March 9, 2017 Reference No. 082715

Ms. Beverly McKeone
Division of Air Quality
WV Department of Environmental Protection
601 57th Street, SE
Charleston, West Virginia 25304

Dear Ms. Beverly McKeone:

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

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

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

1. Decrease in production.
2. Removal of one Kubota Engine
3. Removal of one well
4. Removal of one GPU heater
5. Removal of three enclosed combustors
6. Removal of nine line heaters
7. Removal of four condensate tanks

Please refer to Table 13 in Attachment S - 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:

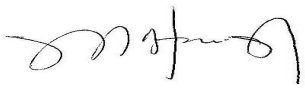
- Original copy of the G70-D General Permit Modification Application.
- Two CD copies of the G70-D General Permit Modification Application.
- The application fee with check no. 468473 in the amount of $1,500.00.

GHD
6320 Rothway Street 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 Services Inc.



Manuel Bautista

MB/ma/300

Encl.

cc: Barry Schatz, Antero Resources Corporation
Elizabeth McLaughlin, Antero Resources Corporation

General Permit G70-D Modification Application

Decrease in production, and removal of one Kubota Engine, one well, one GPU heater, nine Line Heaters, four Condensate Tanks, and three Enclosed Combustors

Fritz Well Pad

Antero Resources Corporation

GHD | 6320 Rothway Suite 100 Houston Texas 77040
082715 | Report No 300 | March 2017

Table of Contents

west virginia department of environmental protection

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

G70-D GENERAL PERMIT REGISTRATION APPLICATION

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

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

SECTION 1. GENERAL INFORMATION

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

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

Applicant's Mailing Address: 1615 Wynkoop Street

City: Denver	State: CO	ZIP Code: 80202

Facility Name: Fritz Well Pad

Operating Site Physical Address: 201 Elliot Rd

City: West Union	Zip Code: 26456	County: Doddridge

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.23415
Longitude: -80.84013

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities) 017-00107

CERTIFICATION OF INFORMATION

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

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

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

Responsible Official Signature:_____
Name and Title: Phone: Fax:
Email: Date:

If applicable:
Authorized Representative Signature: Barry Schatz
Name and Title: Barry Schatz/ Senior Environmental & Regulatory Manager Phone: 303-357-7276 Fax: 303-357-7315
Email: bschatz@anteroresources.com Date: 3/9/2017

If applicable:
Environmental Contact
Name and Title: Phone: Fax:
Email: Date:

OPERATING SITE INFORMATION	
Briefly describe the proposed new operation and/or any change(s) to the facility: Decrease in production, and removal of one Kubota Engine, one well, one GPU heater, nine Line Heaters, four Condensate Tanks, and three Enclosed Combustors	
Directions to the facility: From West Union, head north on Neely Ave toward Marie St/Old U.S.50E, turn left at the 1st cross street onto Marie St/Old U.S. 50 W, drive 2.3 mi ,turn right onto US-50 W, turn left onto Old U.S 50 E/Sunnyside Rd for 1.9 mi, make a left onto Co Rte. 21/Oxford Rd for 2.9 mi. Turn left onto Co Rte. 11/3 for 0.4 mi. Facility is on the right.	

ATTACHMENTS AND SUPPORTING DOCUMENTS	
I have enclosed the following required documents:	
Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22). ☒ Check attached to front of application. ☐ I wish to pay by electronic transfer. Contact for payment (incl. name and email address): ☐ I wish to pay by credit card. Contact for payment (incl. name and email address): ☒$500 (Construction, Modification, and Relocation) ☐$300 (Class II Administrative Update) ☒$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ, OOOO and/or OOOOa [1] ☐$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH [2] [1] Only one NSPS fee will apply. [2] Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ. *NSPS and NESHAP fees apply to new construction or if the source is being modified.*	
☒ Responsible Official or Authorized Representative Signature (if applicable)	
☒ Single Source Determination Form **(must be completed in its entirety)** – Attachment A	
☐ Siting Criteria Waiver (if applicable) – Attachment B	☒ Current Business Certificate – Attachment C
☒ Process Flow Diagram – Attachment D	☒ Process Description – Attachment E
☒ Plot Plan – Attachment F	☒ Area Map – Attachment G
☒ G70-D Section Applicability Form – Attachment H	☒ Emission Units/ERD Table – Attachment I
☒ Fugitive Emissions Summary Sheet – Attachment J	
☒ Gas Well Affected Facility Data Sheet (if applicable) – Attachment K	
☒ Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment L	
☒ Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment M	
☒ Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N	
☒ Tanker Truck Loading Data Sheet (if applicable) – Attachment O	
☐ Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment P	
☐ Pneumatic Controllers Data Sheet – Attachment Q	
☐ Pneumatic Pump Data Sheet – Attachment R	
☒ Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment S	
☒ Emission Calculations (please be specific and include all calculation methodologies used) – Attachment T	
☒ Facility-wide Emission Summary Sheet(s) – Attachment U	
☒ Class I Legal Advertisement – Attachment V	
☒ One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments	

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 A
Single Source Determination Form

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

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

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

The Source Determination Rule for the oil and gas industry was published in the Federal Register on June 3, 2016 and will become effective on August 2, 2016. EPA defined the term "adjacent" and stated that equipment and activities in the oil and gas sector that are under common control will be considered part of the same source if they are located on the same site or on sites that share equipment and are within ¼ mile of each other.

Is there equipment and activities in the same industrial grouping (defined by SIC code)?
Yes ☒ No ☐

Is there equipment and activities under the control of the same person/people?
Yes ☒ No ☐

Is there equipment and activities located on the same site or on sites that share equipment and are within ¼ mile of each other?
Yes ☐ No ☒

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

Attachment B
Siting Criteria Waiver

Attachment B

Siting Waiver
Fritz Well Pad
Antero Resources Corporation
Doddridge County, West Virginia

A Siting Waiver form is not required because there are no occupied dwelling structures within 300 feet of Fritz Well Pad.

Attachment C
Current Business Certificate

State of West Virginia

Certificate

I, Natalie E. Tennant, Secretary of State of the State of West Virginia, hereby certify that

ANTERO RESOURCES CORPORATION

a corporation formed under the laws of Delaware, which is authorized to transact business in West Virginia by a Certificate of Authority has filed in my office as required by the provisions of the West Virginia Code, a copy of an amendment to its Articles of Incorporation authenticated by the proper office of the state or country of its incorporation and was found to conform to law.

Therefore, I issue this

CERTIFICATE OF AMENDMENT TO CERTIFICATE OF AUTHORITY

Given under my hand and the Great Seal of the State of West Virginia on this day of June 10, 2013

Natalie E Tennant

Secretary of State

FILED

JUN 10 2013

IN THE OFFICE OF SECRETARY OF STATE

Natalie E. Tennant
Secretary of State
1900 Kanawha Blvd E
Bldg 1, Suite 157-K
Charleston, WV 25305

Penney Barker, Manager
Corporations Division
Tel: (304)558-8000
Fax: (304)558-8381
Website: www.wvsos.com
E-mail: business@wvsos.com

Office Hours: Monday – Friday
8:30 a.m. – 5:00 p.m. ET

FILE ONE ORIGINAL
(Two if you want a filed stamped copy returned to you)
FEE: $25.00

APPLICATION FOR AMENDED CERTIFICATE OF AUTHORITY

****** In accordance with the provisions of the West Virginia Code, the undersigned corporation hereby **** applies for an Amended Certificate of Authority and submits the following statement:**

1. Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachian Corporation

2. Date Certificate of Authority was issued in West Virginia: 6/25/2008

3. Corporate name has been changed to: Antero Resources Corporation
(Attach one Certified Copy of Name Change as filed in home State of incorporation.)

4. Name the corporation elects to use in WV: Antero Resources Corporation
(due to home state name not being available)

5. Other amendments:
(attach additional pages if necessary)

6. **Name and phone number of contact person.** (This is optional, however, if there is a problem with the filing, listing a contact person and phone number may avoid having to return or reject the document.)

Alvyn A. Schopp — Contact Name
(303) 357-7310 — Phone Number

7. **Signature information** (See below ******Important Legal Notice Regarding Signature*):

Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person

Signature: Alvyn A. Schopp **Date:** June 10, 2013

******Important Legal Notice Regarding Signature*: **Per West Virginia Code §31D-1-129. Penalty for signing false document. Any person who signs a document he or she knows is false in any material respect and knows that the document is to be delivered to the secretary of state for filing is guilty of a misdemeanor and, upon conviction thereof, shall be fined not more than one thousand dollars or confined in the county or regional jail not more than one year, or both.**

Delaware

The First State

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF AMENDMENT OF "ANTERO RESOURCES APPALACHIAN CORPORATION", CHANGING ITS NAME FROM "ANTERO RESOURCES APPALACHIAN CORPORATION" TO "ANTERO RESOURCES CORPORATION", FILED IN THIS OFFICE ON THE TENTH DAY OF JUNE, A.D. 2013, AT 9:37 O'CLOCK A.M.

A FILED COPY OF THIS CERTIFICATE HAS BEEN FORWARDED TO THE NEW CASTLE COUNTY RECORDER OF DEEDS.

Jeffrey W. Bullock, Secretary of State

4520810 8100

130754186

AUTHENTICATION: 0496546

DATE: 06-10-13

You may verify this certificate online at corp.delaware.gov/authver.shtml

State of Delaware
Secretary of State
Division of Corporations
Delivered 09:37 AM 06/10/2013
FILED 09:37 AM 06/10/2013
SRV 130754186 - 4520810 FILE

AMENDMENT TO THE AMENDED AND RESTATED CERTIFICATE OF INCORPORATION OF ANTERO RESOURCES APPALACHIAN CORPORATION

Antero Resources Appalachian Corporation (the "Corporation"), a corporation organized and existing under the laws of the State of Delaware, hereby certifies as follows:

1. The original Certificate of Incorporation of the Corporation was filed under the name Antero Resources Barnett Corporation with the filing of the original Certificate of Incorporation of the Corporation with the Secretary of State of the State of Delaware on March 18, 2008.

2. This Amendment to the Amended and Restated Certificate of Incorporation has been duly adopted and approved in accordance with Sections 242 of the General Corporation Law of the State of Delaware.

3. Article FIRST of the Amended and Restated Certificate of Incorporation is hereby amended to read in its entirety as follows:

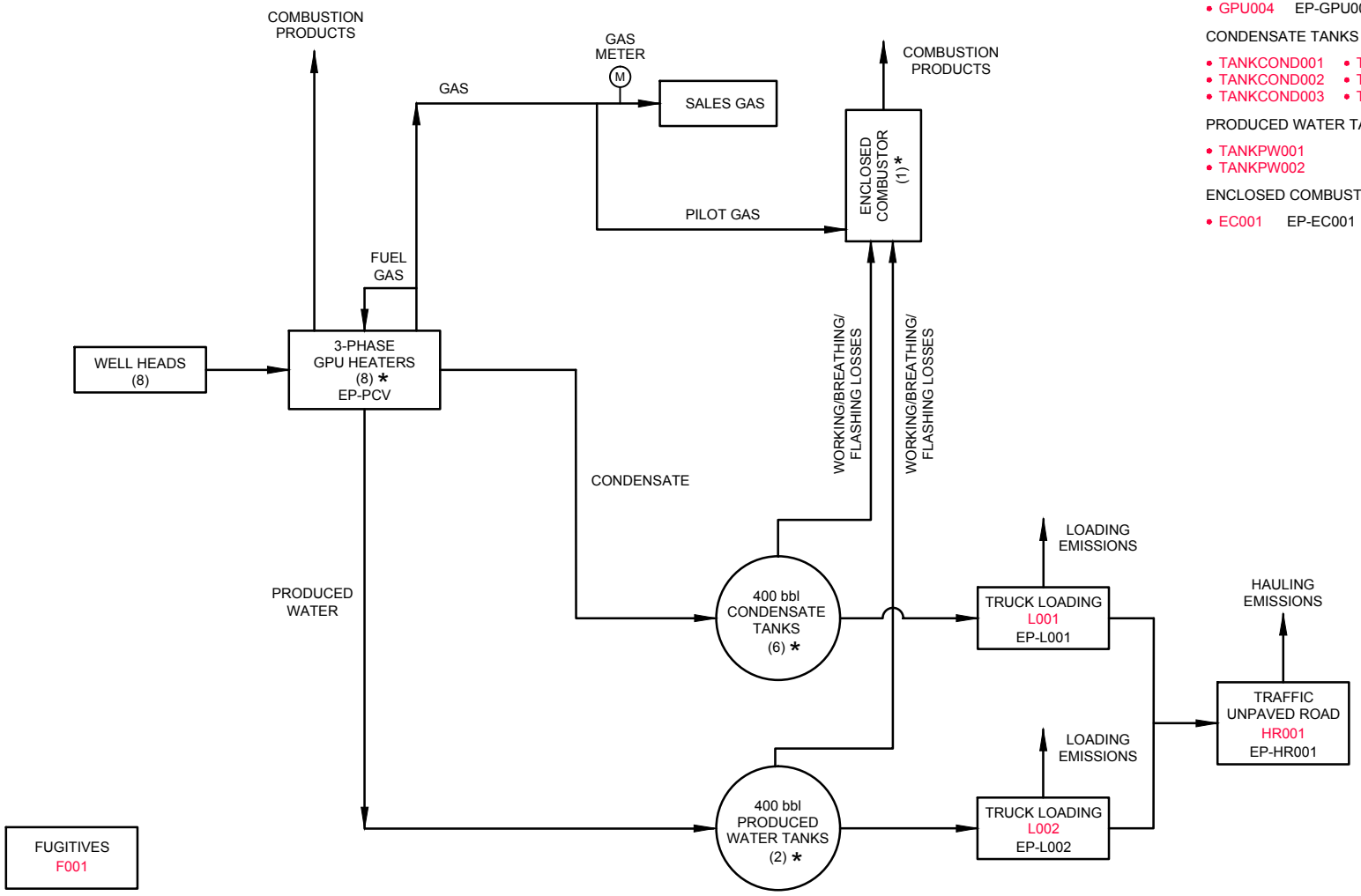
FIRST. The name of the Corporation is Antero Resources Corporation.

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be executed by its duly authorized officer on the 10th day of June, 2013.

ANTERO RESOURCES APPALACHIAN CORPORATION

By: _____
Name: Alvyn A. Schopp
Title: Vice President of Accounting & Administration / Treasurer

Attachment D
Process Flow Diagram



* 3-PHASE SEPARATORS WITH HEATERS (8)

- GPU001 EP-GPU001
- GPU002 EP-GPU002
- GPU003 EP-GPU003
- GPU004 EP-GPU004
- GPU005 EP-GPU005
- GPU006 EP-GPU006
- GPU007 EP-GPU007
- GPU008 EP-GPU008

CONDENSATE TANKS (6)

- TANKCOND001
- TANKCOND002
- TANKCOND003
- TANKCOND004
- TANKCOND005
- TANKCOND006

PRODUCED WATER TANKS (2)

- TANKPW001
- TANKPW002

ENCLOSED COMBUSTORS (1)

- EC001 EP-EC001

Attachment D

PROCESS FLOW DIAGRAM - ANTERO RESOURCES FRITZ WELL PAD

Doddridge County, West Virginia

Attachment E
Process Description

Attachment E

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

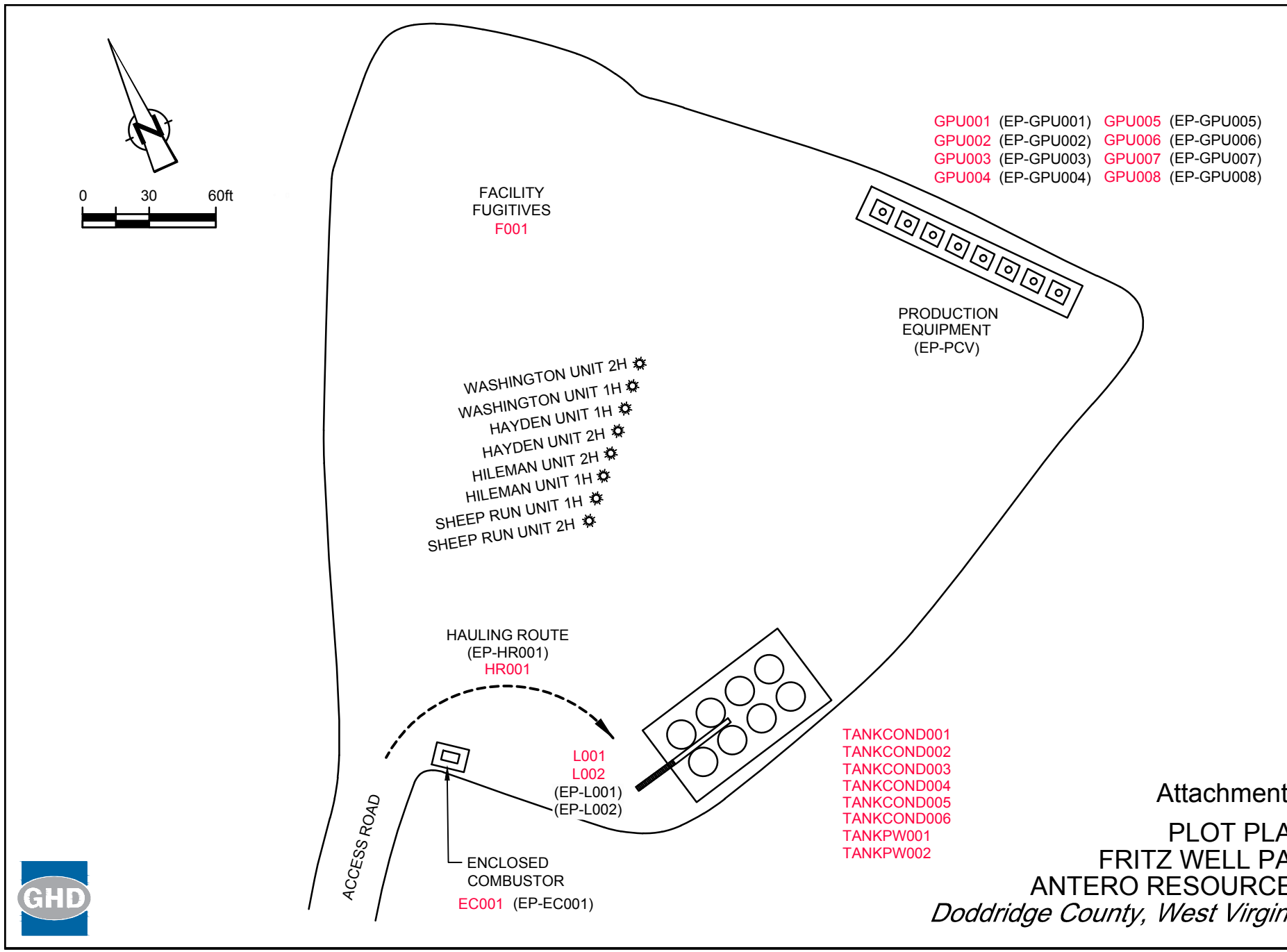
A mixture of condensate, water, and entrained gas from the condensate and gas wells enters the facility through a series of gas production units (GPU001-GPU008) which are 3 phase separators where the gas, condensate, and produced water are separated. The GPUs are fueled by a slip stream of the separated gas. The separated gas is then metered and sent to the sales gas pipeline. The separated condensate and water from the separators flow to their respective storage tanks (TANKCOND001-006 and TANKPW001-002).

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. The flashing, working and breathing losses from the tanks are routed to the enclosed combustor (EC001) to control the emissions. The enclosed combustor that will be used to control emissions is designed to achieve a VOC destruction efficiency of 98 percent.

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

Emissions from the facility's emission sources were calculated using the extended analysis of the condensate from Nero 2H, one of the wells in McGill well pad and site specific gas analysis from Sheep Run 2H, one of the wells in the Fritz Well Pad. The extended analysis is considered representative of the materials from Fritz Well Pad, being in the same Marcellus rock formation.

Attachment F
Plot Plan



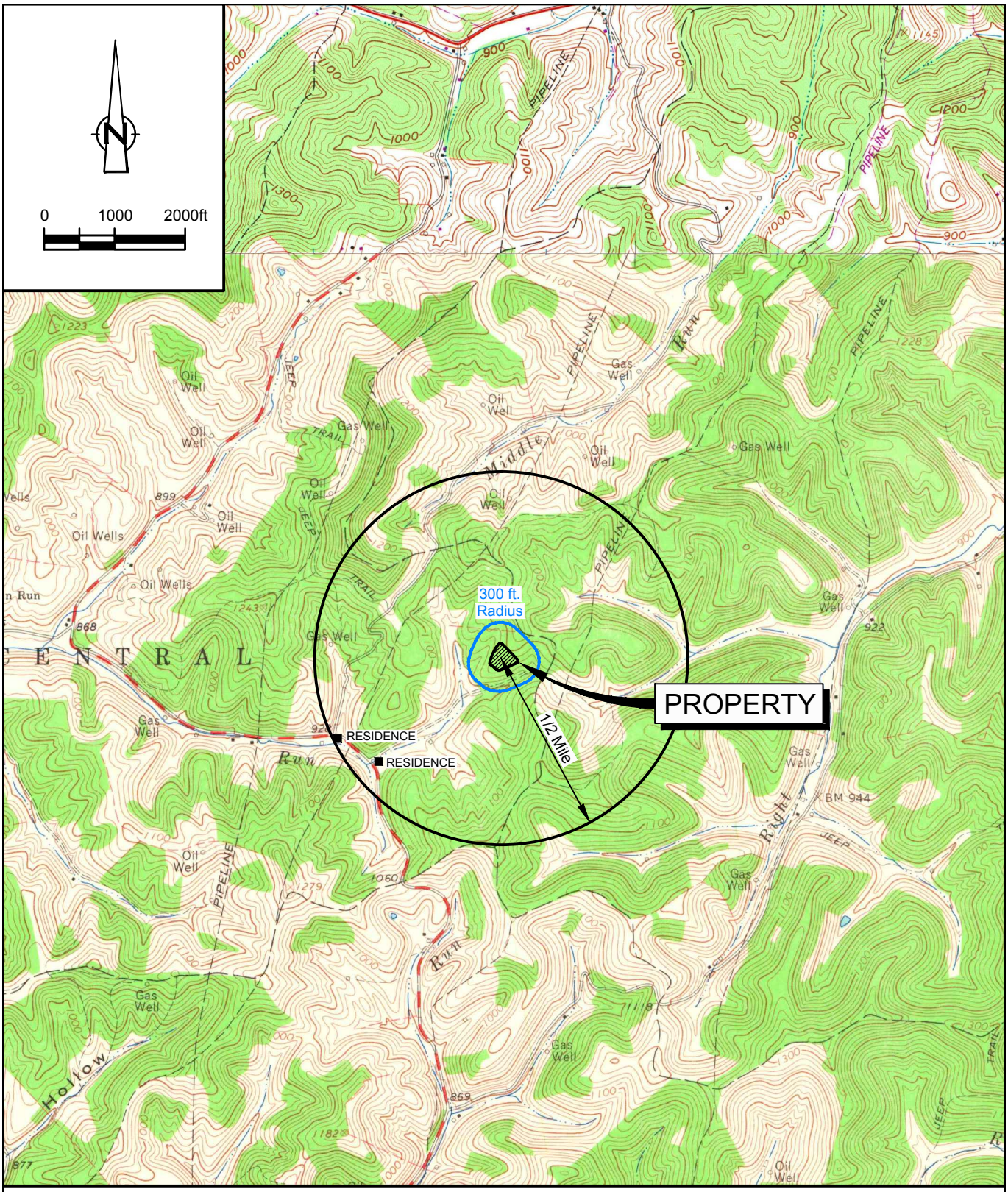
GHD

Attachment F

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

82715-00(300)GN-WA002 FEB 16, 2017

Attachment G
Area Map



SOURCE: USGS QUADRANGLE MAPS;
OXFORD AND WEST UNION, WEST VIRGINIA

SITE COORDINATES: LAT: 39.23415, LONG: -80.84013
SITE ELEVATION: 1053.8 ft AMSL

GHD

Attachment G

AREA MAP
FRITZ WELL PAD
ANTERO RESOURCES
Doddridge County, West Virginia

82715-00(300)GN-WA003 FEB 16, 2017

Attachment H
G70-C Section Applicability Form

ATTACHMENT H – G70-D SECTION APPLICABILITY FORM

General Permit G70-D Registration[1]
Section Applicability Form

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

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

GENERAL PERMIT G70-D APPLICABLE SECTIONS	
☒Section 5.0	Gas Well Affected Facility (NSPS, Subpart OOOO/OOOOa)
☒Section 6.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☐Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)
☒Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa and/or NESHAP Subpart HH
☒Section 9.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
☐Section 10.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO/OOOOa)
☐Section 11.0	Pneumatic Pump Affected Facility (NSPS, Subpart OOOOa)
☒Section 12.0	Fugitive Emissions GHG and VOC Standards (NSPS, Subpart OOOOa)
☐Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines
☒Section 14.0	Tanker Truck/Rail Car Loading[2]
☐Section 15.0	Glycol Dehydration Units[3]

