January 26, 2018 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
Robert Williams 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 Robert Williams Well Pad.

A General Permit Registration Modification is requested due to the planned operational change below:

1. Removal of one Kubota VRU engine and one Cimarron enclosed combustor.

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 512003 in the amount of $1,500.00.

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

Sincerely,

GHD Services Inc.

Manuel Bautista

MB/ma/380

Encl.

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

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

G70-D General Permit Registration Modification Application

Removal of one Kubota VRU engine and one Cimarron enclosed combustor

Robert Williams Well Pad

Antero Resources Corporation

GHD | 6320 Rothway Suite 100 Houston Texas 77040
082715 | Report No 380 | January 2018

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: Robert Williams Well Pad

Operating Site Physical Address: 20 Cabin Run Rd West Union

City: West Union	Zip Code: 26456	County: Doddridge

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.237675
Longitude: -80.862658

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities) 017-00099

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: 1/26/2018

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: Removal of one Kubota VRU engine and one Cimarron enclosed combustor.
Directions to the facility: From Clarksburg, head west on US-50 for about 28.5 miles. Turn left onto County Road 50/30/Old U.S 50 E and continue for 1.9 miles. Turn left onto Oxford Rd. and continue for 2.0 miles. Turn right onto Co Route 21/1 – Well Pad will be 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 ☒

Robert Williams 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 nearby 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 well pad site identified as Primm Well Pad. It is located approximately 0.6 miles northeast of facility.

Attachment B
Siting Criteria Waiver

Attachment B

Siting Waiver
Robert Williams 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 Robert Williams 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:

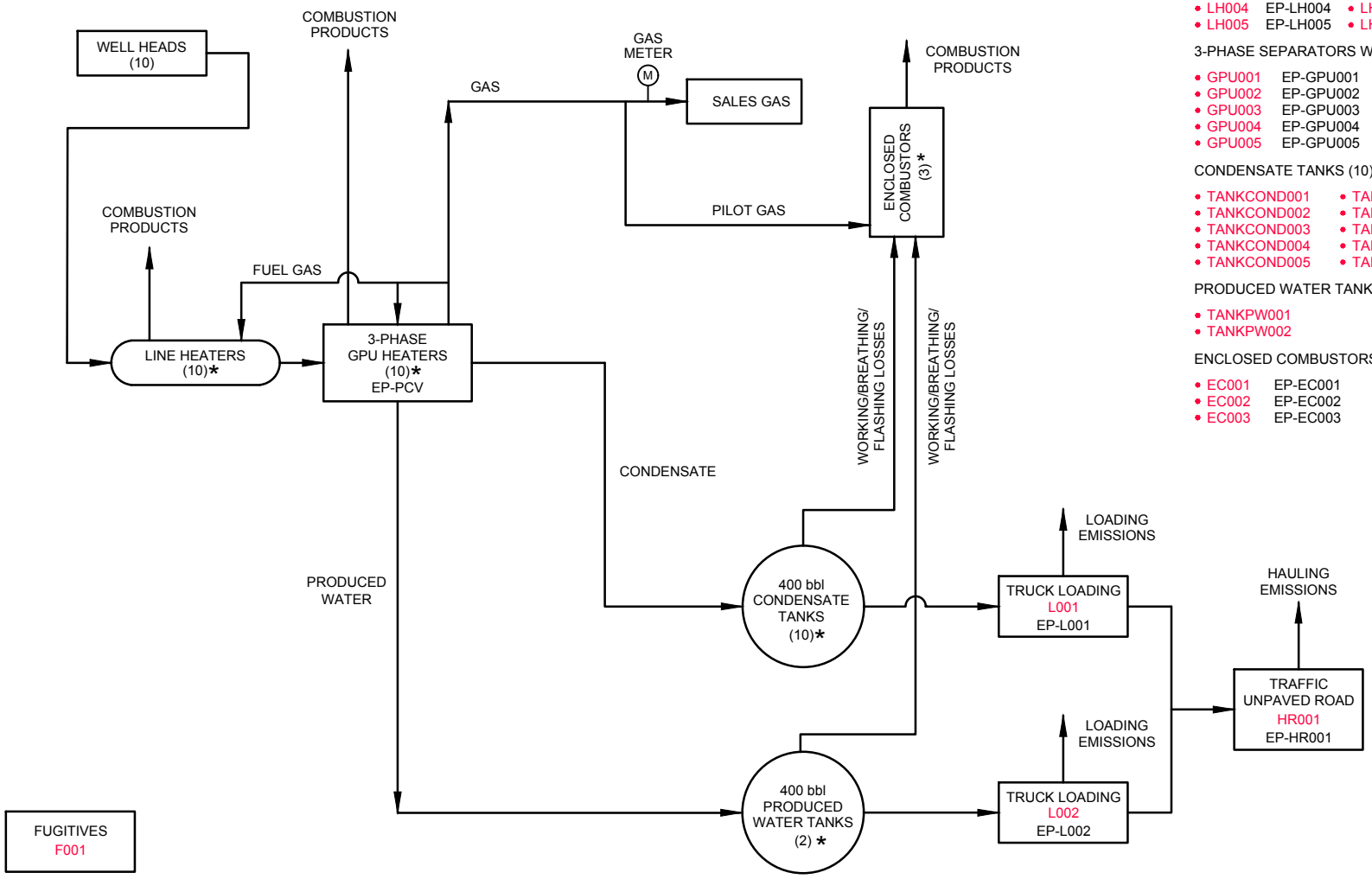
FIRST. The name of the Corporation is Antero Resources Corporation.

