mass fractions and loading losses from Promax output

Using equation L_L = 12.46 SPM/T from AP-42, Chapter 5, Section 5.2-4

MW was obtained by Promax; RVP was taken from laboratory reports

Annual Average Temp (F) obtained from Charleston, WV (preset in Promax)

S (saturation factor) is based on submerged loading, dedicated service as it was most representative

True vapor pressure (TVP) equation from AP-42, Chapter 7, Figure 7.1-13b

Loading emissions are vented to the atmosphere.

Table 9

Gas Production Unit Heater Emissions
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Gas Production Unit Heater Emissions

Number of Units	9
GPU Heater Rating (MMBtu/hr)	1.50
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,219

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.108	4.851
CO	84	0.930	4.075
CO_2	120,000	1329.015	5821.085
Lead	0.0005	5.54E-06	2.43E-05
N_2O	2.2	0.024	0.107
PM (Total)	7.6	0.084	0.369
SO_2	0.6	0.007	0.029
TOC	11	0.122	0.534
Methane	2.3	0.025	0.112
VOC	5.5	0.061	0.267
HAPS			
2-Methylnaphthalene	2.40E-05	2.66E-07	1.16E-06
Benzene	2.10E-03	2.33E-05	1.02E-04
Dichlorobenzene	1.20E-03	1.33E-05	5.82E-05
Fluoranthene	3.00E-06	3.32E-08	1.46E-07
Fluorene	2.80E-06	3.10E-08	1.36E-07
Formaldehyde	7.50E-02	8.31E-04	3.64E-03
Hexane	1.80E+00	1.99E-02	8.73E-02
Naphthalene	6.10E-04	6.76E-06	2.96E-05
Phenanathrene	1.70E-05	1.88E-07	8.25E-07
Toluene	3.40E-03	3.77E-05	1.65E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.142	0.623
TOTAL Uncontrolled HAPs	0.049	0.213
TOTAL Uncontrolled TAPs (Benzene)	5.43E-05	2.38E-04
TOTAL Uncontrolled TAPs (Formaldehyde)	0.002	0.008
TOTAL CO_{2e} Emissions	3,119.46	13,663.25

Enter any notes here:
All Emission Factors based off AP-42 Sec 1.4 Natural Gas Combustion

Line Heater Emissions

Number of Units	9
Line Heater Rating (MMBtu/hr)	2.00
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,219

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.477	6.468
CO	84	1.240	5.433
CO_2	120,000	1772.020	7761.447
Lead	0.0005	7.38E-06	3.23E-05
N_2O	2.2	0.032	0.142
PM (Total)	7.6	0.112	0.492
SO_2	0.6	0.009	0.039
TOC	11	0.162	0.711
Methane	2.3	0.034	0.149
VOC	5.5	0.081	0.356
HAPS			
2-Methylnaphthalene	2.40E-05	3.54E-07	1.55E-06
Benzene	2.10E-03	3.10E-05	1.36E-04
Dichlorobenzene	1.20E-03	1.77E-05	7.76E-05
Fluoranthene	3.00E-06	4.43E-08	1.94E-07
Fluorene	2.80E-06	4.13E-08	1.81E-07
Formaldehyde	7.50E-02	1.11E-03	4.85E-03
Hexane	1.80E+00	2.66E-02	1.16E-01
Naphthalene	6.10E-04	9.01E-06	3.95E-05
Phenanathrene	1.70E-05	2.51E-07	1.10E-06
Toluene	3.40E-03	5.02E-05	2.20E-04

Table 10

Enclosed Combustor Emissions
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

General Information	
Unit Name:	EC001, EC002, EC003, EC004

Pollutant	Emission Factor (lb/MMscf)
NOx	100
CO	84
PM10	7.6
PM2.5	5.7
SO_2	0.6
CO_2	120,000
VOC	5.5
benzene	2.10E-03
Hexane	1.80E+00
Toluene	3.40E-03
Formaldehyde	7.50E-02
N_2O	2.20
Lead	5.00E-04

Constants	
Btu/MMBtu	1,000,000
scf/MMscf	1,000,000
lb/ton	2,000
H_2S molecular weight	34.08
SO_2 molecular weight	64.06
seconds/hour	3,600
inches/ft	12

Destruction Efficiency	
VOC percent destruction efficiency (%)	98
H_2S percent destruction efficiency (%)	98

Enclosed Combustor operating hours	8760
No. of Enclosed Combustors	4

Stream Information							
	1	2	3	4	5	6	Total
Stream Sent to Flare/Vapor Combustor (Enter Name of Each Stream Here)	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
Maximum Expected Hourly Volumetric Flow Rate of Stream (scf/hr)	50.4	--	3,756.12	284.61	198.65	2.02	4,291.81
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	441,504.00	--	32,903,642.68	2,493,211.13	1,740,174.71	17,680.26	37,596,212.78
Heating Content (Btu/ft3)	1,219		2,348.05	1,054.78	2,348.05	1,054.78	2,234.11

Mass Flow Rates of the Vapors Sent to this Control Device, Hourly Basis (lb/hr)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
H2S	-	-	0.000	0.000	0.000	0.000	0.000
Total VOC	-	-	339.969	1.814	17.236	0.000	359.02
Benzene	-	-	0.565	0.029	0.002	0.000	0.595
Toluene	-	-	0.495	0.024	0.003	0.000	0.521
Ethylbenzene	-	-	0.151	0.007	0.002	0.000	0.160
Xylenes	-	-	0.342	0.016	0.005	0.000	0.363
n-Hexane	-	-	14.096	0.009	0.046	0.000	14.151
HAPs	-	-	15.649	0.085	0.057	0.000	15.791
Total Mass Flow	-	-	438.348	13.751	23.183	0.098	475.379
Mass Flow Rates of the Vapors Sent to this Control Device, Annual Basis (tpy)							
H2S	-	-	0.000	0.000	0.000	0.000	0.000
Total VOC	-	-	1489.064	7.947	75.494	0.000	1572.505
Benzene	-	-	2.473	0.126	0.007	0.000	2.606
Toluene	-	-	2.166	0.103	0.013	0.000	2.282
Ethylbenzene	-	-	0.663	0.031	0.007	0.000	0.702
Xylenes	-	-	1.500	0.071	0.020	0.000	1.591
n-Hexane	-	-	61.740	0.040	0.203	0.000	61.983
HAP	-	-	68.542	0.372	0.250	0.000	69.164
Total Mass Flow	-	-	1919.964	60.230	101.541	0.427	2082.162

Table 10

Enclosed Combustor Emissions
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Controlled Emissions							
Hourly (lb/hr)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.005	-	0.376	0.028	0.020	0.000	0.43
CO	0.004	-	0.316	0.024	0.017	0.000	0.36
PM2.5	0.000	-	0.021	0.002	0.001	0.000	0.02
PM10	0.000	-	0.029	0.002	0.002	0.000	0.03
H2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	6.048	-	-	-	-	-	6.05
Total VOC	0.000	-	6.799	0.036	0.345	0.000	7.18
Benzene	0.000	-	0.011	0.001	0.000	0.000	0.01
Toluene	0.000	-	0.010	0.000	0.000	0.000	0.01
Ethylbenzene	0.000	-	0.003	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.007	0.000	0.000	0.000	0.01
n-Hexane	0.000	-	0.282	0.000	0.001	0.000	0.28
HAP	0.000	-	0.313	0.002	0.001	0.000	0.32
N_2O	0.000	-	0.008	0.001	0.000	0.000	0.01
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00
Annual (tpy)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.022	-	1.645	0.125	0.087	0.001	1.88
CO	0.019	-	1.382	0.105	0.073	0.001	1.58
PM2.5	0.001	-	0.094	0.007	0.005	0.000	0.11
PM10	0.002	-	0.125	0.009	0.007	0.000	0.14
H_2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	26.490	-	-	-	-	-	26.49
Total VOC	0.001	-	29.781	0.159	1.510	0.000	31.45
Benzene	0.000	-	0.049	0.003	0.000	0.000	0.05
Toluene	0.000	-	0.043	0.002	0.000	0.000	0.05
Ethylbenzene	0.000	-	0.013	0.001	0.000	0.000	0.01
Xylenes	0.000	-	0.030	0.001	0.000	0.000	0.03
n-Hexane	0.000	-	1.235	0.001	0.004	0.000	1.24
HAP	0.000	-	1.371	0.007	0.005	0.000	1.38
N_2O	0.000	-	0.036	0.003	0.002	0.000	0.04
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00

Enclosed Combustor/Vapor Combustor Total Emissions		
	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Total VOC	7.18	31.45
NOx	4.29E-01	1.88E+00
CO	3.61E-01	1.58E+00
PM2.5	2.45E-02	1.07E-01
PM10	3.26E-02	1.43E-01
H_2S	1.61E-05	7.05E-05
SO_2	3.02E-05	1.32E-04
Benzene (TAPs)	1.19E-02	5.21E-02
Formaldehyde (TAPs)	3.78E-06	1.66E-05
HAPs	0.32	1.38
CO_2e	1649.61	7225.28
N_2O	9.44E-03	4.14E-02
Lead	2.15E-06	9.40E-06

Enter any notes here as needed
1. Emission Factors from AP-42 Tables 1.4-1, 1.4-2, and 1.4.3

Table 11

Enclosed Combustor GHG Emissions
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Enclosed Combustor CO_2 and CH_4 Emissions

Components	Mole fraction of oil flash gas constituents[a]	Volume of oil flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of water flash gas constituents[a]	Volume of water flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of oil tank vapors constituents[a]	Volume of oil tank vapor sent to Enclosed Combustor *scf/year*	Mole fraction of water tank vapors constituents[a]	Volume of water tank vapors sent to Enclosed Combustor *scf/year*	Component volume of gas sent to Enclosed Combustor *scf/year*	Number of carbon atoms	Combustion Efficiency	Combusted CO_2 Volume[b] *scf/year*	Uncombusted CO_2 and CH_4 Volume[b] *scf/year*	Volume GHGs Emitted *scf/year*
CO_2	0.001	32,903,643	0.0493	2,493,211	0.0008	1,740,175	0.012	17,680	151,249	1	0	--	151,249	119,018,753
Methane	0.080	32,903,643	3.8533	2,493,211	0.0163	1,740,175	0.038	17,680	12,256,834	1	0.98	12,011,698	245,137	245,137
Ethane	0.290	32,903,643	0.7048	2,493,211	0.3679	1,740,175	0.006	17,680	11,955,838	2	0.98	23,433,443	--	
Propane	0.315	32,903,643	0.2051	2,493,211	0.3353	1,740,175	0.000	17,680	11,454,457	3	0.98	33,676,103	--	
i-Butane	0.057	32,903,643	0.0075	2,493,211	0.0570	1,740,175	0.000	17,680	2,004,629	4	0.98	7,858,145	--	
n-Butane	0.131	32,903,643	0.0321	2,493,211	0.1295	1,740,175	0.000	17,680	4,630,847	4	0.98	18,152,920	--	
Pentane	0.071	32,903,643	0.0096	2,493,211	0.0653	1,740,175	0.000	17,680	2,469,361	5	0.98	12,099,871	--	
Hexane	0.032	32,903,643	0.0022	2,493,211	0.0148	1,740,175	0.000	17,680	1,085,720	6	0.98	6,384,036	--	
Benzene	0.001	32,903,643	0.0027	2,493,211	0.0000	1,740,175	0.000	17,680	31,037	6	0.98	182,496	--	
Heptanes	0.013	32,903,643	0.0017	2,493,211	0.0079	1,740,175	0.000	17,680	433,743	7	0.98	2,975,478	--	
Toluene	0.001	32,903,643	0.0018	2,493,211	0.0001	1,740,175	0.000	17,680	22,775	7	0.98	156,236	--	
Octane	0.006	32,903,643	0.0010	2,493,211	0.0045	1,740,175	0.000	17,680	203,128	8	0.98	1,592,525	--	
Ethyl benzene	0.000	32,903,643	0.0005	2,493,211	0.0000	1,740,175	0.000	17,680	6,054	8	0.98	47,467	--	
Xylenes	0.000	32,903,643	0.0011	2,493,211	0.0001	1,740,175	0.000	17,680	13,753	8	0.98	107,827	--	
Nonane	0.001	32,903,643	0.0000	2,493,211	0.0004	1,740,175	0.000	17,680	18,685	9	0.98	164,803	--	
Decane plus	0.000	32,903,643	0.0000	2,493,211	0.0000	1,740,175	0.000	17,680	2,496	10	0.98	24,458	--	
											Subtotal	**118,867,504**	--	

Pollutant	Volume Emitted *scf/year*	Density of GHG[c] *lb/scf*	Conversion Factor *lb/ton*	GWF	Emissions[c] *lbs/hr*	Emissions[c] *(tons/yr)*
CO_2	119,018,753	0.12	2000	1	1575.54	6,900.89
CH_4	245,137	0.09	2000	25	2.60	11.40
				CO_2e Emissions	**1,640.6**	**7185.97**

GHG Emissions Summary

Notes

a Flashing/Working/Breathing Losses from ProMax output reports

b 40 CFR 98.233 (n)(4): Eqns: W-19, W-20 and W-21

c 40 CFR 98.233(v) Eqn W-36 - density at 60F and 14.7 psia

Table 12

Haul Road Emissions
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

	PM	PM10
Particle Size Multiplier (k)	0.8	0.36
Silt Content of Road Surface Material (s) (%)	5.1	5.1
Days per Year with Precipitation > 0.01 in (p)	150	150
Control Efficiency for Watering [1] (%)	50	50

Tanker Truck Trip Calculation	
Condensate Production (bbl/day)	900
PW Production (bbl/day)	1,800
Truck Capacity (bbl)	200

Pick Up Truck Trip Calculation	
No of Trips Per day	2
Trips Per Year	730

	# of Wheels	Mean Vehicle Weight (W) (tons)	Mean Vehicle Speed (S) (mph)	Miles Per Trip (miles)	Maximum Trips per Hour	Maximum Trips per Year	Vehicle Miles Travelled (miles/hr)	Vehicle Miles Travelled (miles/year)	PM (lbs/VMT)	PM10 (lbs/VMT)
Tanker Trucks Condensate	10	40	10	0.1000	1	1643	0.1000	164.3000	3.8175	1.7179
Tanker Trucks PW	10	40	10	0.1000	1	3285	0.1000	328.5000	3.8175	1.7179
Pick Up Truck	4	3	10	0.1900	1	730	0.1900	138.7000	0.3467	0.1560

	Uncontrolled Emissions						Controlled Emissions					
	PM			PM10			PM			PM10		
	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)
Tanker Trucks Condensate	0.3818	627.2201	0.3136	0.1718	282.2490	0.1411	0.1909	313.6100	0.1568	0.0859	141.1245	0.0706
Tanker Trucks PW	0.3818	1254.0584	0.6270	0.1718	564.3263	0.2822	0.1909	627.0292	0.3135	0.0859	282.1631	0.1411
Pick Up Truck	0.0659	48.0845	0.0240	0.0296	21.6380	0.0108	0.0329	24.0422	0.0120	0.0148	10.8190	0.0054
Total Emissions	0.8294	1,929.3630	0.9647	0.3732	868.2133	0.4341	0.4147	964.6815	0.4823	0.1866	434.1067	0.2171

Enter any notes here:	1 EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (11/06); assume 2:1 moisture ratio Section 13.2.2 Unpaved Roads (11/06) Source: Attachment L, Fugitive Emissions from Unpaved Haul Roads, Rev 03/2007, West Virginia Department of Environmental Protection

Table 13

Engine Emissions
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Kubota DG972-E2

Power (hp)	24
Fuel consumption (lbs/BHP-hr) [1]	0.449
Heat Content of Fuel (Btu/scf)	1218.948
Density of NG (lb/scf)	0.056
Operating Hours/year	8760

Pollutant	Emission Factors (g/hp-hr)	Emission Factors (lb/MMBtu)	lb/hr	tpy
NOx[1]	5.97		0.3158	1.3831
CO[2]	106.7		5.6445	24.7228
CO_2		110.000	25.8016	113.01
$PM_{2.5}$		9.910E-03	0.0023	0.0102
PM_{10}		9.500E-03	0.0022	0.0098
PM (Total)		9.910E-03	0.0023	0.0102
SO_2		5.880E-04	0.0001	0.0006
TOC		0.358	0.0840	0.3678
Methane		0.230	0.0539	0.2363
VOC[3]		0.0296	0.0069	0.0304
HAPS				
Benzene		1.58E-03	3.71E-04	1.62E-03
Ethylbenzene		2.48E-05	5.82E-06	2.55E-05
Formaldehyde		2.05E-02	4.81E-03	2.11E-02
Naphthalene		9.71E-05	2.28E-05	9.98E-05
Toluene		5.58E-04	1.31E-04	5.73E-04
Xylene		1.95E-04	4.57E-05	2.00E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.007	0.030
TOTAL Uncontrolled NOx	0.316	1.383
TOTAL Uncontrolled HAPs	0.005	0.024
TOTAL Uncontrolled TAPs (Benzene)	0.000	0.002
TOTAL Uncontrolled TAPs (Formaldehyde)	0.005	0.021
TOTAL CO_{2e} Emissions	27.15	118.9

Enter Any Notes Here:

1. Emission factor used for the 24 HP engine's NOx is the 40 CFR 1054 standard indicated on the EPA's Certificate of Conformity. See Appendix P.