1 *Applicants that are subject to Section 6 may also be subject to Section 7 if the applicant is subject to the NSPS, Subparts OOOO or OOOOa control requirements or the applicable control device requirements of Section 8.*

2 *Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 8.*

3 *Applicants that are subject to Section 15 may also be subject to the requirements of Section 9 (reboilers). Applicants that are subject to Section 15 may also be subject to control device and emission reduction device requirements of Section 8.*

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Attachment I
Emission Units/ ERD Table

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

Include ALL emission units and air pollution control devices /ERDs that will be part of this permit application review. This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed	Manufac. Date[3]	Design Capacity	Type[4] and Date of Change	Control Device(s)[5]	ERD (s)[6]
GPU001-008	EP-GPU001-008	Gas Production Unit Heater	2014		1.5 MMBtu/hr	Existing	N/A	
GPU009	EP-GPU009	Gas Production Unit Heater	2015		1.5 MMBtu/hr	Removal-2017	N/A	
LH001-009	EP-LH001 -009	Gas Production Unit Heater	2014		2.0 MMBtu/hr	Removal-2017	N/A	
F001	F001	Fugitives	2014		N/A	Existing	N/A	
TANKCOND001-006	EP-EC001	Condensate Tank F/W/B	2014		400 bbl each	Modification[1]	EP-EC001	
TANKCOND007-008	EP-EC001	Condensate Tank F/W/B	2014		400 bbl each	Removal - 2017	EP-EC001 -004	
TANKCOND009-0010	EP-EC001	Condensate Tank F/W/B	2015		400 bbl each	Removal - 2017	EP-EC001 -004	
TANKPW001-002	EP-EC001	PW Tank F/W/B	2014		400 bbl each	Modification[2]	EP-EC001	
L001	EP-L001	Loading (Condensate)	2014		10080 gal/hr 1149750 gal/yr	Modification[3]	N/A	
L002	EP-L002	Loading (Produced Water)	2014		10080 gal/hr 2299500 gal/yr	Modification[4]	N/A	
HR001	EP-HR001	Haul Road	2014		Tanker Trucks Condensate: 137 trips per year Tanker Trucks PW: 274 trips per year Pick Up Truck: 730 trips per year	Modification[5]	N/A	
EC001	EP-EC001	Enclosed Combustor	2014		12 MMBtu/hr	Modification[6]	N/A	
EC002	EP-EC002	Enclosed Combustor	2015		12 MMBtu/hr	Removal - 2017	N/A	
EC003	EP-EC003	Enclosed Combustor	2015		12 MMBtu/hr	Removal - 2017	N/A	
EC004	EP-EC004	Enclosed Combustor	2015		12 MMBtu/hr	Removal - 2017	N/A	
PCV	EP-PCV	Pneumatic CV	2014		6.6 scf/day/PCV	Existing	N/A	
ENG001	EP-ENG001	Compressor Engine	2014	2013	24 HP	Removal-2017	Non-Selective Catalytic Reduction	

1 For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S, ... or other appropriate designation.
2 For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.
3 When required by rule.
4 New, modification, removal, existing.
5 For Control Devices use the following numbering system: 1C, 2C, 3C, ... or other appropriate designation.
6 For ERDs use the following numbering system: 1D, 2D, 3D, ... or other appropriate designation.

Notes:

1. This is not a physical modification. Change in emissions due to decrease in condensate throughput and change of number of tanks.
2. This is not a physical modification. Change in emissions due to decrease in PW throughput.
3. This is not physical modification. Change in emissions due to decrease in loading throughput.
4. This is not physical modification. Change in emissions due to decrease in produced water loading throughput.
5. This is not physical modification. Change in emissions due to decrease in loading throughput
6. This is not physical modification. Change in emissions due to increase in throughput and change of number of enclosed combustors.

Attachment J
Fugitive Emissions Summary Sheet

ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

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

Source/Equipment:

Leak Detection Method Used	☐ Audible, visual, and olfactory (AVO) inspections	☑ Infrared (FLIR) cameras	☐ Other (please describe)	☐ None required

Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)			
					VOC	HAP	GHG (methane)	GHG (CO2e)
Valves	☐ Yes ☑ No	400	EPA	gas	2.644	0.221	11.169	279.237
Valves	☐ Yes ☑ No	416	EPA	liquid	9.810	0.690	0.072	1.798
Connections (Not sampling)	☐ Yes ☑ No	472	EPA	gas	0.139	0.012	0.586	14.644
Flanges	☐ Yes ☑ No	104	EPA	gas	0.060	0.005	0.252	6.292

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

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

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

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

Attachment K
Gas Well Affected Facility Data Sheet

ATTACHMENT K – GAS WELL AFFECTED FACILITY DATA SHEET

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

API Number	Date of Flowback	Date of Well Completion	Green Completion and/or Combustion Device	Subject to OOOO or OOOOa?
47017064640000	1/30/2015	10/26/2014	Green	OOOO
47017064650000	1/23/2015	10/21/2014	Green	OOOO
47017066590000	2/17/2016	11/21/2015	Green	OOOOa
47017066600000	2/23/2016	11/30/2015	Green	OOOOa
47017066570000	3/5/2016	12/30/2015	Green	OOOOa
47017066580000	3/1/2016	1/9/2016	Green	OOOOa
47017063700000	2/5/2015	10/28/2014	Green	OOOO
47017063710000	2/11/2015	10/28/2014	Green	OOOO

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

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

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

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

Where,

047 = State code. The state code for WV is 047.

001 = County Code. County codes are odd numbers, beginning with 001 (Barbour) and continuing to 109 (Wyoming).

00001 = Well number. Each well will have a unique well number.

Attachment L
Storage Vessel Data Sheet

ATTACHMENT L – STORAGE VESSEL DATA SHEET

Complete this data sheet if you are the owner or operator of a storage vessel that contains condensate and/or produced water. This form must be completed for each new or modified bulk liquid storage vessel(s) that contains condensate and/or produced water . (If you have more than one (1) identical tank (i.e. 4-400 bbl condensate tanks), then you can list all on one (1) data sheet). **Include gas sample analysis, flashing emissions, working and breathing losses, USEPA Tanks, simulation software (ProMax, E&P Tanks, HYSYS, etc.), and any other supporting documents where applicable.**

The following information is REQUIRED:

☐ Composition of the representative sample used for the simulation
☐ For each stream that contributes to flashing emissions:
  ☐ Temperature and pressure (inlet and outlet from separator(s))
  ☐ Simulation-predicted composition
  ☐ Molecular weight
  ☐ Flow rate
☐ Resulting flash emission factor or flashing emissions from simulation
☐ Working/breathing loss emissions from tanks and/or loading emissions if simulation is used to quantify those emissions

Additional information may be requested if necessary.

GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name: Tanks	2. Tank Name: Condensate Tank 001-06
3. Emission Unit ID number: TANKCOND001-006	4. Emission Point ID number. EP-EC001
5. Date Installed , Modified or Relocated (for existing tanks) 2014 Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? ☑ Yes ☐ No Was the tank manufactured after September 18, 2015? ☐ Yes ☑ No	6. Type of change: ☑ New construction ☐ New stored material ☐ Other ☐ Relocation

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.
☐ Yes ☑ No

7C. Was USEPA Tanks simulation software utilized?
☐ Yes ☑ No

If Yes, please provide the appropriate documentation and items 8-42 below are not required.

TANK INFORMATION

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 400bbls

9A. Tank Internal Diameter (ft): 12	9B. Tank Internal Height (or Length) (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" and considers design liquid levels and overflow valve heights.: 400bbls

13A. Maximum annual throughput (gal/yr): 1149750	13B. Maximum daily throughput (gal/day): 3150
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 12	15. Maximum tank fill rate (gal/min) 168

16. Tank fill method ☐ Submerged ☑ Splash ☐ Bottom Loading

17. Is the tank system a variable vapor space system? ☐ Yes ☑ No

If yes, (A) What is the volume expansion capacity of the system (gal)?
(B) What are the number of transfers into the system per year?

18. Type of tank (check all that apply):

☑ Fixed Roof ☑ vertical ☐ horizontal ☑ flat roof ☐ cone roof ☐ dome roof ☐ other (describe)
☐ External Floating Roof ☐ pontoon roof ☐ double deck roof
☐ Domed External (or Covered) Floating Roof
☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting
☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm
☐ Pressurized ☐ spherical ☐ cylindrical
☐ other

ATTACHMENT L – STORAGE VESSEL DATA SHEET

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply

☐ Inert Gas Blanket of

☑ Vent to Vapor Combustion Device (vapor combustors, flares, thermal oxidizers, enclosed combustors)

☐ Conservation Vent (psig)

Vacuum Setting Pressure Setting

☐ Emergency relief Valve (psig)

Vacuum Setting Pressure Setting

☐ Thief Hatch Weighted ☐ Yes ☐ No

Complete appropriate Air Pollution Control Device Sheet

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

Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emission Loss		[1]Estimation Method
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
Please see Table 6 and Table 7									

TANK CONSTRUCTION & OPERATION INFORMATION

21. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated ☑ Other (describe): Steel

21A. Shell Color: Green	21B. Roof Color: Green	21C. Year Last Painted 2014

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

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

23. Operating Pressure Range (psig): 0 psig, atmospheric **Must be listed for tanks using VRUs with closed vent system**	

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

25. Complete the following section for **Floating Roof Tanks** Does Not Apply

25A. Year Internal Floaters Installed:

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

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ Yes ☐ No

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

25E. Is the Floating Roof equipped with a weather shield? ☐ Yes ☐ No

25F. Describe deck fittings

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

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

26C. Deck seam:
☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft wide ☐ 5 x 12 ft wide ☐ Other (describe)

26D. Deck seam length (ft)	26E. Area of deck (ft_2)	26F. For column supported tanks: Number of columns:	26G. For column supported tanks, Diameter of each column:

27. Closed Vent System with VRU ☐ Yes ☑ No

28. Closed Vent System with Enclosed Combustor? ☑ Yes ☐ No

ATTACHMENT L – STORAGE VESSEL DATA SHEET

SITE INFORMATION

29. Provide the city and state on which the data in this section are based.: West Union, WV			
30. Daily Average Ambient Temperature (°F):	72.10	31. Annual Average Maximum Temperature (°F):	75.94
32. Annual Average Minimum Temperature (°F):	46.56	33. Average Wind Speed (miles/hr): 18.5 mph	
34. Annual Average Solar Insulation Factor (BTU/(ft²·day))	1030.235999	35. Atmospheric Pressure (psia): 14.8 (based off local conditions, could not find annual)	

LIQUID INFORMATION

36. Average daily temperature range of bulk liquid (F):	72.10	36A. Minimum (°F):	46.56	36B. Maximum (°F)	75.94
37. Average operating pressure range of tank (psig):	atmosphere	37A. Minimum (psig)	0	37B. Maximum (psig)	atmosphere

38A. Minimum Liquid Surface Temperature (°F)	46.56	38B. Corresponding Vapor Pressure (psia)	1.3337
39A. Average Liquid Surface Temperature (°F)	72.10	39B. Corresponding Vapor Pressure (psia)	2.2962
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	2.4806

41. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

41A. Material Name or Composition	Condensate		
41B. CAS Number	mix of HC		
41C. Liquid Density (lb/gal)	5.9600		
41D. Liquid Molecular Weight (lb/lb-mole)	112.40		
41E. Vapor Molecular Weight (lb/lb-mole)	40.8475		
Maximum Vapor Pressure 41F. True (psia)	2.4806		
41G. Reid (psia)	3.54		
Months Storage per Year 41H. From - To	year round		
Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations 42.	154 psig; 70 F		

ATTACHMENT L – STORAGE VESSEL DATA SHEET

Complete this data sheet if you are the owner or operator of a storage vessel that contains condensate and/or produced water. This form must be completed for each new or modified bulk liquid storage vessel(s) that contains condensate and/or produced water . (If you have more than one (1) identical tank (i.e. 4-400 bbl condensate tanks), then you can list all on one (1) data sheet). **Include gas sample analysis, flashing emissions, working and breathing losses, USEPA Tanks, simulation software (ProMax, E&P Tanks, HYSYS, etc.), and any other supporting documents where applicable.**

The following information is REQUIRED:

☐ Composition of the representative sample used for the simulation
☐ For each stream that contributes to flashing emissions:
- ☐ Temperature and pressure (inlet and outlet from separator(s))
- ☐ Simulation-predicted composition
- ☐ Molecular weight
- ☐ Flow rate

☐ Resulting flash emission factor or flashing emissions from simulation
☐ Working/breathing loss emissions from tanks and/or loading emissions if simulation is used to quantify those emissions

Additional information may be requested if necessary.

GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name: Tanks	2. Tank Name: Produced Water Tank 001-002
3. Emission Unit ID number: TANKPW001-002	4. Emission Point ID number. EP-EC001
5. Date Installed , Modified or Relocated (for existing tanks) 2014 Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? ☑ Yes ☐ No Was the tank manufactured after September 18, 2015? ☐ Yes ☑ No	6. Type of change: ☑ New construction ☐ New stored material ☐ Other ☐ Relocation

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.
☐ Yes ☑ No

7C. Was USEPA Tanks simulation software utilized?
☐ Yes ☑ No

If Yes, please provide the appropriate documentation and items 8-42 below are not required.

TANK INFORMATION

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 400bbls

9A. Tank Internal Diameter (ft): 12	9B. Tank Internal Height (or Length) (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" and considers design liquid levels and overflow valve heights.: 400bbls

13A. Maximum annual throughput (gal/yr): 2299500	13B. Maximum daily throughput (gal/day): 6300
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 69	15. Maximum tank fill rate (gal/min) 168

16. Tank fill method ☐ Submerged ☑ Splash ☐ Bottom Loading

17. Is the tank system a variable vapor space system? ☐ Yes ☑ No

If yes, (A) What is the volume expansion capacity of the system (gal)?
(B) What are the number of transfers into the system per year?

18. Type of tank (check all that apply):

☑ Fixed Roof ☑ vertical ☐ horizontal ☑ flat roof ☐ cone roof ☐ dome roof ☐ other (describe)
☐ External Floating Roof ☐ pontoon roof ☐ double deck roof
☐ Domed External (or Covered) Floating Roof
☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting
☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm
☐ Pressurized ☐ spherical ☐ cylindrical

ATTACHMENT L – STORAGE VESSEL DATA SHEET

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does not apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket ☐ Carbon Adsorption

☑ Vent to Vapor Combustion Device (vapor combustors, flares, thermal oxidizers, enclosed combustors)

☐ Conservation Vent (psig)
Vacuum Setting Pressure Setting

☐ Emergency relief Valve (psig)
Vacuum Setting Pressure Setting

☐ Thief Hatch Weighted ☐ Yes ☐ No

Complete appropriate Air Pollution Control Device Sheet

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

Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emission Loss		[1] Estimation Method
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
Please see Table 6 and Table 7									

TANK CONSTRUCTION & OPERATION INFORMATION

21. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated ☑ Other(describe): Steel

21A. Shell Color: Green	21B. Roof Color: Green	21C. Year Last Painted 2014

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

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

23. Operating Pressure Range (psig): 0 psig, atmospheric
Must be listed for tanks using VRUs with closed vent system

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

25. Complete the following section for **Floating Roof Tanks** Does Not Apply

25A. Year Internal Floaters Installed:

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

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ Yes ☐ No

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

25E. Is the Floating Roof equipped with a weather shield? ☐ Yes ☐ No

25F. Describe deck fittings

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

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

26C. Deck seam:
☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ Other (describe)

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

27. Closed Vent System with VRU ☐ Yes ☑ No

28. Closed Vent System with Enclosed Combustor? ☑ Yes ☐ No

ATTACHMENT L – STORAGE VESSEL DATA SHEET

SITE INFORMATION

29. Provide the city and state on which the data in this section are based.: West Union, WV			
30. Daily Average Ambient Temperature (°F):	72.10	31. Annual Average Maximum Temperature (°F):	75.94
32. Annual Average Minimum Temperature (°F):	46.56	33. Average Wind Speed (miles/hr): 5.9 mph	
34. Annual Average Solar Insulation Factor (BTU/(ft2· day))	1030.236	35. Atmospheric Pressure (psia): 14.8 (based off local conditions, could not find annual)	

LIQUID INFORMATION

36. Average daily temperature range of bulk liquid (F):	72.10	36A. Minimum (°F):	46.56	36B. Maximum (°F)	75.94
37. Average operating pressure range of tank (psig):	atmosphere	37A. Minimum (psig)	0	37B. Maximum (psig)	atmosphere

38A. Minimum Liquid Surface Temperature (°F)	46.56	38B. Corresponding Vapor Pressure (psia)	0.2279
39A. Average Liquid Surface Temperature (°F)	72.10	39B. Corresponding Vapor Pressure (psia)	0.4523
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	0.4986

41. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

41A. Material Name or Composition	Produced Water		
41B. CAS Number	mix of HC and water		
41C. Liquid Density (lb/gal)	8.3300		
41D. Liquid Molecular Weight (lb/lb-mole)	18.48		
41E. Vapor Molecular Weight (lb/lb-mole)	18.4809		
Maximum Vapor Pressure 41F. True (psia)	0.4986		
41G. Reid (psia)	1.0329		
Months Storage per Year 41H. From - To	year round		
Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations 42.	154 psig; 70 F		

Attachment M
Natural Gas Fired Fuel Burning Unit(s) Data Sheet

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

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

Emission Unit ID#	Emission Point ID#	Emission Unit Description (Manufacturer, model#)	Year Installed/ Modified	Type and Date of Change	Maximum Design Heat Input (MMBTU/hr)	Fuel Heating Value (BTU/scf)
GPU001	EP-GPU001	Gas Production Unit Heater	2014	Existing	1.5	1225.2339
GPU002	EP-GPU002	Gas Production Unit Heater	2014	Existing	1.5	1225.2339
GPU003	EP-GPU003	Gas Production Unit Heater	2014	Existing	1.5	1225.2339
GPU004	EP-GPU004	Gas Production Unit Heater	2014	Existing	1.5	1225.2339
GPU005	EP-GPU005	Gas Production Unit Heater	2014	Existing	1.5	1225.2339
GPU006	EP-GPU006	Gas Production Unit Heater	2014	Existing	1.5	1225.2339
GPU007	EP-GPU007	Gas Production Unit Heater	2014	Existing	1.5	1225.2339
GPU008	EP-GPU008	Gas Production Unit Heater	2014	Existing	1.5	1225.2339
GPU009	EP-GPU009	Gas Production Unit Heater	2017	Removal-2017	1.5	1225.2339
LH001	EP-LH001	Line Heater	2014	Removal-2017	2	1225.2339
LH002	EP-LH002	Line Heater	2014	Removal-2017	2	1225.2339
LH003	EP-LH003	Line Heater	2014	Removal-2017	2	1225.2339
LH004	EP-LH004	Line Heater	2014	Removal-2017	2	1225.2339
LH005	EP-LH005	Line Heater	2014	Removal-2017	2	1225.2339
LH006	EP-LH006	Line Heater	2014	Removal-2017	2	1225.2339
LH007	EP-LH007	Line Heater	2014	Removal-2017	2	1225.2339
LH008	EP-LH008	Line Heater	2014	Removal-2017	2	1225.2339
LH009	EP-LH009	Line Heater	2014	Removal-2017	2	1225.2339

1. Enter the appropriate Emission Unit (or Source) identification number for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For sources, use 1S, 2S, 3S…or other appropriate designation. Enter glycol dehydration unit Reboiler Vent data on the Glycol Dehydration Unit Data Sheet.
2. Enter the appropriate Emission Point identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For emission points, use 1E, 2E, 3E…or other appropriate designation.
3. New, modification, removal.
4. Enter design heat input capacity in MMBtu/hr.
5. Enter the fuel heating value in BTU/standard cubic foot.

Attachment N
Internal Combustion Engine Data Sheet

ATTACHMENT N – INTERNAL COMBUSTION ENGINE DATA SHEET

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

Emission Unit ID#	ENG001	
Engine Manufacturer/Model	Engine (Kubota DG972-E2)	
Manufacturers Rated bhp/rpm	24 HP @ 3600 rpm	
Source Status	REM	
Date Installed/ Modified/ Removed/ Relocated	2017	
Engine Manufacturer/ Reconstruction Date	2013	
Check all applicable Federal Rules for the engine (include EPA Certification of Conformity if applicable)	☑ 40CFR60 Subpart JJJJ ☑ JJJJ Certified? ☐ 40CFR60 Subpart IIII ☐ IIII Certified? ☑ 40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐ 40CFR60 Subpart JJJJ ☐ JJJJ Certified? ☐ 40CFR60 Subpart IIII ☐ IIII Certified? ☐ 40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources
Engine Type	4SRB	
APCD Type	NSCR	
Fuel Type	RG	
H2S (gr/ 100 scf)	0	
Operating bhp/rpm	16.5 HP @ 2400 rpm	
BSFC (BTU/bhp-hr)	9824	
Hourly Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	193 ft^3/hr gal/hr	ft^3/hr gal/hr
Fuel Usage or Hours of Operation Metered	1.6907 $MMft^3/yr$ gal/yr	$MMft^3/yr$ gal/yr

Calculation Methodology	Pollutant	Hourly PTE (lb/hr)	Annual PTE (tons/year)	Hourly PTE (lb/hr)	Annual PTE (tons/year)
MD	NOx	0.0000	0.0000		
MD	CO	0.0000	0.0000		
AP	VOC	0.0000	0.0000		
AP	SO2	0.0000	0.0000		
AP	PM10	0.0000	0.0000		
AP	Formaldehyde	0.0000	0.0000		
AP	Total HAPs	0.0000	0.0000		
OT	GHG (CO2e)	0.0000	0.0000		

Attachment O
Tanker Truck Loading Data Sheet

ATTACHMENT O – TANKER TRUCK LOADING DATA S HEET

Complete this data sheet for each new or modified bulk liquid transfer area or loading rack at the facility. This is to be used for bulk liquid transfer operations to tanker trucks. Use extra pages if necessary.

Truck Loadout Collection Efficiencies

The following applicable capture efficiencies of a truck loadout are allowed:

- For tanker trucks passing the MACT level annual leak test – 99.2%
- For tanker trucks passing the NSPS level annual leak test – 98.7%
- For tanker trucks not passing one of the annual leak tests listed above – 70%

Compliance with this requirement shall be demonstrated by keeping records of the applicable MACT or NSPS Annual Leak Test certification for ***every*** truck and railcar loaded/unloaded. This requirement can be satisfied if the trucking company provided certification that its entire fleet was compliant. This certification must be submitted in writing to the Director of the DAQ. These additional requirements must be noted in the Registration Application.

Emission Unit ID#:	L001, L002	Emission Point ID#:	EP-L001, EP-L002	Year Installed/ Modified:	2014

Emission Unit Description: Condensate Loading, Produced Water Loading

Loading Area Data

Number of Pumps: 2 | Number of Liquids Loaded: 2 | Max number of trucks loading at one time: 2

Are Tanker trucks pressure tested for leaks at this any other location? ☑ Yes ☐ No ☐ Not Required

If Yes, Please 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.

Provide description of closed vent system and any bypasses

Are any of the following truck loadout systems utilized? No

☐ Closed System to Tanker Truck passing a MACT level annual leak test?

☐ Closed System to Tanker Truck passing a NSPS level annual leak test?

☐ Closed System to Tanker Truck not passing an annual leak test and has vapor return?

