August 20, 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
Wagner 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 Wagner Well Pad.

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

1. Decrease in condensate production
2. Removal of the 48" Cimarron enclosed combustor

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. 423593 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/220

Encl.

cc: Barry Schatz, Antero Resources Corporation

General Permit Application G70-A Modification

Decrease in production and the removal of the 48" Cimarron enclosed combustor.

Wagner Well Pad

Antero Resources Corporation

6320 Rothway, Suite 100 Houston Texas 77040

082715 | Report No 220 | August 2015

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:
2509 Johnson Fork
Salem, WV 26462

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

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):
017-00122

10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only):
PD14-111
G70-A127
G70-A127A

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site:	12A. Address of primary operating site:
Wagner Well Pad	Mailing: N/A Physical: 2509 Johnson Fork Salem, WV 26462

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 New Milton, head southeast on Meathouse Fork and go 3.5 mi. Turn left onto Snake Run Branch and go 0.2 mi. Take a slight right onto Snake Run and go 1.9 mi. Merge onto Standing Stone Rd and go 0.5 mi. Take a slight left and go 456 ft. Keep right and go 0.6 mi to reach destination.

15A. Nearest city or town:	16A. County:	17A. UTM Coordinates:
New Milton	Doddridge	Northing (KM): 4340.2248 Easting (KM): 534.1869 Zone: 17 N

18A. Briefly describe the proposed new operation or change (s) to the facility:	19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Decrease in production and the removal of the 48" Cimarron enclosed combustor.	Latitude: 39.210623 Longitude: -80.604019

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 8/20/2015
(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
Wagner 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 gas production units (H001-H012) which are 3-phase separators where the gas, condensate, and produced water are separated. The 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 from the two phase separators is metered and sent to the sales gas pipeline. The condensate from the two phase separators flow to the condensate storage tanks (TANKCOND001-006).

The Facility has six (6) tanks (TANKCOND001-006) on site to store condensate and two (2) tanks (TANKPW001-002) to store produced water prior to removal from the site. Flashing, working, and breathing losses from the tanks are vented to the atmosphere.

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 analysis from Tom’s Fork Unit 1H, one of the wells in the Erwin Hilltop pad. This extended analysis is considered representative of the materials from Wagner Well Pad, being in the same Marcellus rock formation.

Wagner 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 Hughes Pad. This operates independently and is approximately 1.06 miles northwest from of facility.

Attachment C
Description of Fugitive Emissions

Attachment C

Description of Fugitive Emissions
Wagner 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 fugitive 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, 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 10.

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	4.3622	0.6579	2.1811	0.3289	MB
Loading/Unloading Operations	VOCs	30.4538	0.5561	30.4538	0.5561	MB
	hexane (110543)	0.0606	1.11E-03	0.0606	1.11E-03	
	o,m,p-xylenes (95476,108383,106423)	0.015949947	2.91E-04	0.015949947	2.91E-04	
	CO2 Equivalent CO2 (124389), CH4	20.2804	0.5683	20.2804	0.5683	
Equipment Leaks (Components)	Benzene (71432)	Does not apply	0.0108	Does not apply	0.0108	MB
	Toluene (108883)		0.1066		0.1066	
	Ethyl benzene (100414)		0.1954		0.1954	
	Hexane (110543)		0.9040		0.9040	
	o,m,p-xylenes (95476,108383,106423)		0.4939		0.4939	
	CO2 Equivalent CO2 (124389)), CH4		458.56		458.56	
	VOCs		18.8777		18.8777	
	TAPs (benzene)		0.0108		0.0108	
Equipment Leaks (PCVs)	hexane (110543)	7.23E-03	0.0316	7.23E-03	0.0316	MB
	CO2 Equivalent CO2 (124389), CH4	8.4368	36.95	8.4368	36.95	
	VOCs	0.0765	0.3353	0.0765	0.3353	

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

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

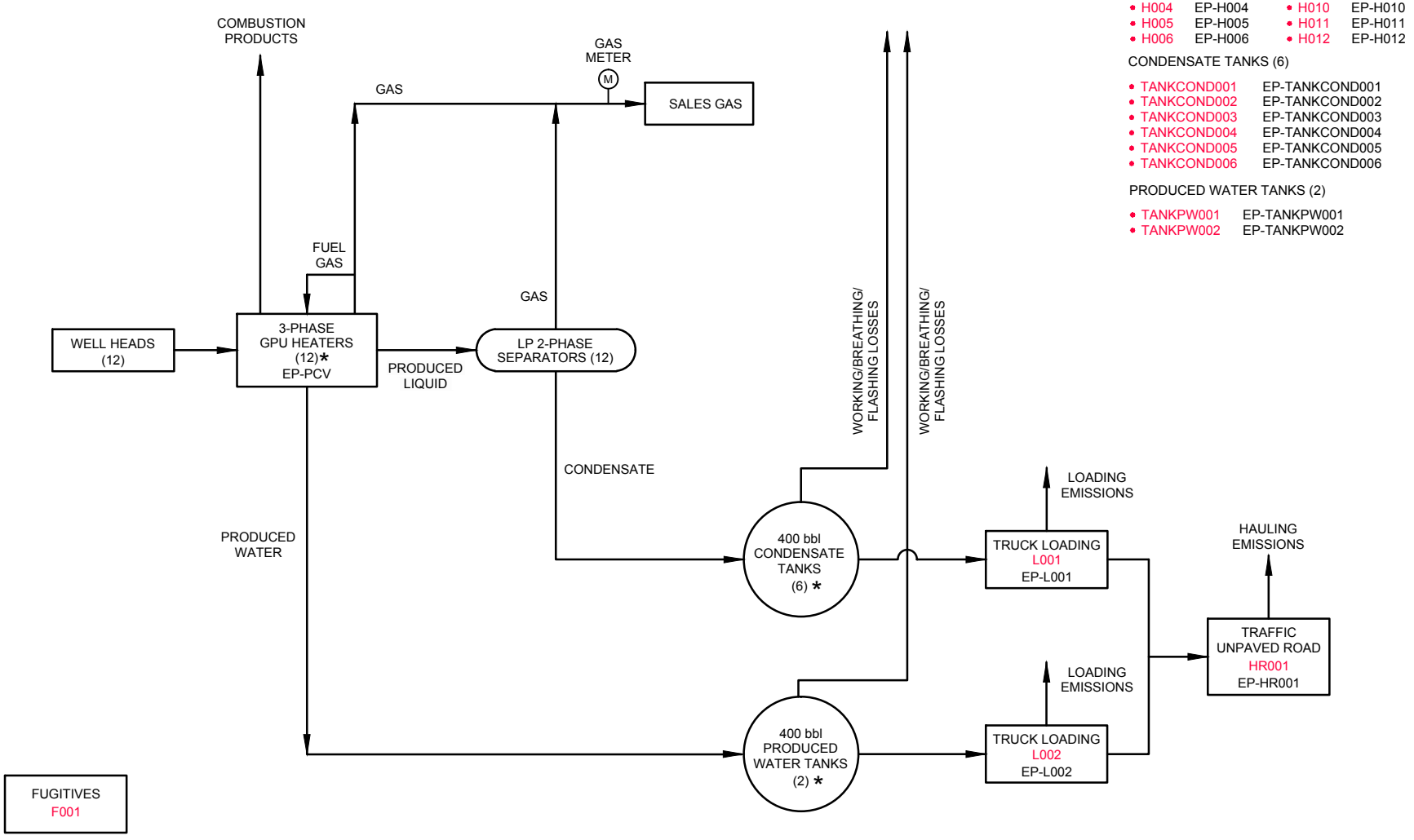
[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

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

Attachment 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	600		First attempt within 5 days of detection and final repair within 15 days	7,699.58
	Light Liquid VOC	624		First attempt within 5 days of detection and final repair within 15 days	29,478.53
	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	156		First attempt within 5 days of detection and final repair within 15 days	173.50
	Non-VOC			First attempt within 5 days of detection and final repair within 15 days	999.01
Other	VOC	708		First attempt within 5 days of detection and final repair within 15 days	403.80
	Non-VOC				2,325.11

Attachment D
Process Flow Diagram

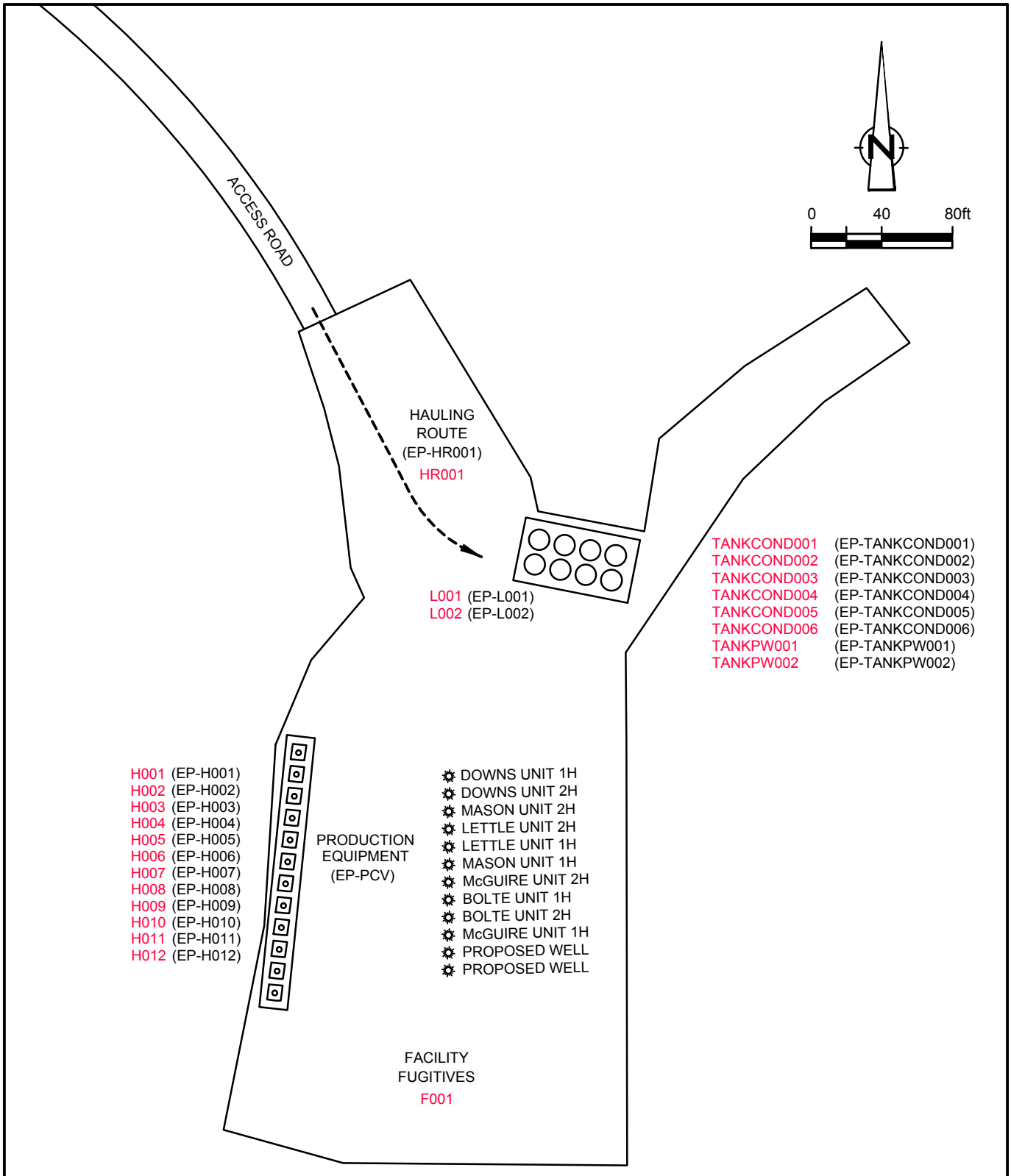


Attachment D

PROCESS FLOW DIAGRAM - ANTERO RESOURCES WAGNER WELL PAD

Doddridge County, West Virginia

Attachment E
Plot Plan



Attachment E

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

LEGEND

PROPOSED WELL NAME AND LOCATION

GHD

82715-00(220)GN-WA002 AUG 13/2015

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:	
47-017-06239-00	47-017-06434-00
47-017-06238-00	4 wells not permitted.
47-017-06233-00	
47-017-06234-00	
47-017-06422-00	
47-017-06435-00	
47-017-06433-00	

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, H010, H011, H012	EP-H001, EP-H002, EP-H003, EP-H004, EP-H005, EP-H006, EP-H007, EP-H008, EP-H009, EP-H010, EP-H011, EP-H012	Gas Production Unit Heater	2015	1 MMBtu/hr (each)	New	N/A
F001	F001	Fugitives	2015	N/A	New	N/A
TANKCOND001-006	EP-TANKCOND001, EP-TANKCOND002, EP-TANKCOND003, EP-TANKCOND004, EP-TANKCOND005, EP-TANKCOND006	Condensate Tank F/W/B	2015	400 bbl each	New	N/A
TANKPW001-002	EP-TANKPW001, EP-TANKPW002	PW Tank F/W/B	2015	400 bbl each	New	N/A
L001	EP-L001	Loading (Condensate)	2015	200 bbl capacity (each)	New	N/A
L002	EP-L002	Loading (Water)	2015	200 bbl capacity (each)	New	N/A
HR001	EP-HR001	Haul Truck	2015	40 ton capacity	New	N/A
PCV	EP-PCV	Pneumatic CV	2015	6.6 scf/day/PCV	New	N/A
EC001	EP-EC001	Enclosed Combustor	2015	90 scf/min	Removal	EC001

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 TANKCOND001-006
3. Emission Unit ID number TANKCOND001-006	4. Emission Point ID number EP-TANKCOND001, EP-TANKCOND002, EP-TANKCOND003, EP-TANKCOND004, EP-TANKCOND005, EP-TANKCOND006
5. Date Installed or Modified *(for existing tanks)* 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) 367,920	13B. Maximum daily throughput (gal/day) 1,008
14. Number of tank turnovers per year 4	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 Loss		
	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 (specify)

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: 2015
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):	4.9281
37A. Avg. liquid surface temperature (°F): 51.7		37B. Corresponding vapor pressure (psia):	6.1139
38A. Maximum liquid surface temperature (°F): 63.8		38B. Corresponding vapor pressure (psia):	7.4969

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):	5.9		
39D. Liquid molecular weight (lb/lb-mole):	103.8		
39E. Vapor molecular weight (lb/lb-mole):	40.33		
39F. Maximum true vapor pressure (psia):	8.5762		
39G. Max Reid vapor pressure (psi):	9.61306		
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-TANKPW001, EP-TANKPW002
5. Date Installed or Modified *(for existing tanks)*	2015	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)	4,415,040	13B. Maximum daily throughput (gal/day)	12,096
14. Number of tank turnovers per year	132	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 Loss		
	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 (specify)

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: 2015
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):	18.4198		
39F. Maximum true vapor pressure (psia):	0.4472		
39G. Max Reid vapor pressure (psi):	1.02419		
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	2015	New	--	1.00	1,200.78
H002	EP-H002	Gas Production Unit Heater	2015	New	--	1.00	1,200.78
H003	EP-H003	Gas Production Unit Heater	2015	New	--	1.00	1,200.78
H004	EP-H004	Gas Production Unit Heater	2015	New	--	1.00	1,200.78
H005	EP-H005	Gas Production Unit Heater	2015	New	--	1.00	1,200.78
H006	EP-H006	Gas Production Unit Heater	2015	New	--	1.00	1,200.78
H007	EP-H007	Gas Production Unit Heater	2015	New	--	1.00	1,200.78
H008	EP-H008	Gas Production Unit Heater	2015	New	--	1.00	1,200.78
H009	EP-H009	Gas Production Unit Heater	2015	New	--	1.00	1,200.78
H010	EP-H010	Gas Production Unit Heater	2015	New	--	1.00	1,200.78
H011	EP-H011	Gas Production Unit Heater	2015	New	--	1.00	1,200.78
H012	EP-H012	Gas Production Unit Heater	2015	New	--	1.00	1,200.78
EC001	EP-EC001	Enclosed Combustor (Cimmaron 48")	2015	Removal	EC001	6.6	1,200.78

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: 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 production pad.
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: 2015

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	3	3	3	3
days/week	2	2	2	2

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

Liquid Name		Condensate	Produced Water	
Max. daily throughput (1000 gal/day)		1.008	12.096	
Max. annual throughput (1000 gal/yr)		367.92	4,415.04	
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]		8.58	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)	49.02	1.17	
	Annual (ton/yr)	0.89	0.26	
Estimation Method [5]		Promax	Promax	

Notes:

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

2 At maximum bulk liquid temperature

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

4 List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets 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	TESTING
N/A	N/A

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

Attachment I
Emission Calculations

Table 1

Facility Information
Wagner 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	Wagner Well Pad
Nearest City/Town	New Milton
API Number/SIC Code	1311
Latitude/Longitude	39.210623, -80.604019
County	Doddridge County

Technical Information	
Max Condensate Site Throughput (bbl/day):	24
Max Produced Water Site Throughput (bbl/day):	288
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	12
Gas Production Unit Heaters	12
Condensate Tanks	6
Produced Water Tanks	2
Loading Jobs	2