2. Emission factor for CO was the Certification CO level taken from EPA's Non-Road Small SI 2013 Certification issued by Office of Transportation and Air Quality, March 2014.

3. Emission factors for all other contaminants including VOCs were obtained from AP-42, Section 3.2 "Natural Gas-fired Reciprocating Engines", Table 3.2-3.

Table 14

Change in Regulated Air Pollutants Emissions
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

	Potential Emissions		Initial Permit Application Emissions		Change in Emissions	
Pollutant	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**
PM	0.6459	1.3524	0.5162	0.7118	1.30E-01	0.6406
PM10	0.4179	1.0871	0.2881	0.5059	0.1297	0.5812
VOC (uncontrolled)	362.5150	1597.7329	236.9349	1039.4011	125.5800	558.3317
CO	8.1757	35.8096	6.7420	29.5301	1.4337	6.2795
NOx	3.3292	14.5817	1.6224	7.1061	1.7068	7.4756
SO2	0.0157	0.0686	0.0061	0.0265	9.62E-03	4.21E-02
Pb	1.51E-05	6.60E-05	6.53E-06	2.86E-05	8.53E-06	3.74E-05
HAPs	0.7038	3.1157	0.6948	3.0550	0.0091	0.0607
TAPs	0.0262	0.1158	0.0153	0.0672	1.09E-02	0.0486

Notes: 1.) Change in emissions due to the increase in production, and the addition of 1 well, 2 condensate tanks, 1 gas production unit heater, 9 line heaters, and 3 Cimarron enclosed combustors.

Bryan Research & Engineering, Inc.

ProMax® 3.2

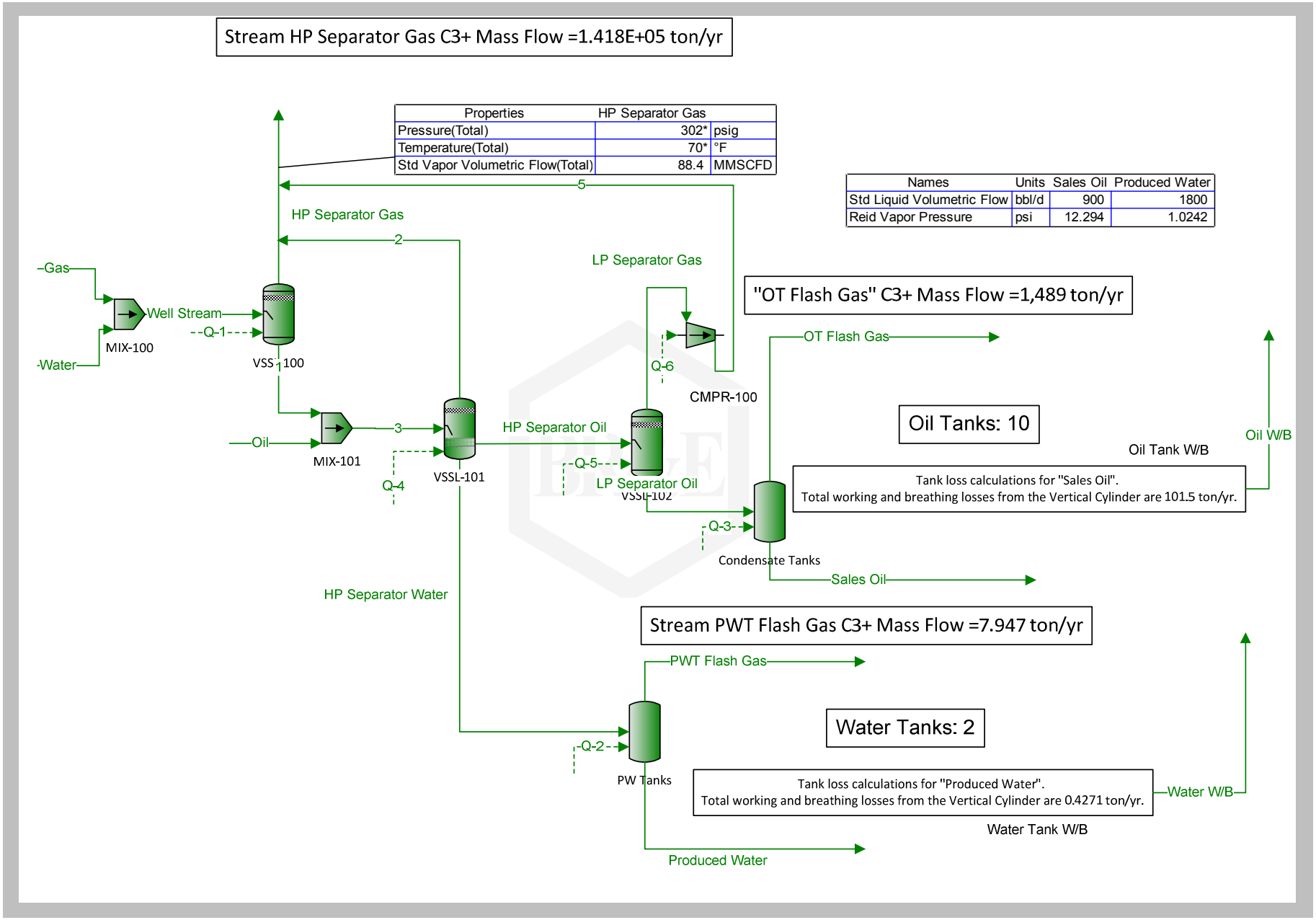
with

TSWEET® & PROSIM®

Simulation Report	
Client Name:	Antero Resources Corporation
Location:	West Virginia
Job:	Fritz Well Pad

Project Name:	PROMAX SCENARIO 3
File Name:	ProMax@V:\AirQuality\ANTERO RESOURCES\ProMax\Antero WV_Updated 2Ph Separator\PROMAX SCENARIO 3.PMX
ProMax Version:	3.2.13330.0

Report Created:	8/3/2015 13:32


Stream HP Separator Gas C3+ Mass Flow =1.418E+05 ton/yr
Properties | HP Separator Gas
Pressure(Total) | 302* | psig
Temperature(Total) | 70* | °F
Std Vapor Volumetric Flow(Total) | 88.4 | MMSCFD
Names | Units | Sales Oil | Produced Water
Std Liquid Volumetric Flow | bbl/d | 900 | 1800
Reid Vapor Pressure | psi | 12.294 | 1.0242
"OT Flash Gas" C3+ Mass Flow =1,489 ton/yr
Oil Tanks: 10
Stream PWT Flash Gas C3+ Mass Flow =7.947 ton/yr
Water Tanks: 2
Gas
Well Stream
Water
MIX-100
VSS-100
Q-1
2
5
HP Separator Gas
LP Separator Gas
Q-6
CMPR-100
OT Flash Gas
Oil
MIX-101
3
HP Separator Oil
VSSL-101
Q-4
Q-5
LP Separator Oil
VSSL-102
Oil Tank W/B
Oil W/B
Tank loss calculations for "Sales Oil".
Total working and breathing losses from the Vertical Cylinder are 101.5 ton/yr.
Q-3
Condensate Tanks
Sales Oil
HP Separator Water
PWT Flash Gas
Q-2
PW Tanks
Tank loss calculations for "Produced Water".
Total working and breathing losses from the Vertical Cylinder are 0.4271 ton/yr.
Water W/B
Water Tank W/B
Produced Water