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

Time	Jan - Mar	Apr - Jun	Jul - Sept	Oct - Dec
Hours/day	4	4	4	4
Days/week	1	1	1	1

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		Condensate	Produced Water	
Max. Daily Throughput (1000 gal/day)		3.15	6.30	
Max. Annual Throughput (1000 gal/yr)		1149.75	2299.50	
Loading Method		BF	BF	
Max. Fill Rate (gal/min)		168	168	
Average Fill Time (min/loading)		50	50	
Max. Bulk Liquid Temperature (F)		72.1	72.1	
True Vapor Pressure		2.3	0.5	
Cargo Vessel Condition		U	U	
Control Equipment or Method		None	None	
Max. Collection Efficiency (%)		0	0	
Max. Control Efficiency (%)		0	0	
Max VOC Emission Rate	Loading (lb/hr)	8.6533	0.0009	
	Annual (ton/yr)	0.4935	0.0001	
Max HAP Emission Rate	Loading (lb/hr)	0.8542	6.08E-06	
	Annual (ton/yr)	0.0487	6.94E-07	
Estimation Method		Promax	Promax	

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill

2 At maximum bulk liquid temperature

3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated servi O Other (describe)

4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)

CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)

ECD Enclosed Combustion Device F Flare

TO Thermal Oxidization or Incineration

5 EPA EPA Emission Factor in AP-42 MB Material Balance

TM Test Measurement based upon test data submittal O Other (describe)

Attachment S
Air Pollution Control Device – Emission Reduction Device Sheets

ATTACHMENT S – AIR POLLUTION CONTROL DEVICE / EMISSION REDUCTION DEVICE SHEETS

Complete the applicable air pollution control device sheet s for each flare, vapor combustor, thermal oxidizer, condenser, adsorption system, vapor recovery unit , BTEX Eliminator, Reboiler with and without Glow Plug, etc. at the facility. Use extra pages if necessary.

Emissions calculations must be performed using the most conservative control device efficiency.

The following five (5) rows are only to be completed if registering an alternative air pollution control device.

Emission Unit ID:	NA	Make/Model:	NA
Primary Control Device ID:	NA	Make/Model	NA
Control Efficiency (%):	NA	APCD/ERD Data Sheet Completed	☐ Yes ☐ No
Secondary Control Device ID:	NA	Make/Model	NA
Control Efficiency (%):	NA	APCD/ERD Data Sheet Completed	☐ Yes ☐ No

VAPOR COMBUSTION (Including Enclosed Combustors)

General Information

Control Device ID#:	EC001-003	Installation Date: ☑ New ☐ Modified ☐ Relocated	
Maximum Rated Total Flow Capacity: 5458 scfh / 131000 scfd		Maximum Design Heating Input (from mfg. spec sheet): 12.0 MMBTU/hr	Design Heat Content: 2300 BTU/scf

Control Device Information

Type of Vapor Combustion Control?

☑ Enclosed Combustion Device ☐ Elevated Flare ☐ Ground Flare ☐ Thermal Oxidizer

Manufacturer: Cimarron Model: 48" HV ECD		Hours of operation per year?	8760

List the emission units whose emissions are controlled by this vapor control device (Emission Point ID# NA

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
TANKCOND001-006	Condensate Tanks		
TANKPW001-002	Produced Water Tanks		

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

Assist Type (Flares only)	Flare height	Tip Diameter	Was the design per §60.18?
☐ Steam ☐ Air ☐ Pressure ☑ Non	25 feet	3.33 feet	☑ Yes ☐ No Provide determination

Waste Gas Information

Maximum Waste Gas Flow Rate	Heat Value of Waste Gas Stream	Exit Velocity of the Emission Stream
6.27 (scfm)	1,965.49 BTU/ft^3	0.0120 (ft/s)

Please see Attachment S, Tables 6 & 7 for VOC composition/ characteristics of the waste gas stream to be burned.

Pilot Gas Information

Number of Pilot Lights	Fuel Flow Rate to Pilot Flame per Pilot	Heat Input per Pilot	Will automatic re-ignition be used?
1	17 scfh	20829 BTU/hr	☑ Yes ☐ No

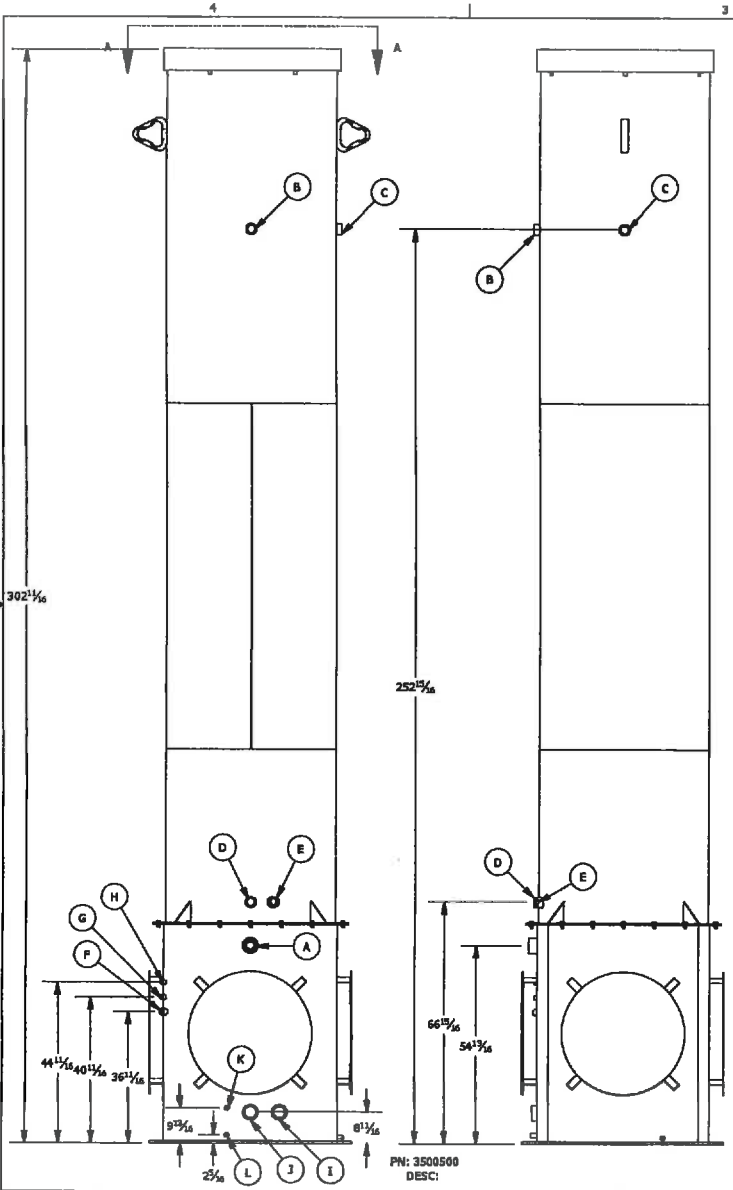
If automatic re-ignition is used, please describe the method. Flame Rectification, a thermocouple equivalent

Is pilot flame equipped with a monitor to detect the presence of the flame?	If Yes, What type?
☑ Yes ☐ No	☐ Thermocouple ☐ Infrared ☐ Ultraviolet ☐ Camera ☑ Other: Flame Ionization Rod

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

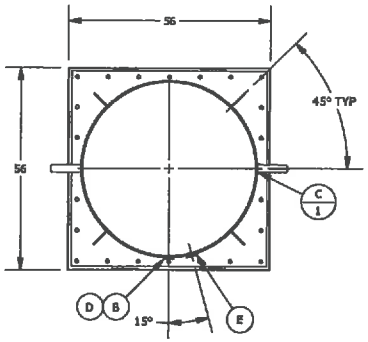
Additional information attached? ☑ Yes ☐ No Manufacturer's specs sheet

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



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

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



VIEW A-A

PN: 3500500
DESC:

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

UNLESS OTHERWISE SPECIFIED

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

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

CIMARRON
Energy Inc.

TITLE:
48" HIGH VOLUME ECD

DATE:	WO No.:	SHEET: 1 OF 1

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

Attachment T
Emissions Calculations

Table 1

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

Oil and Gas Site General Information

Administrative Information	
Company Name	Antero Resources Corporation
Facility/Well Name	Fritz Well Pad
Nearest City/Town	West Union
API Number/SIC Code	1311
Latitude/Longitude	39.23415, -80.84013
County	Doddridge County

Technical Information	
Max Condensate Site Throughput (bbl/day):	75
Max Produced Water Site Throughput (bbl/day):	150
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	8
Gas Production Unit Heaters	8
Condensate Tanks	6
Produced Water Tanks	2
Loading Jobs	2
Enclosed Combustors	1

Table 2

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

Emission Source	VOC		NO_x		CH_4		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)	(lbs/hr)	(ton/yr)
UNCONTROLLED (Fugitives, Storage Tanks, Gas Production Unit Heaters)																										
Fugitive Emissions (Component Count, PCV and Hauling)[1]	2.9589	12.9599			3.0551	13.3812	76.378	334.54							0.6512	0.0755			0.2179	0.9542	0.0013	0.0056	5.60E-02	2.45E-01		
Flashing, Working and Breathing (F/W/B) Losses[2]	24.3504	106.6548			5.4853	24.0255	137.2419	601.1197											2.7313	11.9631	0.0026	0.0116	0.0368	0.1613		
Gas Production Unit Heater Emissions[3]	0.0539	0.2359	0.9794	4.2898	0.0225	0.0987	1,175.29	5,147.75	0.8227	3.6034	0.0059	0.0257	0.0744	0.3260	0.0744	0.3260	4.90E-06	2.14E-05	0.018	0.081	2.06E-05	9.01E-05			0.0007	0.0032
TOTALS:	**27.3632**	**119.8507**	**0.9794**	**4.2898**	**8.5628**	**37.5053**	**1388.9061**	**6083.4086**	**0.8227**	**3.6034**	**0.0059**	**0.0257**	**0.0744**	**0.3260**	**0.7256**	**0.4015**	**4.90E-06**	**2.14E-05**	**2.9676**	**12.9981**	**0.0039**	**0.0172**	**0.0928**	**0.4064**	**0.0007**	**0.0032**
UNCONTROLLED (Truck Loading Emissions)																										
Truck Loading Emissions[4]	8.6543	0.4936			0.5066	0.0310	12.7324	0.7817											0.8543	0.0487	0.0006	3.18E-05	0.0089	0.0005		
CONTROLLED EMISSIONS																										
Enclosed Combustor Emissions (from F/W/B losses)[5]	0.4871	2.1335	0.8177	3.5815	0.0987	0.4322	107.0921	469.0634	3.7214	16.2999	1.02E-05	0.0000	0.0022	0.0098	0.0030	0.0131	1.97E-07	8.62E-07	0.0547	0.2394	0.0001	0.0002	0.0007	0.0032	1.28E-06	5.58E-06
TOTALS:	**0.487**	**2.134**	**0.818**	**3.582**	**0.099**	**0.432**	**107.092**	**469.063**	**3.721**	**16.300**	**1.02E-05**	**4.47E-05**	**0.002**	**0.010**	**0.329**	**0.051**	**1.97E-07**	**8.62E-07**	**0.055**	**0.239**	**5.29E-05**	**2.32E-04**	**7.37E-04**	**0.003**	**1.28E-06**	**5.58E-06**
POTENTIAL TO EMIT[6]	**3.4999**	**15.8230**	**1.7971**	**7.8713**	**3.1763**	**13.9430**	**1358.7562**	**5952.1340**	**4.5441**	**19.9033**	**0.0059**	**0.0258**	**0.0767**	**0.3358**	**0.4030**	**0.3769**	**5.09E-06**	**2.23E-05**	**0.2909**	**1.3231**	**0.0013**	**0.0059**	**0.0567**	**0.2488**	**0.0007**	**0.0032**
POTENTIAL TO EMIT (Excluding Fugitives)	**0.5410**	**2.8631**	**1.7971**	**7.8713**	**0.1212**	**0.5618**	**1282.3779**	**5617.5969**	**4.5441**	**19.9033**	**0.0059**	**0.0258**	**0.0767**	**0.3358**	**0.0774**	**0.3391**	**5.09E-06**	**2.23E-05**	**0.0731**	**0.3689**	**0.0001**	**0.0004**	**0.0007**	**0.0037**	**0.0007**	**0.0032**

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 75 barrels per day, VOC emissions would be 8.6543 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 0.1127 pound per hour.
5- See Table 10 and 11 for enclosed combustion emission calculations.
6 - The hourly potential to emit is the sum of emissions from gas production unit heaters, storage tanks, enclosed combustors, 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

Fritz Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Pollutant		Emissions		Threshold Exceeded?		
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	27.3632	3.4999	6	**Yes**	
	tons/yr	120.3443	15.8230	10	**Yes**	**Yes**
NO_X	lbs/hr	0.9794	1.7971	6		
	tons/yr	4.2898	7.8713	10		
CH_4	lbs/hr	8.5628	3.1763			
	tons/yr	37.5363	13.9430			
CO	lbs/hr	0.8227	4.5441	6		
	tons/yr	3.6034	19.9033	10		**Yes**
SO_2	lbs/hr	0.0059	0.0059	6		
	tons/yr	0.0257	0.0258	10		
$PM_{2.5}$	lbs/hr	0.0744	0.0767	6		
	tons/yr	0.3260	0.3358	10		
PM_{10}	lbs/hr	0.7256	0.4030	6		
	tons/yr	0.4015	0.3769	10		
Lead	lbs/hr	4.90E-06	5.09E-06	6		
	tons/yr	2.14E-05	2.23E-05	10		
Total HAPs	lbs/hr	2.9676	0.2909	2	**Yes**	
	tons/yr	13.0468	1.3231	5	**Yes**	
Total TAPs	lbs/hr	0.0047	0.0021	1.14		
n-Hexane	lbs/hr	2.8042	0.1986			
	tons/yr	12.3302	0.9177			
Toluene	lbs/hr	0.0298	0.0126			
	tons/yr	0.1307	0.0553			
Ethylbenzene	lbs/hr	0.0361	0.0210			
	tons/yr	0.1583	0.0920			
Xylenes	lbs/hr	0.0928	0.0567			
	tons/yr	0.4070	0.2488			
Benzene	lbs/hr	0.0039	0.0013			
	tons/yr	0.0173	0.0059			

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

Table 4

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

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

Gas Weight Fraction From Analysis:	VOC frac	0.152
	Benzene frac	0.000
	Toluene	0.000
	Ethylbenzene	0.000
	Xylenes	0.000
	n-Hexane	0.013
	HAPs	0.013
	Methane	0.644

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
400	Valves	Gas VOC	0.004500	0.27	5,287.16
		Non VOC	0.004500	1.53	29,402.44
		HAPs	0.004500	0.02	442.75
		CO2e	0.004500	28.98	558,474.84
472	Connectors	VOC	0.000200	0.01	277.28
		Non-VOC	0.000200	0.08	1,541.99
		HAPs	0.000200	0.00	23.22
		CO2e	0.000200	1.52	29,288.90
104	Flanges	VOC	0.000390	0.01	119.14
		Non-VOC	0.000390	0.03	662.53
		HAPs	0.000390	0.00	9.98
		CO2e	0.000390	0.652984	12584.299797
			Total VOCs:	0.29	5683.58
			Total THC:	1.93	37290.55
			Total CH4:	1.25	24013.92

Light Liquid Weight Fraction From Analysis:	VOC frac	0.979
	Benzene frac	0.001
	Toluene	0.005
	Ethylbenzene	0.009
	Xylenes	0.024
	n-hexane	0.030
	HAPs	0.069
	Methane	0.007

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
416	Valves	Light Liquid VOC	0.002500	1.02	19,619.75
		Light Liquid Non-VOC	0.002500	0.02	423.13
		Light Liquid HAPs	0.002500	0.07	1,380.80
		CO2e	0.002500	0.19	3595.81
			Total VOC:	1.02	19,619.75
			Total THC:	1.04	20,042.88
			Total CH4:	0.01	143.83

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	25,303.34	2.89	12.65
Ethylbenzene		0.02	0.09
Toluene		0.01	0.05
Xylenes		0.06	0.25
n-Hexane		0.12	0.53
TAPs (Benzene)		0.00	0.01
HAPs		0.21	0.93
CH_4 [3]		2.76	12.08
CO_{2e}	603,943.85	68.94	301.97

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. 3. CH_4 emissions are based on percent of CH4 of the total hydrocarbons

Table 5

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

Number of PCVs	32
Bleed Rate (scf/day/PCV)	6.6
Total Bleed Rate (scf/day)	211.2

Component	Mol%	Molecular Weight (lb/lb-mole)	Component Flow (scf/day)	Component Moles (lb-moles)	Component Emissions (lbs/day)	(lbs/hr)	(tons/year)
H2S	0.00E+00	34.08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.5356	14.01	1.1311872	2.98E-03	0.04	1.74E-03	0.01
Carbon Dioxide	0.1798	44.01	0.3797376	1.00E-03	0.04	1.83E-03	8.04E-03
Methane	79.9344	16.04	168.8214528	0.44	7.14	0.30	1.30
Ethane	13.4821	30.07	28.4741952	0.08	2.26	0.09	0.41
Propane	3.6314	44.1	7.6695168	0.02	0.89	0.04	0.16
Isobutane	0.516	58.12	1.089792	2.87E-03	0.17	0.01	0.03
n-Butane	0.9574	58.12	2.0220288	5.33E-03	0.31	0.01	0.06
Isopentane	0.2345	72.15	0.495264	1.31E-03	0.09	3.92E-03	0.02
n-Pentane	0.2129	72.15	0.4496448	1.18E-03	0.09	3.56E-03	0.02
2-Methylpentane	0.00E+00	86.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3-Methylpentane	0.00E+00	86.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
n-Hexane	0.2949	86.18	0.6228288	1.64E-03	0.14	0.01	0.03
Methylcyclopentane	0.00E+00	84.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	0.00E+00	78.11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylhexane	0.00E+00	100.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3-Methylhexane	0.00E+00	100.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptane	0.00E+00	100.21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methylcyclohexane	0.00E+00	98.186	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	0.00E+00	92.14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Octane	0.00E+00	114.23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	0.00E+00	106.17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
m & p-Xylene	0.00E+00	106.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
o-Xylene	0.00E+00	106.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nonane	0.00E+00	128.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C10+	0.00E+00	174.28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	lb/hr	tpy
VOC Emissions	0.0704	0.3082
Benzene Emissions	0.00E+00	0.00E+00
Toluene Emissions	0.00E+00	0.00E+00
Ethylbenzene Emissions	0.00E+00	0.00E+00
Xylene Emissions	0.00E+00	0.00E+00
n-Hexane Emissions	0.0059	0.0258
HAPs Emissions	0.0059	0.0258
TAPs Emissions	0.00E+00	0.00E+00
CH_4 Emissions	0.2973	1.3023
CO_{2e} emissions	7.4350	32.5652

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

Table 6

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

# Hours Operational	8760

	Condensate Tank Flashing Losses			Produced Water Tank Flashing Losses		
	Vapor Mass Fraction	Flashing Losses		Vapor Mass Fraction	Flashing Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
Water	0.2359	0.0825	0.3612	2.6712	0.0184	0.0807
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0566	0.0198	0.0866	0.3545	0.0024	0.0107
Carbon Dioxide	0.2358	0.0824	0.3611	2.8455	0.0196	0.0860
Methane	14.1481	4.9456	21.6617	57.7263	0.3984	1.7448
Ethane	23.2810	8.1381	35.6448	25.2698	0.1744	0.7638
Propane	23.3071	8.1472	35.6848	6.9610	0.0480	0.2104
Isobutane	6.6059	2.3091	10.1140	0.9217	0.0064	0.0279
n-Butane	13.6517	4.7721	20.9016	2.1082	0.0145	0.0637
Isopentane	4.7555	1.6623	7.2810	0.4520	0.0031	0.0137
n-Pentane	4.5209	1.5803	6.9218	0.1631	0.0011	0.0049
2-Methylpentane	0.1558	0.0545	0.2386	0.0073	0.0001	0.0002
3-Methylpentane	0.1076	0.0376	0.1647	0.0120	0.0001	0.0004
n-Hexane	6.8867	2.4073	10.5441	0.1568	0.0011	0.0047
Methylcyclopentane	0.0273	0.0095	0.0418	0.0049	0.0000	0.0001
Benzene	0.0069	0.0024	0.0106	0.0100	0.0001	0.0003
2-Methylhexane	0.1981	0.0692	0.3033	0.0065	0.0000	0.0002
3-Methylhexane	0.1673	0.0585	0.2561	0.0066	0.0000	0.0002
Heptane	0.3765	0.1316	0.5765	0.0063	0.0000	0.0002
Methylcyclohexane	0.1985	0.0694	0.3039	0.0343	0.0002	0.0010
Toluene	0.0458	0.0160	0.0701	0.0621	0.0004	0.0019
Octane	0.6292	0.2199	0.9633	0.0043	0.0000	0.0001
Ethylbenzene	0.0400	0.0140	0.0612	0.0532	0.0004	0.0016
m & p-Xylene	0.0381	0.0133	0.0584	0.0464	0.0003	0.0014
o-Xylene	0.0572	0.0200	0.0875	0.0784	0.0005	0.0024
Nonane	0.2190	0.0766	0.3353	0.0016	0.0000	0.0000
C10+	0.0429	0.0150	0.0656	0.0053	0.0000	0.0002
Total VOCs	62.04	21.69	94.98	11.102	0.077	0.3356
Total CO_{2e}		123.72	541.9		9.98	43.7
CH_4		4.95	21.66		0.40	1.74
Total TAPs (Benzene)		0.0024	0.0106		0.0001	0.0003
Toluene		0.0160	0.0701		0.0004	0.0019
Ethylbenzene		0.0140	0.0612		0.0004	0.0016
Xylenes		0.0333	0.1459		0.0009	0.0038
n-Hexane		2.407	10.544		0.0011	0.0047
Total HAPs		2.473	10.832		0.0028	0.0123
Total	100.00	34.96	153.1	100.00	0.690	3.02

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

Table 7

Uncontrolled Working and Breathing Losses
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Condensate Tank Information	
Number of Tanks	6
Maximum Working Losses (lbs/hr)	1.2993
Maximum Breathing Losses (lbs/hr)	2.6758
# Hours Operational	8760

	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0030	3.88E-05	1.70E-04	0.0001	0.0003	0.0001	0.0005
Carbon Dioxide	0.1805	0.0023	0.0103	0.0048	0.0211	0.0072	0.0314
Methane	3.5313	0.0459	0.2010	0.0945	0.4139	0.1404	0.6148
Ethane	31.1816	0.4051	1.7745	0.8344	3.6545	1.2395	5.4290
Propane	26.4458	0.3436	1.5050	0.7076	3.0994	1.0513	4.6045
Isobutane	7.1436	0.0928	0.4065	0.1911	0.8372	0.2840	1.2438
n-Butane	14.7298	0.1914	0.8383	0.3941	1.7263	0.5855	2.5646
Isopentane	4.4839	0.0583	0.2552	0.1200	0.5255	0.1782	0.7807
n-Pentane	4.1897	0.0544	0.2384	0.1121	0.4910	0.1665	0.7295
2-Methylpentane	0.1392	0.0018	0.0079	0.0037	0.0163	0.0055	0.0242
3-Methylpentane	0.0958	0.0012	0.0055	0.0026	0.0112	0.0038	0.0167
n-Hexane	6.2993	0.0818	0.3585	0.1686	0.7383	0.2504	1.0968
Methylcyclopentane	0.0222	0.0003	0.0013	0.0006	0.0026	0.0009	0.0039
Benzene	0.0042	5.42E-05	0.0002	0.0001	0.0005	0.0002	0.0007
2-Methylhexane	0.0491	6.38E-04	0.0028	0.0013	0.0058	0.0020	0.0086
3-Methylhexane	0.1513	0.0020	0.0086	0.0040	0.0177	0.0060	0.0263
Heptane	0.3265	0.0042	0.0186	0.0087	0.0383	0.0130	0.0568
Methylcyclohexane	0.1724	0.0022	0.0098	0.0046	0.0202	0.0069	0.0300
Toluene	0.0290	3.77E-04	1.65E-03	0.0008	0.0034	0.0012	0.0051
Octane	0.5252	0.0068	0.0299	0.0141	0.0616	0.0209	0.0914
Ethylbenzene	0.0275	3.57E-04	1.56E-03	0.0007	0.0032	0.0011	0.0048
m & p-Xylene	0.0342	4.45E-04	1.95E-03	0.0009	0.0040	0.0014	0.0060
o-Xylene	0.0327	4.25E-04	0.0019	0.0009	0.0038	0.0013	0.0057
Nonane	0.1771	0.0023	0.0101	0.0047	0.0208	0.0070	0.0308
C10+	0.0244	3.17E-04	0.0014	0.0007	0.0029	0.0010	0.0042
Total VOCs	65.103	0.846	3.705	1.742	7.630	2.588	11.335
Total CO_{2e}		1.1494	5.0344	2.3671	10.3678	3.5165	15.402
CH_4		0.0459	0.2010	0.0945	0.4139	0.1404	0.6148
Total TAPs (Benzene)		5.42E-05	2.37E-04	0.0001	0.0005	0.0002	0.0007
Toluene		3.77E-04	1.65E-03	0.0008	0.0034	0.0012	0.0051
Ethylbenzene		3.57E-04	1.56E-03	0.0007	0.0032	0.0011	0.0048
Xylenes		8.69E-04	0.0038	0.0018	0.0078	0.0027	0.0116
n-Hexane		0.0818	0.3585	0.1686	0.7383	0.2504	1.0968
Total HAPs		0.0835	0.3658	0.1720	0.7532	0.2555	1.1190
Total	100.00	1.2993	5.6910	2.6758	11.7200	3.9751	17.411