Table 2

Uncontrolled/Controlled Emissions Summary
Wagner 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)																								
Fugitive Emissions (Component Count, PCV and Hauling)[1]	4.3865	19.2130			113.130	495.51							1.9630	0.2960			0.3978	1.7423	2.47E-03	0.0108	1.13E-01	4.94E-01		
Flashing, Working and Breathing (F/W/B) Losses[2]	7.12	31.2			29.8	130.7											0.142	0.623	2.87E-03	0.0126	0.0113	0.0494		
Gas Production Unit Heater Emissions[3]	0.0550	0.2407	0.9994	4.3772	1,206.35	5,283.82	0.8395	3.6768	0.0060	0.0263	0.0760	0.3327	0.0760	0.3327	5.00E-06	2.19E-05	1.88E-02	8.24E-02	2.10E-05	9.19E-05			7.50E-04	3.28E-03
TOTALS:	**11.5583**	**50.6255**	**0.9994**	**4.3772**	**1349.3113**	**5909.9835**	**0.8395**	**3.6768**	**0.0060**	**0.0263**	**0.0760**	**0.3327**	**2.0390**	**0.6287**	**5.00E-06**	**2.19E-05**	**0.5588**	**2.4474**	**0.0054**	**0.0235**	**0.1240**	**0.5433**	**7.50E-04**	**3.28E-03**
UNCONTROLLED (Truck Loading Emissions)																								
Truck Loading Emissions[4]	30.454	0.556			20.280	0.568											0.0903	1.65E-03	9.80E-04	1.81E-05	0.0159	2.91E-04		
CONTROLLED EMISSIONS																								
Controlled Fugitive Emissions from Hauling													0.9815	0.1480										
POTENTIAL TO EMIT[5]	**11.5583**	**51.1816**	**0.9994**	**4.3772**	**1349.3113**	**5910.5518**	**0.8395**	**3.6768**	**0.0060**	**0.0263**	**0.0760**	**0.3327**	**1.0575**	**0.4807**	**5.00E-06**	**2.19E-05**	**0.5588**	**2.4490**	**0.0054**	**0.0235**	**0.1240**	**0.5436**	**7.50E-04**	**3.28E-03**

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 9 for gas production unit heater emission calculations 4 - 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 24 barrels per day, VOC emissions would be 30.4538 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 0.127 pound per hour. 5 - The hourly potential to emit is the sum of emissions from gas production unit heaters, engine, storage tanks, and fugitives. 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

Wagner Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Pollutant		Emissions			Threshold Exceeded?	
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	11.5583		6	**Yes**	
	tons/yr	51.1816		10	**Yes**	
NO_X	lbs/hr	0.9994		6		
	tons/yr	4.3772		10		
CO	lbs/hr	0.8395		6		
	tons/yr	3.6768		10		
SO_2	lbs/hr	6.00E-03		6		
	tons/yr	0.0263		10		
$PM_{2.5}$	lbs/hr	7.60E-02		6		
	tons/yr	3.33E-01		10		
PM_{10}	lbs/hr	2.0390	1.0575	6		
	tons/yr	0.6287	0.4807	10		
Lead	lbs/hr	5.00E-06		6		
	tons/yr	2.19E-05		10		
Total HAPs	lbs/hr	0.5588		2		
	tons/yr	2.4490		5		
Total TAPs	lbs/hr	6.10E-03		1.14		
n-Hexane	lbs/hr	0.3456				
	tons/yr	1.5146				
Toluene	lbs/hr	0.0328				
	tons/yr	0.1440				
Ethylbenzene	lbs/hr	0.0502				
	tons/yr	0.2200				
Xylenes	lbs/hr	0.1240				
	tons/yr	0.5436				
Benzene	lbs/hr	5.35E-03				
	tons/yr	0.0235				

Enter any notes here:	1. Please see Attachment C/O- Fugitive Emissions Data Summary Sheet and Attachment O – Emission Points Data Summary Sheet for sitewide sources

Table 4

Fugitive Emissions
Wagner 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	0.148
	Benzene frac	0.000
	Toluene	0.000
	Ethylbenzene	0.000
	Xylenes	0.000
	n-Hexane	0.014
	Methane	0.652

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
600	Valves	Gas VOC	0.004500	0.40	7,699.58
		Non VOC	0.004500	2.30	44,334.82
708	Connectors	VOC	0.000200	0.02	403.80
		Non-VOC	0.000200	0.12	2,325.11
156	Flanges	VOC	0.000390	0.01	173.50
		Non-VOC	0.000390	0.05	999.01
			Total VOCs:	0.43	8,276.88
			Total THC:	2.90	55,935.82

Light Liquid Weight Fraction From Analysis:	VOC frac	0.981
	Benzene frac	0.001
	Toluene	0.007
	Ethylbenzene	0.013
	Xylenes	0.033
	n-hexane	0.034
	Methane	0.007

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
624	Valves	Light Liquid VOC	0.002500	1.53	29,478.53
		Light Liquid Non-VOC		0.03	585.79
			Total VOC:	1.53	29,478.53
			Total THC:	1.56	30,064.32

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	37,755.41	4.31	18.88
Ethylbenzene		0.04	0.20
Toluene		0.02	0.11
Xylenes		0.11	0.49
n-Hexane		0.21	0.90
TAPs (Benzene)		0.00	0.01
HAPs		0.39	1.71
CO_{2e}	917,112.84	104.69	458.56

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
Wagner 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	0.3703	14.01	0.8798328	0.00	0.03	0.00	0.01
Carbon Dioxide	0.1488	44.01	0.3535488	0.00	0.04	0.00	0.01
Methane	80.6305	16.04	191.578068	0.50	8.10	0.34	1.48
Ethane	13.169	30.07	31.289544	0.08	2.48	0.10	0.45
Propane	3.6879	44.1	8.7624504	0.02	1.02	0.04	0.19
Isobutane	0.4747	58.12	1.1278872	0.00	0.17	0.01	0.03
n-Butane	0.7783	58.12	1.8492408	0.00	0.28	0.01	0.05
Isopentane	0.2558	72.15	0.6077808	0.00	0.12	0.00	0.02
n-Pentane	0.1633	72.15	0.3880008	0.00	0.07	0.00	0.01
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	0.3214	86.18	0.7636464	0.00	0.17	0.01	0.03
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	0.0765	0.3353
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	0.0072	0.0316
HAPs Emissions	0.0072	0.0316
TAPs Emissions	0.0000	0.0000
CO_{2e} emissions	8.4368	36.9532

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

Wagner 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	0.1893	0.0099	0.0434	2.6808	0.0000	0.0000
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0129	0.0007	0.0030	0.4762	0.0059	0.0258
Carbon Dioxide	0.2781	0.0146	0.0638	2.6948	0.0333	0.1458
Methane	6.9449	0.3636	1.5924	59.5712	0.7358	3.2228
Ethane	28.2415	1.4784	6.4753	20.9969	0.2593	1.1359
Propane	28.3702	1.4851	6.5048	9.0226	0.1114	0.4881
Isobutane	6.6122	0.3461	1.5161	0.5582	0.0069	0.0302
n-Butane	12.1410	0.6356	2.7837	1.9815	0.0245	0.1072
Isopentane	4.7487	0.2486	1.0888	0.4944	0.0061	0.0267
n-Pentane	3.7052	0.1940	0.8495	0.3687	0.0046	0.0199
2-Methylpentane	1.2405	0.0649	0.2844	0.0573	0.0007	0.0031
3-Methylpentane	0.8075	0.0423	0.1852	0.0979	0.0012	0.0053
n-Hexane	2.0233	0.1059	0.4639	0.0742	0.0009	0.0040
Methylcyclopentane	0.3962	0.0207	0.0908	0.1333	0.0016	0.0072
Benzene	0.0382	0.0020	0.0088	0.0611	0.0008	0.0033
2-Methylhexane	0.6646	0.0348	0.1524	0.0272	0.0003	0.0015
3-Methylhexane	0.5180	0.0271	0.1188	0.0221	0.0003	0.0012
Heptane	0.8286	0.0434	0.1900	0.0370	0.0005	0.0020
Methylcyclohexane	0.5949	0.0311	0.1364	0.1345	0.0017	0.0073
Toluene	0.1095	0.0057	0.0251	0.1665	0.0021	0.0090
Octane	0.9583	0.0502	0.2197	0.0255	0.0003	0.0014
Ethylbenzene	0.0671	0.0035	0.0154	0.1015	0.0013	0.0055
m & p-Xylene	0.0522	0.0027	0.0120	0.0781	0.0010	0.0042
o-Xylene	0.0801	0.0042	0.0184	0.1225	0.0015	0.0066
Nonane	0.2727	0.0143	0.0625	0.0112	0.0001	0.0006
C10+	0.1043	0.0055	0.0239	0.0051	0.0001	0.0003
Total VOCs	64.333	3.37	14.8	13.580	0.1677	0.7347
Total CO_{2e}		9.10	39.9		18.43	80.7
Total TAPs (Benzene)		0.0020	0.0088		0.0008	0.0033
Toluene		0.0057	0.0251		0.0021	0.0090
Ethylbenzene		0.0035	0.0154		0.0013	0.0055
Xylenes		0.0069	0.0303		0.0025	0.0109
n-Hexane		0.106	0.464		0.0009	0.0040
Total HAPs		0.124	0.543		0.0075	0.0327
Total	100.00	5.23	22.9	100.00	1.202	5.26

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

Table 7

Uncontrolled Working and Breathing Losses

Wagner Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Condensate Tank Information	
Number of Tanks	6
Maximum Working Losses (lbs/hr)	0.4788
Maximum Breathing Losses (lbs/hr)	5.2860

	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	0.0005	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001
Carbon Dioxide	0.3030	0.0015	0.0064	0.0160	0.0702	0.0175	0.0765
Methane	1.5622	0.0075	0.0328	0.0826	0.3617	0.0901	0.3945
Ethane	36.0102	0.1724	0.7552	1.9035	8.3374	2.0759	9.0926
Propane	30.7324	0.1472	0.6446	1.6245	7.1154	1.7717	7.7600
Isobutane	6.6291	0.0317	0.1390	0.3504	1.5348	0.3822	1.6739
n-Butane	11.9624	0.0573	0.2509	0.6323	2.7696	0.6896	3.0205
Isopentane	4.4381	0.0213	0.0931	0.2346	1.0275	0.2558	1.1206
n-Pentane	3.4232	0.0164	0.0718	0.1810	0.7926	0.1973	0.8644
2-Methylpentane	1.1169	0.0053	0.0234	0.0590	0.2586	0.0644	0.2820
3-Methylpentane	0.7254	0.0035	0.0152	0.0383	0.1679	0.0418	0.1832
n-Hexane	0.1236	0.0006	0.0026	0.0065	0.0286	0.0071	0.0312
Methylcyclopentane	0.3311	0.0016	0.0069	0.0175	0.0767	0.0191	0.0836
Benzene	0.0020	0.0000	0.0000	0.0001	0.0005	0.0001	0.0005
2-Methylhexane	0.0380	0.0002	0.0008	0.0020	0.0088	0.0022	0.0096
3-Methylhexane	0.4464	0.0021	0.0094	0.0236	0.1034	0.0257	0.1127
Heptane	0.6577	0.0031	0.0138	0.0348	0.1523	0.0379	0.1661
Methylcyclohexane	0.4775	0.0023	0.0100	0.0252	0.1105	0.0275	0.1206
Toluene	0.0121	0.0001	0.0003	0.0006	0.0028	0.0007	0.0031
Octane	0.7166	0.0034	0.0150	0.0379	0.1659	0.0413	0.1809
Ethylbenzene	0.0139	0.0001	0.0003	0.0007	0.0032	0.0008	0.0035
m & p-Xylene	0.0140	0.0001	0.0003	0.0007	0.0032	0.0008	0.0035
o-Xylene	0.0186	0.0001	0.0004	0.0010	0.0043	0.0011	0.0047
Nonane	0.1843	0.0009	0.0039	0.0097	0.0427	0.0106	0.0465
C10+	0.0607	0.0003	0.0013	0.0032	0.0141	0.0035	0.0153
Total VOCs	62.124	0.2975	1.303	3.2839	14.3834	3.5814	15.686
Total CO_{2e}		0.1885	0.8255	2.0805	9.1127	2.2690	9.938
Total TAPs (Benzene)		0.0000	0.0000	0.0001	0.0005	0.0001	0.0005
Toluene		0.0001	0.0003	0.0006	0.0028	0.0007	0.0031
Ethylbenzene		0.0001	0.0003	0.0007	0.0032	0.0008	0.0035
Xylenes		0.0002	0.0007	0.0017	0.0075	0.0019	0.0082
n-Hexane		0.0006	0.0026	0.0065	0.0286	0.0071	0.0312
Total HAPs		0.0009	0.0039	0.0097	0.0426	0.0106	0.0465
Total	100.00	0.4788	2.0973	5.2860	23.1528	5.7649	25.250

Table 7

Uncontrolled Working and Breathing Losses

Wagner Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Produced Water Tank Information	
Number of Tanks	2
Maximum Working Losses (lbs/hr)	0.0269
Maximum Breathing Losses (lbs/hr)	0.0083

	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	0.0093	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide	3.5539	0.0010	0.0042	0.0003	0.0013	0.0013	0.0055
Methane	3.2402	0.0009	0.0038	0.0003	0.0012	0.0011	0.0050
Ethane	1.0539	0.0003	0.0012	0.0001	0.0004	0.0004	0.0016
Propane	0.1104	0.0000	0.0001	0.0000	0.0000	0.0000	0.0002
Isobutane	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Butane	0.0046	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Isopentane	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0002	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	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0001	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	0.1166	0.0000	0.0001	0.0000	0.0000	0.0000	0.0002
Total CO_{2e}		0.0228	0.0997	0.0070	0.0307	0.0298	0.1304
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	0.0269	0.1179	0.0083	0.0363	0.0352	0.1542

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

Table 8

Loading Emissions

Wagner Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	9.61	1.0242
Annual Average Temp (F)	72.1	72.1
S (saturation factor)	0.6	0.6
P (true vapor pressure)	8.58	0.45
M (MW of vapor)	40.33	18.42
Collection Efficiency (%)	0	0
Loading Loss (lb/10^3 gal)*	4.86	0.12
Maximum Throughput (gallons/hr)	10,080	10,080
Average Throughput (gallons/yr)	367,920	4,415,040
Loading Emissions (lbs/hr)	49.02	1.17
Loading Emissions (tpy)	0.89	0.26

	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	0.0005	0.00	0.00	0.0093	1.09E-04	2.38E-05
Carbon Dioxide	0.3030	0.15	0.00	3.5539	4.15E-02	9.09E-03
Methane	1.5622	0.77	0.01	3.2402	3.78E-02	8.28E-03
Ethane	36.0102	17.65	0.32	1.0539	1.23E-02	2.69E-03
Propane	30.7324	15.06	0.27	0.1104	1.29E-03	2.82E-04
Isobutane	6.6291	3.25	0.06	0.0009	9.98E-06	2.19E-06
n-Butane	11.9624	5.86	0.11	0.0046	5.33E-05	1.17E-05
Isopentane	4.4381	2.18	0.04	0.0003	3.33E-06	7.30E-07
n-Pentane	3.4232	1.68	0.03	0.0002	1.81E-06	3.97E-07
2-Methylpentane	1.1169	0.55	0.01	0.0000	5.38E-08	1.18E-08
3-Methylpentane	0.7254	0.36	0.01	0.0000	2.23E-07	4.88E-08
n-Hexane	0.1236	0.06	0.00	0.0000	2.70E-09	5.91E-10
Methylcyclopentane	0.3311	0.16	0.00	0.0001	6.53E-07	1.43E-07
Benzene	0.0020	0.00	0.00	0.0001	9.19E-07	2.01E-07
2-Methylhexane	0.0380	0.02	0.00	0.0000	4.18E-10	9.15E-11
3-Methylhexane	0.4464	0.22	0.00	0.0000	5.09E-09	1.11E-09
Heptane	0.6577	0.32	0.01	0.0000	6.26E-09	1.37E-09
Methylcyclohexane	0.4775	0.23	0.00	0.0000	1.41E-07	3.08E-08
Toluene	0.0121	0.01	0.00	0.0001	1.21E-06	2.64E-07
Octane	0.7166	0.35	0.01	0.0000	8.40E-10	1.84E-10
Ethylbenzene	0.0139	0.01	0.00	0.0000	4.13E-07	9.05E-08
m & p-Xylene	0.0140	0.01	0.00	0.0000	3.55E-07	7.78E-08
o-Xylene	0.0186	0.01	0.00	0.0000	5.82E-07	1.28E-07
Nonane	0.1843	0.09	0.00	0.0000	1.75E-10	3.82E-11
C10+	0.0607	0.03	0.00	0.0000	1.18E-11	2.58E-12
Total VOCs	62.1239	30.452	0.556	0.1166	1.36E-03	2.98E-04
Total CO_{2e}		19.293	0.3521		0.9872	0.2162
Total TAPs (Benzene)		0.0010	0.0000		0.0000	0.0000
Toluene		0.0059	0.0001		0.0000	0.0000
Ethylbenzene		0.0068	0.0001		0.0000	0.0000
Xylenes		0.0159	0.0003		0.0000	0.0000
n-Hexane		0.0606	0.0011		0.0000	0.0000
Total HAPs		0.0902	0.0016		0.0000	0.0000
Total	100.0000	49.0189	0.8946	100.0000	1.1674	0.2557

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
Wagner Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Number of Units	12
Heater Rating (MMBtu/hr)	1.00
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,201