Process Streams		Well Stream	HP Separator Gas	HP Separator Water	HP Separator Oil	OT Flash Gas	Sales Oil	Gas	Water	Oil	Produced Water	PWT Flash Gas	Oil W/B	Water W/B	1	3	LP Separator Oil
Phase: Total	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		13.1652	0.125228	99.9501	0.0487723	0.143739	0.00287966	0	100	0	99.9968	3.02994	6.76193E-05	94.3728	99.9481	92.5174	0.0167626
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.490099	0.563718	0.000203306	0.0253079	0.00872514	1.25891E-05	0.564404	0	0.0259995	4.82767E-06	0.412103	0.000276445	0.00731920	0.000149251	0.00207110	0.000871286
Carbon Dioxide		0.143119	0.164378	0.000943854	0.0306616	0.0813026	0.00133312	0.164818	0	0.0219996	0.000473622	0.976809	0.0808578	1.16883	0.00164132	0.00315487	0.00921480
Methane		68.3141	78.5730	0.0386106	7.71239	7.96455	0.0376596	78.6713	0	7.70285	0.00183785	76.3525	1.62760	3.76803	0.0398324	0.609544	0.818922
Ethane		12.2254	14.0613	0.00711941	7.91353	29.0519	0.893181	14.0790	0	7.91584	0.000391859	13.9687	36.7935	0.636194	0.00740284	0.595360	3.66847
Propane		3.66392	4.21412	0.00208432	7.59185	31.4894	3.59029	4.21942	0	7.59485	0.000126032	4.06608	33.5329	0.0451389	0.00229376	0.566767	6.33998
Isobutane		0.438048	0.503855	7.32617E-05	2.04560	5.73427	1.68502	0.504461	0	2.04696	1.60465E-06	0.148782	5.69955	0.000206828	8.56496E-05	0.152262	2.08411
n-Butane		0.894865	1.02927	0.000321431	5.95314	13.1463	5.59524	1.03054	0	5.95688	1.51063E-05	0.636033	12.9501	0.00133066	0.000374552	0.443215	6.33946
Isopentane		0.227496	0.261671	4.69145E-05	3.26068	3.41376	3.72936	0.261987	0	3.26293	1.53378E-06	0.0942249	3.16170	4.94050E-05	5.97012E-05	0.242640	3.69826
n-Pentane		0.221848	0.255174	4.79067E-05	4.55365	3.67357	5.38958	0.255483	0	4.55691	1.55129E-06	0.0962487	3.36656	3.68066E-05	5.66499E-05	0.338838	5.22046
2-Methylpentane		0	0	5.26697E-06	2.65991	0.930629	3.34530	0	0	2.66195	8.26179E-08	0.0107643	0.838264	7.85987E-07	0	0.197904	3.10732
3-Methylpentane		0	0	9.32385E-06	1.90544	0.598603	2.40726	0	0	1.90696	3.86428E-07	0.0185570	0.539053	3.28516E-06	0	0.141774	2.22900
n-Hexane		0.215852	0.248283	7.44095E-06	6.60213	1.67554	8.40428	0.248578	0	6.60687	9.31122E-08	0.0152563	0.102578	4.31436E-08	1.87922E-05	0.491209	7.74111
Methylcyclopentane		0	0	1.25828E-05	1.03006	0.250781	1.31290	0	0	1.03098	1.44564E-06	0.0231253	0.210609	8.80351E-06	0	0.0766488	1.20822
Benzene		0	0	0.000188909	0.307415	0.0740437	0.391926	0	0	0.309994	0.000163693	0.0525192	0.00387492	6.14380E-05	0	0.0230467	0.360596
2-Methylhexane		0	0	1.59678E-06	2.93175	0.323583	3.79836	0	0	2.93394	2.12370E-08	0.00327129	0.0184363	3.91261E-09	0	0.218126	3.45589
3-Methylhexane		0	0	1.31203E-06	2.42414	0.254290	3.14277	0	0	2.42595	1.82283E-08	0.00268632	0.218731	4.81546E-08	0	0.180359	2.85809
Heptane		0	0	2.35128E-06	5.21201	0.434828	6.77456	0	0	5.21590	3.28472E-08	0.00481377	0.344269	6.33578E-08	0	0.387779	6.14973
Methylcyclohexane		0	0	8.85408E-06	3.39931	0.282220	4.41866	0	0	3.40193	7.00374E-07	0.0169301	0.228806	1.37655E-06	0	0.252919	4.01098
Toluene		0	0	0.000111259	0.815995	0.0549831	1.06268	0	0	0.817984	9.37756E-05	0.0363946	0.00611588	2.04845E-05	0	0.0608135	0.963363
Octane		0	0	9.70898E-07	11.4343	0.303951	14.9642	0	0	11.4428	8.99365E-09	0.00199720	0.224565	5.12255E-09	0	0.850720	13.5193
Ethylbenzene		0	0	2.66695E-05	0.656170	0.0146128	0.859181	0	0	0.656987	2.21113E-05	0.00948626	0.00307466	3.00323E-06	0	0.0488441	0.775941
m-Xylene		0	0	3.04206E-05	0.875956	0.0163327	1.14746	0	0	0.876982	2.53694E-05	0.0105131	0.00442806	3.71573E-06	0	0.0651998	1.03598
o-Xylene		0	0	4.20723E-05	1.00571	0.0167067	1.31776	0	0	1.00698	3.66754E-05	0.0112421	0.00393278	4.15430E-06	0	0.0748645	1.18953
Nonane		0	0	2.68545E-07	6.27423	0.0546237	8.22875	0	0	6.27887	3.93485E-09	0.000549411	0.0365630	6.63579E-10	0	0.466807	7.42312
C10+		0	0	2.29935E-07	13.3299	0.00679285	17.4993	0	0	13.3397	2.03755E-08	0.000435125	0.00364999	1.61299E-10	0	0.991750	15.7753
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water		1469.84	12.1548	1457.63	0.0571729	0.0140322	0.00257120	0	1469.84	0	1457.61	0.0212819	3.53971E-07	0.00501926	1457.69	1457.69	0.0166034
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		54.7175	54.7154	0.00296493	0.0296669	0.000851773	1.12406E-05	54.7175	0	0.0304551	7.03707E-05	0.00289456	1.44713E-06	3.89275E-07	0.00217674	0.0326319	0.000863014
Carbon Dioxide		15.9787	15.9547	0.0137647	0.0359427	0.00793699	0.00119032	15.9787	0	0.0257697	0.00690377	0.00686098	0.000423272	6.21646E-05	0.0239378	0.0497075	0.00912732
Methane		7626.99	7626.41	0.563080	9.04077	0.777522	0.0336257	7626.99	0	9.02291	0.0267895	0.536290	0.00852013	0.000200405	0.580933	9.60385	0.811148
Ethane		1364.92	1364.81	0.103826	9.27655	2.83613	0.797506	1364.92	0	9.27241	0.00571194	0.0981143	0.192605	3.38363E-05	0.107966	9.38038	3.63364
Propane		409.062	409.029	0.0303967	8.89946	3.07408	3.20571	409.062	0	8.89641	0.00183711	0.0285596	0.175537	2.40073E-06	0.0334531	8.92986	6.27979
Isobutane		48.9062	48.9050	0.00106842	2.39794	0.559795	1.50453	48.9062	0	2.39775	2.33902E-05	0.00104503	0.0298358	1.10002E-08	0.00124915	2.39900	2.06433
n-Butane		99.9080	99.9025	0.00468761	6.97851	1.28337	4.99590	99.9080	0	6.97773	0.000220197	0.00446742	0.0677906	7.07718E-08	0.00546263	6.98320	6.27927
Isopentane		25.3990	25.3982	0.000684181	3.82230	0.333261	3.32989	25.3990	0	3.82212	2.23572E-05	0.000661824	0.0165508	2.62763E-09	0.000870707	3.82299	3.66315
n-Pentane		24.7684	24.7676	0.000698651	5.33797	0.358625	4.81227	24.7684	0	5.33784	2.26124E-05	0.000676038	0.0176232	1.95758E-09	0.000826206	5.33867	5.17089
2-Methylpentane		0	0	7.68111E-05	3.11806	0.0908507	2.98697	0	0	3.11813	1.20428E-06	7.56069E-05	0.00438812	4.18031E-11	0	3.11813	3.07782
3-Methylpentane		0	0	0.000135975	2.23363	0.0584374	2.14940	0	0	2.23377	5.63277E-06	0.000130342	0.00282182	1.74723E-10	0	2.23377	2.20784
n-Hexane		24.0990	24.0987	0.000108516	7.73928	0.163571	7.50405	24.0990	0	7.73911	1.35725E-06	0.000107158	0.000536973	2.29461E-12	0.000274073	7.73939	7.66762
Methylcyclopentane		0	0	0.000183502	1.20748	0.0244819	1.17227	0	0	1.20766	2.10724E-05	0.000162429	0.00110249	4.68219E-10	0	1.20766	1.19675
Benzene		0	0	0.00275496	0.360364	0.00722836	0.349944	0	0	0.363119	0.00238607	0.000368888	2.02843E-05	3.26761E-09	0	0.363119	0.357172
2-Methylhexane		0	0	2.32867E-05	3.43672	0.0315891	3.39149	0	0	3.43674	3.09562E-07	2.29771E-05	9.65096E-05	2.08094E-13	0	3.43674	3.42308
3-Methylhexane		0	0	1.91341E-05	2.84168	0.0248245	2.80613	0	0	2.84170	2.65705E-07	1.88684E-05	0.00114501	2.56113E-12	0	2.84170	2.83095
Heptane		0	0	3.42901E-05	6.10973	0.0424492	6.04889	0	0	6.10976	4.78798E-07	3.38113E-05	0.00180217	3.36972E-12	0	6.10976	6.09134
Methylcyclohexane		0	0	0.000129124	3.98481	0.0275511	3.94535	0	0	3.98493	1.02090E-05	0.000118915	0.00119775	7.32126E-11	0	3.98493	3.97290
Toluene		0	0	0.00162255	0.956542	0.00536761	0.948850	0	0	0.958165	0.00136692	0.000255631	3.20152E-05	1.08948E-09	0	0.958165	0.954217
Octane		0	0	1.41591E-05	13.4037	0.0296726	13.3613	0	0	13.4038	1.31096E-07	1.40280E-05	0.00117554	2.72446E-13	0	13.4038	13.3910
Ethylbenzene		0	0	0.000388937	0.769188	0.00142655	0.767148	0	0	0.769577	0.000322306	6.66302E-05	1.60951E-05	1.59728E-10	0	0.769577	0.768575
m-Xylene		0	0	0.000443640	1.02683	0.00159444	1.02455	0	0	1.02727	0.000369798	7.38426E-05	2.31799E-05	1.97623E-10	0	1.02727	1.02615
o-Xylene		0	0	0.000613564	1.17894	0.00163096	1.17661	0	0	1.17955	0.000534600	7.89634E-05	2.05872E-05	2.20948E-10	0	1.17955	1.17824
Nonane		0	0	3.91634E-06	7.35491	0.00533253	7.34732	0	0	7.35491	5.73565E-08	3.85899E-06	0.000191399	3.52928E-14	0	7.35491	7.35265
C10+		0	0	3.35327E-06	15.6258	0.000663138	15.6249	0	0	15.6258	2.97005E-07	3.05626E-06	1.91068E-05	8.57877E-15	0	15.6258	15.6255
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		11.7951	0.110469	99.9421	0.00995066	0.0576699	0.000493385	0	100	0	99.9945	2.71251	2.75069E-05	92.7287	99.9403	71.6999	0.00304390
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.682782	0.773262	0.000316112	0.00802896	0.00544341	3.35400E-06	0.774087	0	0.00824348	7.50675E-06	0.573677	0.000174866	0.0111829	0.000232064	0.00249587	0.000246022
Carbon Dioxide		0.313240	0.354232	0.00230556	0.0152819	0.0796863	0.000557982	0.355128	0	0.0109582	0.00115698	2.13625	0.0803523	2.80558	0.00400927	0.00597286	0.00408771
Methane		54.5022	61.7224	0.0343797	1.40119	2.84554	0.00574580	61.7905	0	1.39863	0.00163655	60.8682	0.589589	3.29695	0.0354677	0.420659	0.132422
Ethane		18.2817	20.7035	0.0118819	2.69480	19.4548	0.255424	20.7264	0	2.69399	0.000654031	20.8724	24.9816	1.04336	0.0123550	0.770112	1.11186
Propane		8.03479	9.09915	0.00510133	3.79123	30.9237	1.50567	9.10923	0	3.79048	0.000308479	8.90979	33.3884	0.108561	0.00561395	1.07511	2.81794
Isobutane		1.26618	1.43399	0.000236343	1.34648	7.42254	0.931433	1.43550	0	1.34658	5.17691E-06	0.429723	7.48019	0.000655658	0.000276307	0.380704	1.22099
n-Butane		2.58662	2.92934	0.00103694	3.91855	17.0168	3.09289	2.93251	0	3.91869	4.87358E-05	1.83704	16.9959	0.00421828	0.00120831	1.10818	3.71400
Isopentane		0.816274	0.924449	0.000187871	2.66425	5.48522	2.55898	0.925429	0	2.66451	6.14244E-06	0.337824	5.15085	0.000194413	0.000239077	0.753088	2.68952
n-Pentane		0.796008	0.901497	0.000191845	3.72071	5.90270	3.69818	0.902453	0	3.72117	6.21256E-06	0.345080	5.48460	0.000144838	0.000226857	1.05166	3.79652
2-Methylpentane		0	0	2.51923E-05	2.59590	1.78604	2.74172	0	0	2.59635	3.95190E-07	0.0460961	1.63115	3.69424E-06	0	0.733655	2.69909
3-Methylpentane		0	0	4.45967E-05	1.85958	1.14883	1.97292	0	0	1.85997	1.84842E-06	0.0794671	1.04892	1.54407E-05	0	0.525575	1.93616
n-Hexane		0.925065	1.04768	3.55907E-05	6.44324	3.21567	6.88791	1.04877	0	6.44405	4.45388E-07	0.0653324	0.199603	2.02780E-07	8.98847E-05	1.82097	6.72410
Methylcyclopentane		0	0	5.87766E-05	0.981755	0.470034	1.05085	0	0	0.982049	6.75324E-06	0.0967135	0.400230	4.04097E-05	0	0.277500	1.02494
Benzene		0	0	0.000819017	0.271943	0.128806	0.291155	0	0	0.274063	0.000709733	0.203860	0.00683454	0.000261746	0	0.0774425	0.283913
2-Methylhexane		0	0	8.88064E-06	3.32691	0.722095	3.61973	0	0	3.32742	1.18118E-07	0.0162889	0.0417137	2.13830E-08	0	0.940236	3.49047
3-Methylhexane		0	0	7.29700E-06	2.75088	0.567464	2.99497	0	0	2.75130	1.01384E-07	0.0133761	0.494898	2.63172E-07	0	0.777442	2.88668
Heptane		0	0	1.30769E-05	5.91451	0.970345	6.45596	0	0	5.91541	1.82693E-07	0.0239694	0.778939	3.46260E-07	0	1.67153	6.21126
Methylcyclohexane		0	0	4.82523E-05	3.77988	0.617121	4.12614	0	0	3.78055	3.81706E-06	0.0826049	0.507279	7.37172E-06	0	1.06828	3.96961

Toluene		0	0	0.000568985	0.851463	0.112824	0.931209	0	0	0.853032	0.000479601	0.166638	0.0127242	0.000102942	0	0.241043	0.894703
Octane		0	0	6.15563E-06	14.7918	0.773234	16.2567	0	0	14.7940	5.70243E-08	0.0113368	0.579223	3.19144E-08	0	4.18038	15.5660
Ethylbenzene		0	0	0.000157152	0.788923	0.0345500	0.867500	0	0	0.789438	0.000130300	0.0500463	0.00737069	1.73899E-05	0	0.223073	0.830344
m-Xylene		0	0	0.000179256	1.05318	0.0386164	1.15858	0	0	1.05379	0.000149500	0.0554636	0.0106151	2.15155E-05	0	0.297771	1.10862
o-Xylene		0	0	0.000247915	1.20918	0.0395008	1.33052	0	0	1.20999	0.000216125	0.0593098	0.00942780	2.40550E-05	0	0.341910	1.27293
Nonane		0	0	1.91169E-06	9.11323	0.156023	10.0372	0	0	9.11457	2.80125E-08	0.00350161	0.105888	4.64187E-09	0	2.57553	9.59642
C10+		0	0	2.08791E-06	24.6971	0.0247496	27.2276	0	0	24.7008	1.85030E-07	0.00353748	0.0134835	1.43927E-09	0	6.97975	26.0141
Mass Flow		**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**
Water		26479.6	218.972	26259.6	1.02999	0.252795	0.0463209	0	26479.6	0	26259.2	0.383399	6.37689E-06	0.0904234	26260.6	26260.6	0.299116
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		1532.82	1532.76	0.0830577	0.831071	0.0238611	0.000314887	1532.82	0	0.853151	0.00197132	0.0810864	4.05389E-05	1.09049E-05	0.0609779	0.914129	0.0241760
Carbon Dioxide		703.214	702.160	0.605780	1.58182	0.349303	0.0523855	703.214	0	1.13411	0.303831	0.301948	0.0186280	0.00273583	1.05349	2.18760	0.401689
Methane		122356	122346	9.03319	145.036	12.4734	0.539438	122356	0	144.750	0.429769	8.60342	0.136684	0.00321498	9.31959	154.069	13.0128
Ethane		41041.9	41038.6	3.12196	278.937	85.2798	23.9802	41041.9	0	278.812	0.171753	2.95020	5.79146	0.00101743	3.24644	282.059	109.260
Propane		18037.8	18036.4	1.34036	392.427	135.554	141.358	18037.8	0	392.293	0.0810084	1.25935	7.74041	0.000105862	1.47514	393.768	276.911
Isobutane		2842.54	2842.46	0.0620987	139.373	32.5365	87.4466	2842.54	0	139.363	0.00135949	0.0607392	1.73412	6.39358E-07	0.0726033	139.435	119.983
n-Butane		5806.87	5806.56	0.272454	405.606	74.5926	290.373	5806.87	0	405.561	0.0127983	0.259656	3.94014	4.11341E-06	0.317500	405.879	364.965
Isopentane		1832.51	1832.45	0.0493628	275.775	24.0444	240.247	1832.51	0	275.761	0.00161305	0.0477498	1.19412	1.89580E-07	0.0628205	275.824	264.292
n-Pentane		1787.01	1786.95	0.0504068	385.128	25.8743	347.199	1787.01	0	385.119	0.00163146	0.0487753	1.27149	1.41237E-07	0.0596097	385.179	373.074
2-Methylpentane		0	0	0.00661923	268.700	7.82909	257.403	0	0	268.706	0.000103780	0.00651545	0.378148	3.60240E-09	0	268.706	265.232
3-Methylpentane		0	0	0.0117177	192.484	5.03586	185.226	0	0	192.496	0.000485406	0.0112323	0.243171	1.50568E-08	0	192.496	190.262
n-Hexane		2076.74	2076.72	0.00935137	666.935	14.0958	646.664	2076.74	0	666.921	0.000116962	0.00923441	0.0462739	1.97739E-10	0.0236184	666.944	660.760
Methylcyclopentane		0	0	0.0154434	101.621	2.06039	98.6576	0	0	101.636	0.00177345	0.0136700	0.0927850	3.94051E-08	0	101.636	100.718
Benzene		0	0	0.215195	28.1487	0.564620	27.3348	0	0	28.3639	0.186380	0.0288145	0.00158444	2.55239E-07	0	28.3639	27.8994
2-Methylhexane		0	0	0.00233337	344.366	3.16529	339.834	0	0	344.368	3.10187E-05	0.00230235	0.00967045	2.08514E-11	0	344.368	342.999
3-Methylhexane		0	0	0.00191727	284.742	2.48747	281.179	0	0	284.743	2.66242E-05	0.00189065	0.114732	2.56630E-10	0	284.743	283.667
Heptane		0	0	0.00343593	612.207	4.25349	606.111	0	0	612.210	4.79765E-05	0.00338796	0.180581	3.37652E-10	0	612.210	610.364
Methylcyclohexane		0	0	0.0126782	391.252	2.70514	387.378	0	0	391.265	0.00100238	0.0116758	0.117602	7.18846E-09	0	391.265	390.083
Toluene		0	0	0.149500	88.1343	0.494563	87.4255	0	0	88.2838	0.125946	0.0235534	0.00294983	1.00383E-07	0	88.2838	87.9201
Octane		0	0	0.00161738	1531.09	3.38946	1526.24	0	0	1531.09	1.49749E-05	0.00160240	0.134281	3.11210E-11	0	1531.09	1529.63
Ethylbenzene		0	0	0.0412915	81.6609	0.151449	81.4443	0	0	81.7022	0.0342177	0.00707380	0.00170874	1.69576E-08	0	81.7022	81.5957
m-Xylene		0	0	0.0470991	109.013	0.169274	108.772	0	0	109.061	0.0392596	0.00783950	0.0024608	2.09806E-08	0	109.061	108.941
o-Xylene		0	0	0.0651390	125.162	0.173151	124.914	0	0	125.227	0.0567558	0.00838315	0.00218564	2.34570E-08	0	125.227	125.087
Nonane		0	0	0.000502291	943.304	0.683924	942.331	0	0	943.305	7.35627E-06	0.000494935	0.0245479	4.52648E-12	0	943.305	943.015
C10+		0	0	0.000548594	2556.38	0.108489	2556.23	0	0	2556.38	4.85900E-05	0.000500004	0.00312588	1.40349E-12	0	2556.38	2556.34