Table 7

Uncontrolled Working and Breathing Losses
Fritz Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Produced Water Tank Information	
Number of Tanks	2
Maximum Working Losses (lbs/hr)	0.0213
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
Water	91.4174	0.0195	0.0853	0.0076	0.0333	0.0271	0.1187
H2S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0069	1.48E-06	6.47E-06	5.77E-07	2.53E-06	2.05E-06	9.00E-06
Carbon Dioxide	3.7344	0.0008	0.0035	0.0003	0.0014	0.0011	0.0048
Methane	3.1404	0.0007	0.0029	0.0003	0.0011	0.0009	0.0041
Ethane	1.6216	0.0003	0.0015	0.0001	0.0006	0.0005	0.0021
Propane	0.0696	1.48E-05	0.0001	5.80E-06	2.54E-05	2.06E-05	0.0001
Isobutane	0.0023	4.92E-07	2.15E-06	1.92E-07	8.42E-07	6.84E-07	2.99E-06
n-Butane	0.0048	1.01E-06	4.44E-06	3.96E-07	1.73E-06	1.41E-06	6.17E-06
Isopentane	0.0003	5.61E-08	2.46E-07	2.19E-08	9.61E-08	7.81E-08	3.42E-07
n-Pentane	0.0000	5.97E-09	2.61E-08	2.33E-09	1.02E-08	8.30E-09	3.64E-08
2-Methylpentane	6.89E-07	1.47E-10	6.43E-10	5.74E-11	2.51E-10	2.04E-10	8.94E-10
3-Methylpentane	2.51E-06	5.35E-10	2.34E-09	2.09E-10	9.17E-10	7.45E-10	3.26E-09
n-Hexane	5.20E-06	1.11E-09	4.85E-09	4.33E-10	1.90E-09	1.54E-09	6.75E-09
Methylcyclopentane	1.22E-06	2.59E-10	1.13E-09	1.01E-10	4.43E-10	3.60E-10	1.58E-09
Benzene	1.49E-04	3.17E-08	1.39E-07	1.24E-08	5.44E-08	4.42E-08	1.93E-07
2-Methylhexane	3.54E-08	7.55E-12	3.31E-11	2.95E-12	1.29E-11	1.05E-11	4.60E-11
3-Methylhexane	1.41E-07	3.00E-11	1.32E-10	1.17E-11	5.14E-11	4.18E-11	1.83E-10
Heptane	4.41E-08	9.40E-12	4.12E-11	3.67E-12	1.61E-11	1.31E-11	5.73E-11
Methylcyclohexane	2.75E-06	5.85E-10	2.56E-09	2.29E-10	1.00E-09	8.14E-10	3.56E-09
Toluene	2.00E-04	4.26E-08	1.86E-07	1.66E-08	7.29E-08	5.92E-08	2.59E-07
Octane	3.78E-09	8.05E-13	3.53E-12	3.15E-13	1.38E-12	1.12E-12	4.91E-12
Ethylbenzene	5.12E-05	1.09E-08	4.78E-08	4.27E-09	1.87E-08	1.52E-08	6.65E-08
m & p-Xylene	3.43E-05	7.31E-09	3.20E-08	2.86E-09	1.25E-08	1.02E-08	4.45E-08
o-Xylene	7.39E-05	1.57E-08	6.90E-08	6.16E-09	2.70E-08	2.19E-08	9.59E-08
Nonane	4.27E-10	9.09E-14	3.98E-13	3.55E-14	1.56E-13	1.26E-13	5.54E-13
C10+	6.84E-10	1.46E-13	6.39E-13	5.70E-14	2.50E-13	2.03E-13	8.88E-13
Total VOCs	0.0775	0.0000	0.0001	0.0000	0.0000	0.0000	0.0001
Total CO_{2e}		0.0175	0.0767	0.0068	0.0300	0.0244	0.1067
CH_4		0.0007	0.0029	0.0003	0.0011	0.0009	0.0041
Total TAPs (Benzene)		3.17E-08	1.39E-07	1.24E-08	5.44E-08	4.42E-08	1.93E-07
Toluene		4.26E-08	1.86E-07	1.66E-08	7.29E-08	5.92E-08	2.59E-07
Ethylbenzene		1.09E-08	4.78E-08	4.27E-09	1.87E-08	1.52E-08	6.65E-08
Xylenes		2.31E-08	1.01E-07	9.01E-09	3.95E-08	3.21E-08	1.40E-07
n-Hexane		1.11E-09	4.85E-09	4.33E-10	1.90E-09	1.54E-09	6.75E-09
Total HAPs		1.09E-07	4.79E-07	4.28E-08	1.87E-07	1.52E-07	6.66E-07
Total	100.00	0.0213	0.0933	0.0083	0.0365	0.0296	0.1298

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

Table 8

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

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	3.54	1.0329
Annual Average Temp (F)	72.1	72.1
S (saturation factor)	0.6	0.6
P (true vapor pressure)	2.30	0.45
M (MW of vapor)	40.85	18.48
Collection Efficiency (%)	0.00	0.00
Total Hydrocarbon Loading Loss (lb/10^3 gal)*	1.32	0.12
Maximum Throughput (gallons/hr)**	10,080	10,080
Average Throughput (gallons/yr)	1,149,750	2,299,500
Total Hydrocarbon Loading Emissions (lbs/hr)	13.29	1.18
Total Hydrocarbon Loading Emissions (tpy)	0.76	0.14

	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0030	3.97E-04	2.26E-05	0.0069	8.21E-05	9.36E-06
Carbon Dioxide	0.1805	0.0240	1.37E-03	3.7344	4.42E-02	5.05E-03
Methane	3.5313	0.4694	2.68E-02	3.1404	3.72E-02	4.24E-03
Ethane	31.1816	4.1446	0.2364	1.6216	1.92E-02	2.19E-03
Propane	26.4458	3.5151	2.00E-01	0.0696	8.24E-04	9.40E-05
Isobutane	7.1436	0.9495	5.42E-02	0.0023	2.73E-05	3.12E-06
n-Butane	14.7298	1.9578	1.12E-01	0.0048	5.63E-05	6.42E-06
Isopentane	4.4839	0.5960	3.40E-02	0.0003	3.12E-06	3.56E-07
n-Pentane	4.1897	0.5569	3.18E-02	0.0000	3.32E-07	3.78E-08
2-Methylpentane	0.1392	0.0185	1.05E-03	6.89E-07	8.16E-09	9.30E-10
3-Methylpentane	0.0958	0.0127	7.27E-04	2.51E-06	2.98E-08	3.40E-09
n-Hexane	6.2993	0.8373	4.78E-02	5.20E-06	6.16E-08	7.03E-09
Methylcyclopentane	0.0222	0.0030	1.68E-04	1.22E-06	1.44E-08	1.64E-09
Benzene	0.0042	0.0006	3.16E-05	0.0001	1.76E-06	2.01E-07
2-Methylhexane	0.0491	0.0065	3.72E-04	3.54E-08	4.20E-10	4.79E-11
3-Methylhexane	0.1513	0.0201	1.15E-03	1.41E-07	1.67E-09	1.91E-10
Heptane	0.3265	0.0434	2.47E-03	4.41E-08	5.22E-10	5.96E-11
Methylcyclohexane	0.1724	0.0229	1.31E-03	2.75E-06	3.25E-08	3.71E-09
Toluene	0.0290	0.0039	2.20E-04	0.0002	2.37E-06	2.70E-07
Octane	0.5252	0.0698	3.98E-03	3.78E-09	4.48E-11	5.11E-12
Ethylbenzene	0.0275	0.0037	2.08E-04	5.12E-05	6.07E-07	6.92E-08
m & p-Xylene	0.0342	0.0045	2.59E-04	3.43E-05	4.06E-07	4.63E-08
o-Xylene	0.0327	0.0043	2.48E-04	7.39E-05	8.76E-07	9.99E-08
Nonane	0.1771	0.0235	1.34E-03	4.27E-10	5.05E-12	5.76E-13
C10+	0.0244	0.0032	1.85E-04	6.84E-10	8.11E-12	9.24E-13
Total VOCs	65.1028	8.6533	0.4935	0.0775	0.0009	0.0001
Total CH_4		0.4694	0.0268		0.0372	0.0042
Total CO_{2e}		11.7582	0.6706		0.9741	0.1111
Total TAPs (Benzene)		0.0006	3.16E-05		1.76E-06	2.01E-07
Toluene		0.0039	2.20E-04		2.37E-06	2.70E-07
Ethylbenzene		0.0037	2.08E-04		6.07E-07	6.92E-08
Xylenes		0.0089	5.07E-04		1.28E-06	1.46E-07
n-Hexane		0.8373	4.78E-02		6.16E-08	7.03E-09
Total HAPs		0.8542	4.87E-02		6.08E-06	6.94E-07
Total	100.0000	13.2918	0.7580	100.0000	1.1845	0.1351

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 7.1-13a

** Maximum throughput in gallons per hour obtained from actual transfer rate of 200 barrels in 50 minutes. (10,080 gal/hr = 200 bbl / 50 min x 42 gal/bbl x 60 min/hr)

Loading emissions are vented to the atmosphere.

Table 9

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

Gas Production Unit Heater Emissions

Number of Units	8
GPU Heater Rating (MMBtu/hr)	1.50
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,225.2339

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	0.979	4.290
CO	84	0.823	3.603
CO_2	120,000	1175.286	5147.752
Lead	0.0005	4.90E-06	2.14E-05
N_2O	2.2	0.022	0.094
PM (Total)	7.6	0.074	0.326
SO_2	0.6	0.006	0.026
TOC	11	0.108	0.472
Methane	2.3	0.023	0.099
VOC	5.5	0.054	0.236
HAPS			
2-Methylnaphthalene	2.40E-05	2.35E-07	1.03E-06
Benzene	2.10E-03	2.06E-05	9.01E-05
Dichlorobenzene	1.20E-03	1.18E-05	5.15E-05
Fluoranthene	3.00E-06	2.94E-08	1.29E-07
Fluorene	2.80E-06	2.74E-08	1.20E-07
Formaldehyde	7.50E-02	7.35E-04	3.22E-03
Hexane	1.80E+00	1.76E-02	7.72E-02
Naphthalene	6.10E-04	5.97E-06	2.62E-05
Phenanathrene	1.70E-05	1.66E-07	7.29E-07
Toluene	3.40E-03	3.33E-05	1.46E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.054	0.236
TOTAL Uncontrolled HAPs	0.018	0.081
TOTAL Uncontrolled TAPs (Benzene)	2.06E-05	9.01E-05
TOTAL Uncontrolled Toluene	3.33E-05	1.46E-04
TOTAL Uncontrolled Hexane	0.018	0.077
TOTAL Uncontrolled TAPs (Formaldehyde)	0.001	0.003
TOTAL CH_4	0.023	0.099
TOTAL CO_{2e} Emissions	1,182.27	5,178.34

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

Table 10

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

General Information	
Unit Name:	EC001

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

Pollutant	Emission Factor[2] (lb/MMBtu)
NO_x	0.068
CO	0.31

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

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

Enclosed Combustor operating hours	8760
No. of Enclosed Combustors	1
Maximum Design Heat Input Per Enclosed Combustor (MMBtu/hr)	12

Stream Information							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed/Vapor Combustor (Enter Name of Each Stream Here)	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
Maximum Expected Hourly Volumetric Flow Rate of Stream (scf/hr)	17	--	324.75	14.17	36.93	0.61	393.46
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	148,920.00	--	2,844,787.74	124,129.68	323,503.76	5,330.15	3,446,671.33
Heating Content (Btu/ft3)	1,225		2,064.07	1,177.33	2,336.55	102.17	1,965.49

Mass Flow Rates of the Vapors Sent to this Control Device, Hourly Basis (lb/hr)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
H2S	-	-	0.000	0.000	0.000	0.000	0.000
Total VOC	-	-	21.686	0.077	2.588	0.000	24.35
Benzene	-	-	0.002	0.000	0.000	0.000	0.003
Toluene	-	-	0.016	0.000	0.001	0.000	0.018
Ethylbenzene	-	-	0.014	0.000	0.001	0.000	0.015
Xylenes	-	-	0.033	0.001	0.003	0.000	0.037
n-Hexane	-	-	2.407	0.001	0.250	0.000	2.659
HAPs	-	-	2.473	0.003	0.255	0.000	2.731
Total Mass Flow	-	-	34.956	0.690	3.975	0.030	39.651
Mass Flow Rates of the Vapors Sent to this Control Device, Annual Basis (tpy)							
H2S	-	-	0.000	0.000	0.000	0.000	0.000
Total VOC	-	-	94.984	0.336	11.335	0.000	106.655
Benzene	-	-	0.011	0.000	0.001	0.000	0.012
Toluene	-	-	0.070	0.002	0.005	0.000	0.077
Ethylbenzene	-	-	0.061	0.002	0.005	0.000	0.068
Xylenes	-	-	0.146	0.004	0.012	0.000	0.161
n-Hexane	-	-	10.544	0.005	1.097	0.000	11.646
HAP	-	-	10.832	0.012	1.119	0.000	11.963
Total Mass Flow	-	-	153.107	3.023	17.411	0.130	173.670

Table 10

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

Controlled Emissions							
Hourly (lb/hr)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.002	-	0.816				0.82
CO	0.001	-	3.720				3.72
PM2.5	0.000	-	0.002	0.000	0.000	0.000	0.00
PM10	0.000	-	0.002	0.000	0.000	0.000	0.00
H2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	2.040	-	-	-	-	-	2.04
Total VOC	0.000	-	0.434	0.002	0.052	0.000	0.49
Benzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.000	0.000	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.001	0.000	0.000	0.000	0.00
n-Hexane	0.000	-	0.048	0.000	0.005	0.000	0.05
HAP	0.000	-	0.049	0.000	0.005	0.000	0.05
N_2O	0.000	-	0.001	0.000	0.000	0.000	0.00
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00
Annual (tpy)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.007	-	3.574				3.58
CO	0.006	-	16.294				16.30
PM2.5	0.000	-	0.008	0.000	0.001	0.000	0.01
PM10	0.001	-	0.011	0.000	0.001	0.000	0.01
H_2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	8.935	-	-	-	-	-	8.94
Total VOC	0.000	-	1.900	0.007	0.227	0.000	2.13
Benzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.001	0.000	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.001	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.003	0.000	0.000	0.000	0.00
n-Hexane	0.000	-	0.211	0.000	0.022	0.000	0.23
HAP	0.000	-	0.217	0.000	0.022	0.000	0.24
N_2O	0.000	-	0.003	0.000	0.000	0.000	0.00
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00

Enclosed Combustor/Vapor Combustor Total Emissions		
	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Total VOC	0.49	2.13
NOx	0.818	3.582
CO	3.721	16.300
PM2.5	0.002	0.010
PM10	0.003	0.013
H_2S	5.43E-06	2.38E-05
SO_2	1.02E-05	4.47E-05
Benzene (TAPs)	5.29E-05	2.32E-04
Toluene	3.52E-04	1.54E-03
Ethylbenzene	3.09E-04	1.35E-03
Xylenes	7.37E-04	0.003
Hexanes	0.053	0.233
Formaldehyde (TAPs)	1.28E-06	5.58E-06
HAPs	0.05	0.24
CH_4	0.10	0.43
CO_2e	107.09	469.06
N_2O	0.001	0.004
Lead	1.97E-07	8.62E-07

Enter any notes here as needed

1. Emission Factors from AP-42 Tables 1.4-1, 1.4-2, and 1.4.3
2. Emission Factors from AP-42 Tables 13.5-1 and 13.5-2 for industrial flares

Table 11

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

Enclosed Combustor CO_2 and CH_4 Emissions

Components	Mole fraction of oil flash gas constituents[a]	Volume of oil flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of water flash gas constituents[a]	Volume of water flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of oil tank vapors constituents[a]	Volume of oil tank vapor sent to Enclosed Combustor *scf/year*	Mole fraction of water tank vapors constituents[a]	Volume of water tank vapors sent to Enclosed Combustor *scf/year*	Component volume of gas sent to Enclosed Combustor *scf/year*	Number of carbon atoms	Combustion Efficiency	Combusted CO_2 Volume[b] *scf/year*	Uncombusted CO_2 and CH_4 Volume[b] *scf/year*	Volume GHGs Emitted *scf/year*
CO_2	0.002	2,844,788	0.0132	124,130	0.0017	323,504	0.016	5,330	7,731	1	0	--	7,731	7,730,020
Methane	0.316	2,844,788	0.7342	124,130	0.0899	323,504	0.036	5,330	1,020,586	1	0.98	1,000,175	20,412	20,412
Ethane	0.278	2,844,788	0.1714	124,130	0.4236	323,504	0.010	5,330	948,492	2	0.98	1,859,045	--	
Propane	0.190	2,844,788	0.0322	124,130	0.2450	323,504	0.000	5,330	622,613	3	0.98	1,830,481	--	
i-Butane	0.041	2,844,788	0.0032	124,130	0.0502	323,504	0.000	5,330	132,637	4	0.98	519,936	--	
n-Butane	0.084	2,844,788	0.0074	124,130	0.1035	323,504	0.000	5,330	274,120	4	0.98	1,074,551	--	
Pentane	0.046	2,844,788	0.0017	124,130	0.0491	323,504	0.000	5,330	147,314	5	0.98	721,840	--	
Hexane	0.030	2,844,788	0.0004	124,130	0.0310	323,504	0.000	5,330	94,744	6	0.98	557,095	--	
Benzene	0.000	2,844,788	0.0000	124,130	0.0000	323,504	0.000	5,330	100	6	0.98	590	--	
Heptanes	0.003	2,844,788	0.0001	124,130	0.0023	323,504	0.000	5,330	8,622	7	0.98	59,148	--	
Toluene	0.000	2,844,788	0.0001	124,130	0.0001	323,504	0.000	5,330	566	7	0.98	3,881	--	
Octane	0.003	2,844,788	0.0001	124,130	0.0026	323,504	0.000	5,330	8,533	8	0.98	66,902	--	
Ethyl benzene	0.000	2,844,788	0.0001	124,130	0.0001	323,504	0.000	5,330	431	8	0.98	3,382	--	
Xylenes	0.000	2,844,788	0.0002	124,130	0.0003	323,504	0.000	5,330	1,029	8	0.98	8,069	--	
Nonane	0.001	2,844,788	0.0000	124,130	0.0006	323,504	0.000	5,330	1,926	9	0.98	16,988	--	
Decane plus	0.000	2,844,788	0.0000	124,130	0.0001	323,504	0.000	5,330	21	10	0.98	207	--	
											Subtotal	**7,722,289**	--	

Pollutant	Volume Emitted *scf/year*	Density of GHG[c] *lb/scf*	Conversion Factor *lb/ton*	GWF	Emissions[c] *lbs/hr*	Emissions[c] *(tons/yr)*
CO_2	7,730,020	0.12	2000	1	102.33	448.20
CH_4	20,412	0.04	2000	25	0.10	0.43
				CO_2e Emissions	**104.8**	**459.00**

GHG Emissions Summary

Notes

a Flashing/Working/Breathing Losses from ProMax output reports

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

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

Table 12

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

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

Tanker Truck Trip Calculation	
Condensate Production (bbl/day)	75
PW Production (bbl/day)	150
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	0.1800	1	137	0.1800	24.6600	3.8175	1.7179
Tanker Trucks PW	10	40	10	0.1800	1	274	0.1800	49.3200	3.8175	1.7179
Pick Up Truck	4	3	10	0.2100	1	730	0.2100	153.3000	0.3467	0.1560

	Uncontrolled Emissions						Controlled Emissions					
	PM			PM10			PM			PM10		
	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)
Tanker Trucks Condensate	0.6872	94.1403	0.0471	0.3092	42.3631	0.0212	0.3436	47.0701	0.0235	0.1546	21.1816	0.0106
Tanker Trucks PW	0.6872	188.2805	0.0941	0.3092	84.7262	0.0424	0.3436	94.1403	0.0471	0.1546	42.3631	0.0212
Pick Up Truck	0.0728	53.1460	0.0266	0.0328	23.9157	0.0120	0.0364	26.5730	0.0133	0.0164	11.9578	0.0060
Total Emissions	1.4471	335.5668	0.1678	0.6512	151.0051	0.0755	0.7236	167.7834	0.0839	0.3256	75.5025	0.0378

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

Table 13

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

	Potential Emissions		Previous Permit Application Emissions		Change in Emissions	
Pollutant	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**
$PM_{2.5}$	0.0767	0.3358	0.2232	0.9776	-1.47E-01	-0.6417
PM_{10}	0.4030	0.3769	0.4179	1.0871	-0.0148	-0.7102
VOC (uncontrolled)	27.3632	120.3443	362.5150	1597.7329	-335.1518	-1477.3886
CO	4.5441	19.9033	8.1757	35.8096	-3.6316	-15.9063
NOx	1.7971	7.8713	3.3292	14.5817	-1.5320	-6.7104
SO2	0.0059	0.0258	0.0157	0.0686	-9.79E-03	-4.29E-02
Pb	5.09E-06	2.23E-05	0.0000	0.0001	-9.97E-06	-4.37E-05
HAPs	0.2909	1.3231	0.7038	3.1157	-0.4129	-1.7926
TAPs	0.0021	0.0091	0.0262	0.1158	-2.42E-02	-0.1067

Notes:
1. Change in emissions due to the decreased production and removal of one Kubota Engine, one well, one GPU heater, nine Line Heaters, four Condensate Tanks, three Enclosed Combustors

Bryan Research & Engineering, Inc.

ProMax ®4.0

Simulation Report

Project: PROMAX SCENARIO 3-Fritz.pmx

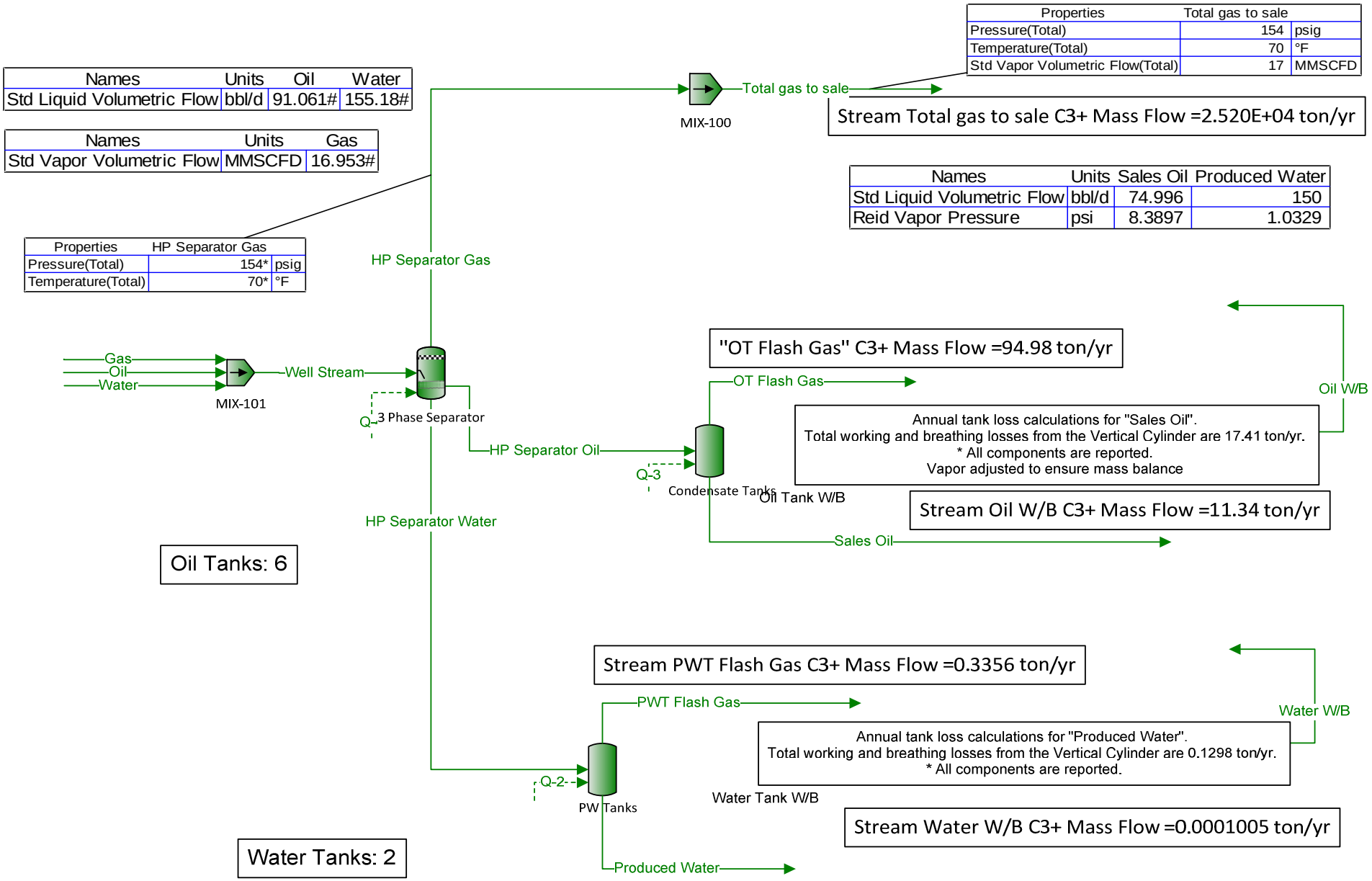
Licensed to GHD Limited and Affiliates

Client Name: Antero Resources Corporation
Location: West Virginia
Job: Fritz

ProMax Filename: C:\Users\ychen1\Documents\Drafts\082715- ANTERO\05-ProMax Report\1 HP\PROMAX SCENARIO 3-Fritz.pmx
ProMax Version: 4.0.16071.0
Simulation Initiated: 2/15/2017 6:14:48 PM

Bryan Research & Engineering, Inc.
Chemical Engineering Consultants
P.O. Box 4747 Bryan, Texas 77805
Office: (979) 776-5220
FAX: (979) 776-4818
mailto:sales@bre.com
http://www.bre.com/

Report Navigator can be activated via the ProMax Navigator Toolbar.
An asterisk (*), throughout the report, denotes a user specified value.
A question mark (?) after a value, throughout the report, denotes an extrapolated or approximate value.