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



* LINE HEATERS (10)

• LH001	EP-LH001	• LH006	EP-LH006
• LH002	EP-LH002	• LH007	EP-LH007
• LH003	EP-LH003	• LH008	EP-LH008
• LH004	EP-LH004	• LH009	EP-LH009
• LH005	EP-LH005	• LH010	EP-LH010

3-PHASE SEPARATORS WITH HEATERS (10)

• GPU001	EP-GPU001	• GPU006	EP-GPU006
• GPU002	EP-GPU002	• GPU007	EP-GPU007
• GPU003	EP-GPU003	• GPU008	EP-GPU008
• GPU004	EP-GPU004	• GPU009	EP-GPU009
• GPU005	EP-GPU005	• GPU010	EP-GPU010

CONDENSATE TANKS (10)

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

PRODUCED WATER TANKS (2)

- TANKPW001
- TANKPW002

ENCLOSED COMBUSTORS (3)

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

Attachment D

PROCESS FLOW DIAGRAM - ANTERO RESOURCES
ROBERT WILLIAMS WELL PAD
Doddridge County, West Virginia

Attachment E
Process Description

Attachment E

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

A mixture of condensate, water, and entrained gas from the condensate and gas wells enters the facility through a series of line heaters (LH001-010) and gas production units (GPU001-GPU010) which are 3-phase separators where the gas, condensate, and produced water are separated. The line heaters and GPUs are fueled by a slip stream of the separated gas.