Process Streams		**Well Stream**	**HP Separator Gas**	**HP Separator Water**	**HP Separator Oil**	**OT Flash Gas**	**Sales Oil**	**Gas**	**Water**	**Oil**	**Produced Water**	**PWT Flash Gas**	**Oil W/B**	**Water W/B**	**1**	**3**	**LP Separator Oil**
Phase: Total	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	**Units**																
Temperature	°F	58.3	70.0	70.0	70.0	75.9	75.9	67.0	67.0	67.0	75.9	75.94	75.9425	75.9425	70	69.4776	70
Pressure	psig	200	302	302	302	0	0	300	200	300	0	0	8.28840	-14.2261	302	300	40
Mole Fraction Vapor	%	86.9337	100	0	0	100	0	100	0	0	0	100	100	100	0	0	0
Mole Fraction Light Liquid	%	13.0663	0	100	100	0	100	0	100	100	100	0	0	0	100	7.43995	100
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	92.5601	0
Molecular Weight	lb/lbmol	20.1	20.4	18.0	88.3	44.9	105.1	20.4	18.0	88.4	18.0	20.1235	44.2864	18.3347	18.0167	23.2459	99.2092
Mass Density	lb/ft^3	0.9	1.2	62.3	43.1	0.1	44.5	1.2	62.3	43.2	62.2	0.0516271	0.181882	0.00149944	62.2544	55.3070	44.1311
Molar Flow	lbmol/h	11164.6	9706.1	1458.4	117.2	9.8	89.3	9694.8	1469.8	117.1	1457.7	0.702387	0.523477	0.00531855	1458.44	1575.58	99.0506
Mass Flow	lb/h	224496.7	198220.4	26274.8	10350.9	438.3	9388.4	198017.1	26479.6	10349.4	26260.6	14.1345	23.1829	0.0975140	26276.3	36625.7	9826.74
Vapor Volumetric Flow	MCFH	237.3	160.5	0.4	0.2	3.8	0.2	160.3	0.4	0.2	0.4	0.273780	0.127462	0.0650335	0.422080	0.662226	0.222671
Liquid Volumetric Flow	Mbbl/d	1014.2	686.2	1.8	1.0	16.0	0.9	685.1	1.8	1.0	1.8	1.17030	0.544845	0.277991	1.80421	2.83074	0.951827
Std Vapor Volumetric Flow	MMSCFD	101.7	88.4	13.3	1.1	0.1	0.8	88.3	13.4	1.1	13.3	0.00639708	0.00476763	4.84394E-05	13.2829	14.3498	0.902116
Std Liquid Volumetric Flow	Mbbl/d	41.9	40.1	1.8	1.1	0.1	0.9	40.1	1.8	1.1	1.8	0.00282307	0.00326997	7.37350E-06	1.80300	2.85373	0.960499
Compressibility		0.821	0.921	0.016	0.114	0.983	0.006	0.920	0.011	0.114	0.001	0.996577	0.973642	0.999551	0.0161242	0.0232925	0.0216318
Specific Gravity			0.705	0.998	0.691	1.550	0.713	0.705	0.999	0.692	0.998	0.694811	1.52909	0.633047	0.998162	0.886770	0.707581
API Gravity				10.1	71.8		64.7		10.0	71.8	10.0				10.0612	27.5881	67.0776
Enthalpy	MMBtu/h	-512.7	-332.8	-179.3	-9.4	-0.5	-8.1	-331.9	-180.9	-9.4	-179.2	-0.0258314	-0.0239217	-0.000540166	-179.329	-188.729	-8.63127
Mass Enthalpy	Btu/lb	-2283.9	-1679.0	-6824.8	-907.5	-1031.8	-860.9	-1675.9	-6830.9	-908.2	-6822.3	-1827.54	-1031.87	-5539.37	-6824.75	-5152.91	-878.345
Mass Cp	Btu/(lb**F)	0.6	0.5	1.0	0.5	0.4	0.5	0.5	1.0	0.5	1.0	0.479803	0.407727	0.444327	0.982989	0.845863	0.488941
Ideal Gas CpCv Ratio		1.265	1.254	1.326	1.064	1.123	1.053	1.255	1.326	1.064	1.326	1.26007	1.12524	1.32250	1.32580	1.24933	1.05664
Dynamic Viscosity	cP		0.0	1.0	0.4	0.0	0.5	0.0	1.0	0.4	0.9	0.0107839	0.00835942	0.0102373	0.995523	0.766155	0.431325
Kinematic Viscosity	cSt		0.6	1.0	0.5	4.4	0.7	0.6	1.0	0.5	0.9	13.0400	2.86924	426.219	0.998299	0.825060	0.610153
Thermal Conductivity	Btu/(h*ft*°F)		0.0	0.3	0.1	0.0	0.1	0.0	0.3	0.1	0.3	0.0173627	0.0104937	0.0122537	0.346277	0.245028	0.0685950
Surface Tension	lbf/ft			0.005	0.001		0.001		0.005	0.001	0.005				0.00503863	0.00364318	0.00140610
Net I.G. Heating Value	Btu/ft^3	970.2	1115.9	0.5	4465.4	2348.1	5291.7	1117.3	0.0	4468.6	0.0	1054.78	2320.77	45.6651	0.554172	332.737	5001.54
Net Liquid Heating Value	Btu/lb	18134.8	20677.6	-1047.6	19011.5	19685.4	18914.5	20701.6	-1059.8	19014.1	-1058.8	19808.4	19727.9	-41.3840	-1047.49	4621.36	18948.9
Gross I.G. Heating Value	Btu/ft^3	1076.8	1231.0	50.9	4805.9	2551.3	5686.8	1232.5	50.3	4809.3	50.4	1165.47	2522.16	97.9886	50.8955	404.662	5377.72
Gross Liquid Heating Value	Btu/lb	20146.7	22815.7	12.7	20472.7	21402.4	20338.3	22840.8	0.0	20475.3	0.9	21895.6	21453.4	1041.6	12.8	5795.0	20385.8

Process Streams		**Well Stream**	**HP Separator Gas**	**HP Separator Water**	**HP Separator Oil**	**OT Flash Gas**	**Sales Oil**	**Gas**	**Water**	**Oil**	**Produced Water**	**PWT Flash Gas**	**Oil W/B**	**Water W/B**	**1**	**3**	**LP Separator Oil**
Phase: Vapor	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water		0.119745	0.125228			0.143739	0.143739	0			3.02994	3.02994	6.76193E-05	94.3728	0.125228		0.223236
H2S		0	0			0	0	0			0	0	0	0	0		0
Nitrogen		0.563745	0.563718			0.00872514	0.00872514	0.564404			0.412103	0.412103	0.000276445	0.00731920	0.563718		0.158495
Carbon Dioxide		0.164431	0.164378			0.0813026	0.0813026	0.164818			0.976809	0.976809	0.0808578	1.16883	0.164378		0.147553
Methane		78.5774	78.5730			7.96455	7.96455	78.6713			76.3525	76.3525	1.62760	3.76803	78.5730		45.2840
Ethane		14.0621	14.0613			29.0519	29.0519	14.0790			13.9687	13.9687	36.7935	0.636194	14.0613		31.0505
Propane		4.21430	4.21412			31.4894	31.4894	4.21942			4.06608	4.06608	33.5329	0.0451389	4.21412		14.4149

Isobutane		0.503875	0.503855			5.73427	5.73427	0.504461			0.148782	0.148782	5.69955	0.000206828	0.503855		1.83571
n-Butane		1.02931	1.02927			13.1463	13.1463	1.03054			0.636033	0.636033	12.9501	0.00133066	1.02927		3.84759
Isopentane		0.261681	0.261671			3.41376	3.41376	0.261987			0.0942249	0.0942249	3.16170	4.94050E-05	0.261671		0.875757
n-Pentane		0.255184	0.255174			3.67357	3.67357	0.255483			0.0962487	0.0962487	3.36656	3.68066E-05	0.255174		0.919355
2-Methylpentane		0	0			0.930629	0.930629	0			0.0107643	0.0107643	0.838264	7.85987E-07	0		0.221431
3-Methylpentane		0	0			0.598603	0.598603	0			0.0185570	0.0185570	0.539053	3.28516E-06	0		0.141900
n-Hexane		0.248292	0.248283			1.67554	1.67554	0.248578			0.0152563	0.0152563	0.102578	4.31436E-08	0.248283		0.394318
Methylcyclopentane		0	0			0.250781	0.250781	0			0.0231253	0.0231253	0.210609	8.80351E-06	0		0.0590288
Benzene		0	0			0.0740437	0.0740437	0			0.0525192	0.0525192	0.00387492	6.14380E-05	0		0.0175600
2-Methylhexane		0	0			0.323583	0.323583	0			0.00327129	0.00327129	0.0184363	3.91261E-09	0		0.0750493
3-Methylhexane		0	0			0.254290	0.254290	0			0.00268632	0.00268632	0.218731	4.81546E-08	0		0.0590173
Heptane		0	0			0.434828	0.434828	0			0.00481377	0.00481377	0.344269	6.33578E-08	0		0.101182
Methylcyclohexane		0	0			0.282220	0.282220	0			0.0169301	0.0169301	0.228806	1.37655E-06	0		0.0655256
Toluene		0	0			0.0549831	0.0549831	0			0.0363946	0.0363946	0.00611588	2.04845E-05	0		0.0127936
Octane		0	0			0.303951	0.303951	0			0.00199720	0.00199720	0.224565	5.12255E-09	0		0.0702066
Ethylbenzene		0	0			0.0146128	0.0146128	0			0.00948626	0.00948626	0.00307466	3.00323E-06	0		0.00337582
m-Xylene		0	0			0.0163327	0.0163327	0			0.0105131	0.0105131	0.00442806	3.71573E-06	0		0.00376480
o-Xylene		0	0			0.0167067	0.0167067	0			0.0112421	0.0112421	0.00393278	4.15430E-06	0		0.00385000
Nonane		0	0			0.0546237	0.0546237	0			0.000549411	0.000549411	0.0365630	6.63579E-10	0		0.0124094
C10+		0	0			0.00679285	0.00679285	0			0.000435125	0.000435125	0.00364999	1.61299E-10	0		0.00154112
Molar Flow		**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**
Water		11.6222	12.1548			0.0140322	0	0			0	0.0212819	3.53971E-07	0.00501926	0		0
H2S		0	0			0	0	0			0	0	0	0	0		0
Nitrogen		54.7159	54.7154			0.000851773	0	54.7175			0	0.00289456	1.44713E-06	3.89275E-07	0		0
Carbon Dioxide		15.9593	15.9547			0.00793699	0	15.9787			0	0.00686098	0.000423272	6.21646E-05	0		0
Methane		7626.56	7626.41			0.777522	0	7626.99			0	0.536290	0.00852013	0.000200405	0		0
Ethane		1364.83	1364.81			2.83613	0	1364.92			0	0.0981143	0.192605	3.38363E-05	0		0
Propane		409.032	409.029			3.07408	0	409.062			0	0.0285596	0.175537	2.40073E-06	0		0
Isobutane		48.9051	48.9050			0.559795	0	48.9062			0	0.00104503	0.0298358	1.10002E-08	0		0
n-Butane		99.9031	99.9025			1.28337	0	99.9080			0	0.00446742	0.0677906	7.07718E-08	0		0
Isopentane		25.3982	25.3982			0.333261	0	25.3990			0	0.000661824	0.0165508	2.62763E-09	0		0
n-Pentane		24.7676	24.7676			0.358625	0	24.7684			0	0.000676038	0.0176232	1.95758E-09	0		0
2-Methylpentane		0	0			0.0908507	0	0			0	7.56069E-05	0.00438812	4.18031E-11	0		0
3-Methylpentane		0	0			0.0584374	0	0			0	0.000130342	0.00282182	1.74723E-10	0		0
n-Hexane		24.0987	24.0987			0.163571	0	24.0990			0	0.000107158	0.000536973	2.29461E-12	0		0
Methylcyclopentane		0	0			0.0244819	0	0			0	0.000162429	0.00110249	4.68219E-10	0		0
Benzene		0	0			0.00722836	0	0			0	0.000368888	2.02843E-05	3.26761E-09	0		0
2-Methylhexane		0	0			0.0315891	0	0			0	2.29771E-05	9.65096E-05	2.08094E-13	0		0
3-Methylhexane		0	0			0.0248245	0	0			0	1.88684E-05	0.00114501	2.56113E-12	0		0
Heptane		0	0			0.0424492	0	0			0	3.38113E-05	0.00180217	3.36972E-12	0		0
Methylcyclohexane		0	0			0.0275511	0	0			0	0.000118915	0.00119775	7.32126E-11	0		0
Toluene		0	0			0.00536761	0	0			0	0.000255631	3.20152E-05	1.08948E-09	0		0
Octane		0	0			0.0296726	0	0			0	1.40280E-05	0.00117554	2.72446E-13	0		0
Ethylbenzene		0	0			0.00142655	0	0			0	6.66302E-05	1.60951E-05	1.59728E-10	0		0
m-Xylene		0	0			0.00159444	0	0			0	7.38426E-05	2.31799E-05	1.97623E-10	0		0
o-Xylene		0	0			0.00163096	0	0			0	7.89634E-05	2.05872E-05	2.20948E-10	0		0
Nonane		0	0			0.00533253	0	0			0	3.85899E-06	0.000191399	3.52928E-14	0		0
C10+		0	0			0.000663138	0	0			0	3.05626E-06	1.91068E-05	8.57877E-15	0		0
Mass Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water		0.105632	0.110469			0.0576699	0.0576699	0			2.71251	2.71251	2.75069E-05	92.7287	0.110469		0.139428
H2S		0	0			0	0	0			0	0	0	0	0		0
Nitrogen		0.773294	0.773262			0.00544341	0.00544341	0.774087			0.573677	0.573677	0.000174866	0.0111829	0.773262		0.153931
Carbon Dioxide		0.354345	0.354232			0.0796863	0.0796863	0.355128			2.13625	2.13625	0.0803523	2.80558	0.354232		0.225134
Methane		61.7255	61.7224			2.84554	2.84554	61.7905			60.8682	60.8682	0.589589	3.29695	61.7224		25.1860
Ethane		20.7045	20.7035			19.4548	19.4548	20.7264			20.8724	20.8724	24.9816	1.04336	20.7035		32.3692
Propane		9.09950	9.09915			30.9237	30.9237	9.10923			8.90979	8.90979	33.3884	0.108561	9.09915		22.0370
Isobutane		1.43404	1.43399			7.42254	7.42254	1.43550			0.429723	0.429723	7.48019	0.000655658	1.43399		3.69905
n-Butane		2.92945	2.92934			17.0168	17.0168	2.93251			1.83704	1.83704	16.9959	0.00421828	2.92934		7.75311
Isopentane		0.924479	0.924449			5.48522	5.48522	0.925429			0.337824	0.337824	5.15085	0.000194413	0.924449		2.19057
n-Pentane		0.901528	0.901497			5.90270	5.90270	0.902453			0.345080	0.345080	5.48460	0.000144838	0.901497		2.29962
2-Methylpentane		0	0			1.78604	1.78604	0			0.0460961	0.0460961	1.63115	3.69424E-06	0		0.661554
3-Methylpentane		0	0			1.14883	1.14883	0			0.0794671	0.0794671	1.04892	1.54407E-05	0		0.423946
n-Hexane		1.04771	1.04768			3.21567	3.21567	1.04877			0.0653324	0.0653324	0.199603	2.02780E-07	1.04768		1.17808
Methylcyclopentane		0	0			0.470034	0.470034	0			0.0967135	0.0967135	0.400230	4.04097E-05	0		0.172231