Names Units Oil Water
Std Liquid Volumetric Flow bbl/d 91.061# 155.18#
Names Units Gas
Std Vapor Volumetric Flow MMSCFD 16.953#
Properties HP Separator Gas
Pressure(Total) 154* psig
Temperature(Total) 70* °F
Properties Total gas to sale
Pressure(Total) 154 psig
Temperature(Total) 70 °F
Std Vapor Volumetric Flow(Total) 17 MMSCFD
Names Units Sales Oil Produced Water
Std Liquid Volumetric Flow bbl/d 74.996 150
Reid Vapor Pressure psi 8.3897 1.0329
MIX-100
Total gas to sale
Stream Total gas to sale C3+ Mass Flow =2.520E+04 ton/yr
HP Separator Gas
Gas
Oil
Water
MIX-101
Well Stream
3 Phase Separator
Q-1
"OT Flash Gas" C3+ Mass Flow =94.98 ton/yr
OT Flash Gas
Oil W/B
Annual tank loss calculations for "Sales Oil".
Total working and breathing losses from the Vertical Cylinder are 17.41 ton/yr.
* All components are reported.
Vapor adjusted to ensure mass balance
HP Separator Oil
Q-3
Condensate Tanks
Oil Tank W/B
Stream Oil W/B C3+ Mass Flow =11.34 ton/yr
HP Separator Water
Sales Oil
Oil Tanks: 6
Stream PWT Flash Gas C3+ Mass Flow =0.3356 ton/yr
PWT Flash Gas
Water W/B
Annual tank loss calculations for "Produced Water".
Total working and breathing losses from the Vertical Cylinder are 0.1298 ton/yr.
* All components are reported.
Q-2
PW Tanks
Water Tank W/B
Stream Water W/B C3+ Mass Flow =0.0001005 ton/yr
Produced Water
Water Tanks: 2

Process Streams		Gas	HP Separator Gas	HP Separator Oil	HP Separator Water	Oil	Oil W/B	OT Flash Gas	Produced Water	PWT Flash Gas	Sales Oil	Total gas to sale	Water	Water W/B	Well Stream
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Total**	From Block:	--	3 Phase Separator	3 Phase Separator	3 Phase Separator	--	--	Condensate Tanks	PW Tanks	PW Tanks	Condensate Tanks	MIX-100	--	--	MIX-101
	To Block:	MIX-101	MIX-100	Condensate Tanks	PW Tanks	MIX-101	--	--	--	--	--	--	MIX-101	--	3 Phase Separator
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		0*	0.225091	0.0755776	99.9698	0*	0.000426520*	0.470302	99.9967	3.03276	0.0144206	0.225091	100*	93.7802*	6.29806
H2S		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen		0.5356*	0.534111	0.00982504	7.48975E-05	0.0180004*	0.00435033*	0.0725030	3.03124E-06	0.258821	0.000113987	0.534111	0*	0.00457244*	0.499687
Carbon Dioxide		0.1798*	0.179180	0.0281306	0.00100793	0.0150003*	0.167492*	0.192447	0.000640890	1.32249	0.00267214	0.179180	0*	1.56818*	0.167782
Methane		79.9344*	79.7096	4.37994	0.0222094	4.77710*	8.99139*	31.6724	0.00177307	73.6008	0.151361	79.7096	0*	3.61775*	74.5834
Ethane		13.4821*	13.4483	4.45123	0.00539059	4.94810*	42.3588*	27.8058	0.000617760	17.1894	0.832773	13.4483	0*	0.996657*	12.5970
Propane		3.6314*	3.62571	4.41784	0.000978490	4.86310*	24.4978*	18.9822	8.19397E-05	3.22890	2.16130	3.62571	0*	0.0291628*	3.40788
Isobutane		0.516*	0.514422	1.61215	9.58002E-05	1.36903*	5.02045*	4.08169	5.73537E-06	0.324363	1.22953	0.514422	0*	0.000733686*	0.487096
n-Butane		0.9574*	0.954975	4.33819	0.000223272	3.81508*	10.3519*	8.43523	1.72675E-05	0.741919	3.70342	0.954975	0*	0.00151148*	0.909142
Isopentane		0.2345*	0.235302	2.46677	3.76907E-05	2.45605*	2.53859*	2.36712	2.10870E-06	0.128146	2.48221	0.235302	0*	6.74973E-05*	0.229090
n-Pentane		0.2129*	0.216114	3.02796	1.31455E-05	3.46207*	2.37202*	2.25035	3.04292E-07	0.0462463	3.14844	0.216114	0*	7.17446E-06*	0.213180
2-Methylpentane		0*	0.00597535	0.198365	4.96559E-07	1.49803*	0.0659633*	0.0649373	1.56749E-08	0.00173186	0.219038	0.00597535	0*	1.47703E-07*	0.00631108
3-Methylpentane		0*	0.00411207	0.151700	8.54827E-07	1.04402*	0.0454287*	0.0448390	6.37926E-08	0.00284888	0.168257	0.00411207	0*	5.38919E-07*	0.00439838
n-Hexane		0.2949*	0.261892	12.5143	1.05026E-05	3.65807*	2.98590*	2.87001	1.67309E-07	0.0372213	14.0085	0.261892	0*	1.11580E-06*	0.290496
Methylcyclopentane		0*	0.00105001	0.0496446	3.71737E-07	0.276006*	0.0107755*	0.0116393	4.39702E-08	0.00118046	0.0555329	0.00105001	0*	2.66952E-07*	0.00116279
Benzene		0*	0.000284097	0.0148116	9.31257E-06	0.0760016*	0.00218023*	0.00317034	8.58623E-06	0.00262442	0.0166153	0.000284097	0*	3.52518E-05*	0.000320188
2-Methylhexane		0*	0.00656566	0.689559	3.75428E-07	2.05304*	0.0200228*	0.0709935	8.19398E-09	0.00132256	0.785397	0.00656566	0*	6.53573E-09*	0.00864930
3-Methylhexane		0*	0.00552519	0.644405	3.81864E-07	1.78304*	0.0616676*	0.0599473	9.90761E-09	0.00133957	0.734959	0.00552519	0*	2.60091E-08*	0.00751179
Heptane		0*	0.0125474	1.89898	3.59733E-07	4.42509*	0.133084*	0.134945	4.24471E-09	0.00128025	2.17229	0.0125474	0*	8.13609E-09*	0.0186425
Methylcyclohexane		0*	0.00662054	1.00331	2.24562E-06	2.33605*	0.0717328*	0.0726003	2.64270E-07	0.00713587	1.14751	0.00662054	0*	5.16853E-07*	0.00984158
Toluene		0*	0.00161863	0.297833	3.77699E-05	0.617013*	0.0128758*	0.0178406	3.39519E-05	0.0137838	0.341214	0.00161863	0*	4.00837E-05*	0.00259942
Octane		0*	0.0188639	9.01491	2.13770E-07	11.9692*	0.187803*	0.197803	1.08073E-09	0.000765976	10.3810	0.0188639	0*	6.11692E-10*	0.0504254
Ethylbenzene		0*	0.00126512	0.726165	2.53891E-05	0.908019*	0.0105705*	0.0135293	2.25518E-05	0.0102405	0.836577	0.00126512	0*	8.91498E-06*	0.00382541
m-Xylene		0*	0.00121089	0.759987	1.51718E-05	0.925019*	0.0131642*	0.0129013	1.26952E-05	0.00893202	0.875737	0.00121089	0*	5.97048E-06*	0.00389703
o-Xylene		0*	0.00181223	1.31142	5.36235E-05	1.53503*	0.0125738*	0.0193379	4.94457E-05	0.0150953	1.51161	0.00181223	0*	1.28678E-05*	0.00646696
Nonane		0*	0.00599208	9.12514	7.09906E-08	9.20619*	0.0564009*	0.0613203	3.66769E-10	0.000254344	10.5294	0.00599208	0*	6.14642E-11*	0.0387849
O2		0.021*	0.0209369	0.000719516	5.96387E-06	0*	0.000877925*	0.00526337	4.70317E-07	0.0197849	1.55114E-05	0.0209369	0*	0.00105227*	0.0195889
C10+		0*	0.000960132	36.7911	1.92231E-07	31.9666*	0.00575852*	0.00889547	1.72305E-08	0.000630261	42.4900	0.000960132	0*	7.30583E-11*	0.134673
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
Water		0*	4.20177	0.00548360	121.468	0*	4.15111E-07*	0.00457766	121.467	0.00102321	0.000905941	4.20177	125.675*	0.00150369*	125.675
H2S		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen		9.96954*	9.97025	0.000712866	9.10040E-05	0.00151324*	4.23396E-06*	0.000705705	3.68208E-06	8.73220E-05	7.16095E-06	9.97025	0*	7.33156E-08*	9.97105
Carbon Dioxide		3.34676*	3.34475	0.00204105	0.00122468	0.00126103*	0.000163011*	0.00187318	0.000778495	0.000446187	0.000167871	3.34475	0*	2.51446E-05*	3.34802
Methane		1487.88*	1487.94	0.317791	0.0269855	0.401597*	0.00875087*	0.308282	0.00215377	0.0248317	0.00950886	1487.94	0*	5.80078E-05*	1488.28
Ethane		250.953*	251.039	0.322964	0.00654983	0.415972*	0.0412258*	0.270647	0.000750399	0.00579943	0.0523169	251.039	0*	1.59806E-05*	251.369
Propane		67.5941*	67.6812	0.320541	0.00118891	0.408827*	0.0238425*	0.184762	9.95330E-05	0.00108938	0.135779	67.6812	0*	4.67603E-07*	68.0029
Isobutane		9.60471*	9.60271	0.116971	0.000116402	0.115090*	0.00488616*	0.0397290	6.96682E-06	0.000109435	0.0772420	9.60271	0*	1.17641E-08*	9.71980
n-Butane		17.8208*	17.8265	0.314762	0.000271287	0.320722*	0.0100750*	0.0821040	2.09750E-05	0.000250312	0.232658	17.8265	0*	2.42354E-08*	18.1416
Isopentane		4.36493*	4.39238	0.178979	4.57959E-05	0.206473*	0.00247068*	0.0230403	2.56145E-06	4.32345E-05	0.155939	4.39238	0*	1.08227E-09*	4.57140
n-Pentane		3.96287*	4.03421	0.219697	1.59724E-05	0.291046*	0.00230857*	0.0219037	3.69627E-07	1.56028E-05	0.197793	4.03421	0*	1.15037E-10*	4.25392
2-Methylpentane		0*	0.111542	0.0143926	6.03343E-07	0.125935*	6.41988E-05*	0.000632065	1.90405E-08	5.84303E-07	0.0137605	0.111542	0*	2.36831E-12*	0.125935
3-Methylpentane		0*	0.0767600	0.0110067	1.03866E-06	0.0877678*	4.42135E-05*	0.000436439	7.74895E-08	9.61166E-07	0.0105703	0.0767600	0*	8.64116E-12*	0.0877678
n-Hexane		5.48920*	4.88873	0.907987	1.27611E-05	0.307524*	0.00290603*	0.0279351	2.03232E-07	1.25579E-05	0.880052	4.88873	0*	1.78911E-11*	5.79673
Methylcyclopentane		0*	0.0196005	0.00360201	4.51678E-07	0.0232030*	1.04873E-05*	0.000113291	5.34111E-08	3.98267E-07	0.00348872	0.0196005	0*	4.28037E-12*	0.0232030
Benzene		0*	0.00530324	0.00107467	1.13152E-05	0.00638923*	2.12191E-06*	3.08583E-05	1.04298E-05	8.85435E-07	0.00104381	0.00530324	0*	5.65235E-10*	0.00638923
2-Methylhexane		0*	0.122561	0.0500316	4.56163E-07	0.172593*	1.94872E-05*	0.000691013	9.95331E-09	4.46210E-07	0.0493406	0.122561	0*	1.04796E-13*	0.172593
3-Methylhexane		0*	0.103139	0.0467554	4.63983E-07	0.149895*	6.00180E-05*	0.000583495	1.20349E-08	4.51948E-07	0.0461720	0.103139	0*	4.17037E-13*	0.149895
Heptane		0*	0.234222	0.137782	4.37093E-07	0.372004*	0.000129524*	0.00131349	5.15610E-09	4.31937E-07	0.136469	0.234222	0*	1.30456E-13*	0.372004
Methylcyclohexane		0*	0.123586	0.0727964	2.72854E-06	0.196385*	6.98140E-05*	0.000706652	3.21011E-07	2.40753E-06	0.0720897	0.123586	0*	8.28734E-12*	0.196385
Toluene		0*	0.0302150	0.0216096	4.58922E-05	0.0518705*	1.25313E-05*	0.000173651	4.12418E-05	4.65043E-06	0.0214359	0.0302150	0*	6.42712E-10*	0.0518705
Octane		0*	0.352133	0.654086	2.59741E-07	1.00622*	0.000182780*	0.00192531	1.31277E-09	2.58428E-07	0.652161	0.352133	0*	9.80801E-15*	1.00622
Ethylbenzene		0*	0.0236160	0.0526876	3.08489E-05	0.0763345*	1.02877E-05*	0.000131687	2.73939E-05	3.45499E-06	0.0525559	0.0236160	0*	1.42945E-10*	0.0763345
m-Xylene		0*	0.0226036	0.0551416	1.84345E-05	0.0777636*	1.28121E-05*	0.000125574	1.54209E-05	3.01352E-06	0.0550160	0.0226036	0*	9.57322E-11*	0.0777636
o-Xylene		0*	0.0338288	0.0951516	6.51551E-05	0.129046*	1.22375E-05*	0.000188224	6.00622E-05	5.09292E-06	0.0949634	0.0338288	0*	2.06325E-10*	0.129046
Nonane		0*	0.111854	0.662083	8.62569E-08	0.773937*	5.48922E-05*	0.000596859	4.45518E-10	8.58114E-08	0.661486	0.111854	0*	9.85531E-16*	0.773937
O2		0.390889*	0.390830	5.22052E-05	7.24639E-06	0*	8.54441E-07*	5.12308E-05	5.71299E-07	6.67509E-06	9.74463E-07	0.390830	0*	1.68724E-08*	0.390889
C10+		0*	0.0179228	2.66942	2.33570E-07	2.68734*	5.60448E-06*	8.65837E-05	2.09301E-08	2.12640E-07	2.66933	0.0179228	0*	1.17143E-15*	2.68734
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		0*	0.200856	0.0117643	99.9641	0*	0.000188111*	0.235920	99.9948	2.67116	0.00202799	0.200856	100*	91.4174*	5.56071
H2S		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen		0.744693*	0.741110	0.00237811	0.000116458	0.00446804*	0.00298347*	0.0565547	4.71343E-06	0.354475	2.49265E-05	0.741110	0*	0.00693091*	0.686034
Carbon Dioxide		0.392742*	0.390590	0.0106969	0.00246213	0.00584946*	0.180457*	0.235833	0.00156560	2.84550	0.000918007	0.390590	0*	3.73439*	0.361887
Methane		63.6467*	63.3383	0.607115	0.0197762	0.679054*	3.53128*	14.1481	0.00157887	57.7263	0.0189550	63.3383	0*	3.14041*	58.6402
Ethane		20.1209*	20.0296	1.15646	0.00899685	1.31834*	31.1816*	23.2810	0.00103107	25.2698	0.195473	20.0296	0*	1.62159*	18.5639
Propane		7.94769*	7.91907	1.68321	0.00239489	1.90011*	26.4458*	23.3071	0.000200558	6.96099	0.743963	7.91907	0*	0.0695827*	7.36482
Isobutane		1.48855*	1.48097	0.809616	0.000309060	0.705056*	7.14363*	6.60586	1.85035E-05	0.921711	0.557853	1.48097	0*	0.00230743*	1.38752
n-Butane		2.76189*	2.74928	2.17863	0.000720297	1.96478*	14.7298*	13.6517	5.57085E-05	2.10824	1.68029	2.74928	0*	0.00475358*	2.58974
Isopentane		0.839736*	0.840890	1.53777	0.000150937	1.57013*	4.48389*	4.75550	8.44488E-06	0.452018	1.39800	0.840890	0*	0.000263507*	0.810061
n-Pentane		0.762388*	0.772321	1.88761	5.26429E-05	2.21327*	4.18968*	4.52092	1.21863E-06	0.163127	1.77323	0.772321	0*	2.80088E-05*	0.753802
2-Methylpentane		0*	0.0255054	0.147700	2.37514E-06	1.14386*	0.139162*	0.155821	7.49790E-08	0.00729655	0.147347	0.0255054	0*	6.88731E-07*	0.0266544
3-Methylpentane		0*	0.0175521	0.112954	4.08880E-06	0.797190*	0.0958402*	0.107594	3.05143E-07	0.0120027	0.113187	0.0175521	0*	2.51295E-06*	0.0185762
n-Hexane		1.26133*	1.11787	9.31798	5.02357E-05	2.79322*	6.29931*	6.88673	8.00302E-07	0.156818	9.42358	1.11787	0*	5.20292E-06*	1.22689
Methylcyclopentane		0*	0.00437705	0.0361000	1.73649E-06	0.205821*	0.0222012*	0.0272758	2.05406E-07	0.00485707	0.0364833	0.00437705	0*	1.21566E-06*	0.00479608
Benzene		0*	0.00109918	0.00999658	4.03758E-05	0.0526028*	0.00416922*	0.00689555	3.72280E-05	0.0100224	0.0101313	0.00109918	0*	0.000148996*	0.00122576
2-Methylhexane		0*	0.0325866	0.597008	2.08803E-06	1.82282*	0.0491174*	0.198081	4.55745E-08	0.00647905	0.614335	0.0325866	0*	3.54362E-08*	0.0424755
3-Methylhexane		0*	0.0274226	0.557914	2.12383E-06	1.58309*	0.151275*	0.167260	5.51056E-08	0.00656237	0.574882	0.0274226	0*	1.41019E-07*	0.0368894
Heptane		0*	0.0622750	1.64410	2.00074E-06	3.92887*	0.326465*	0.376514	2.36089E-08	0.00627181	1.69916	0.0622750	0*	4.41132E-08*	0.0915510
Methylcyclohexane		0*	0.0321980	0.851174	1.22383E-05	2.03236*	0.172426*	0.198489	1.44028E-06	0.0342545	0.879524	0.0321980	0*	2.74595E-06*	0.0473584
Toluene		0*	0.00738709	0.237108	0.000193162	0.503738*	0.0290434*	0.0457717	0.000173642	0.0620912	0.245419	0.00738709	0*	0.000199841*	0.0117382
Octane		0*	0.106731	8.89751	1.35536E-06	12.1146*	0.525184*	0.629152	6.85240E-09	0.00427770	9.25665	0.106731	0*	3.78080E-09*	0.282297
Ethylbenzene		0*	0.00665272	0.666114	0.000149611	0.854173*	0.0274732*	0.0399949	0.000132897	0.0531526	0.693310	0.00665272	0*	5.12128E-05*	0.0199040
m-Xylene		0*	0.00636751	0.697140	8.94031E-05	0.870165*	0.0342145*	0.0381382	7.48118E-05	0.0463609	0.725764	0.00636751	0*	3.42979E-05*	0.0202767
o-Xylene		0*	0.00952969	1.20298	0.000315988	1.44400*	0.0326800*	0.0571659	0.000291381	0.0783510	1.25274	0.00952969	0*	7.39200E-05*	0.0336483
Nonane		0*	0.0380660	10.1122	5.05370E-07	10.4622*	0.177090*	0.218991	2.61106E-09	0.00159484	10.5419	0.0380660	0*	4.26553E-10*	0.243792