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	0.999	4.377
CO	84	0.839	3.677
CO_2	120,000	1199.225	5252.603
Lead	0.0005	5.00E-06	2.19E-05
N_2O	2.2	0.022	0.096
PM (Total)	7.6	0.076	0.333
SO_2	0.6	0.006	0.026
TOC	11	0.110	0.481
Methane	2.3	0.023	0.101
VOC	5.5	0.055	0.241
HAPS			
2-Methylnaphthalene	2.40E-05	2.40E-07	1.05E-06
Benzene	2.10E-03	2.10E-05	9.19E-05
Dichlorobenzene	1.20E-03	1.20E-05	5.25E-05
Fluoranthene	3.00E-06	3.00E-08	1.31E-07
Fluorene	2.80E-06	2.80E-08	1.23E-07
Formaldehyde	7.50E-02	7.50E-04	3.28E-03
Hexane	1.80E+00	1.80E-02	7.88E-02
Naphthalene	6.10E-04	6.10E-06	2.67E-05
Phenanathrene	1.70E-05	1.70E-07	7.44E-07
Toluene	3.40E-03	3.40E-05	1.49E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.055	0.241
TOTAL Uncontrolled HAPs	0.019	0.082
TOTAL Uncontrolled TAPs (Benzene)	0.000	0.000
TOTAL Uncontrolled TAPs (Formaldehyde)	0.001	0.003
TOTAL CO_{2e} Emissions	1,206.35	5,283.82

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

Table 10

Haul Road Emissions
Wagner 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)	24
PW Production (bbl/day)	288
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	0.5500	1	44	0.5500	24.2000	3.8175	1.7179
Tanker Trucks PW	10	40	10	0.5500	1	526	0.5500	289.3000	3.8175	1.7179
Pick Up Truck	4	3	10	0.4700	1	730	0.4700	343.1000	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	2.0996	92.3842	0.0462	0.9448	41.5729	0.0208	1.0498	46.1921	0.0231	0.4724	20.7864	0.0104
Tanker Trucks PW	2.0996	1104.4113	0.5522	0.9448	496.9851	0.2485	1.0498	552.2056	0.2761	0.4724	248.4925	0.1242
Pick Up Truck	0.1629	118.9458	0.0595	0.0733	53.5256	0.0268	0.0815	59.4729	0.0297	0.0367	26.7628	0.0134
Total Emissions	4.3622	1,315.7413	0.6579	1.9630	592.0836	0.2960	2.1811	657.8706	0.3289	0.9815	296.0418	0.1480

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 11

Change in Regulated Air Pollutants Emissions
Wagner 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	2.2571	0.6616	2.2586	0.8179	-1.54E-03	-0.1563
PM10	1.0575	0.4807	1.0590	0.5547	-0.0015	-0.0740
VOC (uncontrolled)	11.5583	51.1816	19.8278	87.6423	-8.2695	-36.4607
CO	0.8395	3.6768	0.8564	3.7511	-0.0170	-0.0743
NOx	0.9994	4.3772	1.0196	4.4656	-0.0202	-0.0885
SO2	6.00E-03	0.0263	0.0060	0.0261	3.31E-05	1.45E-04
Pb	5.00E-06	2.19E-05	5.10E-06	2.23E-05	-1.01E-07	-4.42E-07
HAPs	0.5588	2.4490	0.4356	1.9146	0.1232	0.5345
TAPs	6.10E-03	0.0268	3.24E-03	0.0142	2.86E-03	1.26E-02

Notes: Change in emissions due to the decrease in production and the removal of the 48" Cimarron enclosed combustor.

Bryan Research & Engineering, Inc.

ProMax® 3.2

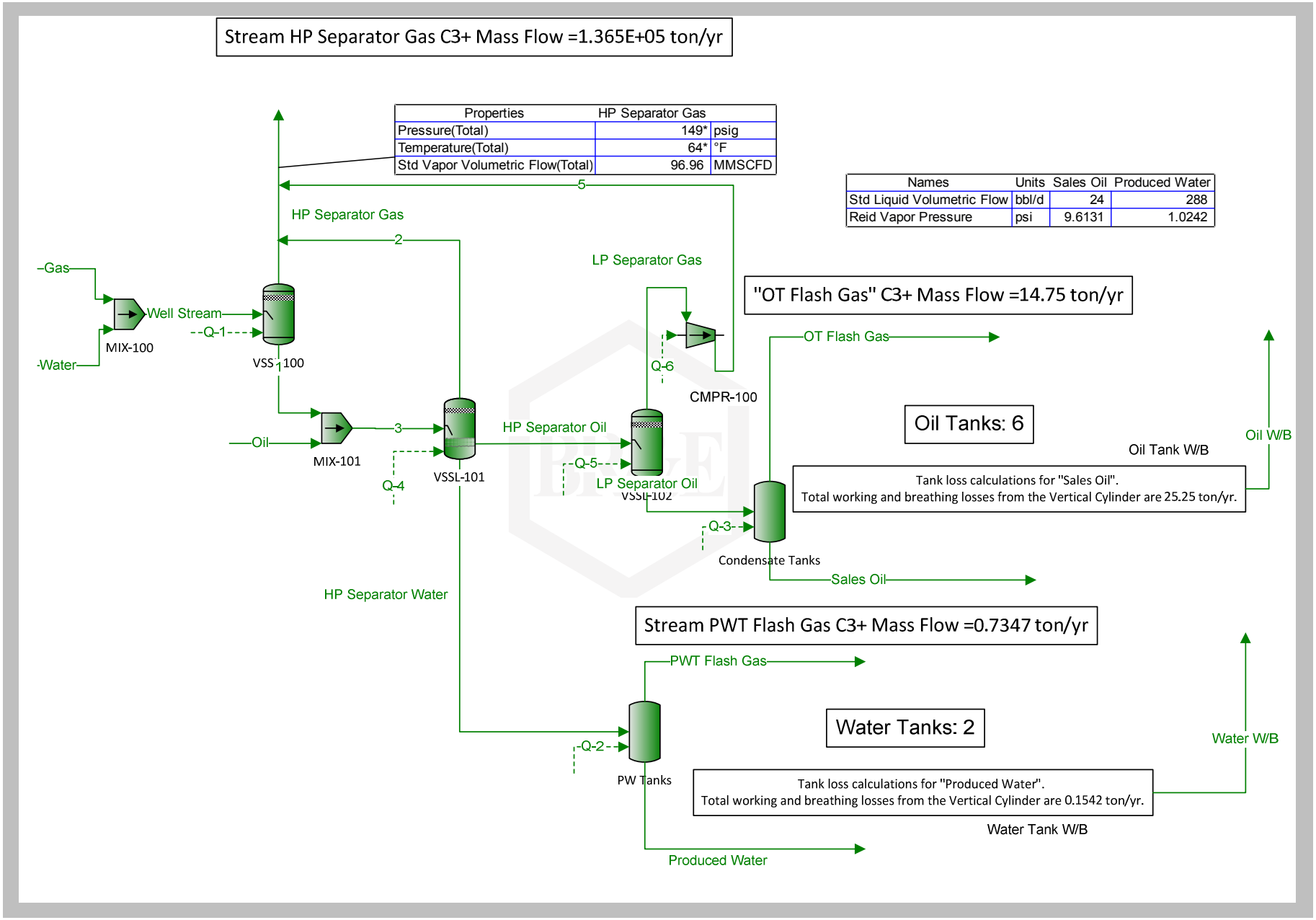
with

TSWEET® & PROSIM®

Simulation Report	
Client Name:	Antero Resources Corporation
Location:	West Virginia
Job:	Wagner 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:	8/6/2015 14:05


Stream HP Separator Gas C3+ Mass Flow =1.365E+05 ton/yr
Properties | HP Separator Gas
Pressure(Total) | 149* | psig
Temperature(Total) | 64* | °F
Std Vapor Volumetric Flow(Total) | 96.96 | MMSCFD
Names | Units | Sales Oil | Produced Water
Std Liquid Volumetric Flow | bbl/d | 24 | 288
Reid Vapor Pressure | psi | 9.6131 | 1.0242
"OT Flash Gas" C3+ Mass Flow =14.75 ton/yr
Stream PWT Flash Gas C3+ Mass Flow =0.7347 ton/yr
Oil Tanks: 6
Water Tanks: 2
Tank loss calculations for "Sales Oil".
Total working and breathing losses from the Vertical Cylinder are 25.25 ton/yr.
Tank loss calculations for "Produced Water".
Total working and breathing losses from the Vertical Cylinder are 0.1542 ton/yr.
Gas
Water
Well Stream
Oil
MIX-100
MIX-101
VSS-100
VSSL-101
VSSL-102
CMPR-100
Condensate Tanks
PW Tanks
HP Separator Gas
HP Separator Oil
HP Separator Water
LP Separator Gas
LP Separator Oil
OT Flash Gas
Sales Oil
PWT Flash Gas
Produced Water
Oil Tank W/B
Oil W/B
Water Tank W/B
Water W/B
Q-1
Q-2
Q-3
Q-4
Q-5
Q-6
2
3
5

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		2.32854	0.188896	99.9715	0.0519370	0.409600	0.00840894	0	100	0	99.9967	3.02997	0.000209482	94.0924	99.9706	98.9073	0.0311924
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.361677	0.369602	9.40562E-05	0.0115858	0.0179916	2.65010E-05	0.3703	0	0.0170005	4.05493E-06	0.346123	0.000755597	0.00612939	5.24321E-05	0.000232696	0.00104673
Carbon Dioxide		0.145335	0.148501	0.000928580	0.0322826	0.246347	0.00428683	0.1488	0	0.0380011	0.000604533	1.24680	0.277697	1.48746	0.000870892	0.00126582	0.0180334
Methane		78.7530	80.4782	0.0214804	4.20606	16.8746	0.0801016	80.6305	0	4.27113	0.00182002	75.6098	3.92767	3.72040	0.0226608	0.0678486	1.03385
Ethane		12.8624	13.1441	0.00409594	4.46475	36.6104	1.11563	13.169	0	4.48413	0.000398856	14.2183	48.3022	0.645631	0.00417553	0.0518255	3.13136
Propane		3.60203	3.68093	0.00121245	4.44789	25.0785	2.89710	3.6879	0	4.44113	0.000129131	4.16626	28.1100	0.0461114	0.00133325	0.0485561	4.15678
Isobutane		0.463646	0.473805	5.29551E-05	1.47944	4.43447	1.31283	0.4747	0	1.47904	2.10881E-06	0.195542	4.60018	0.000271003	5.54240E-05	0.0157863	1.49011
n-Butane		0.760177	0.776831	0.000196989	3.64701	8.14229	3.46416	0.7783	0	3.64611	1.64859E-05	0.694179	8.30115	0.00144787	0.000193548	0.0389725	3.72983
Isopentane		0.249844	0.255318	3.85489E-05	2.69227	2.56558	2.82860	0.2558	0	2.69008	2.27081E-06	0.139517	2.48098	7.29285E-05	4.32916E-05	0.0286552	2.81367
n-Pentane		0.159497	0.162992	2.87311E-05	2.77181	2.00179	2.96157	0.1633	0	2.77008	1.67675E-06	0.104045	1.91366	3.96653E-05	2.63350E-05	0.0294894	2.90706
2-Methylpentane		0	0	3.62527E-06	1.83317	0.561109	2.01701	0	0	1.83205	1.03923E-07	0.0135422	0.522724	9.85737E-07	0	0.0194862	1.93433
3-Methylpentane		0	0	6.49473E-06	1.32950	0.365265	1.46599	0	0	1.32904	4.81489E-07	0.0231256	0.339510	4.08115E-06	0	0.0141360	1.40348
n-Hexane		0.313916	0.320795	4.66449E-06	4.13977	0.915172	4.58166	0.3214	0	4.13512	1.06954E-07	0.0175271	0.0578335	4.94101E-08	1.86174E-05	0.0440007	4.37344
Methylcyclopentane		0	0	1.04005E-05	0.863760	0.183484	0.956527	0	0	0.864026	2.01562E-06	0.0322480	0.158687	1.22380E-05	0	0.00919000	0.912626
Benzene		0	0	5.37244E-05	0.0910797	0.0190521	0.100883	0	0	0.0960029	4.95988E-05	0.0159154	0.00103152	1.85604E-05	0	0.00102111	0.0962361
2-Methylhexane		0	0	1.47134E-06	2.73023	0.258526	3.04776	0	0	2.72808	3.58326E-08	0.00552059	0.0152980	6.58203E-09	0	0.0290166	2.88936
3-Methylhexane		0	0	1.19672E-06	2.23583	0.201523	2.49663	0	0	2.23407	3.04293E-08	0.00448523	0.179691	8.01479E-08	0	0.0237621	2.36629
Heptane		0	0	2.00627E-06	4.50574	0.322321	5.03762	0	0	4.50214	5.12923E-08	0.00751833	0.264737	9.86421E-08	0	0.0478859	4.76984
Methylcyclohexane		0	0	8.40358E-06	3.27607	0.236161	3.66267	0	0	3.27410	1.15330E-06	0.0278836	0.196131	2.26003E-06	0	0.0348242	3.46808
Toluene		0	0	0.000104336	0.793990	0.0463142	0.888510	0	0	0.803024	9.47925E-05	0.0367958	0.00528795	2.06451E-05	0	0.00854117	0.840682
Octane		0	0	1.20054E-06	14.5357	0.327012	16.3053	0	0	14.5234	2.04323E-08	0.00453837	0.253034	1.16031E-08	0	0.154475	15.3979
Ethylbenzene		0	0	5.04034E-05	1.27444	0.0246332	1.42990	0	0	1.27804	4.53545E-05	0.0194621	0.00529149	6.14190E-06	0	0.0135935	1.35009
m-Xylene		0	0	4.00349E-05	1.18532	0.0191811	1.33019	0	0	1.18804	3.61483E-05	0.0149831	0.00530823	5.27874E-06	0	0.0126363	1.25574
o-Xylene		0	0	8.27121E-05	2.03611	0.0294167	2.28523	0	0	2.04206	7.66233E-05	0.0234924	0.00705265	8.65349E-06	0	0.0217199	2.15712
Nonane		0	0	4.76859E-07	11.2329	0.0828814	12.6132	0	0	11.2233	1.27787E-08	0.00178473	0.0579552	2.14862E-09	0	0.119374	11.9016
C10+		0	0	1.79148E-07	24.1314	0.0263671	27.1081	0	0	24.1107	5.61512E-09	0.000667363	0.0158850	1.20407E-10	0	0.256448	25.5702
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		253.329	20.1099	233.218	0.00130146	0.000550078	0.000187562	0	253.329	0	233.216	0.00183801	2.99417E-07	0.00179782	233.219	233.219	0.000737641
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		39.3480	39.3479	0.000219419	0.000290320	2.41621E-05	5.91107E-07	39.3480	0	0.000426371	9.45707E-06	0.000209962	1.07999E-06	1.17114E-07	0.000122318	0.000548688	2.47532E-05
Carbon Dioxide		15.8115	15.8094	0.00216623	0.000808950	0.000330836	9.56181E-05	15.8115	0	0.000953064	0.00140991	0.000756319	0.000396917	2.84209E-05	0.00203169	0.00298475	0.000426454
Methane		8567.78	8567.73	0.0501104	0.105397	0.0226619	0.00178668	8567.78	0	0.107119	0.00424472	0.0458656	0.00561389	7.10856E-05	0.0528650	0.159984	0.0244486
Ethane		1399.34	1399.33	0.00955520	0.111879	0.0491665	0.0248842	1399.34	0	0.112462	0.000930228	0.00862497	0.0690392	1.23361E-05	0.00974100	0.122203	0.0740507
Propane		391.875	391.872	0.00282846	0.111457	0.0336796	0.0646202	391.875	0	0.111383	0.000301164	0.00252729	0.0401782	8.81050E-07	0.00311032	0.114493	0.0982998
Isobutane		50.4415	50.4414	0.000123536	0.0370723	0.00595534	0.0292828	50.4415	0	0.0370943	4.91824E-06	0.000118618	0.00657511	5.17806E-09	0.000129298	0.0372235	0.0352382
n-Butane		82.7020	82.7015	0.000459545	0.0913882	0.0109348	0.0772685	82.7020	0	0.0914440	3.84491E-05	0.000421096	0.0118650	2.76645E-08	0.000451523	0.0918955	0.0882033
Isopentane		27.1813	27.1812	8.99285E-05	0.0674639	0.00344548	0.0630923	27.1813	0	0.0674669	5.29608E-06	8.46324E-05	0.00354611	1.39345E-09	0.000100994	0.0675679	0.0665378
n-Pentane		17.3522	17.3522	6.70253E-05	0.0694570	0.00268833	0.0660581	17.3522	0	0.0694733	3.91059E-06	6.31147E-05	0.00273523	7.57885E-10	6.14364E-05	0.0695348	0.0687464
2-Methylpentane		0	0	8.45721E-06	0.0459363	0.000753550	0.0449895	0	0	0.0459477	2.42373E-07	8.21483E-06	0.000747139	1.88345E-11	0	0.0459477	0.0457431
3-Methylpentane		0	0	1.51512E-05	0.0333151	0.000490538	0.0326991	0	0	0.0333322	1.12295E-06	1.40282E-05	0.000485268	7.79786E-11	0	0.0333322	0.0331896
n-Hexane		34.1519	34.1519	1.08815E-05	0.103736	0.00122904	0.102194	34.1519	0	0.103708	2.49443E-07	1.06321E-05	8.26624E-05	9.44079E-13	4.34321E-05	0.103752	0.103423
Methylcyclopentane		0	0	2.42628E-05	0.0216444	0.000246412	0.0213354	0	0	0.0216697	4.70090E-06	1.95619E-05	0.000226814	2.33832E-10	0	0.0216697	0.0215818
Benzene		0	0	0.000125331	0.00228231	2.55863E-05	0.00225021	0	0	0.00240774	0.000115676	9.65444E-06	1.47437E-06	3.54634E-10	0	0.00240774	0.00227580
2-Methylhexane		0	0	3.43241E-06	0.0684151	0.000347192	0.0679807	0	0	0.0684200	8.35702E-08	3.34884E-06	2.18657E-05	1.25763E-13	0	0.0684200	0.0683279
3-Methylhexane		0	0	2.79175E-06	0.0560262	0.000270638	0.0556876	0	0	0.0560301	7.09684E-08	2.72078E-06	0.000256836	1.53139E-12	0	0.0560301	0.0559582
Heptane		0	0	4.68032E-06	0.112907	0.000432865	0.112365	0	0	0.112913	1.19626E-07	4.56069E-06	0.000378393	1.88476E-12	0	0.112913	0.112798
Methylcyclohexane		0	0	1.96042E-05	0.0820931	0.000317156	0.0816963	0	0	0.0821140	2.68978E-06	1.69145E-05	0.000280334	4.31824E-11	0	0.0821140	0.0820134
Toluene		0	0	0.000243399	0.0198961	6.21983E-05	0.0198183	0	0	0.0201397	0.000221079	2.23207E-05	7.55816E-06	3.94466E-10	0	0.0201397	0.0198805
Octane		0	0	2.80067E-06	0.364241	0.000439166	0.363692	0	0	0.364246	4.76530E-08	2.75302E-06	0.000361666	2.21701E-13	0	0.364246	0.364132
Ethylbenzene		0	0	0.000117583	0.0319353	3.30815E-05	0.0318940	0	0	0.0320530	0.000105778	1.18059E-05	7.56323E-06	1.17353E-10	0	0.0320530	0.0319271
m-Xylene		0	0	9.33954E-05	0.0297023	2.57595E-05	0.0296701	0	0	0.0297958	8.43065E-05	9.08887E-06	7.58715E-06	1.00861E-10	0	0.0297958	0.0296959
o-Xylene		0	0	0.000192955	0.0510215	3.95056E-05	0.0509722	0	0	0.0512146	0.000178704	1.42507E-05	1.00805E-05	1.65342E-10	0	0.0512146	0.0510117
Nonane		0	0	1.11244E-06	0.281478	0.000111307	0.281340	0	0	0.281480	2.98030E-08	1.08263E-06	8.28364E-05	4.10537E-14	0	0.281480	0.281451
C10+		0	0	4.17925E-07	0.604693	3.54101E-05	0.604649	0	0	0.604694	1.30958E-08	4.04829E-07	2.27047E-05	2.30062E-15	0	0.604694	0.604685
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		2.10254	0.170200	99.9656	0.00895939	0.189306	0.00133619	0	100	0	99.9942	2.68082	9.35681E-05	92.0259	99.9662	94.1043	0.00514837
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.507815	0.517840	0.000146247	0.00310778	0.0129300	6.54807E-06	0.518721	0	0.00456213	6.30518E-06	0.476194	0.000524802	0.00932177	8.15272E-05	0.000344267	0.000268646
Carbon Dioxide		0.320579	0.326867	0.00226829	0.0136043	0.278137	0.00166406	0.327464	0	0.0160208	0.00147677	2.69482	0.303010	3.55391	0.00212741	0.00294211	0.00727113
Methane		63.3223	64.5722	0.0191269	0.646110	6.94493	0.0113344	64.6822	0	0.656377	0.00162067	59.5712	1.56223	3.24022	0.0201784	0.0574847	0.151953
Ethane		19.3847	19.7673	0.00683607	1.28551	28.2415	0.295887	19.8010	0	1.29163	0.000665709	20.9969	36.0102	1.05395	0.00696900	0.0823007	0.862646
Propane		7.96087	8.11800	0.00296751	1.87806	28.3702	1.12680	8.13185	0	1.87598	0.000316063	9.02255	30.7324	0.110387	0.00326324	0.113078	1.67931
Isobutane		1.35066	1.37733	0.000170838	0.823378	6.61223	0.673034	1.37967	0	0.823499	6.80342E-06	0.558175	6.62912	0.000855129	0.000178805	0.0484578	0.793485
n-Butane		2.21450	2.25821	0.000635503	2.02974	12.1410	1.77593	2.26206	0	2.03007	5.31868E-05	1.98153	11.9624	0.00456865	0.000624410	0.119630	1.98614
Isopentane		0.903474	0.921310	0.000154374	1.85998	4.74874	1.80006	0.922878	0	1.85923	9.09408E-06	0.494361	4.43805	0.000285655	0.000173370	0.109187	1.85986
n-Pentane		0.576768	0.588154	0.000115057	1.91493	3.70519	1.88468	0.589155	0	1.91453	6.71500E-06	0.368670	3.42321	0.000155365	0.000105463	0.112366	1.92160
2-Methylpentane		0	0	1.73403E-05	1.51268	1.24049	1.53312	0	0	1.51238	4.97099E-07	0.0573139	1.11685	4.61168E-06	0	0.0886851	1.52719
3-Methylpentane		0	0	3.10654E-05	1.09706	0.807524	1.11430	0	0	1.09714	2.30312E-06	0.0978734	0.725397	1.90933E-05	0	0.0643354	1.10808
n-Hexane		1.35586	1.38263	2.23111E-05	3.41602	2.02325	3.48251	1.38498	0	3.41359	5.11598E-07	0.0741789	0.123567	2.31161E-07	8.90516E-05	0.200255	3.45291
Methylcyclopentane		0	0	4.85838E-05	0.696076	0.396154	0.710046	0	0	0.696578	9.41583E-06	0.133289	0.331119	5.59151E-05	0	0.0408469	0.703680
Benzene		0	0	0.000232928	0.0681238	0.0381790	0.0695060	0	0	0.0718358	0.000215048	0.0610551	0.00199772	7.87081E-05	0	0.00421240	0.0688707
2-Methylhexane		0	0	8.18320E-06	2.61960	0.664576	2.69367	0	0	2.61863	1.99298E-07	0.0271675	0.0380059	3.58056E-08	0	0.153554	2.65251
3-Methylhexane		0	0	6.65580E-06	2.14524	0.518041	2.20656	0	0	2.14443	1.69245E-07	0.0220723	0.446419	4.35997E-07	0	0.125748	2.17232
Heptane		0	0	1.11583E-05	4.32317	0.828569	4.45234	0	0	4.32150	2.85283E-07	0.0369986	0.657703	5.36603E-07	0	0.253410	4.37884
Methylcyclohexane		0	0	4.57981E-05	3.08009	0.594871	3.17201	0	0	3.07951	6.28552E-06	0.134458	0.477459	1.20470E-05	0	0.180580	3.11974