Benzene		0	0			0.128806	0.128806	0			0.203860	0.203860	0.00683454	0.000261746	0		0.0475539
2-Methylhexane		0	0			0.722095	0.722095	0			0.0162889	0.0162889	0.0417137	2.13830E-08	0		0.260716
3-Methylhexane		0	0			0.567464	0.567464	0			0.0133761	0.0133761	0.494898	2.63172E-07	0		0.205022
Heptane		0	0			0.970345	0.970345	0			0.0239694	0.0239694	0.778939	3.46260E-07	0		0.351498
Methylcyclohexane		0	0			0.617121	0.617121	0			0.0826049	0.0826049	0.507279	7.37172E-06	0		0.223052
Toluene		0	0			0.112824	0.112824	0			0.166638	0.166638	0.0127242	0.000102942	0		0.0408673
Octane		0	0			0.773234	0.773234	0			0.0113368	0.0113368	0.579223	3.19144E-08	0		0.278033
Ethylbenzene		0	0			0.0345500	0.0345500	0			0.0500463	0.0500463	0.00737069	1.73899E-05	0		0.0124253
m-Xylene		0	0			0.0386164	0.0386164	0			0.0554636	0.0554636	0.0106151	2.15155E-05	0		0.0138569
o-Xylene		0	0			0.0395008	0.0395008	0			0.0593098	0.0593098	0.00942780	2.40550E-05	0		0.0141705
Nonane		0	0			0.156023	0.156023	0			0.00350161	0.00350161	0.105888	4.64187E-09	0		0.0551784
C10+		0	0			0.0247496	0.0247496	0			0.00353748	0.00353748	0.0134835	1.43927E-09	0		0.00874105
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water		209.378	218.972			0.252795	0	0			0	0.383399	6.37689E-06	0.0904234	0		0
H2S		0	0			0	0	0			0	0	0	0	0		0
Nitrogen		1532.78	1532.76			0.0238611	0	1532.82			0	0.0810864	4.05389E-05	1.09049E-05	0		0
Carbon Dioxide		702.361	702.160			0.349303	0	703.214			0	0.301948	0.0186280	0.00273583	0		0
Methane		122349	122346			12.4734	0	122356			0	8.60342	0.136684	0.00321498	0		0
Ethane		41039.2	41038.6			85.2798	0	41041.9			0	2.95020	5.79146	0.00101743	0		0
Propane		18036.5	18036.4			135.554	0	18037.8			0	1.25935	7.74041	0.000105862	0		0
Isobutane		2842.47	2842.46			32.5365	0	2842.54			0	0.0607392	1.73412	6.39358E-07	0		0
n-Butane		5806.59	5806.56			74.5926	0	5806.87			0	0.259656	3.94014	4.11341E-06	0		0
Isopentane		1832.45	1832.45			24.0444	0	1832.51			0	0.0477498	1.19412	1.89580E-07	0		0
n-Pentane		1786.96	1786.95			25.8743	0	1787.01			0	0.0487753	1.27149	1.41237E-07	0		0
2-Methylpentane		0	0			7.82909	0	0			0	0.00651545	0.378148	3.60240E-09	0		0
3-Methylpentane		0	0			5.03586	0	0			0	0.0112323	0.243171	1.50568E-08	0		0
n-Hexane		2076.72	2076.72			14.0958	0	2076.74			0	0.00923441	0.0462739	1.97739E-10	0		0
Methylcyclopentane		0	0			2.06039	0	0			0	0.0136700	0.0927850	3.94051E-08	0		0
Benzene		0	0			0.564620	0	0			0	0.0288145	0.00158444	2.55239E-07	0		0
2-Methylhexane		0	0			3.16529	0	0			0	0.00230235	0.00967045	2.08514E-11	0		0
3-Methylhexane		0	0			2.48747	0	0			0	0.00189065	0.114732	2.56630E-10	0		0
Heptane		0	0			4.25349	0	0			0	0.00338796	0.180581	3.37652E-10	0		0
Methylcyclohexane		0	0			2.70514	0	0			0	0.0116758	0.117602	7.18846E-09	0		0
Toluene		0	0			0.494563	0	0			0	0.0235534	0.00294983	1.00383E-07	0		0
Octane		0	0			3.38946	0	0			0	0.00160240	0.134281	3.11210E-11	0		0
Ethylbenzene		0	0			0.151449	0	0			0	0.00707380	0.00170874	1.69576E-08	0		0
m-Xylene		0	0			0.169274	0	0			0	0.00783950	0.00246089	2.09806E-08	0		0
o-Xylene		0	0			0.173151	0	0			0	0.00838315	0.00218564	2.34570E-08	0		0
Nonane		0	0			0.683924	0	0			0	0.000494935	0.0245479	4.52648E-12	0		0
C10+		0	0			0.108489	0	0			0	0.000500004	0.00312588	1.40349E-12	0		0

Process Streams		**Well Stream**	**HP Separator Gas**	**HP Separator Water**	**HP Separator Oil**	**OT Flash Gas**	**Sales Oil**	**Gas**	**Water**	**Oil**	**Produced Water**	**PWT Flash Gas**	**Oil W/B**	**Water W/B**	**1**	**3**	**LP Separator Oil**
Phase: Vapor	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	**Units**																
Temperature	°F	58.3	70.0			75.9	75.9	67.0			75.9	75.94	75.9425	75.9425	70		70
Pressure	psig	200	302			0	0	300			0	0	8.28840	-14.2261	302		40
Mole Fraction Vapor	%	100	100			100	100	100			100	100	100	100	100		100
Mole Fraction Light Liquid	%	0	0			0	0	0			0	0	0	0	0		0
Mole Fraction Heavy Liquid	%	0	0			0	0	0			0	0	0	0	0		0
Molecular Weight	lb/lbmol	20.4	20.4			44.9	44.9	20.4			20.1	20.1235	44.2864	18.3347	20.4221		28.8440
Mass Density	lb/ft^3	0.8	1.2			0.1	0.1	1.2			0.1	0.0516271	0.181882	0.00149944	1.23476		0.285529
Molar Flow	lbmol/h	9705.8	9706.1			9.8	0.0	9694.8			0.0	0.702387	0.523477	0.00531855	0		0
Mass Flow	lb/h	198214.2	198220.4			438.3	0.0	198017.1			0.0	14.1345	23.1829	0.0975140	0		0
Vapor Volumetric Flow	MCFH	236.8	160.5			3.8	0.0	160.3			0.0	0.273780	0.127462	0.0650335	0		0
Liquid Volumetric Flow	Mbbl/d	1012.4	686.2			16.0	0.0	685.1			0.0	1.17030	0.544845	0.277991	0		0
Std Vapor Volumetric Flow	MMSCFD	88.4	88.4			0.1	0.0	88.3			0.0	0.00639708	0.00476763	4.84394E-05	0		0
Std Liquid Volumetric Flow	Mbbl/d	40.1	40.1			0.1	0.0	40.1			0.0	0.00282307	0.00326997	7.37350E-06	0		0
Compressibility		0.942	0.921			0.983	0.983	0.920			0.997	0.996577	0.973642	0.999551	0.921494		0.972056
Specific Gravity		0.705	0.705			1.550	1.550	0.705			0.695	0.694811	1.52909	0.633047	0.705121		0.995905
API Gravity																	
Enthalpy	MMBtu/h	-333.0	-332.8			-0.5	0.0	-331.9			0.0	-0.0258314	-0.0239217	-0.000540166	0		0
Mass Enthalpy	Btu/lb	-1680.2	-1679.0			-1031.8	-1031.8	-1675.9			-1827.5	-1827.54	-1031.87	-5539.37	-1678.96		-1319.61
Mass Cp	Btu/(lb**F)	0.5	0.5			0.4	0.4	0.5			0.5	0.479803	0.407727	0.444327	0.524292		0.442123
Ideal Gas CpCv Ratio		1.257	1.254			1.123	1.123	1.255			1.260	1.26007	1.12524	1.32250	1.25434		1.18882

Dynamic Viscosity	cP	0.0	0.0			0.0	0.0	0.0			0.0	0.0107839	0.00835942	0.0102373	0.0109779		0.00962445
Kinematic Viscosity	cSt	0.8	0.6			4.4	4.4	0.6			13.0	13.0400	2.86924	426.219	0.555029		2.10429
Thermal Conductivity	Btu/(h*ft*°F)	0.0	0.0			0.0	0.0	0.0			0.0	0.0173627	0.0104937	0.0122537	0.0182992		0.0142475
Surface Tension	lbf/ft																
Net I.G. Heating Value	Btu/ft^3	1116.0	1115.9			2348.1	2348.1	1117.3			1054.8	1054.78	2320.77	45.6651	1115.93		1543.34
Net Liquid Heating Value	Btu/lb	20678.7	20677.6			19685.4	19685.4	20701.6			19808.4	19808.4	19727.9	-41.3840	20677.6		20185.8
Gross I.G. Heating Value	Btu/ft^3	1231.1	1231.0			2551.3	2551.3	1232.5			1165.5	1165.47	2522.16	97.9886	1230.99		1688.99
Gross Liquid Heating Value	Btu/lb	22816.8	22815.7			21402.4	21402.4	22840.8			21895.6	21895.6	21453.4	1041.6	22815.7		22101.9

Process Streams		Well Stream	HP Separator Gas	HP Separator Water	HP Separator Oil	OT Flash Gas	Sales Oil	Gas	Water	Oil	Produced Water	PWT Flash Gas	Oil W/B	Water W/B	1	3	LP Separator Oil
Phase: Light Liquid	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		99.9600	99.9481	99.9501	0.0487723	0.00287966	0.00287966		100	0	99.9968	99.9968	1.91451E-06	100.0000	99.9481	0.0481072	0.0167626
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.000109754	0.000149251	0.000203306	0.0253079	1.25891E-05	1.25891E-05		0	0.0259995	4.82767E-06	4.82767E-06	6.52811E-07	2.74148E-09	0.000149251	0.0253012	0.000871286
Carbon Dioxide		0.00132791	0.00164132	0.000943854	0.0306616	0.00133312	0.00133312		0	0.0219996	0.000473622	0.000473622	0.00202599	1.82158E-05	0.00164132	0.0306453	0.00921480
Methane		0.0299134	0.0398324	0.0386106	7.71239	0.0376596	0.0376596		0	7.70285	0.00183785	0.00183785	0.0124401	2.90874E-06	0.0398324	7.71178	0.818922
Ethane		0.00597748	0.00740284	0.00711941	7.91353	0.893181	0.893181		0	7.91584	0.000391859	0.000391859	1.78439	5.75568E-07	0.00740284	7.91362	3.66847
Propane		0.00208475	0.00229376	0.00208432	7.59185	3.59029	3.59029		0	7.59485	0.000126032	0.000126032	5.98891	4.53311E-08	0.00229376	7.59191	6.33998
Isobutane		7.79178E-05	8.56496E-05	7.32617E-05	2.04560	1.68502	1.68502		0	2.04696	1.60465E-06	1.60465E-06	2.58378	7.25670E-11	8.56496E-05	2.04563	2.08411
n-Butane		0.000333535	0.000374552	0.000321431	5.95314	5.59524	5.59524		0	5.95688	1.51063E-05	1.51063E-05	8.50241	1.02883E-09	0.000374552	5.95324	6.33946
Isopentane		5.78434E-05	5.97012E-05	4.69145E-05	3.26068	3.72936	3.72936		0	3.26293	1.53378E-06	1.53378E-06	5.32249	2.63079E-11	5.97012E-05	3.26073	3.69826
n-Pentane		5.26964E-05	5.66499E-05	4.79067E-05	4.55365	5.38958	5.38958		0	4.55691	1.55129E-06	1.55129E-06	7.58822	1.94044E-11	5.66499E-05	4.55372	5.22046
2-Methylpentane		0	0	5.26697E-06	2.65991	3.34530	3.34530		0	2.66195	8.26179E-08	8.26179E-08	4.63057	1.97980E-13	0	2.65995	3.10732
3-Methylpentane		0	0	9.32385E-06	1.90544	2.40726	2.40726		0	1.90696	3.86428E-07	3.86428E-07	3.32440	2.24520E-12	0	1.90547	2.22900
n-Hexane		1.80184E-05	1.87922E-05	7.44095E-06	6.60213	8.40428	8.40428		0	6.60687	9.31122E-08	9.31122E-08	0.788647	8.65138E-15	1.87922E-05	6.60222	7.74111
Methylcyclopentane		0	0	1.25828E-05	1.03006	1.31290	1.31290		0	1.03098	1.44564E-06	1.44564E-06	1.67429	1.80406E-11	0	1.03008	1.20822
Benzene		0	0	0.000188909	0.307415	0.391926	0.391926		0	0.309994	0.000163693	0.000163693	0.0303902	6.26686E-09	0	0.307422	0.360596
2-Methylhexane		0	0	1.59678E-06	2.93175	3.79836	3.79836		0	2.93394	2.12370E-08	2.12370E-08	0.325848	8.37689E-16	0	2.93180	3.45589
3-Methylhexane		0	0	1.31203E-06	2.42414	3.14277	3.14277		0	2.42595	1.82283E-08	1.82283E-08	4.06389	1.07741E-14	0	2.42418	2.85809
Heptane		0	0	2.35128E-06	5.21201	6.77456	6.77456		0	5.21590	3.28472E-08	3.28472E-08	8.03190	1.42725E-14	0	5.21209	6.14973
Methylcyclohexane		0	0	8.85408E-06	3.39931	4.41866	4.41866		0	3.40193	7.00374E-07	7.00374E-07	5.37370	1.87477E-12	0	3.39936	4.01098
Toluene		0	0	0.000111259	0.815995	1.06268	1.06268		0	0.817984	9.37756E-05	9.37756E-05	0.176167	1.73550E-09	0	0.816012	0.963363
Octane		0	0	9.70898E-07	11.4343	14.9642	14.9642		0	11.4428	8.99365E-09	8.99365E-09	16.5580	7.64962E-16	0	11.4345	13.5193
Ethylbenzene		0	0	2.66695E-05	0.656170	0.859181	0.859181		0	0.656987	2.21113E-05	2.21113E-05	0.267953	2.31357E-10	0	0.656180	0.775941
m-Xylene		0	0	3.04206E-05	0.875956	1.14746	1.14746		0	0.876982	2.53694E-05	2.53694E-05	0.460616	2.96536E-10	0	0.875970	1.03598
o-Xylene		0	0	4.20723E-05	1.00571	1.31776	1.31776		0	1.00698	3.66754E-05	3.66754E-05	0.458422	4.48120E-10	0	1.00573	1.18953
Nonane		0	0	2.68545E-07	6.27423	8.22875	8.22875		0	6.27887	3.93485E-09	3.93485E-09	8.31897	1.58418E-16	0	6.27432	7.42312
C10+		0	0	2.29935E-07	13.3299	17.4993	17.4993		0	13.3397	2.03755E-08	2.03755E-08	13.7316	2.53972E-16	0	13.3301	15.7753
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water		1458.22	0	1457.63	0.0571729	0	0.00257120		1469.84	0	1457.61	0	0	0	1457.69	0.0563923	0.0166034
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.00160109	0	0.00296493	0.0296669	0	1.12406E-05		0	0.0304551	7.03707E-05	0	0	0	0.00217674	0.0296586	0.000863014
Carbon Dioxide		0.0193715	0	0.0137647	0.0359427	0	0.00119032		0	0.0257697	0.00690377	0	0	0	0.0239378	0.0359232	0.00912732
Methane		0.436377	0	0.563080	9.04077	0	0.0336257		0	9.02291	0.0267895	0	0	0	0.580933	9.03992	0.811148
Ethane		0.0871995	0	0.103826	9.27655	0	0.797506		0	9.27241	0.00571194	0	0	0	0.107966	9.27653	3.63364
Propane		0.0304124	0	0.0303967	8.89946	0	3.20571		0	8.89641	0.00183711	0	0	0	0.0334531	8.89941	6.27979
Isobutane		0.00113667	0	0.00106842	2.39794	0	1.50453		0	2.39775	2.33902E-05	0	0	0	0.00124915	2.39794	2.06433
n-Butane		0.00486560	0	0.00468761	6.97851	0	4.99590		0	6.97773	0.000220197	0	0	0	0.00546263	6.97852	6.27927
Isopentane		0.000843819	0	0.000684181	3.82230	0	3.32989		0	3.82212	2.23572E-05	0	0	0	0.000870707	3.82230	3.66315
n-Pentane		0.000768735	0	0.000698651	5.33797	0	4.81227		0	5.33784	2.26124E-05	0	0	0	0.000826206	5.33797	5.17089
2-Methylpentane		0	0	7.68111E-05	3.11806	0	2.98697		0	3.11813	1.20428E-06	0	0	0	0	3.11806	3.07782
3-Methylpentane		0	0	0.000135975	2.23363	0	2.14940		0	2.23377	5.63277E-06	0	0	0	0	2.23363	2.20784
n-Hexane		0.000262852	0	0.000108516	7.73928	0	7.50405		0	7.73911	1.35725E-06	0	0	0	0.000274073	7.73928	7.66762
Methylcyclopentane		0	0	0.000183502	1.20748	0	1.17227		0	1.20766	2.10724E-05	0	0	0	0	1.20748	1.19675
Benzene		0	0	0.00275496	0.360364	0	0.349944		0	0.363119	0.00238607	0	0	0	0	0.360368	0.357172
2-Methylhexane		0	0	2.32867E-05	3.43672	0	3.39149		0	3.43674	3.09562E-07	0	0	0	0	3.43672	3.42308
3-Methylhexane		0	0	1.91341E-05	2.84168	0	2.80613		0	2.84170	2.65705E-07	0	0	0	0	2.84168	2.83095
Heptane		0	0	3.42901E-05	6.10973	0	6.04889		0	6.10976	4.78798E-07	0	0	0	0	6.10973	6.09134
Methylcyclohexane		0	0	0.000129124	3.98481	0	3.94535		0	3.98493	1.02090E-05	0	0	0	0	3.98481	3.97290
Toluene		0	0	0.00162255	0.956542	0	0.948850		0	0.958165	0.00136692	0	0	0	0	0.956548	0.954217
Octane		0	0	1.415915E-05	13.4037	0	13.3613		0	13.4038	1.31096E-07	0	0	0	0	13.4037	13.3910
Ethylbenzene		0	0	0.000388937	0.769188	0	0.767148		0	0.769577	0.000322306	0	0	0	0	0.769189	0.768575
m-Xylene		0	0	0.000443640	1.02683	0	1.02455		0	1.02727	0.000369798	0	0	0	0	1.02683	1.02615