O2	0.0333522*	0.0331843	0.000198933	1.05924E-05	0*	0.000687742*	0.00468969	8.35364E-07	0.0309519	3.87457E-06	0.0331843	0*	0.00182196*	0.0307204
C10+	0*	0.00823214	55.0266	1.84695E-06	49.0301*	0.0244030*	0.0428759	1.65556E-07	0.00533382	57.4148	0.00823214	0*	6.84295E-10*	1.14251
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**
Water	0*	75.6961	0.0987887	2188.28	0*	7.47834E-06*	0.0824679	2188.26	0.0184333	0.0163208	75.6961	2264.08*	0.0270895*	2264.08
H2S	0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen	279.281*	279.301	0.0199698	0.00254933	0.0423910*	0.000118608*	0.0197692	0.000103148	0.00244619	0.000200603	279.301	0*	2.05382E-06*	279.323
Carbon Dioxide	147.289*	147.201	0.0898254	0.0538976	0.0554974*	0.00717405*	0.0824375	0.0342612	0.0196364	0.00738790	147.201	0*	0.00110660*	147.345
Methane	23869.3*	23870.2	5.09814	0.432914	6.44260*	0.140386*	4.94560	0.0345517	0.398362	0.152546	23870.2	0*	0.000930588*	23875.7
Ethane	7545.91*	7548.51	9.71121	0.196947	12.5079*	1.23962*	8.13809	0.0225638	0.174383	1.57312	7548.51	0*	0.000480522*	7558.42
Propane	2980.60*	2984.44	14.1345	0.0524258	18.0275*	1.05135*	8.14721	0.00438897	0.0480369	5.98724	2984.44	0*	2.06193E-05*	2998.63
Isobutane	558.247*	558.131	6.79861	0.00676553	6.68930*	0.283994*	2.30914	0.000404927	0.00636060	4.48947	558.131	0*	6.83755E-07*	564.936
n-Butane	1035.79*	1036.12	18.2947	0.0157678	18.6411*	0.585579*	4.77206	0.00121911	0.0145487	13.5226	1036.12	0*	1.40862E-06*	1054.43
Isopentane	314.924*	316.905	12.9131	0.00330412	14.8968*	0.178257*	1.66233	0.000184806	0.00311932	11.2508	316.905	0*	7.80843E-08*	329.821
n-Pentane	285.916*	291.063	15.8509	0.00115239	20.9986*	0.166560*	1.58033	2.66681E-05	0.00112572	14.2705	291.063	0*	8.29978E-09*	306.915
2-Methylpentane	0*	9.61216	1.24029	5.19933E-05	10.8525*	0.00553236*	0.0544684	1.64082E-06	5.03525E-05	1.18582	9.61216	0*	2.04090E-10*	10.8525
3-Methylpentane	0*	6.61482	0.948511	8.95066E-05	7.56342*	0.00381011*	0.0376103	6.67768E-06	8.28289E-05	0.910900	6.61482	0*	7.44655E-10*	7.56342
n-Hexane	473.034*	421.288	78.2461	0.00109969	26.5010*	0.250428*	2.40732	1.75136E-05	0.00108218	75.8388	421.288	0*	1.54177E-09*	499.535
Methylcyclopentane	0*	1.64957	0.303143	3.80130E-05	1.95275*	0.000882606*	0.00953449	4.49505E-06	3.35180E-05	0.293609	1.64957	0*	3.60234E-10*	1.95275
Benzene	0*	0.414246	0.0839445	0.000883853	0.499074*	0.000165747*	0.00241040	0.000814690	6.91630E-05	0.0815341	0.414246	0*	4.41516E-08*	0.499074
2-Methylhexane	0*	12.2809	5.01327	4.57084E-05	17.2942*	0.00195266*	0.0692408	9.97341E-07	4.47111E-05	4.94403	12.2809	0*	1.05007E-11*	17.2942
3-Methylhexane	0*	10.3347	4.68499	4.64920E-05	15.0197*	0.00601392*	0.0584673	1.20592E-06	4.52861E-05	4.62652	10.3347	0*	4.17879E-11*	15.0197
Heptane	0*	23.4695	13.8061	4.37976E-05	37.2756*	0.0129786*	0.131614	5.16651E-07	4.32809E-05	13.6744	23.4695	0*	1.30719E-11*	37.2756
Methylcyclohexane	0*	12.1344	7.14759	0.000267905	19.2822*	0.00685476*	0.0693834	3.15188E-05	0.000236386	7.07820	12.1344	0*	8.13701E-10*	19.2822
Toluene	0*	2.78396	1.99107	0.00422843	4.77926*	0.00115462*	0.0159999	0.00379995	0.000428483	1.97507	2.78396	0*	5.92184E-08*	4.77926
Octane	0*	40.2237	74.7153	2.96698E-05	114.939*	0.0208786*	0.219925	1.49956E-07	2.95198E-05	74.4954	40.2237	0*	1.12035E-12*	114.939
Ethylbenzene	0*	2.50720	5.59358	0.00327508	8.10405*	0.00109219*	0.0139806	0.00290828	0.000366799	5.57960	2.50720	0*	1.51757E-08*	8.10405
m-Xylene	0*	2.39971	5.85411	0.00195709	8.25578*	0.00136019*	0.0133315	0.00163716	0.000319930	5.84078	2.39971	0*	1.01634E-08*	8.25578
o-Xylene	0*	3.59144	10.1018	0.00691719	13.7001*	0.00129919*	0.0199828	0.00637650	0.000540690	10.0818	3.59144	0*	2.19045E-08*	13.7001
Nonane	0*	14.3459	84.9156	1.10629E-05	99.2614*	0.00704021*	0.0765502	5.71399E-08	1.10058E-05	84.8390	14.3459	0*	1.26399E-13*	99.2614
O2	12.5080*	12.5061	0.00167050	0.000231876	0*	2.73411E-05*	0.00163932	1.82809E-05	0.000213595	3.11817E-05	12.5061	0*	5.39897E-07*	12.5080
C10+	0*	3.10243	462.076	4.04310E-05	465.179*	0.000970136*	0.0149876	3.62299E-06	3.68080E-05	462.061	3.10243	0*	2.02775E-13*	465.179

Process Streams		**Gas**	**HP Separator Gas**	**HP Separator Oil**	**HP Separator Water**	**Oil**	**Oil W/B**	**OT Flash Gas**	**Produced Water**	**PWT Flash Gas**	**Sales Oil**	**Total gas to sale**	**Water**	**Water W/B**	**Well Stream**
Properties	**Status:**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**
Phase: **Total**	**From Block:**	--	3 Phase Separator	3 Phase Separator	3 Phase Separator	--	--	Condensate Tanks	PW Tanks	PW Tanks	Condensate Tanks	MIX-100	--	--	MIX-101
	To Block:	MIX-101	MIX-100	Condensate Tanks	PW Tanks	MIX-101	--	--	--	--	--	--	MIX-101	--	3 Phase Separator
Property	**Units**														
Temperature	°F	85*	70*	70	70	85*	75.9425*	75.94*	75.94	75.94*	75.94	70	85*	75.9425*	84.7793
Pressure	psig	1000*	154*	154	154	1000*	2.88000	0*	0	0*	0	154	1000*	-14.2225	1000
Mole Fraction Vapor	%	100	100	0	0	0	100*	100	0	100	0	100	0	100*	92.9360
Mole Fraction Light Liquid	%	0	0	100	100	100	0	0	100	0	100	0	100	0	0.828503
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0	0	0	0	0	0	0	6.2352
Molecular Weight	lb/lbmol	20.1479	20.1890	115.736	18.0163	112.858	40.8475	35.9131	18.0156	20.4540	128.103	20.1890	18.0153	18.4809	20.4041
Mass Density	lb/ft^3	4.38861	0.624721	45.3077	62.2681	45.1381	0.127087	0.0928379	62.2225	0.0524806	45.7925	0.624721	62.1852	0.00152287	4.74529
Molar Flow	lbmol/h	1861.38	1866.70	7.25560	121.505	8.40671	0.0973251	0.973346	121.471	0.0337384	6.28225	1866.70	125.675	0.00160342	1995.46
Mass Flow	lb/h	37502.8	37686.8	839.733	2189.07	948.760	3.97549*	34.9559	2188.38	0.690087	804.777	37686.8	2264.08	0.0296327*	40715.6
Vapor Volumetric Flow	ft^3/h	8545.48	60325.8	18.5340	35.1555	21.0191	31.2817	376.526	35.1702	13.1494	17.5744	60325.8	36.4086	19.4585	8580.22
Liquid Volumetric Flow	gpm	1065.41	7521.14	2.31073	4.38302	2.62056	3.90006	46.9435	4.38485	1.63940	2.19110	7521.14	4.53926	2.42600	1069.74
Std Vapor Volumetric Flow	MMSCFD	16.9527*	17.0012	0.0660812	1.10662	0.0765651	0.000886399	0.00886486	1.10631	0.000307276	0.0572163	17.0012	1.14460	1.46034E-05	18.1739
Std Liquid Volumetric Flow	sgpm	223.155	223.615	2.34289	4.37901	2.65594*	0.0171186	0.155518	4.37500	0.00400966	2.18737	223.615	4.52605*	6.58562E-05	230.337
Compressibility		0.796968	0.959101	0.0758109	0.00858688	0.434037	0.982812	0.989038	0.000740265	0.996475	0.00715239	0.959101	0.0502914	0.999551	0.746742
Specific Gravity		0.695651	0.697072	0.726445	0.998383	0.723726	1.41035	1.23998	0.997651	0.706223	0.734219	0.697072	0.997052	0.638096	
API Gravity				62.0140	10.0296	60.9100			10.0026		59.3408		9.87799		
Enthalpy	Btu/h	-6.42923E+07	-6.37491E+07	-716234	-1.49424E+07	-800094	-4274.61	-41047.7	-1.49292E+07	-1262.34	-667731	-6.37491E+07	-1.54197E+07	-163.064	-8.05121E+07
Mass Enthalpy	Btu/lb	-1714.33	-1691.55	-852.931	-6825.94	-843.305	-1075.24	-1174.27	-6822.04	-1829.25	-829.709	-1691.55	-6810.58	-5502.84	-1977.42
Mass Cp	Btu/(lb*°F)	0.668055	0.503273	0.494390	0.982129	0.500079	0.411623	0.423022	0.981761	0.475859	0.492311	0.503273	0.979420	0.441734	0.681654
Ideal Gas CpCv Ratio		1.25316	1.25674	1.04742	1.32581	1.04764	1.13524	1.15144	1.32555	1.25748	1.04242	1.25674	1.32512	1.32161	1.25214
Dynamic Viscosity	cP	0.0131452	0.0107579	0.582539	0.995431	0.548681	0.00861154	0.00903682	0.924425	0.0107571	0.689997	0.0107579	0.840378	0.0102787	
Kinematic Viscosity	cSt	0.186991	1.07503	0.802661	0.997986	0.758850	4.23020	6.07672	0.927477	12.7961	0.940659	1.07503	0.843659	421.362	
Thermal Conductivity	Btu/(h*ft*°F)	0.0224895	0.0178149	0.0688345	0.346600	0.0679063	0.0111860	0.0127422	0.349778	0.0171688	0.0693062	0.0178149	0.353848	0.0122538	
Surface Tension	lbf/ft			0.00148255?	0.00502997?	0.000875397			0.00498763?		0.00160448		0.00492045		
Net Ideal Gas Heating Value	Btu/ft^3	1103.13	1102.90	5819.34	0.330735	5675.40	2147.59	1893.21	0.0347933	1065.83	6427.64	1102.90	0	49.7856	1052.92
Net Liquid Heating Value	Btu/lb	20722.8	20673.7	18921.4	-1052.44	18915.4	19799.8	19866.9	-1058.98	19688.3	18880.3	20673.7	-1059.76	48.1432	19469.4
Gross Ideal Gas Heating Value	Btu/ft^3	1217.26	1217.04	6245.68	50.6594	6092.60	2336.55	2064.07	50.3465	1177.33	6893.56	1217.04	50.3101	102.173	1164.30
Gross Liquid Heating Value	Btu/lb	22872.4	22819.0	20318.9	7.65513	20317.2	21555.3	21672.1	0.796725	21756.8	20260.2	22819.0	0	1123.85	21541.0

Process Streams		**Gas**	**HP Separator Gas**	**HP Separator Oil**	**HP Separator Water**	**Oil**	**Oil W/B**	**OT Flash Gas**	**Produced Water**	**PWT Flash Gas**	**Sales Oil**	**Total gas to sale**	**Water**	**Water W/B**	**Well Stream**
Composition	**Status:**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**
Phase: **Vapor**	**From Block:**	--	3 Phase Separator	3 Phase Separator	3 Phase Separator	--	--	Condensate Tanks	PW Tanks	PW Tanks	Condensate Tanks	MIX-100	--	--	MIX-101
	To Block:	MIX-101	MIX-100	Condensate Tanks	PW Tanks	MIX-101	--	--	--	--	--	--	MIX-101	--	3 Phase Separator
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water	0	0.225091				0.000426520	0.470302		3.03276			0.225091		93.7802	0.0752112
H2S	0	0				0	0		0			0		0	0
Nitrogen	0.5356	0.534111				0.00435033	0.0725030		0.258821			0.534111		0.00457244	0.537017
Carbon Dioxide	0.1798	0.179180				0.167492	0.192447		1.32249			0.179180		1.56818	0.179248
Methane	79.9344	79.7096				8.99139	31.6724		73.6008			79.7096		3.61775	80.0310
Ethane	13.4821	13.4483				42.3588	27.8058		17.1894			13.4483		0.996657	13.4198
Propane	3.6314	3.62571				24.4978	18.9822		3.22890			3.62571		0.0291628	3.57775
Isobutane	0.516	0.514422				5.02045	4.08169		0.324363			0.514422		0.000733686	0.500354
n-Butane	0.9574	0.954975				10.3519	8.43523		0.741919			0.954975		0.00151148	0.920213
Isopentane	0.2345	0.235302				2.53859	2.36712		0.128146			0.235302		6.74973E-05	0.222589
n-Pentane	0.2129	0.216114				2.37202	2.25035		0.0462463			0.216114		7.17446E-06	0.201914
2-Methylpentane	0	0.00597535				0.0659633	0.0649373		0.00173186			0.00597535		1.47703E-07	0.00539754
3-Methylpentane	0	0.00411207				0.0454287	0.0448390		0.00284888			0.00411207		5.38919E-07	0.00369247
n-Hexane	0.2949	0.261892				2.98590	2.87001		0.0372213			0.261892		1.11580E-06	0.234624
Methylcyclopentane	0	0.00105001				0.0107755	0.0116393		0.00118046			0.00105001		2.66952E-07	0.000921104
Benzene	0	0.000284097				0.00218023	0.00317034		0.00262442			0.000284097		3.52518E-05	0.000248247

2-Methylhexane	0	0.00656566				0.0200228	0.0709935		0.00132256		0.00656566		6.53573E-09	0.00595397
3-Methylhexane	0	0.00552519				0.0616676	0.0599473		0.00133957		0.00552519		2.60091E-08	0.00501119
Heptane	0	0.0125474				0.133084	0.134945		0.00128025		0.0125474		8.13609E-09	0.0116828
Methylcyclohexane	0	0.00662054				0.0717328	0.0726003		0.00713587		0.00662054		5.16853E-07	0.00590048
Toluene	0	0.00161863				0.0128758	0.0178406		0.0137838		0.00161863		4.00837E-05	0.00144699
Octane	0	0.0188639				0.187803	0.197803		0.000765976		0.0188639		6.11692E-10	0.0209119
Ethylbenzene	0	0.00126512				0.0105705	0.0135293		0.0102405		0.00126512		8.91498E-06	0.00136835
m-Xylene	0	0.00121089				0.0131642	0.0129013		0.00893202		0.00121089		5.97048E-06	0.00133615
o-Xylene	0	0.00181223				0.0125738	0.0193379		0.0150953		0.00181223		1.28678E-05	0.00203741
Nonane	0	0.00599208				0.0564009	0.0613203		0.000254344		0.00599208		6.14642E-11	0.00904083
O2	0.021	0.0209369				0.000877925	0.00526337		0.0197849		0.0209369		0.00105227	0.0210358
C10+	0	0.000960132				0.00575852	0.00889547		0.000630261		0.000960132		7.30583E-11	0.00426952
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**
Water	0	4.20177				4.15111E-07	0.00457766		0.00102321		4.20177		0.00150369	1.39479
H2S	0	0				0	0		0		0		0	0
Nitrogen	9.96954	9.97025				4.23396E-06	0.000705705		8.73220E-05		9.97025		7.33156E-08	9.95899
Carbon Dioxide	3.34676	3.34475				0.000163011	0.00187318		0.000446187		3.34475		2.51446E-05	3.32415
Methane	1487.88	1487.94				0.00875087	0.308282		0.0248317		1487.94		5.80078E-05	1484.17
Ethane	250.953	251.039				0.0412258	0.270647		0.00579943		251.039		1.59806E-05	248.871
Propane	67.5941	67.6812				0.0238425	0.184762		0.00108938		67.6812		4.67603E-07	66.3494
Isobutane	9.60471	9.60271				0.00488616	0.0397290		0.000109435		9.60271		1.17641E-08	9.27907
n-Butane	17.8208	17.8265				0.0100750	0.0821040		0.000250312		17.8265		2.42354E-08	17.0653
Isopentane	4.36493	4.39238				0.00247068	0.0230403		4.32345E-05		4.39238		1.08227E-09	4.12791
n-Pentane	3.96287	4.03421				0.00230857	0.0219037		1.56028E-05		4.03421		1.15037E-10	3.74449
2-Methylpentane	0	0.111542				6.41988E-05	0.000632065		5.84303E-07		0.111542		2.36831E-12	0.100097
3-Methylpentane	0	0.0767600				4.42135E-05	0.000436439		9.61166E-07		0.0767600		8.64116E-12	0.0684769
n-Hexane	5.48920	4.88873				0.00290603	0.0279351		1.25579E-05		4.88873		1.78911E-11	4.35110
Methylcyclopentane	0	0.0196005				1.04873E-05	0.000113291		3.98267E-07		0.0196005		4.28037E-12	0.0170819
Benzene	0	0.00530324				2.12191E-06	3.08583E-05		8.85435E-07		0.00530324		5.65235E-10	0.00460374
2-Methylhexane	0	0.122561				1.94872E-05	0.000691013		4.46210E-07		0.122561		1.04796E-13	0.110416
3-Methylhexane	0	0.103139				6.00180E-05	0.000583495		4.51948E-07		0.103139		4.17037E-13	0.0929325
Heptane	0	0.234222				0.000129524	0.00131349		4.31937E-07		0.234222		1.30456E-13	0.216657
Methylcyclohexane	0	0.123586				6.98140E-05	0.000706652		2.40753E-06		0.123586		8.28734E-12	0.109424
Toluene	0	0.0302150				1.25313E-05	0.000173651		4.65043E-06		0.0302150		6.42712E-10	0.0268345
Octane	0	0.352133				0.000182780	0.00192531		2.58428E-07		0.352133		9.80801E-15	0.387812
Ethylbenzene	0	0.0236160				1.02877E-05	0.000131687		3.45499E-06		0.0236160		1.42945E-10	0.0253761
m-Xylene	0	0.0226036				1.28121E-05	0.000125574		3.01352E-06		0.0226036		9.57322E-11	0.0247789
o-Xylene	0	0.0338288				1.22375E-05	0.000188224		5.09292E-06		0.0338288		2.06325E-10	0.0377838
Nonane	0	0.111854				5.48922E-05	0.000596859		8.58114E-08		0.111854		9.85531E-16	0.167662
O2	0.390889	0.390830				8.54441E-07	5.12308E-05		6.67509E-06		0.390830		1.68724E-08	0.390108
C10+	0	0.0179228				5.60448E-06	8.65837E-05		2.12640E-07		0.0179228		1.17143E-15	0.0791783
Mass Fraction	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water	0	0.200856				0.000188111	0.235920		2.67116		0.200856		91.4174	0.0673366
H2S	0	0				0	0		0		0		0	0
Nitrogen	0.744693	0.741110				0.00298347	0.0565547		0.354475		0.741110		0.00693091	0.747622
Carbon Dioxide	0.392742	0.390590				0.180457	0.235833		2.84550		0.390590		3.73439	0.392038
Methane	63.6467	63.3383				3.53128	14.1481		57.7263		63.3383		3.14041	63.8053
Ethane	20.1209	20.0296				31.1816	23.2810		25.2698		20.0296		1.62159	20.0537
Propane	7.94769	7.91907				26.4458	23.3071		6.96099		7.91907		0.0695827	7.84031
Isobutane	1.48855	1.48097				7.14363	6.60586		0.921711		1.48097		0.00230743	1.44527
n-Butane	2.76189	2.74928				14.7298	13.6517		2.10824		2.74928		0.00475358	2.65802
Isopentane	0.839736	0.840890				4.48389	4.75550		0.452018		0.840890		0.000263507	0.798104
n-Pentane	0.762388	0.772321				4.18968	4.52092		0.163127		0.772321		2.80088E-05	0.723973
2-Methylpentane	0	0.0255054				0.139162	0.155821		0.00729655		0.0255054		6.88731E-07	0.0231157
3-Methylpentane	0	0.0175521				0.0958402	0.107594		0.0120027		0.0175521		2.51295E-06	0.0158135
n-Hexane	1.26133	1.11787				6.29931	6.88673		0.156818		1.11787		5.20292E-06	1.00481
Methylcyclopentane	0	0.00437705				0.0222012	0.0272758		0.00485707		0.00437705		1.21566E-06	0.00385247
Benzene	0	0.00109918				0.00416922	0.00689555		0.0100224		0.00109918		0.000148996	0.000963671
2-Methylhexane	0	0.0325866				0.0491174	0.198081		0.00647905		0.0325866		3.54362E-08	0.0296490
3-Methylhexane	0	0.0274226				0.151275	0.167260		0.00656237		0.0274226		1.41019E-07	0.0249543
Heptane	0	0.0622750				0.326465	0.376514		0.00627181		0.0622750		4.41132E-08	0.0581767
Methylcyclohexane	0	0.0321980				0.172426	0.198489		0.0342545		0.0321980		2.74595E-06	0.0287915
Toluene	0	0.00738709				0.0290434	0.0457717		0.0620912		0.00738709		0.000199841	0.00662576
Octane	0	0.106731				0.525184	0.629152		0.00427770		0.106731		3.78080E-09	0.118713
Ethylbenzene	0	0.00665272				0.0274732	0.0399949		0.0531526		0.00665272		5.12128E-05	0.00721949
m-Xylene	0	0.00636751				0.0342145	0.0381382		0.0463609		0.00636751		3.42979E-05	0.00704961
o-Xylene	0	0.00952969				0.0326800	0.0571659		0.0783510		0.00952969		7.39200E-05	0.0107495
Nonane	0	0.0380660				0.177090	0.218991		0.00159484		0.0380660		4.26553E-10	0.0576250
O2	0.0333522	0.0331843				0.000687742	0.00468969		0.0309519		0.0331843		0.00182196	0.0334518
C10+	0	0.00823214				0.0244030	0.0428759		0.00533382		0.00823214		6.84295E-10	0.0367286
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**
Water	0	75.6961				7.47834E-06	0.0824679		0.0184333		75.6961		0.0270895	25.1276
H2S	0	0				0	0		0		0		0	0
Nitrogen	279.281	279.301				0.000118608	0.0197692		0.00244619		279.301		2.05382E-06	278.985
Carbon Dioxide	147.289	147.201				0.00717405	0.0824375		0.0196364		147.201		0.00110660	146.294
Methane	23869.3	23870.2				0.140386	4.94560		0.398362		23870.2		0.000930588	23809.8
Ethane	7545.91	7548.51				1.23962	8.13809		0.174383		7548.51		0.000480522	7483.32
Propane	2980.60	2984.44				1.05135	8.14721		0.0480369		2984.44		2.06193E-05	2925.72
Isobutane	558.247	558.131				0.283994	2.30914		0.00636060		558.131		6.83755E-07	539.320
n-Butane	1035.79	1036.12				0.585579	4.77206		0.0145487		1036.12		1.40862E-06	991.876
Isopentane	314.924	316.905				0.178257	1.66233		0.00311932		316.905		7.80843E-08	297.823
n-Pentane	285.916	291.063				0.166560	1.58033		0.00112572		291.063		8.29978E-09	270.160
2-Methylpentane	0	9.61216				0.00553236	0.0544684		5.03525E-05		9.61216		2.04090E-10	8.62593
3-Methylpentane	0	6.61482				0.00381011	0.0376103		8.28289E-05		6.61482		7.44655E-10	5.90102
n-Hexane	473.034	421.288				0.250428	2.40732		0.00108218		421.288		1.54177E-09	374.958
Methylcyclopentane	0	1.64957				0.000882606	0.00953449		3.35180E-05		1.64957		3.60234E-10	1.43760
Benzene	0	0.414246				0.000165747	0.00241040		6.91630E-05		0.414246		4.41516E-08	0.359607
2-Methylhexane	0	12.2809				0.00195266	0.0692408		4.47111E-05		12.2809		1.05007E-11	11.0639
3-Methylhexane	0	10.3347				0.00601392	0.0584673		4.52861E-05		10.3347		4.17879E-11	9.31201
Heptane	0	23.4695				0.0129786	0.131614		4.32809E-05		23.4695		1.30719E-11	21.7094
Methylcyclohexane	0	12.1344				0.00685476	0.0693834		0.000236386		12.1344		8.13701E-10	10.7440

Toluene	0	2.78396			0.00115462	0.0159999	0.000428483	2.78396	5.92184E-08	2.47249	
Octane	0	40.2237			0.0208786	0.219925	2.95198E-05	40.2237	1.12035E-12	44.2992	
Ethylbenzene	0	2.50720			0.00109219	0.0139806	0.000366799	2.50720	1.51757E-08	2.69405	
m-Xylene	0	2.39971			0.00136019	0.0133315	0.000319930	2.39971	1.01634E-08	2.63066	
o-Xylene	0	3.59144			0.00129919	0.0199828	0.000540690	3.59144	2.19045E-08	4.01131	
Nonane	0	14.3459			0.00704021	0.0765502	1.10058E-05	14.3459	1.26399E-13	21.5035	
O2	12.5080	12.5061			2.73411E-05	0.00163932	0.000213595	12.5061	5.39897E-07	12.4830	
C10+	0	3.10243			0.000970136	0.0149876	3.68080E-05	3.10243	2.02775E-13	13.7058	