Toluene		0	0	0.000533590	0.700513	0.109476	0.722086	0	0	0.708776	0.000484800	0.166505	0.0120800	0.000103270	0	0.0415622	0.709662
Octane		0	0	7.61174E-06	15.8990	0.958303	16.4282	0	0	15.8922	1.29551E-07	0.0254602	0.716626	7.19557E-08	0	0.931908	16.1145
Ethylbenzene		0	0	0.000297012	1.29557	0.0670913	1.33897	0	0	1.29977	0.000267270	0.101475	0.0139283	3.53996E-05	0	0.0762174	1.31318
m-Xylene		0	0	0.000235914	1.20498	0.0522418	1.24561	0	0	1.20823	0.000213018	0.0781213	0.0139724	3.04247E-05	0	0.0708500	1.22141
o-Xylene		0	0	0.000487398	2.06987	0.0801198	2.13992	0	0	2.07678	0.000451534	0.122489	0.0185641	4.98756E-05	0	0.121781	2.09814
Nonane		0	0	3.39467E-06	13.7952	0.272707	14.2688	0	0	13.7891	9.09725E-08	0.0112418	0.184292	1.49606E-08	0	0.808585	13.9849
C10+		0	0	1.53256E-06	35.6134	0.104255	36.8516	0	0	35.5976	4.80373E-08	0.00505151	0.0607013	1.00748E-09	0	2.08742	36.1063
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		4563.80	362.286	4201.49	0.0234461	0.00990982	0.00337899	0	4563.80	0	4201.46	0.0331123	5.39408E-06	0.0323883	4201.51	4201.51	0.0132888
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		1102.27	1102.27	0.00614666	0.00813286	0.000676862	1.65589E-05	1102.27	0	0.0119441	0.000264925	0.00588174	3.02542E-05	3.28077E-06	0.00342654	0.0153706	0.000693421
Carbon Dioxide		695.854	695.765	0.0953348	0.0356015	0.0145599	0.00420811	695.854	0	0.0419439	0.0620496	0.0332852	0.0174681	0.00125079	0.0894136	0.131357	0.0187680
Methane		137448	137447	0.803893	1.69083	0.363553	0.0286627	137448	0	1.71846	0.0680958	0.735798	0.0900606	0.00114039	0.848084	2.56654	0.392216
Ethane		42076.7	42076.4	0.287316	3.36410	1.47839	0.748245	42076.7	0	3.38161	0.0279711	0.259345	2.07594	0.000370934	0.292903	3.67451	2.22663
Propane		17280.0	17279.9	0.124723	4.91477	1.48512	2.84947	17280.0	0	4.91151	0.0132800	0.111443	1.77168	3.88504E-05	0.137152	5.04866	4.33459
Isobutane		2931.77	2931.76	0.00718019	2.15472	0.346137	1.70198	2931.77	0	2.15600	0.000285859	0.00689433	0.382160	3.00960E-07	0.00751506	2.16351	2.04812
n-Butane		4806.82	4806.80	0.0267098	5.31168	0.635556	4.49101	4806.82	0	5.31492	0.00223475	0.0244750	0.689619	1.60792E-06	0.0262435	5.34117	5.12657
Isopentane		1961.09	1961.09	0.00648823	4.86744	0.248587	4.55203	1961.09	0	4.86765	0.000382106	0.00610613	0.255848	1.00535E-07	0.00728661	4.87494	4.80062
n-Pentane		1251.94	1251.94	0.00483579	5.01124	0.193960	4.76601	1251.94	0	5.01242	0.000282144	0.00455365	0.197344	5.46805E-08	0.00443256	5.01685	4.95997
2-Methylpentane		0	0	0.000728803	3.95858	0.0649374	3.87699	0	0	3.95956	2.08866E-05	0.000707916	0.0643850	1.62307E-09	0	3.95956	3.94193
3-Methylpentane		0	0	0.00130566	2.87094	0.0422723	2.81786	0	0	2.87241	9.67703E-05	0.00120889	0.0418182	6.71983E-09	0	2.87241	2.86013
n-Hexane		2943.05	2943.05	0.000937721	8.93950	0.105913	8.80664	2943.05	0	8.93711	2.14958E-05	0.000916225	0.00712346	8.13563E-11	0.00374278	8.94085	8.91255
Methylcyclopentane		0	0	0.00204195	1.82158	0.0207379	1.79558	0	0	1.82371	0.000395625	0.00164632	0.0190886	1.96792E-08	0	1.82371	1.81632
Benzene		0	0	0.00978981	0.178275	0.00199859	0.175768	0	0	0.188073	0.00903568	0.000754126	0.000115166	2.77011E-08	0	0.188073	0.177767
2-Methylhexane		0	0	0.000343935	6.85533	0.0347893	6.81180	0	0	6.85581	8.37389E-06	0.000335561	0.00219099	1.26017E-11	0	6.85581	6.84659
3-Methylhexane		0	0	0.000279739	5.61394	0.0271185	5.58000	0	0	5.61433	7.11117E-06	0.000272628	0.0257355	1.53448E-10	0	5.61433	5.60712
Heptane		0	0	0.000468977	11.3135	0.0433740	11.2592	0	0	11.3141	1.19867E-05	0.000456990	0.0379157	1.88856E-10	0	11.3141	11.3025
Methylcyclohexane		0	0	0.00192486	8.06040	0.0311403	8.02144	0	0	8.06245	0.000264099	0.00166077	0.0275249	4.23991E-09	0	8.06245	8.05258
Toluene		0	0	0.0224264	1.83320	0.00573085	1.82603	0	0	1.85564	0.0203698	0.00205659	0.000696397	3.63455E-08	0	1.85564	1.83176
Octane		0	0	0.000319917	41.6068	0.0501653	41.5441	0	0	41.6073	5.44333E-06	0.000314473	0.0413126	2.53246E-11	0	41.6073	41.5942
Ethylbenzene		0	0	0.0124832	3.39041	0.00351210	3.38603	0	0	3.40291	0.0112299	0.00125337	0.000802950	1.24588E-08	0	3.40291	3.38954
m-Xylene		0	0	0.00991532	3.15334	0.00273476	3.14993	0	0	3.16327	0.00895040	0.000964920	0.000805489	1.07079E-08	0	3.16327	3.15266
o-Xylene		0	0	0.0204850	5.41670	0.00419411	5.41147	0	0	5.43720	0.0189721	0.00151292	0.00107019	1.75536E-08	0	5.43720	5.41566
Nonane		0	0	0.000142676	36.1010	0.0142757	36.0832	0	0	36.1012	3.82239E-06	0.000138853	0.0106242	5.26534E-12	0	36.1012	36.0975
C10+		0	0	6.44124E-05	93.1979	0.00545756	93.1911	0	0	93.1980	2.01838E-06	6.23940E-05	0.00349935	3.54581E-13	0	93.1980	93.1966

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	56.8	64.0	70.0	70.0	75.9	75.9	67.0	67.0	67.0	75.9	75.94	75.9425	75.9425	64	64.1141	70
Pressure	psig	200	149	149	149	0	0	300	200	300	0	0	7.58986	-14.2247	149	149	40
Mole Fraction Vapor	%	97.7813	100	0	0	100	0	100	0	0	0	100	100	100	0	0	0
Mole Fraction Light Liquid	%	2.21866	0	100	100	0	100	0	100	100	100	0	0	0	100	1.06409	100
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98.9359	0
Molecular Weight	lb/lbmol	20.0	20.0	18.0	104.4	39.0	113.4	20.0	18.0	104.4	18.0	20.3616	40.3330	18.4198	18.0161	18.9348	109.149
Mass Density	lb/ft^3	0.8	0.6	62.3	44.5	0.1	44.9	1.2	62.3	44.7	62.2	0.0522415	0.159802	0.00151089	62.3165	60.9074	44.8237
Molar Flow	lbmol/h	10879.3	10646.0	233.3	2.5	0.1	2.2	10626.0	253.3	2.5	233.2	0.0606610	0.142932	0.00191070	233.288	235.796	2.36481
Mass Flow	lb/h	217061.5	212858.6	4202.9	261.7	5.2	252.9	212497.7	4563.8	261.8	4201.7	1.23516	5.76487	0.0351947	4202.93	4464.74	258.117
Vapor Volumetric Flow	MCFH	259.4	350.6	0.1	0.0	0.1	0.0	176.3	0.1	0.0	0.1	0.0236432	0.0360750	0.0232940	0.0674450	0.0733038	0.00575849
Liquid Volumetric Flow	Mbbl/d	1108.6	1498.7	0.3	0.0	0.2	0.0	753.5	0.3	0.0	0.3	0.101065	0.154206	0.0995720	0.288299	0.313343	0.0246151
Std Vapor Volumetric Flow	MMSCFD	99.1	97.0	2.1	0.0	0.0	0.0	96.8	2.3	0.0	2.1	0.000552478	0.00130177	1.74019E-05	2.12470	2.14754	0.0215378
Std Liquid Volumetric Flow	Mbbl/d	43.9	43.6	0.3	0.0	0.0	0.0	43.6	0.3	0.0	0.3	0.000244825	0.000865766	2.66259E-06	0.288252	0.313704	0.0247804
Compressibility		0.923	0.959	0.008	0.068	0.987	0.006	0.924	0.011	0.130	0.001	0.996510	0.978568	0.999551	0.00842119	0.00905340	0.0234314
Specific Gravity			0.690	0.998	0.714	1.346	0.720	0.690	0.999	0.716	0.998	0.703032	1.39259	0.635986	0.999158	0.976564	0.718686
API Gravity				10.0	65.4		62.9		10.0	65.1	10.0				10.0427	13.2960	64.0876
Enthalpy	MMBtu/h	-393.4	-363.3	-28.7	-0.2	0.0	-0.2	-362.2	-31.2	-0.2	-28.7	-0.00226035	-0.00621070	-0.000194507	-28.7158	-28.9416	-0.219939
Mass Enthalpy	Btu/lb	-1812.4	-1706.6	-6826.4	-861.9	-1112.0	-840.6	-1704.7	-6830.9	-862.4	-6822.3	-1830.01	-1077.34	-5526.60	-6832.32	-6482.25	-852.090
Mass Cp	Btu/(lb**F)	0.5	0.5	1.0	0.5	0.4	0.5	0.5	1.0	0.5	1.0	0.477132	0.409971	0.442427	0.983602	0.954371	0.486233
Ideal Gas CpCv Ratio		1.263	1.260	1.326	1.053	1.142	1.049	1.259	1.326	1.054	1.326	1.25807	1.13815	1.32235	1.32611	1.30944	1.05095
Dynamic Viscosity	cP		0.0	1.0	0.5	0.0	0.5	0.0	1.0	0.5	0.9	0.0107739	0.00864356	0.0102674	1.07544	1.02756	0.518934
Kinematic Viscosity	cSt		1.1	1.0	0.7	5.4	0.7	0.6	1.0	0.7	0.9	12.8747	3.37667	424.234	1.07736	1.04502	0.722743
Thermal Conductivity	Btu/(h*ft*°F)		0.0	0.3	0.1	0.0	0.1	0.0	0.3	0.1	0.3	0.0172803	0.0110172	0.0122326	0.343795	0.321915	0.0693066
Surface Tension	lbf/ft			0.005	0.001		0.002		0.005	0.001	0.005				0.00508649	0.00479248	0.00147915
Net I.G. Heating Value	Btu/ft^3	1073.6	1097.1	0.3	5259.7	2046.8	5699.5	1099.2	0.0	5257.8	0.0	1061.46	2120.03	45.4128	0.315432	56.2353	5492.07
Net Liquid Heating Value	Btu/lb	20345.1	20767.7	-1052.7	18937.7	19774.9	18901.0	20804.9	-1059.8	18938.7	-1058.8	19698.7	19791.5	-44.0820	-1052.78	119.511	18918.8
Gross I.G. Heating Value	Btu/ft^3	1186.0	1210.9	50.6	5651.6	2228.4	6120.4	1213.1	50.3	5649.5	50.4	1172.56	2306.85	97.5640	50.6433	110.194	5899.38
Gross Liquid Heating Value	Btu/lb	22483.8	22927.6	7.3	20360.2	21542.2	20308.4	22966.7	0.0	20361.1	0.9	21769.3	21549.2	1030.3	7.3	1200.8	20333.4