o-Xylene		0	0	0.000613564	1.17894	0	1.17661		0	1.17955	0.000534600	0	0	0	0	1.17894	1.17824
Nonane		0	0	3.91634E-06	7.35491	0	7.34732		0	7.35491	5.73565E-08	0	0	0	0	7.35491	7.35265
C10+		0	0	3.35327E-06	15.6258	0	15.6249		0	15.6258	2.97005E-07	0	0	0	0	15.6258	15.6255
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		99.9530	99.9403	99.9421	0.00995066	0.000493385	0.000493385		100	0	99.9945	99.9945	3.48037E-07	100.0000	99.9403	0.00981484	0.00304390
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.000170653	0.000232064	0.000316112	0.00802896	3.35400E-06	3.35400E-06		0	0.00824348	7.50675E-06	7.50675E-06	1.84535E-07	4.26295E-09	0.000232064	0.00802672	0.000246022
Carbon Dioxide		0.00324371	0.00400927	0.00230556	0.0152819	0.000557982	0.000557982		0	0.0109582	0.00115698	0.00115698	0.000899722	4.44993E-05	0.00400927	0.0152737	0.00408771
Methane		0.0266358	0.0354677	0.0343797	1.40119	0.00574580	0.00574580		0	1.39863	0.00163655	0.00163655	0.00201381	2.59021E-06	0.0354677	1.40106	0.132422
Ethane		0.00997622	0.0123550	0.0118819	2.69480	0.255424	0.255424		0	2.69399	0.000654031	0.000654031	0.541421	9.60671E-07	0.0123550	2.69480	1.11186
Propane		0.00510245	0.00561395	0.00510133	3.79123	1.50567	1.50567		0	3.79048	0.000308479	0.000308479	2.66483	1.10956E-07	0.00561395	3.79122	2.81794
Isobutane		0.000251367	0.000276307	0.000236343	1.34648	0.931433	0.931433		0	1.34658	5.17691E-06	5.17691E-06	1.51539	2.34121E-10	0.000276307	1.34649	1.22099
n-Butane		0.00107600	0.00120831	0.00103694	3.91855	3.09289	3.09289		0	3.91869	4.87358E-05	4.87358E-05	4.98666	3.31928E-09	0.00120831	3.91857	3.71400
Isopentane		0.000231639	0.000239077	0.000187871	2.66425	2.55898	2.55898		0	2.66451	6.14244E-06	6.14244E-06	3.87498	1.05359E-10	0.000239077	2.66426	2.68952
n-Pentane		0.000211027	0.000226857	0.000191845	3.72071	3.69818	3.69818		0	3.72117	6.21256E-06	6.21256E-06	5.52452	7.77121E-11	0.000226857	3.72072	3.79652
2-Methylpentane		0	0	2.51923E-05	2.59590	2.74172	2.74172		0	2.59635	3.95190E-07	3.95190E-07	4.02664	9.47028E-13	0	2.59591	2.69909
3-Methylpentane		0	0	4.45967E-05	1.85958	1.97292	1.97292		0	1.85997	1.84842E-06	1.84842E-06	2.89083	1.07398E-11	0	1.85959	1.93616
n-Hexane		8.61842E-05	8.98847E-05	3.55907E-05	6.44324	6.88791	6.88791		0	6.44405	4.45388E-07	4.45388E-07	0.685790	4.13835E-14	8.98847E-05	6.44326	6.72410
Methylcyclopentane		0	0	5.87766E-05	0.981755	1.05085	1.05085		0	0.982049	6.75324E-06	6.75324E-06	1.42187	8.42778E-11	0	0.981758	1.02494
Benzene		0	0	0.000819017	0.271943	0.291155	0.291155		0	0.274063	0.000709733	0.000709733	0.0239539	2.71723E-08	0	0.271947	0.283913
2-Methylhexane		0	0	8.88064E-06	3.32691	3.61973	3.61973		0	3.32742	1.18118E-07	1.18118E-07	0.329471	4.65927E-15	0	3.32692	3.49047
3-Methylhexane		0	0	7.29700E-06	2.75088	2.99497	2.99497		0	2.75130	1.01384E-07	1.01384E-07	4.10907	5.99259E-14	0	2.75089	2.88668
Heptane		0	0	1.30769E-05	5.91451	6.45596	6.45596		0	5.91541	1.82693E-07	1.82693E-07	8.12120	7.93846E-14	0	5.91453	6.21126
Methylcyclohexane		0	0	4.82523E-05	3.77988	4.12614	4.12614		0	3.78055	3.81706E-06	3.81706E-06	5.32414	1.02178E-11	0	3.77989	3.96961
Toluene		0	0	0.000568985	0.851463	0.931209	0.931209		0	0.853032	0.000479601	0.000479601	0.163792	8.87614E-09	0	0.851470	0.894703
Octane		0	0	6.15563E-06	14.7918	16.2567	16.2567		0	14.7940	5.70243E-08	5.70243E-08	19.0857	4.85035E-15	0	14.7919	15.5660
Ethylbenzene		0	0	0.000157152	0.788923	0.867500	0.867500		0	0.789438	0.000130300	0.000130300	0.287055	1.36340E-09	0	0.788926	0.830344
m-Xylene		0	0	0.000179256	1.05318	1.15858	1.15858		0	1.05379	0.000149500	0.000149500	0.493453	1.74750E-09	0	1.05318	1.10862
o-Xylene		0	0	0.000247915	1.20918	1.33052	1.33052		0	1.20999	0.000216125	0.000216125	0.491103	2.64079E-09	0	1.20919	1.27293
Nonane		0	0	1.91169E-06	9.11323	10.0372	10.0372		0	9.11457	2.80125E-08	2.80125E-08	10.7664	1.12782E-15	0	9.11326	9.59642
C10+		0	0	2.08791E-06	24.6971	27.2276	27.2276		0	24.7008	1.85030E-07	1.85030E-07	22.6688	2.30636E-15	0	24.6972	26.0141
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water		26270.2	0	26259.6	1.02999	0	0.0463209		26479.6	0	26259.2	0	0	0	26260.6	1.01592	0.299116
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.0448519	0	0.0830577	0.831071	0	0.000314887		0	0.853151	0.00197132	0	0	0	0.0609779	0.830838	0.0241760
Carbon Dioxide		0.852529	0	0.605780	1.58182	0	0.0523855		0	1.13411	0.303831	0	0	0	1.05349	1.58096	0.401689
Methane		7.00056	0	9.03319	145.036	0	0.539438		0	144.750	0.429769	0	0	0	9.31959	145.023	13.0128
Ethane		2.62201	0	3.12196	278.937	0	23.9802		0	278.812	0.171753	0	0	0	3.24644	278.936	109.260
Propane		1.34105	0	1.34036	392.427	0	141.358		0	392.293	0.0810084	0	0	0	1.47514	392.425	276.911
Isobutane		0.0660655	0	0.0620987	139.373	0	87.4466		0	139.363	0.00135949	0	0	0	0.0726033	139.373	119.983
n-Butane		0.282800	0	0.272454	405.606	0	290.373		0	405.561	0.0127983	0	0	0	0.317500	405.607	364.965
Isopentane		0.0608805	0	0.0493628	275.775	0	240.247		0	275.761	0.00161305	0	0	0	0.0628205	275.775	264.292
n-Pentane		0.0554633	0	0.0504068	385.128	0	347.199		0	385.119	0.00163146	0	0	0	0.0596097	385.128	373.074
2-Methylpentane		0	0	0.00661923	268.700	0	257.403		0	268.706	0.000103780	0	0	0	0	268.700	265.232
3-Methylpentane		0	0	0.0117177	192.484	0	185.226		0	192.496	0.000485406	0	0	0	0	192.484	190.262
n-Hexane		0.0226514	0	0.00935137	666.935	0	646.664		0	666.921	0.000116962	0	0	0	0.0236184	666.935	660.760
Methylcyclopentane		0	0	0.0154434	101.621	0	98.6576		0	101.636	0.00177345	0	0	0	0	101.621	100.718
Benzene		0	0	0.215195	28.1487	0	27.3348		0	28.3639	0.186380	0	0	0	0	28.1490	27.8994
2-Methylhexane		0	0	0.00233337	344.366	0	339.834		0	344.368	3.10187E-05	0	0	0	0	344.366	342.999
3-Methylhexane		0	0	0.00191727	284.742	0	281.179		0	284.743	2.66242E-05	0	0	0	0	284.742	283.667
Heptane		0	0	0.00343593	612.207	0	606.111		0	612.210	4.79765E-05	0	0	0	0	612.207	610.364
Methylcyclohexane		0	0	0.0126782	391.252	0	387.378		0	391.265	0.00100238	0	0	0	0	391.252	390.083
Toluene		0	0	0.149500	88.1343	0	87.4255		0	88.2838	0.125946	0	0	0	0	88.1348	87.9201
Octane		0	0	0.00161738	1531.09	0	1526.24		0	1531.09	1.49749E-05	0	0	0	0	1531.09	1529.63
Ethylbenzene		0	0	0.0412915	81.6609	0	81.4443		0	81.7022	0.0342177	0	0	0	0	81.6610	81.5957
m-Xylene		0	0	0.0470991	109.013	0	108.772		0	109.061	0.0392596	0	0	0	0	109.014	108.941
o-Xylene		0	0	0.0651390	125.162	0	124.914		0	125.227	0.0567558	0	0	0	0	125.162	125.087
Nonane		0	0	0.000502291	943.304	0	942.331		0	943.305	7.35627E-06	0	0	0	0	943.304	943.015
C10+		0	0	0.000548594	2556.38	0	2556.23		0	2556.38	4.85900E-05	0	0	0	0	2556.38	2556.34

Process Streams		**Well Stream**	**HP Separator Gas**	**HP Separator Water**	**HP Separator Oil**	**OT Flash Gas**	**Sales Oil**	**Gas**	**Water**	**Oil**	**Produced Water**	**PWT Flash Gas**	**Oil W/B**	**Water W/B**	**1**	**3**	**LP Separator Oil**
Phase: Light Liquid	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	**Units**																
Temperature	°F	58.3	70.0	70.0	70.0	75.9	75.9		67.0	67.0	75.9	75.94	75.9425	75.9425	70	69.4776	70

Pressure	psig	200	302	302	302	0	0		200	300	0	0	8.28840	-14.2261	302	300	40
Mole Fraction Vapor	%	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Mole Fraction Light Liquid	%	100	100	100	100	100	100		100	100	100	100	100	100	100	100	100
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Molecular Weight	lb/lbmol	18.0	18.0	18.0	88.3	105.1	105.1		18.0	88.4	18.0	18.0157	99.1001	18.0153	18.0167	88.3015	99.2092
Mass Density	lb/ft^3	62.4	62.3	62.3	43.1	44.5	44.5		62.3	43.2	62.2	62.2171	43.5798	62.2179	62.2544	43.0910	44.1311
Molar Flow	lbmol/h	1458.8	0.0	1458.4	117.2	0.0	89.3		1469.8	117.1	1457.7	0	0	0	1458.44	117.222	99.0506
Mass Flow	lb/h	26282.5	0.0	26274.8	10350.9	0.0	9388.4		26479.6	10349.4	26260.6	0	0	0	26276.3	10350.9	9826.74
Vapor Volumetric Flow	MCFH	0.4	0.0	0.4	0.2	0.0	0.2		0.4	0.2	0.4	0	0	0	0.422080	0.240210	0.222671
Liquid Volumetric Flow	Mbbl/d	1.8	0.0	1.8	1.0	0.0	0.9		1.8	1.0	1.8	0	0	0	1.80421	1.02680	0.951827
Std Vapor Volumetric Flow	MMSCFD	13.3	0.0	13.3	1.1	0.0	0.8		13.4	1.1	13.3	0	0	0	13.2829	1.06762	0.902116
Std Liquid Volumetric Flow	Mbbl/d	1.8	0.0	1.8	1.1	0.0	0.9		1.8	1.1	1.8	0	0	0	1.80300	1.05090	0.960499
Compressibility		0.011	0.016	0.016	0.114	0.006	0.006		0.011	0.114	0.001	0.000740332	0.00909299	2.36694E-05	0.0161242	0.113562	0.0216318
Specific Gravity		1.000	0.998	0.998	0.691	0.713	0.713		0.999	0.692	0.998	0.997564	0.698741	0.997577	0.998162	0.690904	0.707581
API Gravity		10.1	10.1	10.1	71.8	64.7	64.7		10.0	71.8	10.0	10.0154	68.7336	10.0135	10.0612	71.8208	67.0776
Enthalpy	MMBtu/h	-179.7	0.0	-179.3	-9.4	0.0	-8.1		-180.9	-9.4	-179.2	0	0	0	-179.329	-9.39597	-8.63127
Mass Enthalpy	Btu/lb	-6837.1	-6824.8	-6824.8	-907.5	-860.9	-860.9		-6830.9	-908.2	-6822.3	-6822.35	-906.085	-6822.67	-6824.75	-907.744	-878.345
Mass Cp	Btu/(lb*°F)	1.0	1.0	1.0	0.5	0.5	0.5		1.0	0.5	1.0	0.982732	0.495477	0.982746	0.982989	0.497704	0.488941
Ideal Gas CpCv Ratio		1.326	1.326	1.326	1.064	1.053	1.053		1.326	1.064	1.326	1.32555	1.05568	1.32556	1.32580	1.06359	1.05664
Dynamic Viscosity	cP	1.2	1.0	1.0	0.4	0.5	0.5		1.0	0.4	0.9	0.924437	0.412225	0.924435	0.995523	0.351307	0.431325
Kinematic Viscosity	cSt	1.2	1.0	1.0	0.5	0.7	0.7		1.0	0.5	0.9	0.927571	0.590511	0.927556	0.998299	0.508954	0.610153
Thermal Conductivity	Btu/(h*ft*°F)	0.3	0.3	0.3	0.1	0.1	0.1		0.3	0.1	0.3	0.349781	0.0680484	0.349835	0.346277	0.0675269	0.0685950
Surface Tension	lbf/ft	0.005	0.005	0.005	0.001	0.001	0.001		0.005	0.001	0.005	0.00499712	0.00137564	0.00499737	0.00503863	0.00118412	0.00140610
Net I.G. Heating Value	Btu/ft^3	0.4	0.6	0.5	4465.4	5291.7	5291.7		0.0	4468.6	0.0	0.0407786	5009.46	3.72033E-05	0.554172	4465.47	5001.54
Net Liquid Heating Value	Btu/lb	-1050.1	-1047.5	-1047.6	19011.5	18914.5	18914.5		-1059.8	19014.1	-1058.8	-1058.85	19008.0	-1059.76	-1047.49	19011.5	18948.9
Gross I.G. Heating Value	Btu/ft^3	50.8	50.9	50.9	4805.9	5686.8	5686.8		50.3	4809.3	50.4	50.3526	5391.25	50.3100	50.8955	4805.92	5377.72
Gross Liquid Heating Value	Btu/lb	10.1	12.8	12.7	20472.7	20338.3	20338.3		0.0	20475.3	0.9	0.925050	20468.6	0.000830905	12.8480	20472.7	20385.8