Process Streams		**Gas**	**HP Separator Gas**	**HP Separator Oil**	**HP Separator Water**	**Oil**	**Oil W/B**	**OT Flash Gas**	**Produced Water**	**PWT Flash Gas**	**Sales Oil**	**Total gas to sale**	**Water**	**Water W/B**	**Well Stream**
Properties	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Vapor**	**From Block:**	--	3 Phase Separator	3 Phase Separator	3 Phase Separator	--	--	Condensate Tanks	PW Tanks	PW Tanks	Condensate Tanks	MIX-100	--	--	MIX-101
	To Block:	MIX-101	MIX-100	Condensate Tanks	PW Tanks	MIX-101	--	--	--	--	--	--	MIX-101	--	3 Phase Separator
Property	**Units**														
Temperature	°F	85	70			75.9425	75.94		75.94		70	75.9425	84.7793		
Pressure	psig	1000	154			2.88000	0		0		154	-14.2225	1000		
Mole Fraction Vapor	%	100	100			100	100		100		100	100	100		
Mole Fraction Light Liquid	%	0	0			0	0		0		0	0	0		
Mole Fraction Heavy Liquid	%	0	0			0	0		0		0	0	0		
Molecular Weight	lb/lbmol	20.1479	20.1890			40.8475	35.9131		20.4540		20.1890	18.4809	20.1220		
Mass Density	lb/ft^3	4.38861	0.624721			0.127087	0.0928379		0.0524806		0.624721	0.00152287	4.38257		
Molar Flow	lbmol/h	1861.38	1866.70			0.0973251	0.973346		0.0337384		1866.70	0.00160342	1854.50		
Mass Flow	lb/h	37502.8	37686.8			3.97549	34.9559		0.690087		37686.8	0.0296327	37316.3		
Vapor Volumetric Flow	ft^3/h	8545.48	60325.8			31.2817	376.526		13.1494		60325.8	19.4585	8514.73		
Liquid Volumetric Flow	gpm	1065.41	7521.14			3.90006	46.9435		1.63940		7521.14	2.42600	1061.58		
Std Vapor Volumetric Flow	MMSCFD	16.9527	17.0012			0.000886399	0.00886486		0.000307276		17.0012	1.46034E-05	16.8901		
Std Liquid Volumetric Flow	sgpm	223.155	223.615			0.0171186	0.155518		0.00400966		223.615	6.58562E-05	222.065		
Compressibility		0.796968	0.959101			0.982812	0.989038		0.996475		0.959101	0.999551	0.797368		
Specific Gravity		0.695651	0.697072			1.41035	1.23998		0.706223		0.697072	0.638096	0.694760		
API Gravity															
Enthalpy	Btu/h	-6.42923E+07	-6.37491E+07			-4274.61	-41047.7		-1262.34		-6.37491E+07	-163.064	-6.41210E+07		
Mass Enthalpy	Btu/lb	-1714.33	-1691.55			-1075.24	-1174.27		-1829.25		-1691.55	-5502.84	-1718.31		
Mass Cp	Btu/(lb*°F)	0.668055	0.503273			0.411623	0.423022		0.475859		0.503273	0.441734	0.667806		
Ideal Gas CpCv Ratio		1.25316	1.25674			1.13524	1.15144		1.25748		1.25674	1.32161	1.25353		
Dynamic Viscosity	cP	0.0131452	0.0107579			0.00861154	0.00903682		0.0107571		0.0107579	0.0102787	0.0131436		
Kinematic Viscosity	cSt	0.186991	1.07503			4.23020	6.07672		12.7961		1.07503	421.362	0.187225		
Thermal Conductivity	Btu/(h*ft*°F)	0.0224895	0.0178149			0.0111860	0.0127422		0.0171688		0.0178149	0.0122538	0.0224918		
Surface Tension	lbf/ft														
Net Ideal Gas Heating Value	Btu/ft^3	1103.13	1102.90			2147.59	1893.21		1065.83		1102.90	49.7856	1101.02		
Net Liquid Heating Value	Btu/lb	20722.8	20673.7			19799.8	19866.9		19688.3		20673.7	48.1432	20709.1		
Gross Ideal Gas Heating Value	Btu/ft^3	1217.26	1217.04			2336.55	2064.07		1177.33		1217.04	102.173	1214.99		
Gross Liquid Heating Value	Btu/lb	22872.4	22819.0			21555.3	21672.1		21756.8		22819.0	1123.85	22858.6		

Process Streams		**Gas**	**HP Separator Gas**	**HP Separator Oil**	**HP Separator Water**	**Oil**	**Oil W/B**	**OT Flash Gas**	**Produced Water**	**PWT Flash Gas**	**Sales Oil**	**Total gas to sale**	**Water**	**Water W/B**	**Well Stream**
Composition	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Light Liquid**	**From Block:**	--	3 Phase Separator	3 Phase Separator	3 Phase Separator	--	--	Condensate Tanks	PW Tanks	PW Tanks	Condensate Tanks	MIX-100	--	--	MIX-101
	To Block:	MIX-101	MIX-100	Condensate Tanks	PW Tanks	MIX-101	--	--	--	--	--	--	MIX-101	--	3 Phase Separator
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water				0.0755776	99.9698	0			99.9967		0.0144206		100		0.0777479
H2S				0	0	0			0		0		0		0
Nitrogen				0.00982504	7.48975E-05	0.0180004			3.03124E-06		0.000113987		0		0.0697474
Carbon Dioxide				0.0281306	0.00100793	0.0150003			0.000640890		0.00267214		0		0.115675
Methane				4.37994	0.0222094	4.77710			0.00177307		0.151361		0		24.0632
Ethane				4.45123	0.00539059	4.94810			0.000617760		0.832773		0		14.9830
Propane				4.41784	0.000978490	4.86310			8.19397E-05		2.16130		0		9.98471
Isobutane				1.61215	9.58002E-05	1.36903			5.73537E-06		1.22953		0		2.66467
n-Butane				4.33819	0.000223272	3.81508			1.72675E-05		3.70342		0		6.50685
Isopentane				2.46677	3.76907E-05	2.45605			2.10870E-06		2.48221		0		2.68228
n-Pentane				3.02796	1.31455E-05	3.46207			3.04292E-07		3.14844		0		3.08128
2-Methylpentane				0.198365	4.96559E-07	1.49803			1.56749E-08		0.219038		0		0.156281
3-Methylpentane				0.151700	8.54827E-07	1.04402			6.37926E-08		0.168257		0		0.116679
n-Hexane				12.5143	1.05026E-05	3.65807			1.67309E-07		14.0085		0		8.74411
Methylcyclopentane				0.0496446	3.71737E-07	0.276006			4.39702E-08		0.0555329		0		0.0370223
Benzene				0.0148116	9.31257E-06	0.0760016			8.58623E-06		0.0166153		0		0.0107345
2-Methylhexane				0.689559	3.75428E-07	2.05304			8.19398E-09		0.785397		0		0.376088
3-Methylhexane				0.644405	3.81864E-07	1.78304			9.90761E-09		0.734959		0		0.344546
Heptane				1.89898	3.59733E-07	4.42509			4.24471E-09		2.17229		0		0.939652
Methylcyclohexane				1.00331	2.24562E-06	2.33605			2.64270E-07		1.14751		0		0.525986
Toluene				0.297833	3.77699E-05	0.617013			3.39519E-05		0.341214		0		0.151226
Octane				9.01491	2.13770E-07	11.9692			1.08073E-09		10.3810		0		3.74057
Ethylbenzene				0.726165	2.53891E-05	0.908019			2.25518E-05		0.836577		0		0.308117
m-Xylene				0.759987	1.51718E-05	0.925019			1.26952E-05		0.875737		0		0.320416
o-Xylene				1.31142	5.36235E-05	1.53503			4.94457E-05		1.51161		0		0.551767
Nonane				9.12514	7.09906E-08	9.20619			3.66769E-10		10.5294		0		3.66718
O2				0.000719516	5.96387E-06	0			4.70317E-07		1.55114E-05		0		0.00449006
C10+				36.7911	1.92231E-07	31.9666			1.72305E-08		42.4900		0		15.7760
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
Water				0.00548360	121.468	0			121.467		0.000905941		125.675		0.0128536
H2S				0	0	0			0		0		0		0
Nitrogen				0.000712866	9.10040E-05	0.00151324			3.68208E-06		7.16095E-06		0		0.0115309
Carbon Dioxide				0.00204105	0.00122468	0.00126103			0.000778495		0.000167871		0		0.0191239
Methane				0.317791	0.0269855	0.401597			0.00215377		0.00950886		0		3.97824
Ethane				0.322964	0.00654983	0.415972			0.000750399		0.0523169		0		2.47705
Propane				0.320541	0.00118891	0.408827			9.95330E-05		0.135779		0		1.65072
Isobutane				0.116971	0.000116402	0.115090			6.96682E-06		0.0772420		0		0.440536
n-Butane				0.314762	0.000271287	0.320722			2.09750E-05		0.232658		0		1.07574
Isopentane				0.178979	4.57959E-05	0.206473			2.56145E-06		0.155939		0		0.443446

n-Pentane				0.219697	1.59724E-05	0.291046				3.69627E-07		0.197793		0		0.509411	
2-Methylpentane				0.0143926	6.03343E-07	0.125935				1.90405E-08		0.0137605		0		0.0258370	
3-Methylpentane				0.0110067	1.03866E-06	0.0877678				7.74895E-08		0.0105703		0		0.0192899	
n-Hexane				0.907987	1.27611E-05	0.307524				2.03232E-07		0.880052		0		1.44561	
Methylcyclopentane				0.00360201	4.51678E-07	0.0232030				5.34111E-08		0.00348872		0		0.00612068	
Benzene				0.00107467	1.13152E-05	0.00638923				1.04298E-05		0.00104381		0		0.00177467	
2-Methylhexane				0.0500316	4.56163E-07	0.172593				9.95331E-09		0.0493406		0		0.0621765	
3-Methylhexane				0.0467554	4.63983E-07	0.149895				1.20349E-08		0.0461720		0		0.0569619	
Heptane				0.137782	4.37093E-07	0.372004				5.15610E-09		0.136469		0		0.155347	
Methylcyclohexane				0.0727964	2.72854E-06	0.196385				3.21011E-07		0.0720897		0		0.0869584	
Toluene				0.0216096	4.58922E-05	0.0518705				4.12418E-05		0.0214359		0		0.0250014	
Octane				0.654086	2.59741E-07	1.00622				1.31277E-09		0.652161		0		0.618407	
Ethylbenzene				0.0526876	3.08489E-05	0.0763345				2.73939E-05		0.0525559		0		0.0509393	
m-Xylene				0.0551416	1.84345E-05	0.0777636				1.54209E-05		0.0550160		0		0.0529726	
o-Xylene				0.0951516	6.51551E-05	0.129046				6.00622E-05		0.0949634		0		0.0912206	
Nonane				0.662083	8.62569E-08	0.773937				4.45518E-10		0.661486		0		0.606275	
O2				5.22052E-05	7.24639E-06	0				5.71299E-07		9.74463E-07		0		0.000742316	
C10+				2.66942	2.33570E-07	2.68734				2.09301E-08		2.66933		0		2.60816	
Mass Fraction	%		%	%	%	%	%		%	%	%	%	%	%	%	%	%
Water				0.0117643	99.9641	0				99.9948		0.00202799		100		0.0200064	
H2S				0	0	0				0		0		0		0	
Nitrogen				0.00237811	0.000116458	0.00446804				4.71343E-06		2.49265E-05		0		0.0279082	
Carbon Dioxide				0.0106969	0.00246213	0.00584946				0.00156560		0.000918007		0		0.0727149	
Methane				0.607115	0.0197762	0.679054				0.00157887		0.0189550		0		5.51395	
Ethane				1.15646	0.00899685	1.31834				0.00103107		0.195473		0		6.43510	
Propane				1.68321	0.00239489	1.90011				0.000200558		0.743963		0		6.28882	
Isobutane				0.809616	0.000309060	0.705056				1.85035E-05		0.557853		0		2.21220	
n-Butane				2.17863	0.000720297	1.96478				5.57085E-05		1.68029		0		5.40196	
Isopentane				1.53777	0.000150937	1.57013				8.44488E-06		1.39800		0		2.76421	
n-Pentane				1.88761	5.26429E-05	2.21327				1.21863E-06		1.77323		0		3.17540	
2-Methylpentane				0.147700	2.37514E-06	1.14386				7.49790E-08		0.147347		0		0.192365	
3-Methylpentane				0.112954	4.08880E-06	0.797190				3.05143E-07		0.113187		0		0.143620	
n-Hexane				9.31798	5.02357E-05	2.79322				8.00302E-07		9.42358		0		10.7631	
Methylcyclopentane				0.0361000	1.73649E-06	0.205821				2.05406E-07		0.0364833		0		0.0445045	
Benzene				0.00999658	4.03758E-05	0.0526028				3.72280E-05		0.0101313		0		0.0119767	
2-Methylhexane				0.597008	2.08803E-06	1.82282				4.55745E-08		0.614335		0		0.538275	
3-Methylhexane				0.557914	2.12383E-06	1.58309				5.51056E-08		0.574882		0		0.493131	
Heptane				1.64410	2.00074E-06	3.92887				2.36089E-08		1.69916		0		1.34487	
Methylcyclohexane				0.851174	1.22383E-05	2.03236				1.44028E-06		0.879524		0		0.737671	
Toluene				0.237108	0.000193162	0.503738				0.000173642		0.245419		0		0.199024	
Octane				8.89751	1.35536E-06	12.1146				6.85240E-09		9.25665		0		6.10310	
Ethylbenzene				0.666114	0.000149611	0.854173				0.000132897		0.693310		0		0.467235	
m-Xylene				0.697140	8.94031E-05	0.870165				7.48118E-05		0.725764		0		0.485885	
o-Xylene				1.20298	0.000315988	1.44400				0.000291381		1.25274		0		0.836711	
Nonane				10.1122	5.05370E-07	10.4622				2.61106E-09		10.5419		0		6.71809	
O2				0.000198933	1.05924E-05	0				8.35364E-07		3.87457E-06		0		0.00205222	
C10+				55.0266	1.84695E-06	49.0301				1.65556E-07		57.4148		0		39.0061	
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
Water				0.0987887	2188.28	0				2188.26		0.0163208		2264.08		0.231562	
H2S				0	0	0				0		0		0		0	
Nitrogen				0.0199698	0.00254933	0.0423910				0.000103148		0.000200603		0		0.323021	
Carbon Dioxide				0.0898254	0.0538976	0.0554974				0.0342612		0.00738790		0		0.841632	
Methane				5.09814	0.432914	6.44260				0.0345517		0.152546		0		63.8207	
Ethane				9.71121	0.196947	12.5079				0.0225638		1.57312		0		74.4825	
Propane				14.1345	0.0524258	18.0275				0.00438897		5.98724		0		72.7894	
Isobutane				6.79861	0.00676553	6.68930				0.000404927		4.48947		0		25.6049	
n-Butane				18.2947	0.0157678	18.6411				0.00121911		13.5226		0		62.5245	
Isopentane				12.9131	0.00330412	14.8968				0.000184806		11.2508		0		31.9941	
n-Pentane				15.8509	0.00115239	20.9986				2.66681E-05		14.2705		0		36.7534	
2-Methylpentane				1.24029	5.19933E-05	10.8525				1.64082E-06		1.18582		0		2.22652	
3-Methylpentane				0.948511	8.95066E-05	7.56342				6.67768E-06		0.910900		0		1.66232	
n-Hexane				78.2461	0.00109969	26.5010				1.75136E-05		75.8388		0		124.576	
Methylcyclopentane				0.303143	3.80130E-05	1.95275				4.49505E-06		0.293609		0		0.515114	
Benzene				0.0839445	0.000883853	0.499074				0.000814690		0.0815341		0		0.138623	
2-Methylhexane				5.01327	4.57084E-05	17.2942				9.97341E-07		4.94403		0		6.23021	
3-Methylhexane				4.68499	4.64920E-05	15.0197				1.20592E-06		4.62652		0		5.70769	
Heptane				13.8061	4.37976E-05	37.2756				5.16651E-07		13.6744		0		15.5661	
Methylcyclohexane				7.14759	0.000267905	19.2822				3.15188E-05		7.07820		0		8.53810	
Toluene				1.99107	0.00422843	4.77926				0.00379995		1.97507		0		2.30359	
Octane				74.7153	2.96698E-05	114.939				1.49956E-07		74.4954		0		70.6398	
Ethylbenzene				5.59358	0.00327508	8.10405				0.00290828		5.57960		0		5.40797	
m-Xylene				5.85411	0.00195709	8.25578				0.00163716		5.84078		0		5.62384	
o-Xylene				10.1018	0.00691719	13.7001				0.00637650		10.0818		0		9.68444	
Nonane				84.9156	1.10629E-05	99.2614				5.71399E-08		84.8390		0		77.7579	
O2				0.00167050	0.000231876	0				1.82809E-05		3.11817E-05		0		0.0237532	
C10+				462.076	4.04310E-05	465.179				3.62299E-06		462.061		0		451.473	

Process Streams		**Gas**	**HP Separator Gas**	**HP Separator Oil**	**HP Separator Water**	**Oil**	**Oil W/B**	**OT Flash Gas**	**Produced Water**	**PWT Flash Gas**	**Sales Oil**	**Total gas to sale**	**Water**	**Water W/B**	**Well Stream**
Properties	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Light Liquid**	**From Block:**	--	3 Phase Separator	3 Phase Separator	3 Phase Separator	--	--	Condensate Tanks	PW Tanks	PW Tanks	Condensate Tanks	MIX-100	--	--	MIX-101
	To Block:	MIX-101	MIX-100	Condensate Tanks	PW Tanks	MIX-101	--	--	--	--	--	--	MIX-101	--	3 Phase Separator
Property	**Units**														
Temperature	°F			70	70	85			75.94		75.94		85		84.7793
Pressure	psig			154	154	1000			0		0		1000		1000
Mole Fraction Vapor	%			0	0	0			0		0		0		0
Mole Fraction Light Liquid	%			100	100	100			100		100		100		100
Mole Fraction Heavy Liquid	%			0	0	0			0		0		0		0
Molecular Weight	lb/lbmol			115.736	18.0163	112.858			18.0156		128.103		18.0153		70.0103
Mass Density	lb/ft^3			45.3077	62.2681	45.1381			62.2225		45.7925		62.1852		39.3861

Molar Flow	lbmol/h		7.25560	121.505	8.40671		121.471	6.28225	125.675	16.5324					
Mass Flow	lb/h		839.733	2189.07	948.760		2188.38	804.777	2264.08	1157.44					
Vapor Volumetric Flow	ft^3/h		18.5340	35.1555	21.0191		35.1702	17.5744	36.4086	29.3870					
Liquid Volumetric Flow	gpm		2.31073	4.38302	2.62056		4.38485	2.19110	4.53926	3.66383					
Std Vapor Volumetric Flow	MMSCFD		0.0660812	1.10662	0.0765651		1.10631	0.0572163	1.14460	0.150571					
Std Liquid Volumetric Flow	sgpm		2.34289	4.37901	2.65594		4.37500	2.18737	4.52605	3.77783					
Compressibility			0.0758109	0.00858688	0.434037		0.000740265	0.00715239	0.0502914	0.308698					
Specific Gravity			0.726445	0.998383	0.723726		0.997651	0.734219	0.997052	0.631502					
API Gravity			62.0140	10.0296	60.9100		10.0026	59.3408	9.87799	87.2263					
Enthalpy	Btu/h		-716234	-1.49424E+07	-800094		-1.49292E+07	-667731	-1.54197E+07	-1.13714E+06					
Mass Enthalpy	Btu/lb		-852.931	-6825.94	-843.305		-6822.04	-829.709	-6810.58	-982.462					
Mass Cp	Btu/(lb*°F)		0.494390	0.982129	0.500079		0.981761	0.492311	0.979420	0.549359					
Ideal Gas CpCv Ratio			1.04742	1.32581	1.04764		1.32555	1.04242	1.32512	1.07638					
Dynamic Viscosity	cP		0.582539	0.995431	0.548681		0.924425	0.689997	0.840378	0.226684					
Kinematic Viscosity	cSt		0.802661	0.997986	0.758850		0.927477	0.940659	0.843659	0.359300					
Thermal Conductivity	Btu/(h*ft*°F)		0.0688345	0.346600	0.0679063		0.349778	0.0693062	0.353848	0.0637108					
Surface Tension	lbf/ft		0.00148255	0.00502997?	0.000875397		0.00498763?	0.00160448	0.00492045	0.000596151					
Net Ideal Gas Heating Value	Btu/ft^3		5819.34	0.330735	5675.40		0.0347933	6427.64	0	3571.80					
Net Liquid Heating Value	Btu/lb		18921.4	-1052.44	18915.4		-1058.98	18880.3	-1059.76	19208.9					
Gross Ideal Gas Heating Value	Btu/ft^3		6245.68	50.6594	6092.60		50.3465	6893.56	50.3101	3851.87					
Gross Liquid Heating Value	Btu/lb		20318.9	7.65513	20317.2		0.796725	20260.2	0	20726.6					

Process Streams		**Gas**	**HP Separator Gas**	**HP Separator Oil**	**HP Separator Water**	**Oil**	**Oil W/B**	**OT Flash Gas**	**Produced Water**	**PWT Flash Gas**	**Sales Oil**	**Total gas to sale**	**Water**	**Water W/B**	**Well Stream**
Composition	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Heavy Liquid**	**From Block:**	--	3 Phase Separator	3 Phase Separator	3 Phase Separator	--	--	Condensate Tanks	PW Tanks	PW Tanks	Condensate Tanks	MIX-100	--	--	MIX-101
	To Block:	MIX-101	MIX-100	Condensate Tanks	PW Tanks	MIX-101	--	--	--	--	--	--	MIX-101	--	3 Phase Separator
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water															99.8717
H2S															0
Nitrogen															0.000429999
Carbon Dioxide															0.00381196
Methane															0.104482
Ethane															0.0165885
Propane															0.00223068
Isobutane															0.000153957
n-Butane															0.000373381
Isopentane															4.24895E-05
n-Pentane															1.69436E-05
2-Methylpentane															4.81396E-07
3-Methylpentane															7.94765E-07
n-Hexane															9.55983E-06
Methylcyclopentane															3.51382E-07
Benzene															8.69575E-06
2-Methylhexane															2.37320E-07
3-Methylhexane															2.34568E-07
Heptane															2.40466E-07
Methylcyclohexane															1.56791E-06
Toluene															2.77671E-05
Octane															1.38890E-07
Ethylbenzene															1.53435E-05
m-Xylene															9.71932E-06
o-Xylene															3.31465E-05
Nonane															3.71273E-08
O2															3.11746E-05
C10+															1.28357E-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
Water															124.268
H2S															0
Nitrogen															0.000535036
Carbon Dioxide															0.00474312
Methane															0.130004
Ethane															0.0206406
Propane															0.00277558
Isobutane															0.000191565
n-Butane															0.000464588
Isopentane															5.28685E-05
n-Pentane															2.10824E-05
2-Methylpentane															5.98988E-07
3-Methylpentane															9.88904E-07
n-Hexane															1.18950E-05
Methylcyclopentane															4.37215E-07
Benzene															1.08199E-05
2-Methylhexane															2.95291E-07
3-Methylhexane															2.91866E-07
Heptane															2.99205E-07
Methylcyclohexane															1.95091E-06
Toluene															3.45498E-05
Octane															1.72817E-07
Ethylbenzene															1.90915E-05
m-Xylene															1.20935E-05
o-Xylene															4.12433E-05
Nonane															4.61965E-08
O2															3.87898E-05
C10+															1.59712E-07
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water															99.8613
H2S															0
Nitrogen															0.000668570
Carbon Dioxide															0.00931127

Methane														0.0930305
Ethane														0.0276847
Propane														0.00545942
Isobutane														0.000496656
n-Butane														0.00120450
Isopentane														0.000170147
n-Pentane														6.78496E-05
2-Methylpentane														2.30250E-06
3-Methylpentane														3.80133E-06
n-Hexane														4.57243E-05
Methylcyclopentane														1.64133E-06
Benzene														3.76996E-05
2-Methylhexane														1.31985E-06
3-Methylhexane														1.30454E-06
Heptane														1.33734E-06
Methylcyclohexane														8.54448E-06
Toluene														0.000141999
Octane														8.80559E-07
Ethylbenzene														9.04106E-05
m-Xylene														5.72705E-05
o-Xylene														0.000195313
Nonane														2.64290E-07
O2														5.53667E-05
C10+														1.23319E-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**
Water														2238.72
H2S														0
Nitrogen														0.0149882
Carbon Dioxide														0.208743
Methane														2.08558
Ethane														0.620644
Propane														0.122391
Isobutane														0.0111342
n-Butane														0.0270029
Isopentane														0.00381440
n-Pentane														0.00152107
2-Methylpentane														5.16180E-05
3-Methylpentane														8.52192E-05
n-Hexane														0.00102506
Methylcyclopentane														3.67958E-05
Benzene														0.000845161
2-Methylhexane														2.95888E-05
3-Methylhexane														2.92456E-05
Heptane														2.99809E-05
Methylcyclohexane														0.000191552
Toluene														0.00318336
Octane														1.97406E-05
Ethylbenzene														0.00202685
m-Xylene														0.00128390
o-Xylene														0.00437859
Nonane														5.92493E-06
O2														0.00124123
C10+														2.76461E-05