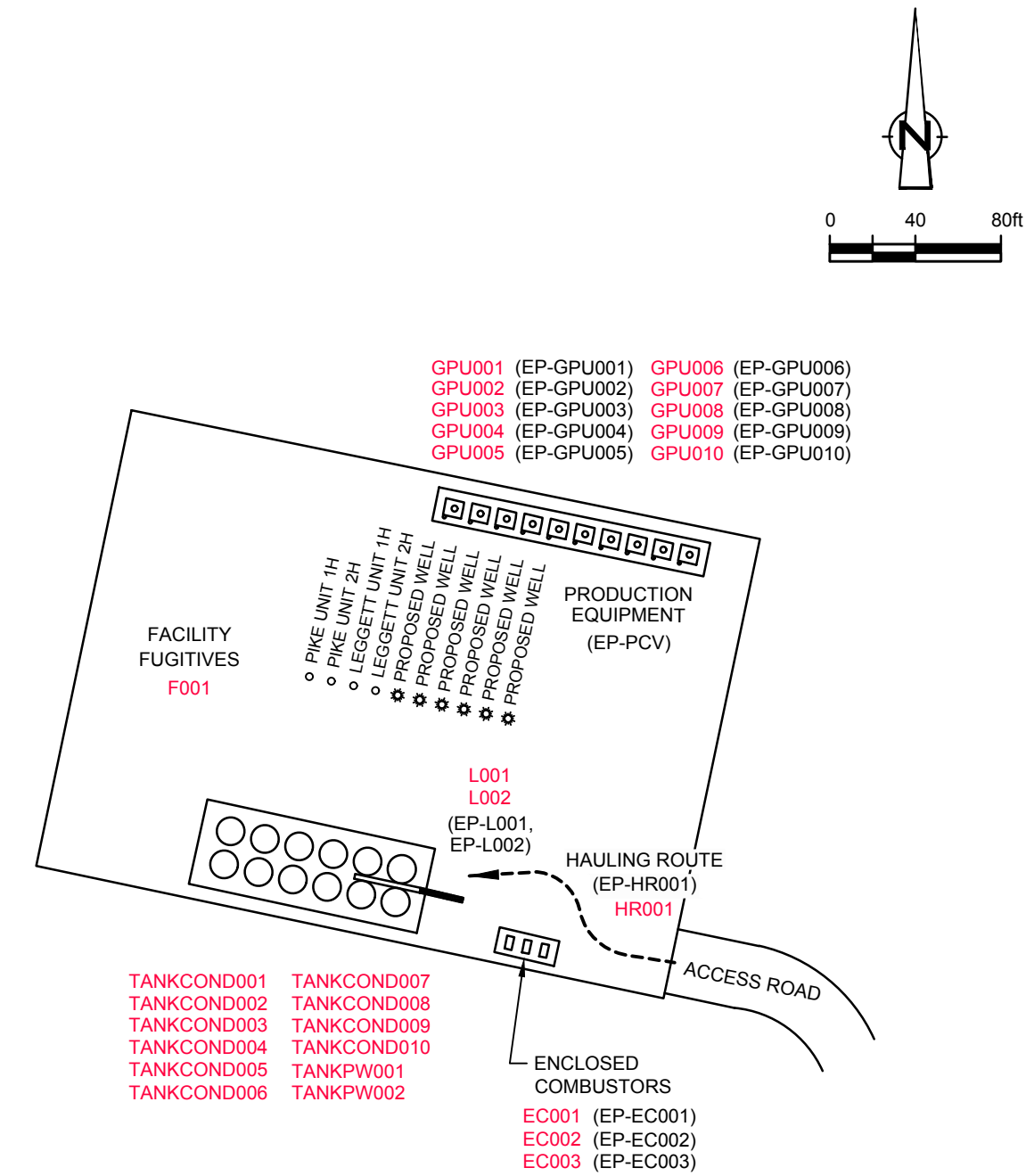
The separated gas is then metered and sent to the sales gas pipeline. The separated condensate and water from the separators flow to their respective storage tanks (TANKCOND001-010 and TANKPW001-002). The line heaters are only used during the first several months from start of production and will be removed once production has normalized.

The facility has ten (10) tanks (TANKCOND001-010) on site to store condensate and two (2) tanks (TANKPW001-002) to store produced water prior to removal from the site. The flashing, working and breathing losses from the tanks are routed to the enclosed combustors (EC001-EC003) to control the emissions. The enclosed combustors that will be used to control emissions are designed to achieve a VOC destruction efficiency of 98 percent.

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

Emissions from the facility's emission sources were calculated using the extended analysis of the condensate from Prunty No. 1H, one of the wells in Lockhart Heirs Well Pad and gas from Pike Unit 2H, one of the wells in Robert Williams Well Pad. The extended analysis of the condensate is considered representative of the materials from Robert Williams Well Pad, being in the same Marcellus rock formation.