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		0.113289	0.188896	0.232152	0.232152	0.409600	0.409600	0			3.02997	3.02997	0.000209482	94.0924	0.188896		0.399779
H2S		0	0	0	0	0	0	0			0	0	0	0	0		0
Nitrogen		0.369882	0.369602	0.691304	0.691304	0.0179916	0.0179916	0.3703			0.346123	0.346123	0.000755597	0.00612939	0.369602		0.188303
Carbon Dioxide		0.148605	0.148501	0.169813	0.169813	0.246347	0.246347	0.1488			1.24680	1.24680	0.277697	1.48746	0.148501		0.271212
Methane		80.5392	80.4782	79.4609	79.4609	16.8746	16.8746	80.6305			75.6098	75.6098	3.92767	3.72040	80.4782		57.3972
Ethane		13.1541	13.1441	13.6308	13.6308	36.6104	36.6104	13.169			14.2183	14.2183	48.3022	0.645631	13.1441		26.8227
Propane		3.68371	3.68093	3.69060	3.69060	25.0785	25.0785	3.6879			4.16626	4.16626	28.1100	0.0461114	3.68093		9.32921

Isobutane		0.474165	0.473805	0.491556	0.491556	4.43447	4.43447	0.4747			0.195542	0.195542	4.60018	0.000271003	0.473805		1.30052
n-Butane		0.777420	0.776831	0.847108	0.847108	8.14229	8.14229	0.7783			0.694179	0.694179	8.30115	0.00144787	0.776831		2.25830
Isopentane		0.255511	0.255318	0.249414	0.249414	2.56558	2.56558	0.2558			0.139517	0.139517	2.48098	7.29285E-05	0.255318		0.656686
n-Pentane		0.163116	0.162992	0.191214	0.191214	2.00179	2.00179	0.1633			0.104045	0.104045	1.91366	3.96653E-05	0.162992		0.503811
2-Methylpentane		0	0	0.0528886	0.0528886	0.561109	0.561109	0			0.0135422	0.0135422	0.522724	9.85737E-07	0		0.136994
3-Methylpentane		0	0	0.0343586	0.0343586	0.365265	0.365265	0			0.0231256	0.0231256	0.339510	4.08115E-06	0		0.0889341
n-Hexane		0.321038	0.320795	0.0862680	0.0862680	0.915172	0.915172	0.3214			0.0175271	0.0175271	0.0578335	4.94101E-08	0.320795		0.221702
Methylcyclopentane		0	0	0.0170858	0.0170858	0.183484	0.183484	0			0.0322480	0.0322480	0.158687	1.22380E-05	0		0.0443824
Benzene		0	0	0.00176767	0.00176767	0.0190521	0.0190521	0			0.0159154	0.0159154	0.00103152	1.85604E-05	0		0.00461714
2-Methylhexane		0	0	0.0247235	0.0247235	0.258526	0.258526	0			0.00552059	0.00552059	0.0152980	6.58203E-09	0		0.0618498
3-Methylhexane		0	0	0.0192714	0.0192714	0.201523	0.201523	0			0.00448523	0.00448523	0.179691	8.01479E-08	0		0.0482393
Heptane		0	0	0.0311469	0.0311469	0.322321	0.322321	0			0.00751833	0.00751833	0.264737	9.86421E-08	0		0.0772786
Methylcyclohexane		0	0	0.0224465	0.0224465	0.236161	0.236161	0			0.0278836	0.0278836	0.196131	2.26003E-06	0		0.0564884
Toluene		0	0	0.00437797	0.00437797	0.0463142	0.0463142	0			0.0367958	0.0367958	0.00528795	2.06451E-05	0		0.0110586
Octane		0	0	0.0324428	0.0324428	0.327012	0.327012	0			0.00453837	0.00453837	0.253034	1.16031E-08	0		0.0777877
Ethylbenzene		0	0	0.00239476	0.00239476	0.0246332	0.0246332	0			0.0194621	0.0194621	0.00529149	6.14190E-06	0		0.00583829
m-Xylene		0	0	0.00186928	0.00186928	0.0191811	0.0191811	0			0.0149831	0.0149831	0.00530823	5.27874E-06	0		0.00453479
o-Xylene		0	0	0.00286504	0.00286504	0.0294167	0.0294167	0			0.0234924	0.0234924	0.00705265	8.65349E-06	0		0.00694974
Nonane		0	0	0.00841518	0.00841518	0.0828814	0.0828814	0			0.00178473	0.00178473	0.0579552	2.14862E-09	0		0.0195045
C10+		0	0	0.00280780	0.00280780	0.0263671	0.0263671	0			0.000667363	0.000667363	0.0158850	1.20407E-10	0		0.00616081
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		12.0516	20.1099	0	0	0.000550078	0	0			0	0.00183801	2.99417E-07	0.00179782	0		0
H2S		0	0	0	0	0	0	0			0	0	0	0	0		0
Nitrogen		39.3478	39.3479	0	0	2.41621E-05	0	39.3480			0	0.000209962	1.07999E-06	1.17114E-07	0		0
Carbon Dioxide		15.8085	15.8094	0	0	0.000330836	0	15.8115			0	0.000756319	0.000396917	2.84209E-05	0		0
Methane		8567.71	8567.73	0	0	0.0226619	0	8567.78			0	0.0458656	0.00561389	7.10856E-05	0		0
Ethane		1399.32	1399.33	0	0	0.0491665	0	1399.34			0	0.00862497	0.0690392	1.23361E-05	0		0
Propane		391.871	391.872	0	0	0.0336796	0	391.875			0	0.00252729	0.0401782	8.81050E-07	0		0
Isobutane		50.4413	50.4414	0	0	0.00595534	0	50.4415			0	0.000118618	0.00657511	5.17806E-09	0		0
n-Butane		82.7014	82.7015	0	0	0.0109348	0	82.7020			0	0.000421096	0.0118650	2.76645E-08	0		0
Isopentane		27.1811	27.1812	0	0	0.00344548	0	27.1813			0	8.46324E-05	0.00354611	1.39345E-09	0		0
n-Pentane		17.3521	17.3522	0	0	0.00268833	0	17.3522			0	6.31147E-05	0.00273523	7.57885E-10	0		0
2-Methylpentane		0	0	0	0	0.000753550	0	0			0	8.21483E-06	0.000747139	1.88345E-11	0		0
3-Methylpentane		0	0	0	0	0.000490538	0	0			0	1.40282E-05	0.000485268	7.79786E-11	0		0
n-Hexane		34.1518	34.1519	0	0	0.00122904	0	34.1519			0	1.06321E-05	8.26624E-05	9.44079E-13	0		0
Methylcyclopentane		0	0	0	0	0.000246412	0	0			0	1.95619E-05	0.000226814	2.33832E-10	0		0
Benzene		0	0	0	0	2.55863E-05	0	0			0	9.65444E-06	1.47437E-06	3.54634E-10	0		0
2-Methylhexane		0	0	0	0	0.000347192	0	0			0	3.34884E-06	2.18657E-05	1.25763E-13	0		0
3-Methylhexane		0	0	0	0	0.000270638	0	0			0	2.72078E-06	0.000256836	1.53139E-12	0		0
Heptane		0	0	0	0	0.000432865	0	0			0	4.56069E-06	0.000378393	1.88476E-12	0		0
Methylcyclohexane		0	0	0	0	0.000317156	0	0			0	1.69145E-05	0.000280334	4.31824E-11	0		0
Toluene		0	0	0	0	6.21983E-05	0	0			0	2.23207E-05	7.55816E-06	3.94466E-10	0		0
Octane		0	0	0	0	0.000439166	0	0			0	2.75302E-06	0.000361666	2.21701E-13	0		0
Ethylbenzene		0	0	0	0	3.30815E-05	0	0			0	1.18059E-05	7.56323E-06	1.17353E-10	0		0
m-Xylene		0	0	0	0	2.57595E-05	0	0			0	9.08887E-06	7.58715E-06	1.00861E-10	0		0
o-Xylene		0	0	0	0	3.95056E-05	0	0			0	1.42507E-05	1.00805E-05	1.65342E-10	0		0
Nonane		0	0	0	0	0.000111307	0	0			0	1.08263E-06	8.28364E-05	4.10537E-14	0		0
C10+		0	0	0	0	3.54101E-05	0	0			0	4.04829E-07	2.27047E-05	2.30062E-15	0		0
Mass Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water		0.102069	0.170200	0.206981	0.206981	0.189306	0.189306	0			2.68082	2.68082	9.35681E-05	92.0259	0.170200		0.284010
H2S		0	0	0	0	0	0	0			0	0	0	0	0		0
Nitrogen		0.518195	0.517840	0.958413	0.958413	0.0129300	0.0129300	0.518721			0.476194	0.476194	0.000524802	0.00932177	0.517840		0.208015
Carbon Dioxide		0.327072	0.326867	0.369858	0.369858	0.278137	0.278137	0.327464			2.69482	2.69482	0.303010	3.55391	0.326867		0.470682
Methane		64.6163	64.5722	63.0873	63.0873	6.94493	6.94493	64.6822			59.5712	59.5712	1.56223	3.24022	64.5722		36.3106
Ethane		19.7808	19.7673	20.2842	20.2842	28.2415	28.2415	19.8010			20.9969	20.9969	36.0102	1.05395	19.7673		31.8049
Propane		8.12353	8.11800	8.05396	8.05396	28.3702	28.3702	8.13185			9.02255	9.02255	30.7324	0.110387	8.11800		16.2223
Isobutane		1.37827	1.37733	1.41394	1.41394	6.61223	6.61223	1.37967			0.558175	0.558175	6.62912	0.000855129	1.37733		2.98079
n-Butane		2.25975	2.25821	2.43668	2.43668	12.1410	12.1410	2.26206			1.98153	1.98153	11.9624	0.00456865	2.25821		5.17601
Isopentane		0.921940	0.921310	0.890567	0.890567	4.74874	4.74874	0.922878			0.494361	0.494361	4.43805	0.000285655	0.921310		1.86835
n-Pentane		0.588557	0.588154	0.682757	0.682757	3.70519	3.70519	0.589155			0.368670	0.368670	3.42321	0.000155365	0.588154		1.43340
2-Methylpentane		0	0	0.225560	0.225560	1.24049	1.24049	0			0.0573139	0.0573139	1.11685	4.61168E-06	0		0.465539
3-Methylpentane		0	0	0.146533	0.146533	0.807524	0.807524	0			0.0978734	0.0978734	0.725397	1.90933E-05	0		0.302220
n-Hexane		1.38358	1.38263	0.367917	0.367917	2.02325	2.02325	1.38498			0.0741789	0.0741789	0.123567	2.31161E-07	1.38263		0.753397
Methylcyclopentane		0	0	0.0711630	0.0711630	0.396154	0.396154	0			0.133289	0.133289	0.331119	5.59151E-05	0		0.147294

Benzene		0	0	0.00683336	0.00683336	0.0381790	0.0381790	0			0.0610551	0.0610551	0.00199772	7.87081E-05	0		0.0142221
2-Methylhexane		0	0	0.122604	0.122604	0.664576	0.664576	0			0.0271675	0.0271675	0.0380059	3.58056E-08	0		0.244392
3-Methylhexane		0	0	0.0955668	0.0955668	0.518041	0.518041	0			0.0220723	0.0220723	0.446419	4.35997E-07	0		0.190612
Heptane		0	0	0.154457	0.154457	0.828569	0.828569	0			0.0369986	0.0369986	0.657703	5.36603E-07	0		0.305357
Methylcyclohexane		0	0	0.109073	0.109073	0.594871	0.594871	0			0.134458	0.134458	0.477459	1.20470E-05	0		0.218716
Toluene		0	0	0.0199632	0.0199632	0.109476	0.109476	0			0.166505	0.166505	0.0120800	0.000103270	0		0.0401804
Octane		0	0	0.183405	0.183405	0.958303	0.958303	0			0.0254602	0.0254602	0.716626	7.19557E-08	0		0.350394
Ethylbenzene		0	0	0.0125823	0.0125823	0.0670913	0.0670913	0			0.101475	0.101475	0.0139283	3.53996E-05	0		0.0244421
m-Xylene		0	0	0.00982139	0.00982139	0.0522418	0.0522418	0			0.0781213	0.0781213	0.0139724	3.04247E-05	0		0.0189850
o-Xylene		0	0	0.0150532	0.0150532	0.0801198	0.0801198	0			0.122489	0.122489	0.0185641	4.98756E-05	0		0.0290952
Nonane		0	0	0.0534140	0.0534140	0.272707	0.272707	0			0.0112418	0.0112418	0.184292	1.49606E-08	0		0.0986466
C10+		0	0	0.0214168	0.0214168	0.104255	0.104255	0			0.00505151	0.00505151	0.0607013	1.00748E-09	0		0.0374439
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		217.113	362.286	0	0	0.00990982	0	0			0	0.0331123	5.39408E-06	0.0323883	0		0
H2S		0	0	0	0	0	0	0			0	0	0	0	0		0
Nitrogen		1102.27	1102.27	0	0	0.000676862	0	1102.27			0	0.00588174	3.02542E-05	3.28077E-06	0		0
Carbon Dioxide		695.724	695.765	0	0	0.0145599	0	695.854			0	0.0332852	0.0174681	0.00125079	0		0
Methane		137447	137447	0	0	0.363553	0	137448			0	0.735798	0.0900606	0.00114039	0		0
Ethane		42076.3	42076.4	0	0	1.47839	0	42076.7			0	0.259345	2.07594	0.000370934	0		0
Propane		17279.8	17279.9	0	0	1.48512	0	17280.0			0	0.111443	1.77168	3.88504E-05	0		0
Isobutane		2931.76	2931.76	0	0	0.346137	0	2931.77			0	0.00689433	0.382160	3.00960E-07	0		0
n-Butane		4806.79	4806.80	0	0	0.635556	0	4806.82			0	0.0244750	0.689619	1.60792E-06	0		0
Isopentane		1961.08	1961.09	0	0	0.248587	0	1961.09			0	0.00610613	0.255848	1.00535E-07	0		0
n-Pentane		1251.94	1251.94	0	0	0.193960	0	1251.94			0	0.00455365	0.197344	5.46805E-08	0		0
2-Methylpentane		0	0	0	0	0.0649374	0	0			0	0.000707916	0.0643850	1.62307E-09	0		0
3-Methylpentane		0	0	0	0	0.0422723	0	0			0	0.00120889	0.0418182	6.71983E-09	0		0
n-Hexane		2943.05	2943.05	0	0	0.105913	0	2943.05			0	0.000916225	0.00712346	8.13563E-11	0		0
Methylcyclopentane		0	0	0	0	0.0207379	0	0			0	0.00164632	0.0190886	1.96792E-08	0		0
Benzene		0	0	0	0	0.00199859	0	0			0	0.000754126	0.000115166	2.77011E-08	0		0
2-Methylhexane		0	0	0	0	0.0347893	0	0			0	0.000335561	0.00219099	1.26017E-11	0		0
3-Methylhexane		0	0	0	0	0.0271185	0	0			0	0.000272628	0.0257355	1.53448E-10	0		0
Heptane		0	0	0	0	0.0433740	0	0			0	0.000456990	0.0379157	1.88856E-10	0		0
Methylcyclohexane		0	0	0	0	0.0311403	0	0			0	0.00166077	0.0275249	4.23991E-09	0		0
Toluene		0	0	0	0	0.00573085	0	0			0	0.00205659	0.000696397	3.63455E-08	0		0
Octane		0	0	0	0	0.0501653	0	0			0	0.000314473	0.0413126	2.53246E-11	0		0
Ethylbenzene		0	0	0	0	0.00351210	0	0			0	0.00125337	0.000802950	1.24588E-08	0		0
m-Xylene		0	0	0	0	0.00273476	0	0			0	0.000964920	0.000805489	1.07079E-08	0		0
o-Xylene		0	0	0	0	0.00419411	0	0			0	0.00151292	0.00107019	1.75536E-08	0		0
Nonane		0	0	0	0	0.0142757	0	0			0	0.000138853	0.0106242	5.26534E-12	0		0
C10+		0	0	0	0	0.00545756	0	0			0	6.23940E-05	0.00349935	3.54581E-13	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	56.8	64.0	70.0	70.0	75.9	75.9	67.0			75.9	75.94	75.9425	75.9425	64		70
Pressure	psig	200	149	149	149	0	0	300			0	0	7.58986	-14.2247	149		40
Mole Fraction Vapor	%	100	100	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	0		0
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0			0	0	0	0	0		0
Molecular Weight	lb/lbmol	20.0	20.0	20.2	20.2	39.0	39.0	20.0			20.4	20.3616	40.3330	18.4198	19.9942		25.3588
Mass Density	lb/ft^3	0.8	0.6	0.6	0.6	0.1	0.1	1.2			0.1	0.0522415	0.159802	0.00151089	0.607099		0.249373
Molar Flow	lbmol/h	10637.9	10646.0	0.0	0.0	0.1	0.0	10626.0			0.0	0.0606610	0.142932	0.00191070	0		0
Mass Flow	lb/h	212712.8	212858.6	0.0	0.0	5.2	0.0	212497.7			0.0	1.23516	5.76487	0.0351947	0		0
Vapor Volumetric Flow	MCFH	259.3	350.6	0.0	0.0	0.1	0.0	176.3			0.0	0.0236432	0.0360750	0.0232940	0		0
Liquid Volumetric Flow	Mbbl/d	1108.3	1498.7	0.0	0.0	0.2	0.0	753.5			0.0	0.101065	0.154206	0.0995720	0		0
Std Vapor Volumetric Flow	MMSCFD	96.9	97.0	0.0	0.0	0.0	0.0	96.8			0.0	0.000552478	0.00130177	1.74019E-05	0		0
Std Liquid Volumetric Flow	Mbbl/d	43.6	43.6	0.0	0.0	0.0	0.0	43.6			0.0	0.000244825	0.000865766	2.66259E-06	0		0
Compressibility		0.944	0.959	0.960	0.960	0.987	0.987	0.924			0.997	0.996510	0.978568	0.999551	0.959314		0.978509
Specific Gravity		0.690	0.690	0.698	0.698	1.346	1.346	0.690			0.703	0.703032	1.39259	0.635986	0.690345		0.875569
API Gravity																	
Enthalpy	MMBtu/h	-363.7	-363.3	0.0	0.0	0.0	0.0	-362.2			0.0	-0.00226035	-0.00621070	-0.000194507	0		0
Mass Enthalpy	Btu/lb	-1709.7	-1706.6	-1686.6	-1686.6	-1112.0	-1112.0	-1704.7			-1830.0	-1830.01	-1077.34	-5526.60	-1706.58		-1445.97
Mass Cp	Btu/(lb**F)	0.5	0.5	0.5	0.5	0.4	0.4	0.5			0.5	0.477132	0.409971	0.442427	0.502675		0.455535
Ideal Gas CpCv Ratio		1.262	1.260	1.257	1.257	1.142	1.142	1.259			1.258	1.25807	1.13815	1.32235	1.26003		1.21197