Process Streams		**Well Stream**	**HP Separator Gas**	**HP Separator Water**	**HP Separator Oil**	**OT Flash Gas**	**Sales Oil**	**Gas**	**Water**	**Oil**	**Produced Water**	**PWT Flash Gas**	**Oil W/B**	**Water W/B**	**1**	**3**	**LP Separator Oil**
Phase: Heavy Liquid	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water					99.9501											99.9500	
H2S					0											0	
Nitrogen					0.000203306											0.000203877	
Carbon Dioxide					0.000943854											0.000945193	
Methane					0.0386106											0.0386685	
Ethane					0.00711941											0.00712102	
Propane					0.00208432											0.00208823	
Isobutane					7.32617E-05											7.32064E-05	
n-Butane					0.000321431											0.000320627	
Isopentane					4.69145E-05											4.68318E-05	
n-Pentane					4.79067E-05											4.77134E-05	
2-Methylpentane					5.26697E-06											5.23588E-06	
3-Methylpentane					9.32385E-06											9.28110E-06	
n-Hexane					7.44095E-06											7.39569E-06	
Methylcyclopentane					1.25828E-05											1.25847E-05	
Benzene					0.000188909											0.000188637	
2-Methylhexane					1.59678E-06											1.59531E-06	
3-Methylhexane					1.31203E-06											1.31044E-06	
Heptane					2.35128E-06											2.35751E-06	
Methylcyclohexane					8.85408E-06											8.82081E-06	
Toluene					0.000111259											0.000110878	
Octane					9.70898E-07											9.63976E-07	
Ethylbenzene					2.66695E-05											2.66096E-05	
m-Xylene					3.04206E-05											3.03127E-05	
o-Xylene					4.20723E-05											4.18996E-05	
Nonane					2.68545E-07											2.66608E-07	
C10+					2.29935E-07											2.28351E-07	
Molar Flow		**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**	**lbmol/h**
Water					0											1457.63	
H2S					0											0	
Nitrogen					0											0.00297325	
Carbon Dioxide					0											0.0137843	
Methane					0											0.563924	

Ethane					0											0.103850	
Propane					0											0.0304538	
Isobutane					0											0.00106761	
n-Butane					0											0.00467589	
Isopentane					0											0.000682975	
n-Pentane					0											0.000695832	
2-Methylpentane					0											7.63578E-05	
3-Methylpentane					0											0.000135352	
n-Hexane					0											0.000107856	
Methylcyclopentane					0											0.000183530	
Benzene					0											0.00275100	
2-Methylhexane					0											2.32654E-05	
3-Methylhexane					0											1.91109E-05	
Heptane					0											3.43809E-05	
Methylcyclohexane					0											0.000128639	
Toluene					0											0.00161699	
Octane					0											1.40582E-05	
Ethylbenzene					0											0.000388064	
m-Xylene					0											0.000442068	
o-Xylene					0											0.000611046	
Nonane					0											3.88810E-06	
C10+					0											3.33017E-06	
Mass Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water					99.9421											99.9421	
H2S					0											0	
Nitrogen					0.000316112											0.000316999	
Carbon Dioxide					0.00230556											0.00230883	
Methane					0.0343797											0.0344312	
Ethane					0.0118819											0.0118846	
Propane					0.00510133											0.00511090	
Isobutane					0.000236343											0.000236165	
n-Butane					0.00103694											0.00103435	
Isopentane					0.000187871											0.000187540	
n-Pentane					0.000191845											0.000191071	
2-Methylpentane					2.51923E-05											2.50436E-05	
3-Methylpentane					4.45967E-05											4.43922E-05	
n-Hexane					3.55907E-05											3.53741E-05	
Methylcyclopentane					5.87766E-05											5.87857E-05	
Benzene					0.000819017											0.000817840	
2-Methylhexane					8.88064E-06											8.87251E-06	
3-Methylhexane					7.29700E-06											7.28814E-06	
Heptane					1.30769E-05											1.31115E-05	
Methylcyclohexane					4.82523E-05											4.80710E-05	
Toluene					0.000568985											0.000567034	
Octane					6.15563E-06											6.11174E-06	
Ethylbenzene					0.000157152											0.000156800	
m-Xylene					0.000179256											0.000178620	
o-Xylene					0.000247915											0.000246897	
Nonane					1.91169E-06											1.89790E-06	
C10+					2.08791E-06											2.07353E-06	
Mass Flow		**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**
Water					0											26259.6	
H2S					0											0	
Nitrogen					0											0.0832909	
Carbon Dioxide					0											0.606640	
Methane					0											9.04673	
Ethane					0											3.12267	
Propane					0											1.34288	
Isobutane					0											0.0620519	
n-Butane					0											0.271773	
Isopentane					0											0.0492758	
n-Pentane					0											0.0502035	
2-Methylpentane					0											0.00658016	
3-Methylpentane					0											0.0116640	

n-Hexane					0											0.00929449	
Methylcyclopentane					0											0.0154458	
Benzene					0											0.214886	
2-Methylhexane					0											0.00233124	
3-Methylhexane					0											0.00191495	
Heptane					0											0.00344503	
Methylcyclohexane					0											0.0126306	
Toluene					0											0.148987	
Octane					0											0.00160585	
Ethylbenzene					0											0.0411988	
m-Xylene					0											0.0469321	
o-Xylene					0											0.0648717	
Nonane					0											0.000498668	
C10+					0											0.000544816	

Process Streams		Well Stream	HP Separator Gas	HP Separator Water	HP Separator Oil	OT Flash Gas	Sales Oil	Gas	Water	Oil	Produced Water	PWT Flash Gas	Oil W/B	Water W/B	1	3	LP Separator Oil
Phase: Heavy Liquid	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	Units																
Temperature	°F				70.0											69.4776	
Pressure	psig				302											300	
Mole Fraction Vapor	%				0											0	
Mole Fraction Light Liquid	%				0											0	
Mole Fraction Heavy Liquid	%				100											100	
Molecular Weight	lb/lbmol				18.0											18.0167	
Mass Density	lb/ft^3				62.3											62.2603	
Molar Flow	lbmol/h				0.0											1458.36	
Mass Flow	lb/h				0.0											26274.8	
Vapor Volumetric Flow	MCFH				0.0											0.422016	
Liquid Volumetric Flow	Mbbl/d				0.0											1.80394	
Std Vapor Volumetric Flow	MMSCFD				0.0											13.2822	
Std Liquid Volumetric Flow	Mbbl/d				0.0											1.80283	
Compressibility					0.016											0.0160367	
Specific Gravity					0.998											0.998256	
API Gravity					10.1											10.0589	
Enthalpy	MMBtu/h				0.0											-179.333	
Mass Enthalpy	Btu/lb				-6824.8											-6825.28	
Mass Cp	Btu/(lb*°F)				1.0											0.983019	
Ideal Gas CpCv Ratio					1.326											1.32582	
Dynamic Viscosity	cP				1.0											1.00229	
Kinematic Viscosity	cSt				1.0											1.00499	
Thermal Conductivity	Btu/(h*ft*°F)				0.3											0.346061	
Surface Tension	lbf/ft				0.005											0.00504287	
Net I.G. Heating Value	Btu/ft^3				0.5											0.549330	
Net Liquid Heating Value	Btu/lb				-1047.6											-1047.61	
Gross I.G. Heating Value	Btu/ft^3				50.9											50.8902	
Gross Liquid Heating Value	Btu/lb				12.7											12.7	

October 7, 2013

FESCO, Ltd.
1100 FESCO Avenue - Alice, Texas 78332

For: Antero Resources Appalachian Corp.
1625 17th Street
Denver, Colorado 80202

Sample: Seaborne No. 1H (Vogt Pad well sample)
Separator Hydrocarbon Liquid
Sampled @ 320 psig & 72 °F

Date Sampled: 09/20/13 Job Number: 35820.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.026	0.007	0.008
Carbon Dioxide	0.022	0.009	0.011
Methane	7.703	3.192	1.406
Ethane	7.916	5.177	2.708
Propane	7.595	5.117	3.810
Isobutane	2.047	1.638	1.353
n-Butane	5.957	4.593	3.939
2,2 Dimethylpropane	0.080	0.075	0.066
Isopentane	3.263	2.918	2.678
n-Pentane	4.477	3.969	3.675
2,2 Dimethylbutane	0.231	0.236	0.226
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.514	0.515	0.504
2 Methylpentane	2.662	2.702	2.610
3 Methylpentane	1.907	1.904	1.870
n-Hexane	4.853	4.880	4.758
Heptanes Plus	50.748	63.069	70.379
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

Specific Gravity	0.7601	(Water=1)
°API Gravity	54.66	@ 60°F
Molecular Weight	121.9	
Vapor Volume	19.79	CF/Gal
Weight	6.33	Lbs/Gal

Characteristics of Total Sample:

Specific Gravity	0.6812	(Water=1)
°API Gravity	76.24	@ 60°F
Molecular Weight	87.9	
Vapor Volume	24.60	CF/Gal
Weight	5.68	Lbs/Gal

Base Conditions: 14.850 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: XG
Processor: JCdjv
Cylinder ID: W-1016

David Dannhaus 361-661-7015

TANKS DATA INPUT REPORT

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.022	0.009	0.011
Nitrogen	0.026	0.007	0.008
Methane	7.703	3.192	1.406
Ethane	7.916	5.177	2.708
Propane	7.595	5.117	3.810
Isobutane	2.047	1.638	1.353
n-Butane	6.037	4.668	4.005
Isopentane	3.263	2.918	2.678
n-Pentane	4.477	3.969	3.675
Other C-6's	5.314	5.356	5.209
Heptanes	12.616	13.622	14.000
Octanes	14.845	16.794	18.294
Nonanes	6.279	8.213	9.061
Decanes Plus	13.338	21.169	24.822
Benzene	0.310	0.212	0.276
Toluene	0.818	0.670	0.858
E-Benzene	0.657	0.620	0.794
Xylenes	1.883	1.768	2.275
n-Hexane	4.853	4.880	4.758
2,2,4 Trimethylpentane	0.000	0.000	0.000
Totals:	100.000	100.000	100.000

Characteristics of Total Sample:

Specific Gravity	0.6812	(Water=1)
°API Gravity	76.24	@ 60°F
Molecular Weight	87.9	
Vapor Volume	24.60	CF/Gal
Weight	5.68	Lbs/Gal

Characteristics of Decanes (C10) Plus:

Specific Gravity	0.7987	(Water=1)
Molecular Weight	163.6	

Characteristics of Atmospheric Sample:

°API Gravity	63.19	@ 60°F
Reid Vapor Pressure (ASTM D-5191)	4.45	psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
Cylinder Number	------	W-1016*	T-3025
Pressure, PSIG	320	302	301
Temperature, °F	72	70	70

* Sample used for analysis

TOTAL EXTENDED REPORT

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.026	0.007	0.008
Carbon Dioxide	0.022	0.009	0.011
Methane	7.703	3.192	1.406
Ethane	7.916	5.177	2.708
Propane	7.595	5.117	3.810
Isobutane	2.047	1.638	1.353
n-Butane	5.957	4.593	3.939
2,2 Dimethylpropane	0.080	0.075	0.066
Isopentane	3.263	2.918	2.678
n-Pentane	4.477	3.969	3.675
2,2 Dimethylbutane	0.231	0.236	0.226
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.514	0.515	0.504
2 Methylpentane	2.662	2.702	2.610
3 Methylpentane	1.907	1.904	1.870
n-Hexane	4.853	4.880	4.758
Methylcyclopentane	1.031	0.892	0.987
Benzene	0.310	0.212	0.276
Cyclohexane	1.009	0.840	0.966
2-Methylhexane	2.934	3.336	3.345
3-Methylhexane	2.426	2.723	2.765
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	0.828	0.881	0.935
n-Heptane	4.388	4.950	5.002
Methylcyclohexane	3.402	3.344	3.800
Toluene	0.818	0.670	0.858
Other C-8's	8.240	9.437	10.332
n-Octane	3.203	4.013	4.162
E-Benzene	0.657	0.620	0.794
M & P Xylenes	0.877	0.832	1.059
O-Xylene	1.007	0.936	1.216
Other C-9's	4.414	5.647	6.340
n-Nonane	1.865	2.566	2.721
Other C-10's	3.956	5.561	6.358
n-decane	1.123	1.685	1.817
Undecanes(11)	3.018	4.353	5.047
Dodecanes(12)	1.740	2.710	3.186
Tridecanes(13)	1.212	2.024	2.412
Tetradecanes(14)	0.714	1.277	1.543
Pentadecanes(15)	0.441	0.846	1.034
Hexadecanes(16)	0.286	0.585	0.722
Heptadecanes(17)	0.207	0.449	0.559
Octadecanes(18)	0.165	0.377	0.471
Nonadecanes(19)	0.114	0.271	0.342
Eicosanes(20)	0.081	0.201	0.255
Heneicosanes(21)	0.065	0.168	0.214
Docosanes(22)	0.051	0.137	0.175
Tricosanes(23)	0.036	0.102	0.131
Tetracosanes(24)	0.030	0.088	0.114
Pentacosanes(25)	0.022	0.066	0.086
Hexacosanes(26)	0.020	0.064	0.083
Heptacosanes(27)	0.017	0.055	0.072
Octacosanes(28)	0.012	0.039	0.051
Nonacosanes(29)	0.010	0.033	0.044
Triacontanes(30)	0.006	0.020	0.027
Hentriacontanes Plus(31+)	0.014	0.059	0.080
Total	100.000	100.000	100.000

October 15, 2013

FESCO, Ltd.
1100 Fesco Avenue - Alice, Texas 78332

For: Antero Resources Appalachian Corp.
1625 17th Street
Denver, Colorado 80202

Date Sampled: 09/20/13

Date Analyzed: 10/02/13

Sample: Seaborne No. 1H (Vogt Pad well sample)

Job Number: J35820

FLASH LIBERATION OF HYDROCARBON LIQUID		
	Separator HC Liquid	**Stock Tank**
Pressure, psig	320	0
Temperature, °F	72	70
Gas Oil Ratio (1)	------	327
Gas Specific Gravity (2)	------	1.303
Separator Volume Factor (3)	1.1969	1.000

STOCK TANK FLUID PROPERTIES	
Shrinkage Recovery Factor (4)	0.8355
Oil API Gravity at 60 °F	63.19
Reid Vapor Pressure, psi (5)	4.45

Quality Control Check			
	Sampling Conditions	**Test Samples**	
Cylinder No.	------	W-1016*	T-3025
Pressure, psig	320	302	301
Temperature, °F	72	70	70

(1) - Scf of flashed vapor per barrel of stock tank oil
(2) - Air = 1.000
(3) - Separator volume / Stock tank volume
(4) - Fraction of first stage separator liquid
(5) - Absolute pressure at 100 deg F
Analyst: M. G.
* Sample used for flash study
Base Conditions: 14.85 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

David Dannhaus 361-661-7015

FESCO, Ltd.
1100 Fesco Ave. - Alice, Texas 78332

For: Antero Resources Appalachian Corp.
1625 17th Street
Denver, Colorado 80202

Sample: Seaborne No. 1H (Vogt Pad well sample)
Gas Evolved from Hydrocarbon Liquid Flashed
From 320 psig & 72 °F to 0 psig & 70 °F

Date Sampled: 09/20/13 Job Number: 35820.001

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.084	
Carbon Dioxide	0.109	
Methane	28.979	
Ethane	27.515	7.417
Propane	21.197	5.886
Isobutane	3.988	1.315
n-Butane	9.085	2.887
2-2 Dimethylpropane	0.097	0.037
Isopentane	2.547	0.939
n-Pentane	2.631	0.961
Hexanes	2.134	0.886
Heptanes Plus	1.634	0.724
Totals	100.000	21.052