Process Streams		**Gas**	**HP Separator Gas**	**HP Separator Oil**	**HP Separator Water**	**Oil**	**Oil W/B**	**OT Flash Gas**	**Produced Water**	**PWT Flash Gas**	**Sales Oil**	**Total gas to sale**	**Water**	**Water W/B**	**Well Stream**
Properties	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Heavy Liquid**	**From Block:**	--	3 Phase Separator	3 Phase Separator	3 Phase Separator	--	--	Condensate Tanks	PW Tanks	PW Tanks	Condensate Tanks	MIX-100	--	--	MIX-101
	To Block:	MIX-101	MIX-100	Condensate Tanks	PW Tanks	MIX-101	--	--	--	--	--	--	MIX-101	--	3 Phase Separator
Property	**Units**														
Temperature	°F														84.7793
Pressure	psig														1000
Mole Fraction Vapor	%														0
Mole Fraction Light Liquid	%														0
Mole Fraction Heavy Liquid	%														100
Molecular Weight	lb/lbmol														18.0172
Mass Density	lb/ft^3														62.0908
Molar Flow	lbmol/h														124.427
Mass Flow	lb/h														2241.83
Vapor Volumetric Flow	ft^3/h														36.1056
Liquid Volumetric Flow	gpm														4.50148
Std Vapor Volumetric Flow	MMSCFD														1.13324
Std Liquid Volumetric Flow	sgpm														4.49396
Compressibility															0.0503934
Specific Gravity															0.995540
API Gravity															10.0924
Enthalpy	Btu/h														-1.52539E+07
Mass Enthalpy	Btu/lb														-6804.25
Mass Cp	Btu/(lb*°F)														0.980472
Ideal Gas CpCv Ratio															1.32505
Dynamic Viscosity	cP														0.833944
Kinematic Viscosity	cSt														0.838471
Thermal Conductivity	Btu/(h*ft*°F)														0.351849
Surface Tension	lbf/ft														0.00491021?
Net Ideal Gas Heating Value	Btu/ft^3														1.29344
Net Liquid Heating Value	Btu/lb														-1031.11
Gross Ideal Gas Heating Value	Btu/ft^3														51.6753
Gross Liquid Heating Value	Btu/lb														30.0537

Process Streams		Gas	HP Separator Gas	HP Separator Oil	HP Separator Water	Oil	Oil W/B	OT Flash Gas	Produced Water	PWT Flash Gas	Sales Oil	Total gas to sale	Water	Water W/B	Well Stream
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Mixed Liquid**	From Block:	--	3 Phase Separator	3 Phase Separator	3 Phase Separator	--	--	Condensate Tanks	PW Tanks	PW Tanks	Condensate Tanks	MIX-100	--	--	MIX-101
	To Block:	MIX-101	MIX-100	Condensate Tanks	PW Tanks	MIX-101	--	--	--	--	--	--	MIX-101	--	3 Phase Separator
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water															88.1674
H2S															0
Nitrogen															0.00855988
Carbon Dioxide															0.0169318
Methane															2.91448
Ethane															1.77192
Propane															1.17302
Isobutane															0.312662
n-Butane															0.763485
Isopentane															0.314628
n-Pentane															0.361403
2-Methylpentane															0.0183298
3-Methylpentane															0.0136854
n-Hexane															1.02556
Methylcyclopentane															0.00434246
Benzene															0.00126667
2-Methylhexane															0.0441096
3-Methylhexane															0.0404103
Heptane															0.110207
Methylcyclohexane															0.0616916
Toluene															0.0177611
Octane															0.438712
Ethylbenzene															0.0361510
m-Xylene															0.0375885
o-Xylene															0.0647432
Nonane															0.430105
O2															0.000554134
C10+															1.85029
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
Water															124.281
H2S															0
Nitrogen															0.0120660
Carbon Dioxide															0.0238670
Methane															4.10824
Ethane															2.49769
Propane															1.65349
Isobutane															0.440727
n-Butane															1.07621
Isopentane															0.443499
n-Pentane															0.509432
2-Methylpentane															0.0258376
3-Methylpentane															0.0192909
n-Hexane															1.44563
Methylcyclopentane															0.00612112
Benzene															0.00178549
2-Methylhexane															0.0621768
3-Methylhexane															0.0569622
Heptane															0.155348
Methylcyclohexane															0.0869603
Toluene															0.0250359
Octane															0.618408
Ethylbenzene															0.0509584
m-Xylene															0.0529847
o-Xylene															0.0912619
Nonane															0.606275
O2															0.000781106
C10+															2.60816
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water															65.8656
H2S															0
Nitrogen															0.00994359
Carbon Dioxide															0.0309000
Methane															1.93884
Ethane															2.20939
Propane															2.14493
Isobutane															0.753575
n-Butane															1.84015
Isopentane															0.941317
n-Pentane															1.08126
2-Methylpentane															0.0655014
3-Methylpentane															0.0489047
n-Hexane															3.66483
Methylcyclopentane															0.0151547
Benzene															0.00410288
2-Methylhexane															0.183282
3-Methylhexane															0.167910
Heptane															0.457927
Methylcyclohexane															0.251180
Toluene															0.0678608
Octane															2.07809
Ethylbenzene															0.159152
m-Xylene															0.165480
o-Xylene															0.285027
Nonane															2.28749
O2															0.000735289

C10+														13.2815
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**
Water														2238.95
H2S														0
Nitrogen														0.338009
Carbon Dioxide														1.05037
Methane														65.9063
Ethane														75.1031
Propane														72.9118
Isobutane														25.6160
n-Butane														62.5515
Isopentane														31.9979
n-Pentane														36.7549
2-Methylpentane														2.22657
3-Methylpentane														1.66240
n-Hexane														124.577
Methylcyclopentane														0.515150
Benzene														0.139468
2-Methylhexane														6.23024
3-Methylhexane														5.70772
Heptane														15.5662
Methylcyclohexane														8.53829
Toluene														2.30677
Octane														70.6398
Ethylbenzene														5.41000
m-Xylene														5.62512
o-Xylene														9.68882
Nonane														77.7579
O2														0.0249945
C10+														451.473

Process Streams		**Gas**	**HP Separator Gas**	**HP Separator Oil**	**HP Separator Water**	**Oil**	**Oil W/B**	**OT Flash Gas**	**Produced Water**	**PWT Flash Gas**	**Sales Oil**	**Total gas to sale**	**Water**	**Water W/B**	**Well Stream**
Properties	**Status:**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**	**Solved**
Phase: **Mixed Liquid**	**From Block:**	**--**	**3 Phase Separator**	**3 Phase Separator**	**3 Phase Separator**	**--**	**--**	**Condensate Tanks**	**PW Tanks**	**PW Tanks**	**Condensate Tanks**	**MIX-100**	**--**	**--**	**MIX-101**
	To Block:	**MIX-101**	**MIX-100**	**Condensate Tanks**	**PW Tanks**	**MIX-101**	**--**	**--**	**--**	**--**	**--**	**--**	**MIX-101**	**--**	**3 Phase Separator**
Property	**Units**														
Temperature	°F														84.7793
Pressure	psig														1000
Mole Fraction Vapor	%														0
Mole Fraction Light Liquid	%														11.7285
Mole Fraction Heavy Liquid	%														88.2715
Molecular Weight	lb/lbmol														24.1152
Mass Density	lb/ft^3														51.9031
Molar Flow	lbmol/h														140.960
Mass Flow	lb/h														3399.27
Vapor Volumetric Flow	ft^3/h														65.4926
Liquid Volumetric Flow	gpm														8.16531
Std Vapor Volumetric Flow	MMSCFD														1.28381
Std Liquid Volumetric Flow	sgpm														8.27179
Compressibility															0.0806886
Specific Gravity															0.832193
API Gravity															36.7093
Enthalpy	Btu/h														-1.63911E+07
Mass Enthalpy	Btu/lb														-4821.95
Mass Cp	Btu/(lb*°F)														0.833679
Ideal Gas CpCv Ratio															1.23523
Dynamic Viscosity	cP														0.561462
Kinematic Viscosity	cSt														0.675315
Thermal Conductivity	Btu/(h*ft*°F)														0.222559
Surface Tension	lbf/ft														0.00297446?
Net Ideal Gas Heating Value	Btu/ft^3														420.060
Net Liquid Heating Value	Btu/lb														5860.54
Gross Ideal Gas Heating Value	Btu/ft^3														497.381
Gross Liquid Heating Value	Btu/lb														7077.17

November 6, 2014

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

For: Antero Resources Appalachian Corp.
1615 Wynkoop Street
Denver, Colorado 80202

Sample: Nero No. 2H
First Stage Separator Hydrocarbon Liquid
Sampled @ 168 psig & 81 °F

Date Sampled: 10/14/14 Job Number: 45832.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.018	0.004	0.005
Carbon Dioxide	0.015	0.005	0.006
Methane	4.777	1.626	0.682
Ethane	4.948	2.658	1.324
Propane	4.863	2.691	1.908
Isobutane	1.369	0.900	0.708
n-Butane	3.815	2.416	1.973
2,2 Dimethylpropane	0.071	0.055	0.046
Isopentane	2.456	1.804	1.576
n-Pentane	3.391	2.469	2.177
2,2 Dimethylbutane	0.121	0.101	0.093
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.214	0.176	0.164
2 Methylpentane	1.498	1.249	1.149
3 Methylpentane	1.044	0.856	0.801
n-Hexane	2.751	2.273	2.109
Heptanes Plus	68.649	80.716	85.281
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

Specific Gravity	0.7559	(Water=1)
°API Gravity	55.70	@ 60°F
Molecular Weight	139.6	
Vapor Volume	17.18	CF/Gal
Weight	6.30	Lbs/Gal

Characteristics of Total Sample:

Specific Gravity	0.7154	(Water=1)
°API Gravity	66.29	@ 60°F
Molecular Weight	112.4	
Vapor Volume	20.20	CF/Gal
Weight	5.96	Lbs/Gal

Base Conditions: 14.850 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: XG
Processor: XGdjv
Cylinder ID: W-872

David Dannhaus 361-661-7015

TANKS DATA INPUT REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.015	0.005	0.006
Nitrogen	0.018	0.004	0.005
Methane	4.777	1.626	0.682
Ethane	4.948	2.658	1.324
Propane	4.863	2.691	1.908
Isobutane	1.369	0.900	0.708
n-Butane	3.887	2.471	2.019
Isopentane	2.456	1.804	1.576
n-Pentane	3.391	2.469	2.177
Other C-6's	2.877	2.383	2.206
Heptanes	9.109	8.235	7.991
Octanes	14.305	13.813	13.908
Nonanes	9.207	10.205	10.397
Decanes Plus	31.967	45.408	49.244
Benzene	0.076	0.043	0.053
Toluene	0.617	0.415	0.506
E-Benzene	0.908	0.704	0.858
Xylenes	2.460	1.894	2.324
n-Hexane	2.751	2.273	2.109
2,2,4 Trimethylpentane	0.000	0.000	0.000
Totals:	100.000	100.000	100.000

Characteristics of Total Sample:

Specific Gravity	0.7154	(Water=1)
°API Gravity	66.29	@ 60°F
Molecular Weight	112.4	
Vapor Volume	20.20	CF/Gal
Weight	5.96	Lbs/Gal

Characteristics of Decanes (C10) Plus:

Specific Gravity	0.7759	(Water=1)
Molecular Weight	173.1	

Characteristics of Atmospheric Sample:

°API Gravity	59.77	@ 60°F
Reid Vapor Pressure (ASTM D-5191)	3.54	psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
Cylinder Number	------	W-872*	W-298
Pressure, PSIG	168	154	150
Temperature, °F	81	70	70

* Sample used for analysis

TOTAL EXTENDED REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.018	0.004	0.005
Carbon Dioxide	0.015	0.005	0.006
Methane	4.777	1.626	0.682
Ethane	4.948	2.658	1.324
Propane	4.863	2.691	1.908
Isobutane	1.369	0.900	0.708
n-Butane	3.815	2.416	1.973
2,2 Dimethylpropane	0.071	0.055	0.046
Isopentane	2.456	1.804	1.576
n-Pentane	3.391	2.469	2.177
2,2 Dimethylbutane	0.121	0.101	0.093
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.214	0.176	0.164
2 Methylpentane	1.498	1.249	1.149
3 Methylpentane	1.044	0.856	0.801
n-Hexane	2.751	2.273	2.109
Methylcyclopentane	0.276	0.196	0.207
Benzene	0.076	0.043	0.053
Cyclohexane	0.572	0.391	0.428
2-Methylhexane	2.053	1.918	1.831
3-Methylhexane	1.783	1.644	1.590
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	0.995	0.907	0.878
n-Heptane	3.430	3.179	3.058
Methylcyclohexane	2.336	1.886	2.041
Toluene	0.617	0.415	0.506
Other C-8's	8.334	8.186	8.173
n-Octane	3.635	3.740	3.694
E-Benzene	0.908	0.704	0.858
M & P Xylenes	0.925	0.721	0.874
O-Xylene	1.535	1.172	1.450
Other C-9's	6.075	6.665	6.824
n-Nonane	3.131	3.540	3.573
Other C-10's	7.205	8.687	9.057
n-decane	2.282	2.813	2.888
Undecanes(11)	6.933	8.576	9.068
Dodecanes(12)	4.501	6.014	6.448
Tridecanes(13)	3.174	4.548	4.943
Tetradecanes(14)	2.056	3.156	3.476
Pentadecanes(15)	1.432	2.354	2.624
Hexadecanes(16)	0.949	1.667	1.874
Heptadecanes(17)	0.752	1.397	1.586
Octadecanes(18)	0.575	1.124	1.283
Nonadecanes(19)	0.436	0.889	1.020
Eicosanes(20)	0.329	0.698	0.806
Heneicosanes(21)	0.255	0.568	0.660
Docosanes(22)	0.213	0.494	0.578
Tricosanes(23)	0.164	0.395	0.464
Tetracosanes(24)	0.142	0.355	0.419
Pentacosanes(25)	0.103	0.267	0.317
Hexacosanes(26)	0.089	0.238	0.283
Heptacosanes(27)	0.071	0.198	0.237
Octacosanes(28)	0.054	0.156	0.188
Nonacosanes(29)	0.047	0.140	0.169
Triacontanes(30)	0.035	0.107	0.130
Hentriacontanes Plus(31+)	0.168	0.566	0.726
Total	100.000	100.000	100.000

November 6, 2014

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

For: Antero Resources Appalachian Corp.
1615 Wynkoop Street
Denver, Colorado 80202

Date Sampled: 10/14/14

Date Analyzed: 10/24/14

Sample: Nero No. 2H

Job Number: J45832

FLASH LIBERATION OF HYDROCARBON LIQUID		
	First Stage Separator HC Liquid	Stock Tank
Pressure, psig	168	0
Temperature, °F	81	70
Gas Oil Ratio (1)	------	112
Gas Specific Gravity (2)	------	1.194
Separator Volume Factor (3)	1.0721	1.000

STOCK TANK FLUID PROPERTIES	
Shrinkage Recovery Factor (4)	0.9328
Oil API Gravity at 60 °F	59.77
Reid Vapor Pressure, psi (5)	3.54

Quality Control Check			
	Sampling Conditions	Test Samples	
Cylinder No.	------	W-872*	W-298
Pressure, psig	168	154	150
Temperature, °F	81	70	70

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

Certified: FESCO, Ltd. - Alice, Texas

David Dannhaus 361-661-7015

October 28, 2014

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

For: Antero Resources Appalachian Corp.
1615 Wynkoop Street
Denver, Colorado 80202

Sample: Nero No. 2H
Gas Evolved from Hydrocarbon Liquid Flashed
From 168 psig & 81 °F to 0 psig & 70 °F

Date Sampled: 10/14/14 Job Number: 45832.001

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2286

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.132	
Carbon Dioxide	0.650	
Methane	34.713	
Ethane	29.751	8.019
Propane	18.532	5.146
Isobutane	2.953	0.974
n-Butane	6.222	1.977
2-2 Dimethylpropane	0.064	0.025
Isopentane	1.702	0.627
n-Pentane	1.747	0.638
Hexanes	1.654	0.687
Heptanes Plus	1.880	0.832
Totals	100.000	18.925

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.543	(Air=1)
Molecular Weight	101.49	
Gross Heating Value	5409	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.194	(Air=1)
Compressibility (Z)	0.9890	
Molecular Weight	34.21	
Gross Heating Value		
Dry Basis	2005	BTU/CF
Saturated Basis	1971	BTU/CF

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

Base Conditions: 14.850 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: MR
Processor: IM
Cylinder ID: FL-7S

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2286
TOTAL REPORT

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.132		0.108
Carbon Dioxide	0.650		0.836
Methane	34.713		16.278
Ethane	29.751	8.019	26.150
Propane	18.532	5.146	23.887
Isobutane	2.953	0.974	5.017
n-Butane	6.222	1.977	10.571
2,2 Dimethylpropane	0.064	0.025	0.135
Isopentane	1.702	0.627	3.590
n-Pentane	1.747	0.638	3.684
2,2 Dimethylbutane	0.059	0.025	0.149
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.094	0.039	0.237
2 Methylpentane	0.497	0.208	1.252
3 Methylpentane	0.315	0.130	0.794
n-Hexane	0.689	0.286	1.736
Methylcyclopentane	0.060	0.021	0.148
Benzene	0.026	0.007	0.059
Cyclohexane	0.100	0.034	0.246
2-Methylhexane	0.198	0.093	0.580
3-Methylhexane	0.203	0.093	0.595
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.191	0.084	0.554
n-Heptane	0.309	0.144	0.905
Methylcyclohexane	0.214	0.087	0.614
Toluene	0.064	0.022	0.172
Other C8's	0.333	0.156	1.073
n-Octane	0.086	0.044	0.287
Ethylbenzene	0.002	0.001	0.006
M & P Xylenes	0.016	0.006	0.050
O-Xylene	0.002	0.001	0.006
Other C9's	0.067	0.034	0.247
n-Nonane	0.006	0.003	0.022
Other C10's	0.003	0.002	0.012
n-Decane	0.000	0.000	0.000
Undecanes (11)	0.000	0.000	0.000
Totals	100.000	18.925	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.194	(Air=1)
Compressibility (Z)	0.9890	
Molecular Weight	34.21	
Gross Heating Value		
Dry Basis	2005	BTU/CF
Saturated Basis	1971	BTU/CF

GAS ANALYTICAL SERVICES

C6+ Gas Analysis Report

Gas Analytical
Stonewood, West Virginia
8444 Water Street
Stonewood, WV 26301-8006

Report Date: Dec 21, 2016 12:51p

Client:	ANTERO RESOURCES	Date Sampled:	Dec 9, 2016
Client Code:	9569	Analysis Date:	Dec 20, 2016 12:00a
Site:	SHEEP RUN UNIT 2H	Collected By:	MH
Field:	190-RESOURCES	Date Effective:	Jan 1, 2017 12:00a
Meter:	6109	Sample Pressure (PSI):	280.0
Source Laboratory	Stonewood, WV	Sample Temp (°F):	56
Lab File No:	**516604589**	Field H2O (lb/MMSCFD):	
Cylinder No:	69		
Analysis Status:	good		
Sample Type:	Spot		
Measurement Analyst:	Ashley Free		

Component	Mol %	GPM @Contract PSIA
H2S		
Methane	79.9344	0.0000
Ethane	13.4821	3.6167
Propane	3.6314	1.0035
I-Butane	0.5160	0.1694
N-Butane	0.9574	0.3028
I-Pentane	0.2345	0.0860
N-Pentane	0.2129	0.0774
Nitrogen	0.5356	0.0000
Oxygen	0.0210	0.0000
Carbon Dioxide	0.1798	0.0000
Helium	0.0000	
Hexanes+	0.2949	0.1284
TOTAL	100.0000	5.3842

Analytical Results at Base Conditions (Real)		
BTU/SCF (Dry):	1,222.3964	BTU/ft³
BTU/SCF (Saturated):	1,201.5474	BTU/ft³
PSIA:	14.696	PSI
Temperature (°F):	60.0	°F
Z Factor (Dry):	0.99669	
Z Factor (Saturated):	0.99630	

Analytical Results at Contract Conditions (Real)		
BTU/SCF (Dry):	1,225.2339	BTU/ft³
BTU/SCF (Saturated):	1,204.3858	BTU/ft³
PSIA:	14.730	PSI
Temperature (°F):	60.0	°F
Z Factor (Dry):	0.99670	
Z Factor (Saturated):	0.99630	

Calculated Specific Gravities			
Ideal Gravity:	0.6964	Real Gravity:	0.6984
Molecular Wt:	20.1686	lb/lbmol	

Methods, standards, and uncertainties based on GPA 2261-13.
Analytical Calculations performed in accordance with GPA 2172-09.

Source	Date	Notes

Attachment U
Facility-wide Emissions Summary Sheet(s)

ATTACHMENT U – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

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

Emission Point ID#	NOx		CO		VOC		SO2		PM10		PM2.5		CH_4		GHG (CO2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
EP-HR001									0.3256	0.0378						
EP-PCV					0.0704	0.3082							0.2973	1.3023	7.4350	32.5652
F001					2.8885	12.6517							2.7577	12.0789	68.9434	301.9719
EP-L001					8.6533	0.4935							0.4694	0.0268	11.7582	0.6706
EP-L002					9.17E-04	1.05E-04							0.0372	0.0042	0.9741	0.1111
GPU001-008 (emissions per EPN)	0.1224	0.5362	0.1028	0.4504	0.0067	0.0295	0.0007	0.0032	0.0093	0.0408	0.0093	0.0408	0.0028	0.0123	146.9107	643.4690
EP-EC001 (emissions per EPN)	0.8177	3.5815	3.7214	16.2999	0.4871	2.1335	0.0000	0.0000	0.0030	0.0131	0.0022	0.0098	0.0987	0.4322	107.0921	469.0634
TOTAL	1.7971	7.8713	4.5441	19.9033	0.5410	2.8631	0.0059	0.0258	0.0774	0.3391	0.0767	0.3358	0.1212	0.5618	1282.3779	5617.5969

Annual emissions shall be based on 8760 hours per year of operation for all emission units except emergency generators.

According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above

ATTACHMENT U – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

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

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
EP-HR001														
EP-PCV			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0059	0.0258	0.0059	0.0258
F001			0.0013	0.0056	0.0122	0.0534	0.0207	0.0905	0.0560	0.2451	0.1219	0.5339	0.2120	0.9284
EP-L001			5.54E-04	3.16E-05	3.86E-03	2.20E-04	3.65E-03	2.08E-04	0.009	5.07E-04	0.837	0.048	0.854	0.049
EP-L002			1.76E-06	2.01E-07	2.37E-06	2.70E-07	6.07E-07	6.92E-08	1.28E-06	1.46E-07	6.16E-08	7.03E-09	6.08E-06	6.94E-07
GPU001-008 (emissions per EPN)	0.0001	0.0004	2.57E-06	1.13E-05	4.16E-06	1.82E-05			0.00E+00	0.00E+00	0.0022	0.0097	0.0023	0.0101
EP-EC001 (emissions per EPN)	1.28E-06	5.58E-06	5.29E-05	2.32E-04	3.52E-04	1.54E-03	3.09E-04	1.35E-03	7.37E-04	3.23E-03	5.32E-02	2.33E-01	5.47E-02	2.39E-01
TOTAL	0.0007	0.0032	0.0001	0.0004	0.0004	0.0019	0.0003	0.0016	0.0007	0.0037	0.0708	0.3580	0.0731	0.3689

Annual emissions shall be based on 8760 hours per year of operation for all emission units except emergency generators.

According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above

Attachment V
Class I Legal Advertisement

Attachment V

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

Notice is given that Antero Resources Corporation has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-D General Permit Modification for an Oil and Natural Gas Production facility located at 201 Elliot Rd, in Doddridge County, West Virginia.

The latitude and longitude coordinates are: 39.23415 and -80.84013

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

Pollutants	TOTALS (tpy):
NO_X	7.8713
CO	19.9033
$PM_{2.5}$	0.3358
PM_{10}	0.3391
VOC	2.8631
SO_2	0.0258
CO_{2e}	5617.5969
CH_4	0.5618
Formaldehyde	0.0032
Benzene	0.0004
Toluene	0.0019
Ethylbenzene	0.0016
Xylenes	0.0037
Hexane	0.3580
Total HAPs	0.3689

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

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.
Dated this the __ day of _____, 2017

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

www.ghd.com