Dynamic Viscosity	cP	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0107739	0.00864356	0.0102674	0.0106519		0.00999480
Kinematic Viscosity	cSt	0.8	1.1	1.1	1.1	5.4	5.4	0.6			12.9	12.8747	3.37667	424.234	1.09534		2.50210
Thermal Conductivity	Btu/(h*ft*°F)	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0172803	0.0110172	0.0122326	0.0176226		0.0153762
Surface Tension	lbf/ft																
Net I.G. Heating Value	Btu/ft^3	1097.9	1097.1	1101.8	1101.8	2046.8	2046.8	1099.2			1061.5	1061.46	2120.03	45.4128	1097.10		1363.78
Net Liquid Heating Value	Btu/lb	20782.6	20767.7	20635.2	20635.2	19774.9	19774.9	20804.9			19698.7	19698.7	19791.5	-44.0820	20767.7		20306.4
Gross I.G. Heating Value	Btu/ft^3	1211.8	1210.9	1215.8	1215.8	2228.4	2228.4	1213.1			1172.6	1172.56	2306.85	97.5640	1210.91		1496.58
Gross Liquid Heating Value	Btu/lb	22943.3	22927.6	22776.0	22776.0	21542.2	21542.2	22966.7			21769.3	21769.3	21549.2	1030.3	22927.6		22293.6

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		99.9597	99.9706	99.9715	0.0519370	0.00840894	0.00840894		100	0	99.9967	99.9967	5.97283E-06	100.0000	99.9706	0.0444154	0.0311924
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		7.27859E-05	5.24321E-05	9.40562E-05	0.0115858	2.65010E-05	2.65010E-05		0	0.0170005	4.05493E-06	4.05493E-06	1.75936E-06	2.30267E-09	5.24321E-05	0.0122723	0.00104673
Carbon Dioxide		0.00122354	0.000870892	0.000928580	0.0322826	0.00428683	0.00428683		0	0.0380011	0.000604533	0.000604533	0.00718720	2.32507E-05	0.000870892	0.0318599	0.0180334
Methane		0.0309992	0.0226608	0.0214804	4.20606	0.0801016	0.0801016		0	4.27113	0.00182002	0.00182002	0.0289765	2.88053E-06	0.0226608	4.29719	1.03385
Ethane		0.00568538	0.00417553	0.00409594	4.46475	1.11563	1.11563		0	4.48413	0.000398856	0.000398856	2.24662	5.85847E-07	0.00417553	4.48629	3.13136
Propane		0.00187689	0.00133325	0.00121245	4.44789	2.89710	2.89710		0	4.44113	0.000129131	0.000129131	4.93855	4.64458E-08	0.00133325	4.44787	4.15678
Isobutane		7.52962E-05	5.54240E-05	5.29551E-05	1.47944	1.31283	1.31283		0	1.47904	2.10881E-06	2.10881E-06	2.04015	9.53669E-11	5.54240E-05	1.47867	1.49011
n-Butane		0.000257764	0.000193548	0.000196989	3.64701	3.46416	3.46416		0	3.64611	1.64859E-05	1.64859E-05	5.28179	1.12279E-09	0.000193548	3.64471	3.72983
Isopentane		5.82119E-05	4.32916E-05	3.85489E-05	2.69227	2.82860	2.82860		0	2.69008	2.27081E-06	2.27081E-06	4.08393	3.89497E-11	4.32916E-05	2.68942	2.81367
n-Pentane		3.45455E-05	2.63350E-05	2.87311E-05	2.77181	2.96157	2.96157		0	2.77008	1.67675E-06	1.67675E-06	4.21720	2.09738E-11	2.63350E-05	2.76878	2.90706
2-Methylpentane		0	0	3.62527E-06	1.83317	2.01701	2.01701		0	1.83205	1.03923E-07	1.03923E-07	2.79603	2.49034E-13	0	1.83094	1.93433
3-Methylpentane		0	0	6.49473E-06	1.32950	1.46599	1.46599		0	1.32904	4.81489E-07	4.81489E-07	2.02410	2.79752E-12	0	1.32789	1.40348
n-Hexane		2.39258E-05	1.86174E-05	4.66449E-06	4.13977	4.58166	4.58166		0	4.13512	1.06954E-07	1.06954E-07	0.429849	9.93750E-15	1.86174E-05	4.13465	4.37344
Methylcyclopentane		0	0	1.04005E-05	0.863760	0.956527	0.956527		0	0.864026	2.01562E-06	2.01562E-06	1.21951	2.51535E-11	0	0.862681	0.912626
Benzene		0	0	5.37244E-05	0.0910797	0.100883	0.100883		0	0.0960029	4.95988E-05	4.95988E-05	0.00789529	1.89886E-09	0	0.0910424	0.0962361
2-Methylhexane		0	0	1.47134E-06	2.73023	3.04776	3.04776		0	2.72808	3.58326E-08	3.58326E-08	0.264707	1.41341E-15	0	2.72676	2.88936
3-Methylhexane		0	0	1.19672E-06	2.23583	2.49663	2.49663		0	2.23407	3.04293E-08	3.04293E-08	3.26316	1.79856E-14	0	2.23299	2.36629
Heptane		0	0	2.00627E-06	4.50574	5.03762	5.03762		0	4.50214	5.12923E-08	5.12923E-08	6.04745	2.22872E-14	0	4.49998	4.76984
Methylcyclohexane		0	0	8.40358E-06	3.27607	3.66267	3.66267		0	3.27410	1.15330E-06	1.15330E-06	4.44003	3.08718E-12	0	3.27193	3.46808
Toluene		0	0	0.000104336	0.793990	0.888510	0.888510		0	0.803024	9.47925E-05	9.47925E-05	0.147756	1.75432E-09	0	0.793339	0.840682
Octane		0	0	1.20054E-06	14.5357	16.3053	16.3053		0	14.5234	2.04323E-08	2.04323E-08	18.3559	1.73788E-15	0	14.5170	15.3979
Ethylbenzene		0	0	5.04034E-05	1.27444	1.42990	1.42990		0	1.27804	4.53545E-05	4.53545E-05	0.444151	4.74557E-10	0	1.27291	1.35009
m-Xylene		0	0	4.00349E-05	1.18532	1.33019	1.33019		0	1.18804	3.61483E-05	3.61483E-05	0.531835	4.22527E-10	0	1.18394	1.25574
o-Xylene		0	0	8.27121E-05	2.03611	2.28523	2.28523		0	2.04206	7.66233E-05	7.66233E-05	0.789912	9.36225E-10	0	2.03383	2.15712
Nonane		0	0	4.76859E-07	11.2329	12.6132	12.6132		0	11.2233	1.27787E-08	1.27787E-08	12.9113	5.14475E-16	0	11.2184	11.9016
C10+		0	0	1.79148E-07	24.1314	27.1081	27.1081		0	24.1107	5.61512E-09	5.61512E-09	23.4821	3.41080E-17	0	24.1002	25.5702
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		241.278	0	233.218	0.00130146	0	0.000187562		253.329	0	233.216	0	0	0	233.219	0.00111442	0.000737641
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.000175687	0	0.000219419	0.000290320	0	5.91107E-07		0	0.000426371	9.45707E-06	0	0	0	0.000122318	0.000307922	2.47532E-05
Carbon Dioxide		0.00295332	0	0.00216623	0.000808950	0	9.56181E-05		0	0.000953064	0.00140991	0	0	0	0.00203169	0.000799390	0.000426454
Methane		0.0748243	0	0.0501104	0.105397	0	0.00178668		0	0.107119	0.00424472	0	0	0	0.0528650	0.107820	0.0244486
Ethane		0.0137231	0	0.00955520	0.111879	0	0.0248842		0	0.112462	0.000930228	0	0	0	0.00974100	0.112564	0.0740507
Propane		0.00453034	0	0.00282846	0.111457	0	0.0646202		0	0.111383	0.000301164	0	0	0	0.00311032	0.111600	0.0982998
Isobutane		0.000181746	0	0.000123536	0.0370723	0	0.0292828		0	0.0370943	4.91824E-06	0	0	0	0.000129298	0.0371010	0.0352382
n-Butane		0.000622178	0	0.000459545	0.0913882	0	0.0772685		0	0.0914440	3.84491E-05	0	0	0	0.000451523	0.0914486	0.0882033
Isopentane		0.000140509	0	8.99285E-05	0.0674639	0	0.0630923		0	0.0674669	5.29608E-06	0	0	0	0.000100994	0.0674797	0.0665378
n-Pentane		8.33842E-05	0	6.70253E-05	0.0694570	0	0.0660581		0	0.0694733	3.91059E-06	0	0	0	6.14364E-05	0.0694708	0.0687464
2-Methylpentane		0	0	8.45721E-06	0.0459363	0	0.0449895		0	0.0459477	2.42373E-07	0	0	0	0	0.0459398	0.0457431
3-Methylpentane		0	0	1.51512E-05	0.0333151	0	0.0326991		0	0.0333322	1.12295E-06	0	0	0	0	0.0333178	0.0331896
n-Hexane		5.77510E-05	0	1.08815E-05	0.103736	0	0.102194		0	0.103708	2.49443E-07	0	0	0	4.34321E-05	0.103742	0.103423
Methylcyclopentane		0	0	2.42628E-05	0.0216444	0	0.0213354		0	0.0216697	4.70090E-06	0	0	0	0	0.0216453	0.0215818
Benzene		0	0	0.000125331	0.00228231	0	0.00225021		0	0.00240774	0.000115676	0	0	0	0	0.00228433	0.00227580
2-Methylhexane		0	0	3.43241E-06	0.0684151	0	0.0679807		0	0.0684200	8.35702E-08	0	0	0	0	0.0684166	0.0683279
3-Methylhexane		0	0	2.79175E-06	0.0560262	0	0.0556876		0	0.0560301	7.09684E-08	0	0	0	0	0.0560274	0.0559582
Heptane		0	0	4.68032E-06	0.112907	0	0.112365		0	0.112913	1.19626E-07	0	0	0	0	0.112908	0.112798
Methylcyclohexane		0	0	1.96042E-05	0.0820931	0	0.0816963		0	0.0821140	2.68978E-06	0	0	0	0	0.0820952	0.0820134
Toluene		0	0	0.000243399	0.0198961	0	0.0198183		0	0.0201397	0.000221079	0	0	0	0	0.0199055	0.0198805
Octane		0	0	2.80067E-06	0.364241	0	0.363692		0	0.364246	4.76530E-08	0	0	0	0	0.364243	0.364132
Ethylbenzene		0	0	0.000117583	0.0319353	0	0.0318940		0	0.0320530	0.000105778	0	0	0	0	0.0319383	0.0319271
m-Xylene		0	0	9.33954E-05	0.0297023	0	0.0296701		0	0.0297958	8.43065E-05	0	0	0	0	0.0297060	0.0296959