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.558	(Air=1)
Molecular Weight	101.68	
Gross Heating Value	5428	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.303	(Air=1)
Compressibility (Z)	0.9868	
Molecular Weight	37.25	
Gross Heating Value		
Dry Basis	2191	BTU/CF
Saturated Basis	2153	BTU/CF

*Hydrogen Sulfide tested in laboratory by: Stained Tube Method (GPA 2377)
Results: <0.013 Gr/100 CF, <0.2 PPMV or <0.001 Mol %

Base Conditions: 14.850 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: MR
Processor: ANB
Cylinder ID: FL# 9 S

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.084		0.063
Carbon Dioxide	0.109		0.129
Methane	28.979		12.483
Ethane	27.515	7.417	22.213
Propane	21.197	5.886	25.095
Isobutane	3.988	1.315	6.223
n-Butane	9.085	2.887	14.177
2,2 Dimethylpropane	0.097	0.037	0.188
Isopentane	2.547	0.939	4.934
n-Pentane	2.631	0.961	5.097
2,2 Dimethylbutane	0.081	0.034	0.187
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.128	0.053	0.296
2 Methylpentane	0.661	0.277	1.529
3 Methylpentane	0.408	0.168	0.944
n-Hexane	0.856	0.355	1.981
Methylcyclopentane	0.072	0.025	0.163
Benzene	0.024	0.007	0.050
Cyclohexane	0.109	0.037	0.246
2-Methylhexane	0.178	0.083	0.479
3-Methylhexane	0.178	0.082	0.479
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.179	0.079	0.477
n-Heptane	0.248	0.115	0.667
Methylcyclohexane	0.177	0.072	0.467
Toluene	0.039	0.013	0.096
Other C8's	0.232	0.109	0.687
n-Octane	0.065	0.034	0.199
Ethylbenzene	0.002	0.001	0.006
M & P Xylenes	0.018	0.007	0.051
O-Xylene	0.002	0.001	0.006
Other C9's	0.070	0.036	0.237
n-Nonane	0.014	0.008	0.048
Other C10's	0.021	0.012	0.080
n-Decane	0.004	0.002	0.015
Undecanes (11)	0.002	0.001	0.008
Totals	100.000	21.052	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.303	(Air=1)
Compressibility (Z)	0.9868	
Molecular Weight	37.25	

Gross Heating Value

Dry Basis	2191	BTU/CF
Saturated Basis	2153	BTU/CF

Antero Resources
Seaborn Unit 1H - Vogt Pad

Tag Name	Value	Units	Timestamp
Accumulated Gas Flow	683627.1	MCF	12/5/2013 08:05:40
Casing Pressure	352.52	PSIA	12/5/2013 08:05:48
Current Day Gas Flow	49.19	MCF	12/5/2013 08:05:40
Differential Pressure	38.91	inH2O	12/5/2013 08:05:40
Flow Rate	6834.16	MCF Per Day	12/5/2013 08:05:40
Pressure	135.66	PSIA	12/5/2013 08:05:40
Previous Day Energy	8199.34	MBTU	12/5/2013 08:05:41
Previous Day Gas Flow	6726.57	MCF	12/5/2013 08:05:41
Temperature	68.72	F	12/5/2013 08:05:40
Tubing Pressure	606.04	PSIA	12/5/2013 08:05:48
Daily AP	37.24	PSIA	12/5/2013 09:00:00
Daily DP	137.62	inH2O	12/5/2013 09:00:00
Daily Energy	8199.34	MBTU	12/5/2013 09:00:00
Daily Flow	6726.57	MCF	12/5/2013 09:00:00
Daily Tf	68.49	F	12/5/2013 09:00:00
Hourly AP	134.4	PSIA	12/5/2013 09:00:00
Hourly DP	37.66	Inches	12/5/2013 09:00:00
Hourly Energy	339.8	MBTU	12/5/2013 09:00:00
Hourly Flow Time	3600	Seconds	12/5/2013 09:00:00
Hourly Tf	68.6	F	12/5/2013 09:00:00
Hourly Volume	278.8	MCF	12/5/2013 09:00:00
Audited Accumulated Gas Volume		MCF	
Audited Casing Pressure	383	PSI	12/2/2013 09:00:00
Audited Gas Volume	6544.49	MCF	12/2/2013 09:00:00
Audited Oil Volume	0	Barrels	12/2/2013 09:00:00
Audited Tubing Pressure	627	PSI	12/2/2013 09:00:00
Audited Water Volume	0	Barrels	12/2/2013 09:00:00
Argon	0	%	12/5/2013 08:05:47
BTU	1218.948	BTU	12/5/2013 08:05:40
C02	0.1647	%	12/5/2013 08:05:47
Carbon Monoxide	0	%	12/5/2013 08:05:47
Decane	0	%	12/5/2013 08:05:47
Ethane	14.0689	%	12/5/2013 08:05:47
Helium	0	%	12/5/2013 08:05:47
Heptane	0	%	12/5/2013 08:05:47
Hexane	0.2484	%	12/5/2013 08:05:47
Hydrogen	0	%	12/5/2013 08:05:47
Hydrogen Sulfide	0	%	12/5/2013 08:05:47
Iso-Butane	0.5041	%	12/5/2013 08:05:47
Iso-Pentane	0.2618	%	12/5/2013 08:05:47
Methane	78.61509	%	12/5/2013 08:05:47
N2	0.564	%	12/5/2013 08:05:47
N-Butane	1.0298	%	12/5/2013 08:05:47
Nonane	0	%	12/5/2013 08:05:47
N-Pentane	0.2553	%	12/5/2013 08:05:47
Octane	0	%	12/5/2013 08:05:47
Oxygen	0.0715	%	12/5/2013 08:05:47
Plate Size	3.75	Inches	12/5/2013 08:05:45
Propane	4.2164	%	12/5/2013 08:05:47
SPG	0.7062		12/5/2013 08:05:40
Water	0	%	12/5/2013 08:05:47

Attachment J
Class I Legal Advertisement

Attachment J

Air Quality Permit Notice
Notice of Application
Fritz Well Pad
Antero Resources Corporation
Doddridge County, West Virginia

Notice is given that Antero Resources Corporation has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-A Modification Permit Application for an Oil and Natural Gas facility located at 0.43 miles northeast from the intersection of Co Rte 11/3 and Co Rte 21 in Doddridge County, West Virginia.

The latitude and longitude coordinates are: 39.234154 degrees N and -80.839975 degrees W

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

Pollutants	TOTALS (tpy):
VOC	56.6790
NO_X	14.5817
CO_{2e}	21291.9000
CO	35.8096
SO_2	0.0686
$PM_{2.5}$	0.9776
PM_{10}	1.0871
Lead	6.60E-05
Total HAPs	3.1157
Benzene	0.0863
Formaldehyde	0.0296
Xylenes	0.2937

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

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.
Dated this the __ day of _____, 2015

By: Antero Resources Corporation
Barry Schatz
Senior Environmental & Regulatory Manager
1615 Wynkoop Street
Denver, CO 80202

Attachment L
General Permit Modification Application Fee

U.S. DOLLARS

GHD SERVICES INC.

▼ PLEASE DETACH AND RETAIN FOR YOUR RECORDS ▼

INVOICE NUMBER	DATE		VOUCHER NO.	AMOUNT
Account Number:		40WVDEPAQ	421637	
CR71715	7/17/2015	400960438		1,500.00

TOTAL: 1,500.00

THIS DOCUMENT IS PROTECTED BY A MICRO-PRINT SIGNATURE LINE, FLUORESCENT PAPER FIBERS, A WATERMARKED BACKER, AND IS REACTIVE TO CHEMICAL ALTERATION

GHD SERVICES INC.
2055 NIAGARA FALLS BLVD, SUITE 3
NIAGARA FALLS, NY 14304

M&T BANK
MANUFACTURERS AND TRADERS TRUST COMPANY
Commercial Banking
Main Office, Ithaca, NY 14850
50-7063-2213

NO. 421637

7/17/2015

PAY **********1,500 DOLLARS AND **********00 CENTS $ **********1,500.00 U.S. DOLLARS

TO THE ORDER OF

WV Dept. of Environmental Protectio
Division Air Quality
601 57th Street SE
Charleston,, WV 25304 US

GHD SERVICES INC

AUTHORIZED SIGNATURES

WARNING: THIS DOCUMENT IS VOID IF ACCOUNT NUMBER DOES NOT APPEAR ON THE REVERSE SIDE IN TIED

⑈421637⑈ ⑆221370632⑆6100000011891O⑈

Attachment O
Emissions Summary Sheet

Attachment O: G70-A Emissions Summary Sheet

Emission Points Data Summary Sheet

Table 1: Emissions Data												
Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type1	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		All Regulated Pollutants - Chemical Name/CAS3 *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions 4		Maximum Potential Controlled Emissions 5		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used 6
		ID No.	Source	ID No.	Device Type		lb/hr	ton/yr	lb/hr	ton/yr		
EP-H001, EP-H002, EP-H003, EP-H004, EP-H005, EP-H006, EP-H007, EP-H008, EP-H009	Vertical Stack	H001, H002, H003, H004, H005, H006, H007, H008, H009	Gas Production Unit Heaters	N/A		CO (630080)	0.9303	4.0748	0.9303	4.0748	Gas/Vapor /Solid (for PM)	MB AP-42
						NOx (10102439)	1.1075	4.8509	1.1075	4.8509		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4 (74828)	1329.0149	5821.0851	1329.0149	5821.0851		
						SO2 (7446095)	6.65E-03	0.0291	6.65E-03	0.0291		
						PM, PM10, PM2.5	0.0842	0.3687	0.0842	0.3687		
						Hexane (110543)	0.0199	0.0873	0.0199	0.0873		
						Total VOCs	0.0609	0.2668	0.0609	0.2668		
EP-LH001, EP-LH002, EP-LH003, EP-LH004, EP-LH005, EP-LH006, EP-LH007, EP-LH008, EP-LH009	Vertical Stack	LH001, LH002, LH003, LH004, LH005, LH006, LH007, LH008, LH009	Line Heaters	N/A		CO (630080)	1.2404	5.4330	1.2404	5.4330		
						NOx (10102439)	1.4767	6.4679	1.4767	6.4679		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4 (74828)	1772.0198	7761.4468	1772.0198	7761.4468		
						SO2 (7446095)	8.86E-03	0.0388	8.86E-03	0.0388		
						PM, PM10, PM2.5	0.1122	0.4916	0.1122	0.4916		
						Hexane (110543)	0.0266	0.1164	0.0266	0.1164		
						Total VOCs	0.0812	0.3557	0.0812	0.3557		
F001	N/A	F001	Fugitives	N/A		Toluene (108883)	2.23E-02	0.0976	2.23E-02	0.0976	Gas/Vapor	MB
						Ethyl benzene (100414)	0.0206	0.0903	0.0206	0.0903		
						Hexane (110543)	0.2191	0.9598	0.2191	0.9598		
						o,m,p-xylenes (95476,108383,106423)	0.0591	0.2590	0.0591	0.2590		
						CO2 Equivalent CO2 (124389)), CH4	75.7324	331.7077	75.7324	331.7077		
						VOCs	3.2593	14.2758	3.2593	14.2758		
EP-L001, EP-L002	N/A	L001, L002	Loading (Condensate), Loading (Water)	N/A		VOCs	14.4896	9.9172	14.4896	9.9172	Gas/Vapor	MB
						hexane (110543)	0.0389	0.0266	0.0389	0.0266		
						CO2 Equivalent CO2 (124389), CH4	3.8784	3.3320	3.8784	3.3320		

Attachment O: G70-A Emissions Summary Sheet

Emission Points Data Summary Sheet

Table 1: Emissions Data												
Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type1	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		All Regulated Pollutants - Chemical Name/CAS3 *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions 4		Maximum Potential Controlled Emissions 5		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used 6
		ID No.	Source	ID No.	Device Type		lb/hr	ton/yr	lb/hr	ton/yr		
EP-HR001	N/A	HR001	Haul Truck	N/A		PM, PM10, PM2.5	0.8294	0.9647	0.4147	0.4823	Solid	MB
EP-EC001, EP-EC002, EP-EC003, EP-EC004	N/A	TANKCOND001-010, TANKPW001-002, EC001, EC002, EC003, EC004	Condensate Tank F/W/B, PW Tank F/W/B, Enclosed Combustor	EC001, EC002, EC003, EC004	Enclosed Combustor	CO (630080)	0.00E+00	0.00E+00	0.3605	1.5790	Gas/Vapor/ Solid (for PM)	MB
						NOx (10102439)	0.00E+00	0.00E+00	0.4292	1.8798		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4	0.00E+00	0.00E+00	1649.6063	7225.2756		
						PM, PM10, PM2.5	0.00E+00	0.00E+00	0.0326	7.05E-05		
						Benzene (71432)	0.5950	2.6062	1.19E-02	0.0521		
						Toluene (108883)	0.5211	2.2823	1.04E-02	0.0456		
						ethyl benzene	0.1602	15.4410	3.20E-03	0.3088		
						hexane (110543)	14.1513	61.9828	0.2830	1.2397		
						o,m,p-xylenes (95476,108383,106423)	0.3633	1.5912	7.27E-03	0.0318		
						VOCs	359.0195	1572.5055	7.1807	31.4513		
EP-PCV	valve	PCV	Pneumatic CV	N/A		hexane (110543)	5.58E-03	0.0245	5.58E-03	0.0245	Gas/Vapor	MB
						CO2 Equivalent CO2 (124389)), CH4	8.2261	36.0305	8.2261	36.0305		
						VOCs	0.0871	0.3814	0.0871	0.3814		
EP-ENG001	Vertical Stack	ENG001	Compressor Engine	N/A		CO (630080)	5.6445	24.7228	5.6445	24.7228	Gas/Vapor/ Solid (for PM)	MB
						NOx (10102439)	0.3158	1.3831	0.3158	1.3831		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4 (74828)	25.8016	113.0112	25.8016	113.0112		
						TAPs Formaldehyde (50000)	4.81E-03	0.0211	4.81E-03	0.0211		
						Total VOCs	6.94E-03	0.0304	6.94E-03	0.0304		

Attachment C/O: G70-A Emissions Summary Sheet

Fugitive Emissions Data Summary Sheet

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants Chemical Name/CAS 1	Maximum Potential Uncontrolled Emissions 2		Maximum Potential Controlled Emissions 3		Est. Method Used 4
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	n/a					
Unpaved Haul Roads	PM, PM10, PM2.5	0.8294	0.9647	0.4147	0.4823	MB
Loading/Unloading Operations	VOCs	14.4896	9.9172	14.4896	9.9172	MB
	hexane (110543)	0.0389	0.0266	0.0389	0.0266	
	CO2 Equivalent CO2 (124389), CH4	3.8784	3.3320	3.8784	3.3320	
Equipment Leaks (Components)	Toluene (108883)	Does not apply	0.0976	Does not apply	0.0976	MB
	Ethyl benzene (100414)		0.0903		0.0903	
	Hexane (110543)		0.9598		0.9598	
	o,m,p-xylenes (95476,108383,106423)		0.2590		0.2590	
	CO2 Equivalent CO2 (124389)), CH4		331.7077		331.7077	
	VOCs		14.2758		14.2758	
Equipment Leaks (PCVs)	hexane (110543)	5.58E-03	2.45E-02	5.58E-03	2.45E-02	MB
	CO2 Equivalent CO2 (124389)), CH4	8.2261	36.0305	8.2261	36.0305	
	VOCs	0.0871	0.3814	0.0871	0.3814	

1 List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS2, VOCs, H2S, Inorganics, Lead, Organics, O3, NO, NO2, SO2, SO3, all applicable Greenhouse Gases (including CO2 and methane), etc. DO NOT LIST H2, H2O, N2, O2, and Noble Gases.

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

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

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