o-Xylene		0	0	0.000192955	0.0510215	0	0.0509722		0	0.0512146	0.000178704	0	0	0	0	0.0510304	0.0510117
Nonane		0	0	1.11244E-06	0.281478	0	0.281340		0	0.281480	2.98030E-08	0	0	0	0	0.281479	0.281451
C10+		0	0	4.17925E-07	0.604693	0	0.604649		0	0.604694	1.30958E-08	0	0	0	0	0.604694	0.604685
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		99.9537	99.9662	99.9656	0.00895939	0.00133619	0.00133619		100	0	99.9942	99.9942	9.93133E-07	99.9999	99.9662	0.00766960	0.00514837
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.000113174	8.15272E-05	0.000146247	0.00310778	6.54807E-06	6.54807E-06		0	0.00456213	6.30518E-06	6.30518E-06	4.54890E-07	3.58061E-09	8.15272E-05	0.00329527	0.000268646
Carbon Dioxide		0.00298880	0.00212741	0.00226829	0.0136043	0.00166406	0.00166406		0	0.0160208	0.00147677	0.00147677	0.00291939	5.67991E-05	0.00212741	0.0134397	0.00727113
Methane		0.0276028	0.0201784	0.0191269	0.646110	0.0113344	0.0113344		0	0.656377	0.00162067	0.00162067	0.00429045	2.56509E-06	0.0201784	0.660775	0.151953
Ethane		0.00948882	0.00696900	0.00683607	1.28551	0.295887	0.295887		0	1.29163	0.000665709	0.000665709	0.623498	9.77828E-07	0.00696900	1.29302	0.862646
Propane		0.00459374	0.00326324	0.00296751	1.87806	1.12680	1.12680		0	1.87598	0.000316063	0.000316063	2.00993	1.13684E-07	0.00326324	1.87995	1.67931
Isobutane		0.000242911	0.000178805	0.000170838	0.823378	0.673034	0.673034		0	0.823499	6.80342E-06	6.80342E-06	1.09444	3.07679E-10	0.000178805	0.823780	0.793485
n-Butane		0.000831567	0.000624410	0.000635503	2.02974	1.77593	1.77593		0	2.03007	5.31868E-05	5.31868E-05	2.83341	3.62243E-09	0.000624410	2.03050	1.98614
Isopentane		0.000233117	0.000173370	0.000154374	1.85998	1.80006	1.80006		0	1.85923	9.09408E-06	9.09408E-06	2.71953	1.55988E-10	0.000173370	1.85988	1.85986
n-Pentane		0.000138342	0.000105463	0.000115057	1.91493	1.88468	1.88468		0	1.91453	6.71500E-06	6.71500E-06	2.80827	8.39974E-11	0.000105463	1.91476	1.92160
2-Methylpentane		0	0	1.73403E-05	1.51268	1.53312	1.53312		0	1.51238	4.97099E-07	4.97099E-07	2.22388	1.19124E-12	0	1.51236	1.52719
3-Methylpentane		0	0	3.10654E-05	1.09706	1.11430	1.11430		0	1.09714	2.30312E-06	2.30312E-06	1.60991	1.33818E-11	0	1.09684	1.10808
n-Hexane		0.000114441	8.90516E-05	2.23111E-05	3.41602	3.48251	3.48251		0	3.41359	5.11598E-07	5.11598E-07	0.341889	4.75356E-14	8.90516E-05	3.41523	3.45291
Methylcyclopentane		0	0	4.85838E-05	0.696076	0.710046	0.710046		0	0.696578	9.41583E-06	9.41583E-06	0.947274	1.17506E-10	0	0.695907	0.703680
Benzene		0	0	0.000232928	0.0681238	0.0695060	0.0695060		0	0.0718358	0.000215048	0.000215048	0.00569209	8.23319E-09	0	0.0681645	0.0688707
2-Methylhexane		0	0	8.18320E-06	2.61960	2.69367	2.69367		0	2.61863	1.99298E-07	1.99298E-07	0.244810	7.86147E-15	0	2.61891	2.65251
3-Methylhexane		0	0	6.65580E-06	2.14524	2.20656	2.20656		0	2.14443	1.69245E-07	1.69245E-07	3.01787	1.00037E-13	0	2.14467	2.17232
Heptane		0	0	1.11583E-05	4.32317	4.45234	4.45234		0	4.32150	2.85283E-07	2.85283E-07	5.59287	1.23963E-13	0	4.32200	4.37884
Methylcyclohexane		0	0	4.57981E-05	3.08009	3.17201	3.17201		0	3.07951	6.28552E-06	6.28552E-06	4.02366	1.68256E-11	0	3.07929	3.11974
Toluene		0	0	0.000533590	0.700513	0.722086	0.722086		0	0.708776	0.000484800	0.000484800	0.125653	8.97238E-09	0	0.700644	0.709662
Octane		0	0	7.61174E-06	15.8990	16.4282	16.4282		0	15.8922	1.29551E-07	1.29551E-07	19.3524	1.10193E-14	0	15.8946	16.1145
Ethylbenzene		0	0	0.000297012	1.29557	1.33897	1.33897		0	1.29977	0.000267270	0.000267270	0.435210	2.79659E-09	0	1.29532	1.31318
m-Xylene		0	0	0.000235914	1.20498	1.24561	1.24561		0	1.20823	0.000213018	0.000213018	0.521128	2.48998E-09	0	1.20479	1.22141
o-Xylene		0	0	0.000487398	2.06987	2.13992	2.13992		0	2.07678	0.000451534	0.000451534	0.774010	5.51722E-09	0	2.06963	2.09814
Nonane		0	0	3.39467E-06	13.7952	14.2688	14.2688		0	13.7891	9.09725E-08	9.09725E-08	15.2838	3.66267E-15	0	13.7913	13.9849
C10+		0	0	1.53256E-06	35.6134	36.8516	36.8516		0	35.5976	4.80373E-08	4.80373E-08	33.4036	2.91800E-16	0	35.6033	36.1063
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		4346.69	0	4201.49	0.0234461	0	0.00337899		4563.80	0	4201.46	0	0	0	4201.51	0.0200765	0.0132888
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.00492159	0	0.00614666	0.00813286	0	1.65589E-05		0	0.0119441	0.000264925	0	0	0	0.00342654	0.00862595	0.000693421
Carbon Dioxide		0.129974	0	0.0953348	0.0356015	0	0.00420811		0	0.0419439	0.0620496	0	0	0	0.0894136	0.0351808	0.0187680
Methane		1.20037	0	0.803893	1.69083	0	0.0286627		0	1.71846	0.0680958	0	0	0	0.848084	1.72970	0.392216
Ethane		0.412640	0	0.287316	3.36410	0	0.748245		0	3.38161	0.0279711	0	0	0	0.292903	3.38470	2.22663
Propane		0.199768	0	0.124723	4.91477	0	2.84947		0	4.91151	0.0132800	0	0	0	0.137152	4.92109	4.33459
Isobutane		0.0105635	0	0.00718019	2.15472	0	1.70198		0	2.15600	0.000285859	0	0	0	0.00751506	2.15639	2.04812
n-Butane		0.0361624	0	0.0267098	5.31168	0	4.49101		0	5.31492	0.00223475	0	0	0	0.0262435	5.31519	5.12657
Isopentane		0.0101376	0	0.00648823	4.86744	0	4.55203		0	4.86765	0.000382106	0	0	0	0.00728661	4.86858	4.80062
n-Pentane		0.00601607	0	0.00483579	5.01124	0	4.76601		0	5.01242	0.000282144	0	0	0	0.00443256	5.01223	4.95997
2-Methylpentane		0	0	0.000728803	3.95858	0	3.87699		0	3.95956	2.08866E-05	0	0	0	0	3.95888	3.94193
3-Methylpentane		0	0	0.00130566	2.87094	0	2.81786		0	2.87241	9.67703E-05	0	0	0	0	2.87117	2.86013
n-Hexane		0.00497671	0	0.000937721	8.93950	0	8.80664		0	8.93711	2.14958E-05	0	0	0	0.00374278	8.93998	8.91255
Methylcyclopentane		0	0	0.00204195	1.82158	0	1.79558		0	1.82371	0.000395625	0	0	0	0	1.82166	1.81632
Benzene		0	0	0.00978981	0.178275	0	0.175768		0	0.188073	0.00903568	0	0	0	0	0.178433	0.177767
2-Methylhexane		0	0	0.000343935	6.85533	0	6.81180		0	6.85581	8.37389E-06	0	0	0	0	6.85547	6.84659
3-Methylhexane		0	0	0.000279739	5.61394	0	5.58000		0	5.61433	7.11117E-06	0	0	0	0	5.61405	5.60712
Heptane		0	0	0.000468977	11.3135	0	11.2592		0	11.3141	1.19867E-05	0	0	0	0	11.3136	11.3025
Methylcyclohexane		0	0	0.00192486	8.06040	0	8.02144		0	8.06245	0.000264099	0	0	0	0	8.06060	8.05258
Toluene		0	0	0.0224264	1.83320	0	1.82603		0	1.85564	0.0203698	0	0	0	0	1.83406	1.83176
Octane		0	0	0.000319917	41.6068	0	41.5441		0	41.6073	5.44333E-06	0	0	0	0	41.6070	41.5942
Ethylbenzene		0	0	0.0124832	3.39041	0	3.38603		0	3.40291	0.0112299	0	0	0	0	3.39073	3.38954
m-Xylene		0	0	0.00991532	3.15334	0	3.14993		0	3.16327	0.00895040	0	0	0	0	3.15374	3.15266
o-Xylene		0	0	0.0204850	5.41670	0	5.41147		0	5.43720	0.0189721	0	0	0	0	5.41764	5.41566
Nonane		0	0	0.000142676	36.1010	0	36.0832		0	36.1012	3.82239E-06	0	0	0	0	36.1011	36.0975
C10+		0	0	6.44124E-05	93.1979	0	93.1911		0	93.1980	2.01838E-06	0	0	0	0	93.1980	93.1966

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	56.8	64.0	70.0	70.0	75.9	75.9		67.0	67.0	75.9	75.94	75.9425	75.9425	64	64.1141	70

Pressure	psig	200	149	149	149	0	0	200	300	0	0	7.58986	-14.2247	149	149	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	104.4	113.4	113.4	18.0	104.4	18.0	18.0157	108.346	18.0153	18.0161	104.328	109.149
Mass Density	lb/ft^3	62.4	62.3	62.3	44.5	44.9	44.9	62.3	44.7	62.2	62.2171	44.2020	62.2179	62.3165	44.6887	44.8237
Molar Flow	lbmol/h	241.4	0.0	233.3	2.5	0.0	2.2	253.3	2.5	233.2	0	0	0	233.288	2.50908	2.36481
Mass Flow	lb/h	4348.7	0.0	4202.9	261.7	0.0	252.9	4563.8	261.8	4201.7	0	0	0	4202.93	261.768	258.117
Vapor Volumetric Flow	MCFH	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0	0	0	0.0674450	0.00585759	0.00575849
Liquid Volumetric Flow	Mbbl/d	0.3	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.3	0	0	0	0.288299	0.0250387	0.0246151
Std Vapor Volumetric Flow	MMSCFD	2.2	0.0	2.1	0.0	0.0	0.0	2.3	0.0	2.1	0	0	0	2.12470	0.0228518	0.0215378
Std Liquid Volumetric Flow	Mbbl/d	0.3	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.3	0	0	0	0.288252	0.0254509	0.0247804
Compressibility		0.011	0.008	0.008	0.068	0.006	0.006	0.011	0.130	0.001	0.000740333	0.00950354	2.37399E-05	0.00842119	0.0679870	0.0234314
Specific Gravity		1.000	0.999	0.998	0.714	0.720	0.720	0.999	0.716	0.998	0.997564	0.708717	0.997577	0.999158	0.716521	0.718686
API Gravity		10.1	10.0	10.0	65.4	62.9	62.9	10.0	65.1	10.0	10.0152	66.0287	10.0135	10.0427	65.4298	64.0876
Enthalpy	MMBtu/h	-29.7	0.0	-28.7	-0.2	0.0	-0.2	-31.2	-0.2	-28.7	0	0	0	-28.7158	-0.226404	-0.219939
Mass Enthalpy	Btu/lb	-6838.7	-6832.3	-6826.4	-861.9	-840.6	-840.6	-6830.9	-862.4	-6822.3	-6822.34	-883.747	-6822.66	-6832.32	-864.902	-852.090
Mass Cp	Btu/(lb*°F)	1.0	1.0	1.0	0.5	0.5	0.5	1.0	0.5	1.0	0.982731	0.493587	0.982746	0.983602	0.485342	0.486233
Ideal Gas CpCv Ratio		1.326	1.326	1.326	1.053	1.049	1.049	1.326	1.054	1.326	1.32555	1.05038	1.32556	1.32611	1.05382	1.05095
Dynamic Viscosity	cP	1.2	1.1	1.0	0.5	0.5	0.5	1.0	0.5	0.9	0.924433	0.487038	0.924434	1.07544	0.494482	0.518934
Kinematic Viscosity	cSt	1.2	1.1	1.0	0.7	0.7	0.7	1.0	0.7	0.9	0.927566	0.687861	0.927556	1.07736	0.690768	0.722743
Thermal Conductivity	Btu/(h*ft*°F)	0.3	0.3	0.3	0.1	0.1	0.1	0.3	0.1	0.3	0.349779	0.0687315	0.349835	0.343795	0.0693829	0.0693066
Surface Tension	lbf/ft	0.005	0.005	0.005	0.001	0.002	0.002	0.005	0.001	0.005	0.00499711	0.00144284	0.00499737	0.00508649	0.00141698	0.00147915
Net I.G. Heating Value	Btu/ft^3	0.4	0.3	0.3	5259.7	5699.5	5699.5	0.0	5257.8	0.0	0.0405607	5469.11	3.70299E-05	0.315432	5254.62	5492.07
Net Liquid Heating Value	Btu/lb	-1050.2	-1052.8	-1052.7	18937.7	18901.0	18901.0	-1059.8	18938.7	-1058.8	-1058.85	18986.1	-1059.76	-1052.78	18938.5	18918.8
Gross I.G. Heating Value	Btu/ft^3	50.8	50.6	50.6	5651.6	6120.4	6120.4	50.3	5649.5	50.4	50.3523	5880.83	50.3100	50.6433	5646.15	5899.38
Gross Liquid Heating Value	Btu/lb	10.0	7.3	7.3	20360.2	20308.4	20308.4	0.0	20361.1	0.9	0.920875	20427.2	0.000817738	7.31318	20361.1	20333.4

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					99.9715											99.9706	
H2S					0											0	
Nitrogen					9.40562E-05											0.000103206	
Carbon Dioxide					0.000928580											0.000936769	
Methane					0.0214804											0.0223606	
Ethane					0.00409594											0.00413144	
Propane					0.00121245											0.00124007	
Isobutane					5.29551E-05											5.25381E-05	
n-Butane					0.000196989											0.000191567	
Isopentane					3.85489E-05											3.77878E-05	
n-Pentane					2.87311E-05											2.74388E-05	
2-Methylpentane					3.62527E-06											3.38968E-06	
3-Methylpentane					6.49473E-06											6.16566E-06	
n-Hexane					4.66449E-06											4.35285E-06	
Methylcyclopentane					1.04005E-05											1.04270E-05	
Benzene					5.37244E-05											5.29028E-05	
2-Methylhexane					1.47134E-06											1.45701E-06	
3-Methylhexane					1.19672E-06											1.18104E-06	
Heptane					2.00627E-06											2.06918E-06	
Methylcyclohexane					8.40358E-06											8.05697E-06	
Toluene					0.000104336											0.000100415	
Octane					1.20054E-06											1.10659E-06	
Ethylbenzene					5.04034E-05											4.91699E-05	
m-Xylene					4.00349E-05											3.84786E-05	
o-Xylene					8.27121E-05											7.89991E-05	
Nonane					4.76859E-07											4.39286E-07	
C10+					1.79148E-07											1.64638E-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											233.218	
H2S					0											0	
Nitrogen					0											0.000240766	
Carbon Dioxide					0											0.00218536	
Methane					0											0.0521645	

Ethane					0											0.00963811	
Propane					0											0.00289291	
Isobutane					0											0.000122565	
n-Butane					0											0.000446900	
Isopentane					0											8.81541E-05	
n-Pentane					0											6.40111E-05	
2-Methylpentane					0											7.90767E-06	
3-Methylpentane					0											1.43837E-05	
n-Hexane					0											1.01546E-05	
Methylcyclopentane					0											2.43247E-05	
Benzene					0											0.000123415	
2-Methylhexane					0											3.39902E-06	
3-Methylhexane					0											2.75522E-06	
Heptane					0											4.82712E-06	
Methylcyclohexane					0											1.87959E-05	
Toluene					0											0.000234255	
Octane					0											2.58153E-06	
Ethylbenzene					0											0.000114707	
m-Xylene					0											8.97656E-05	
o-Xylene					0											0.000184294	
Nonane					0											1.02480E-06	
C10+					0											3.84079E-07	
Mass Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water					99.9656											99.9647	
H2S					0											0	
Nitrogen					0.000146247											0.000160474	
Carbon Dioxide					0.00226829											0.00228830	
Methane					0.0191269											0.0199108	
Ethane					0.00683607											0.00689532	
Propane					0.00296751											0.00303510	
Isobutane					0.000170838											0.000169492	
n-Butane					0.000635503											0.000618011	
Isopentane					0.000154374											0.000151326	
n-Pentane					0.000115057											0.000109882	
2-Methylpentane					1.73403E-05											1.62134E-05	
3-Methylpentane					3.10654E-05											2.94915E-05	
n-Hexane					2.23111E-05											2.08204E-05	
Methylcyclopentane					4.85838E-05											4.87074E-05	
Benzene					0.000232928											0.000229366	
2-Methylhexane					8.18320E-06											8.10350E-06	
3-Methylhexane					6.65580E-06											6.56863E-06	
Heptane					1.11583E-05											1.15082E-05	
Methylcyclohexane					4.57981E-05											4.39092E-05	
Toluene					0.000533590											0.000513538	
Octane					7.61174E-06											7.01608E-06	
Ethylbenzene					0.000297012											0.000289744	
m-Xylene					0.000235914											0.000226743	
o-Xylene					0.000487398											0.000465519	
Nonane					3.39467E-06											3.12720E-06	
C10+					1.53256E-06											1.40843E-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											4201.49	
H2S					0											0	
Nitrogen					0											0.00674468	
Carbon Dioxide					0											0.0961766	
Methane					0											0.836846	
Ethane					0											0.289809	
Propane					0											0.127565	
Isobutane					0											0.00712372	
n-Butane					0											0.0259748	
Isopentane					0											0.00636021	
n-Pentane					0											0.00461832	
2-Methylpentane					0											0.000681446	
3-Methylpentane					0											0.00123952	

n-Hexane					0											0.000875078	
Methylcyclopentane					0											0.00204716	
Benzene					0											0.00964020	
2-Methylhexane					0											0.000340588	
3-Methylhexane					0											0.000276078	
Heptane					0											0.000483687	
Methylcyclohexane					0											0.00184549	
Toluene					0											0.0215839	
Octane					0											0.000294884	
Ethylbenzene					0											0.0121779	
m-Xylene					0											0.00952997	
o-Xylene					0											0.0195656	
Nonane					0											0.000131435	
C10+					0											5.91958E-05	

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											64.1141	
Pressure	psig				149											149	
Mole Fraction Vapor	%				0											0	
Mole Fraction Light Liquid	%				0											0	
Mole Fraction Heavy Liquid	%				100											100	
Molecular Weight	lb/lbmol				18.0											18.0163	
Mass Density	lb/ft^3				62.3											62.3159	
Molar Flow	lbmol/h				0.0											233.287	
Mass Flow	lb/h				0.0											4202.97	
Vapor Volumetric Flow	MCFH				0.0											0.0674462	
Liquid Volumetric Flow	Mbbl/d				0.0											0.288305	
Std Vapor Volumetric Flow	MMSCFD				0.0											2.12469	
Std Liquid Volumetric Flow	Mbbl/d				0.0											0.288253	
Compressibility					0.008											0.00841955	
Specific Gravity					0.998											0.999149	
API Gravity					10.0											10.0417	
Enthalpy	MMBtu/h				0.0											-28.7152	
Mass Enthalpy	Btu/lb				-6826.4											-6832.11	
Mass Cp	Btu/(lb*°F)				1.0											0.983583	
Ideal Gas CpCv Ratio					1.326											1.32610	
Dynamic Viscosity	cP				1.0											1.07386	
Kinematic Viscosity	cSt				1.0											1.07579	
Thermal Conductivity	Btu/(h*ft*°F)				0.3											0.343846	
Surface Tension	lbf/ft				0.005											0.00508563	
Net I.G. Heating Value	Btu/ft^3				0.3											0.324948	
Net Liquid Heating Value	Btu/lb				-1052.7											-1052.56	
Gross I.G. Heating Value	Btu/ft^3				50.6											50.6530	
Gross Liquid Heating Value	Btu/lb				7.3											7.5	

June 7, 2013

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

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

Date Sampled: 05/17/2013

Date Analyzed: 06/03/2013

Job Number: J33542

Sample: Tom's Fork No. 1H

FLASH LIBERATION OF SEPARATOR WATER		
	Separator	**Stock Tank**
Pressure, psig	149	0
Temperature, °F	64	70
Gas Water Ratio (1)	------	1.44
Gas Specific Gravity (2)	------	1.219
Separator Volume Factor (3)	1.000	1.000

(1) - Scf of water saturated vapor per barrel of stock tank water
(2) - Air = 1.000
(3) - Separator volume / Stock tank volume
Analyst: A. A.

Piston No. : WF-305*

Base Conditions: 14.65 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

David Dannhaus 361-661-7015

June 6, 2013

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

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

Sample: Tom's Fork No. 1H
Gas Liberated from Separator Water
From 149 psig & 64 ºF to 0 psig & 70 ºF

Date Sampled: 05/17/13 Job Number: 33542.001

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.000	
Carbon Dioxide	1.623	
Methane	50.762	
Ethane	15.569	4.140
Propane	9.072	2.485
Isobutane	2.466	0.802
n-Butane	5.548	1.739
2-2 Dimethylpropane	0.112	0.043
Isopentane	3.181	1.157
n-Pentane	2.995	1.079
Hexanes	4.199	1.721
Heptanes Plus	4.473	1.964
Totals	100.000	15.130

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.554	(Air=1)
Molecular Weight	101.71	
Gross Heating Value	5368	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.219	(Air=1)
Compressibility (Z)	0.9882	
Molecular Weight	34.89	
Gross Heating Value		
Dry Basis	1987	BTU/CF
Saturated Basis	1953	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: 14.650 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: MR
Processor: AL
Cylinder ID: WF# 3 S

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.000		0.000
Carbon Dioxide	1.623		2.047
Methane	50.762		23.344
Ethane	15.569	4.140	13.418
Propane	9.072	2.485	11.466
Isobutane	2.466	0.802	4.108
n-Butane	5.548	1.739	9.243
2,2 Dimethylpropane	0.112	0.043	0.232
Isopentane	3.181	1.157	6.578
n-Pentane	2.995	1.079	6.194
2,2 Dimethylbutane	0.180	0.075	0.445
Cyclopentane	0.091	0.038	0.183
2,3 Dimethylbutane	0.196	0.080	0.484
2 Methylpentane	1.316	0.543	3.251
3 Methylpentane	0.846	0.343	2.090
n-Hexane	1.570	0.642	3.878
Methylcyclopentane	0.153	0.052	0.369
Benzene	0.043	0.012	0.096
Cyclohexane	0.222	0.075	0.535
2-Methylhexane	0.568	0.263	1.631
3-Methylhexane	0.552	0.250	1.585
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.574	0.248	1.632
n-Heptane	0.628	0.288	1.804
Methylcyclohexane	0.502	0.201	1.413
Toluene	0.086	0.029	0.227
Other C8's	0.759	0.351	2.398
n-Octane	0.129	0.066	0.422
Ethylbenzene	0.004	0.002	0.012
M & P Xylenes	0.023	0.009	0.070
O-Xylene	0.004	0.002	0.012
Other C9's	0.174	0.088	0.630
n-Nonane	0.020	0.011	0.074
Other C10's	0.028	0.016	0.113
n-Decane	0.003	0.002	0.012
Undecanes (11)	0.001	0.001	0.004
Totals	100.000	15.130	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.219	(Air=1)
Compressibility (Z)	0.9882	
Molecular Weight	34.89	
Gross Heating Value		
Dry Basis	1987	BTU/CF
Saturated Basis	1953	BTU/CF

May 30, 2013

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

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

Sample: Tom's Fork No. 1H
Separator Hydrocarbon Liquid
Sampled @ 149 psig & 62 °F

Date Sampled: 05/17/13 Job Number: 33542.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.017	0.004	0.005
Carbon Dioxide	0.038	0.014	0.016
Methane	4.271	1.558	0.660
Ethane	4.484	2.582	1.299
Propane	4.441	2.634	1.887
Isobutane	1.479	1.042	0.828
n-Butane	3.646	2.475	2.042
2,2 Dimethylpropane	0.074	0.061	0.051
Isopentane	2.616	2.060	1.819
n-Pentane	2.770	2.162	1.926
2,2 Dimethylbutane	0.206	0.185	0.171
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.394	0.348	0.327
2 Methylpentane	1.832	1.637	1.521
3 Methylpentane	1.329	1.168	1.104
n-Hexane	2.879	2.549	2.391
Heptanes Plus	69.523	79.521	83.953
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

Specific Gravity	0.7475	(Water=1)
°API Gravity	57.80	@ 60°F
Molecular Weight	125.3	
Vapor Volume	18.93	CF/Gal
Weight	6.23	Lbs/Gal

Characteristics of Total Sample:

Specific Gravity	0.7080	(Water=1)
°API Gravity	68.35	@ 60°F
Molecular Weight	103.8	
Vapor Volume	21.65	CF/Gal
Weight	5.90	Lbs/Gal

Base Conditions: 14.650 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: JCM
Processor: JCdjv
Cylinder ID: W-1002

David Dannhaus 361-661-7015

TOTAL EXTENDED REPORT

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.017	0.004	0.005
Carbon Dioxide	0.038	0.014	0.016
Methane	4.271	1.558	0.660
Ethane	4.484	2.582	1.299
Propane	4.441	2.634	1.887
Isobutane	1.479	1.042	0.828
n-Butane	3.646	2.475	2.042
2,2 Dimethylpropane	0.074	0.061	0.051
Isopentane	2.616	2.060	1.819
n-Pentane	2.770	2.162	1.926
2,2 Dimethylbutane	0.206	0.185	0.171
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.394	0.348	0.327
2 Methylpentane	1.832	1.637	1.521
3 Methylpentane	1.329	1.168	1.104
n-Hexane	2.879	2.549	2.391
Methylcyclopentane	0.864	0.659	0.701
Benzene	0.096	0.058	0.072
Cyclohexane	0.656	0.481	0.532
2-Methylhexane	2.728	2.730	2.633
3-Methylhexane	2.234	2.208	2.157
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	0.878	0.852	0.839
n-Heptane	3.624	3.600	3.499
Methylcyclohexane	3.274	2.833	3.097
Toluene	0.803	0.579	0.713
Other C-8's	10.455	10.921	11.103
n-Octane	4.068	4.487	4.477
E-Benzene	1.278	1.062	1.308
M & P Xylenes	1.188	0.992	1.215
O-Xylene	2.042	1.672	2.089
Other C-9's	7.928	9.249	9.644
n-Nonane	3.295	3.992	4.072
Other C-10's	8.288	10.626	11.282
n-decane	2.146	2.835	2.942
Undecanes(11)	6.306	8.294	8.931
Dodecanes(12)	3.312	4.706	5.138
Tridecanes(13)	1.921	2.927	3.239
Tetradecanes(14)	1.036	1.691	1.897
Pentadecanes(15)	0.536	0.937	1.064
Hexadecanes(16)	0.249	0.465	0.533
Heptadecanes(17)	0.137	0.270	0.312
Octadecanes(18)	0.081	0.169	0.196
Nonadecanes(19)	0.043	0.094	0.110
Eicosanes(20)	0.022	0.049	0.058
Heneicosanes(21)	0.012	0.029	0.034
Docosanes(22)	0.008	0.020	0.024
Tricosanes(23)	0.005	0.013	0.015
Tetracosanes(24)	0.002	0.006	0.008
Pentacosanes(25)	0.002	0.004	0.005
Hexacosanes(26)	0.001	0.003	0.003
Heptacosanes(27)	0.001	0.002	0.002
Octacosanes(28)	0.001	0.002	0.002
Nonacosanes(29)	0.000	0.001	0.001
Triacontanes(30)	0.000	0.001	0.001
Hentriacontanes Plus(31+)	0.001	0.002	0.002
Total	100.000	100.000	100.000

Antero Resources Erwin Unit 1H well
Erwin Hilltop Well Pad

Tag Name	Value	Units	Timestamp
Accumulated Gas Flow	770780.8	MCF	7/2/2013 16:05:12
Well Casing Pressure	**292.29**	**PSIA**	7/2/2013 16:05:31
Current Day Gas Flow	1055.6	MCF	7/2/2013 16:05:12
Differential Pressure	14.43	inH2O	7/2/2013 16:05:12
Flow Rate	4126.29	MCF Per Day	7/2/2013 16:05:12
Sales Line Pressure	**145.44**	**PSIA**	7/2/2013 16:05:12
Previous Day Energy	4957.7	MBTU	7/2/2013 16:05:16
Previous Day Gas Flow	4128.74	MCF	7/2/2013 16:05:16
Separator Temperature	**72.74**	**F**	7/2/2013 16:05:12
Well Tubing Pressure	**515.39**	**PSIA**	7/2/2013 16:05:31
Hourly AP	145.52	PSIA	7/2/2013 11:00:00
Hourly DP	14.45	Inches	7/2/2013 11:00:00
Hourly Energy	207	MBTU	7/2/2013 11:00:00
Hourly Flow Time	3600	Seconds	7/2/2013 11:00:00
Hourly Tf	70.6	F	7/2/2013 11:00:00
Hourly Volume	172.4	MCF	7/2/2013 11:00:00
Daily AP	14.58	PSIA	7/2/2013 10:00:00
Daily DP	143.44	inH2O	7/2/2013 10:00:00
Daily Energy	4957.7	MBTU	7/2/2013 10:00:00
Daily Flow	4128.74	MCF	7/2/2013 10:00:00
Sales Line Temperature Daily Tf	**70.01**	**F**	7/2/2013 10:00:00
Argon	0	%	7/2/2013 16:05:11
BTU	1200.776	BTU	7/2/2013 16:05:12
C02	0.1488	%	7/2/2013 16:05:11
Carbon Monoxide	0	%	7/2/2013 16:05:11
Decane	0	%	7/2/2013 16:05:11
Ethane	13.169	%	7/2/2013 16:05:11
Helium	0	%	7/2/2013 16:05:11
Heptane	0	%	7/2/2013 16:05:11
Hexane	0.3214	%	7/2/2013 16:05:11
Hydrogen	0	%	7/2/2013 16:05:11
Hydrogen Sulfide	0	%	7/2/2013 16:05:11
Iso-Butane	0.4747	%	7/2/2013 16:05:11
Iso-Pentane	0.2558	%	7/2/2013 16:05:11
Methane	80.6305	%	7/2/2013 16:05:11
N2	0.3703	%	7/2/2013 16:05:11
N-Butane	0.7783	%	7/2/2013 16:05:11
Nonane	0	%	7/2/2013 16:05:11
N-Pentane	0.1633	%	7/2/2013 16:05:11
Octane	0	%	7/2/2013 16:05:11
Oxygen	0	%	7/2/2013 16:05:11
Plate Size	3.75	Inches	7/2/2013 16:05:15
Propane	3.6879	%	7/2/2013 16:05:11
SPG	0.6913		7/2/2013 16:05:12
Water	0	%	7/2/2013 16:05:11

Attachment J
Class I Legal Advertisement

Attachment J

Air Quality Permit Notice
Notice of Application
Wagner 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 2.4 mi east of the intersection of Meathouse Fork and Snake Run Branch in Doddridge County, West Virginia.

The latitude and longitude coordinates are: 39.210623 degrees N and -80.604019 degrees W

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

Pollutants	TOTALS (tpy):
VOC	51.1820
NO_X	4.3772
CO_{2e}	5910.6000
CO	3.6768
SO_2	0.0263
$PM_{2.5}$	0.3327
PM_{10}	0.4807
Lead	2.19E-05
Total HAPs	2.4490
Benzene	0.0235
Formaldehyde	3.30E-03
Xylenes	0.5436

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

GHD SERVICES INC.

▼ PLEASE DETACH AND RETAIN FOR YOUR RECORDS ▼

INVOICE NUMBER	DATE		VOUCHER NO.	AMOUNT
Account Number:		40WVDEPAQ	423593	
CR80715	8/7/2015	400964595		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. 423593

8/7/2015

PAY **********1,500 DOLLARS AND **********00 CENTS $ **********1,500.00

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 RED

⑈423593⑈ ⑆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-TANKCOND001, EP-TANKCOND002, EP-TANKCOND003, EP-TANKCOND004, EP-TANKCOND005, EP-TANKCOND006	F/W/B	TANKCOND001-006	Condensate Tank	N/A		Total VOCs	6.9491	30.4370	6.9491	30.4370	Gas/Vapor	MB
						Total CO_{2e} CO2 (124389), CH4 (74828)	11.3724	49.8110	11.3724	49.8110		
						Total TAPs (Benzene (71432))	0.0021	0.0093	0.0021	0.0093		
						Toluene (108883)	0.0064	0.0282	0.0064	0.0282		
						Ethylbenzene (100414)	0.0043	0.0189	0.0043	0.0189		
						o,m,p-xylenes (95476,108383,106423)	0.0088	0.0386	0.0088	0.0386		
						n-Hexane (110543)	0.1130	0.4951	0.1130	0.4951		
EP-TANKPW001, EP-TANKPW002	F/W/B	TANKPW001-002	Produced Water Tank	N/A		Total VOCs	0.1678	0.7349	0.1678	0.7349	Gas/Vapor	MB
						Total CO2e CO2 (124389), CH4 (74828)	18.4580	80.8460	18.4580	80.8460		
						Toluene (108883)	0.0021	0.0090	0.0021	0.0090		
						o,m,p-xylenes (95476,108383,106423)	0.0025	0.0109	0.0025	0.0109		
EP-H001, EP-H002, EP-H003, EP-H004, EP-H005, EP-H006, EP-H007, EP-H008, EP-H009, EP-H010, EP-H011, EP-H012	Vertical Stack	H001, H002, H003, H004, H005, H006, H007, H008, H009, H010, H011, H012	Gas Production Unit Heater	N/A		CO (630080)	0.8395	3.6768	0.8395	3.6768	Gas/Vapor /Solid (for PM)	MB AP-42
						NOx (10102439)	0.9994	4.3772	0.9994	4.3772		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4	1206.3509	5283.8169	1206.3509	5283.8169		
						SO2 (7446095)	6.00E-03	0.0263	6.00E-03	0.0263		
						PM, PM10, PM2.5	0.0760	0.3327	0.0760	0.3327		
						Hexane (110543)	0.0180	0.0788	0.0180	0.0788		
						Total VOCs	0.0550	0.2407	0.0550	0.2407		
F001	N/A	F001	Fugitives	N/A		Benzene (71432)	0.0025	0.0108	0.0025	0.0108	Gas/Vapor	MB
						Toluene (108883)	0.0243	0.1066	0.0243	0.1066		
						Ethyl benzene (100414)	0.0446	0.1954	0.0446	0.1954		
						Hexane (110543)	0.2064	0.9040	0.2064	0.9040		
						o,m,p-xylenes (95476,108383,106423)	0.1128	0.4939	0.1128	0.4939		
						CO2 Equivalent CO2 (124389)), CH4	104.6932	458.5564	104.6932	458.5564		
						VOCs	4.3100	18.8777	4.3100	18.8777		
						TAPs (benzene)	0.0025	0.0108	0.0025	0.0108		
EP-L001, EP-L002	N/A	L001, L002	Loading (Condensate), Loading (Water)	N/A		VOCs	30.4538	0.5561	30.4538	0.5561	Gas/Vapor	MB
						hexane (110543)	0.0606	0.0011	0.0606	0.0011		
						o,m,p-xylenes (95476,108383,106423)	0.0159	0.0003	0.0159	0.0003		
						CO2 Equivalent CO2 (124389), CH4	20.2804	0.5683	20.2804	0.5683		
EP-HR001	N/A	HR001	Haul Truck	N/A		PM, PM10, PM2.5	4.3622	0.6579	2.1811	0.3289	Solid	MB
EP-PCV	valve	PCV	Pneumatic CV	N/A		hexane (110543)	0.0072	0.0316	0.0072	0.0316	Gas/Vapor	MB
						CO2 Equivalent CO2 (124389), CH4	8.4368	36.9532	8.4368	36.9532		
						VOCs	0.0765	0.3353	0.0765	0.3353		

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	4.3622	0.6579	2.1811	0.3289	MB
Loading/Unloading Operations	VOCs	30.4538	0.5561	30.4538	0.5561	MB
	hexane (110543)	0.0606	1.11E-03	0.0606	1.11E-03	
	o,m,p-xylenes (95476,108383,106423)	0.015949947	2.91E-04	0.015949947	2.91E-04	
	CO2 Equivalent CO2 (124389), CH4	20.2804	0.5683	20.2804	0.5683	
Equipment Leaks (Components)	Benzene (71432)	Does not apply	0.0108	Does not apply	0.0108	MB
	Toluene (108883)		0.1066		0.1066	
	Ethyl benzene (100414)		0.1954		0.1954	
	Hexane (110543)		0.9040		0.9040	
	o,m,p-xylenes (95476,108383,106423)		0.4939		0.4939	
	CO2 Equivalent CO2 (124389)), CH4		458.56		458.56	
	VOCs		18.8777		18.8777	
	TAPs (benzene)		0.0108		0.0108	
Equipment Leaks (PCVs)	hexane (110543)	7.23E-03	0.0316	7.23E-03	0.0316	MB
	CO2 Equivalent CO2 (124389), CH4	8.4368	36.95	8.4368	36.95	
	VOCs	0.0765	0.3353	0.0765	0.3353	

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

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

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

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