Attachment F
Plot Plan



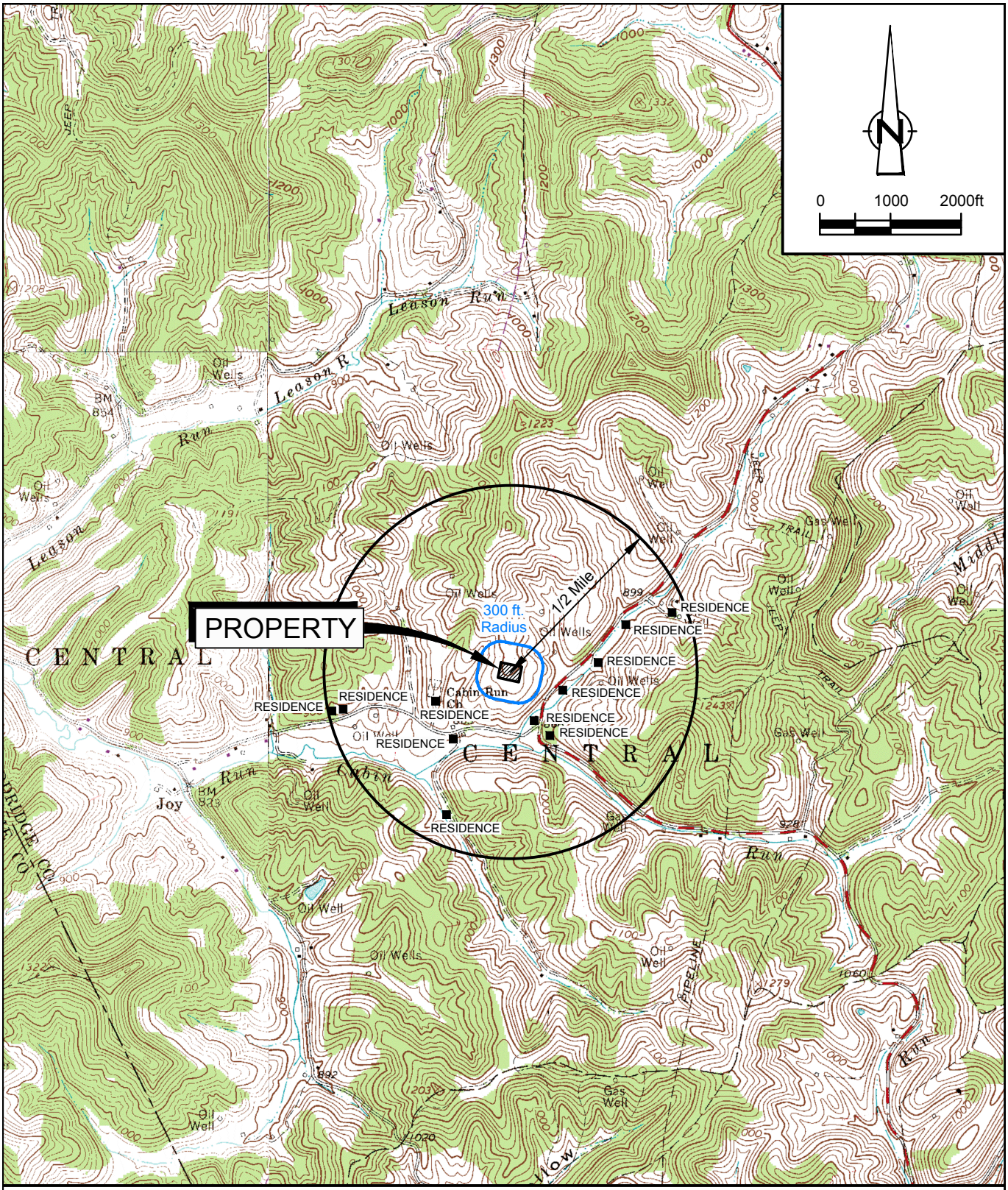
LEGEND

- EXISTING WELL LOCATION
- PROPOSED WELL LOCATION

Attachment F

PLOT PLAN
ROBERT WILLIAMS WELL PAD
ANTERO RESOURCES
Doddridge County, West Virginia

Attachment G
Area Map



SOURCE: USGS QUADRANGLE MAP;
OXFORD, PENNSBORO, PULLMAN, AND WEST UNION, WEST VIRGINIA

SITE COORDINATES: LAT. 39.237675, LONG. -80.862658
SITE ELEVATION: 1000 ft AMSL

GHD

Attachment G

AREA MAP
ROBERT WILLIAMS WELL PAD
ANTERO RESOURCES
Doddridge County, West Virginia

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.*

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, GPU002, GPU003, GPU004, GPU005, GPU006, GPU007, GPU008, GPU009, GPU010	EP-GPU001, EP-GPU002, EP-GPU003, EP-GPU004, EP-GPU005, EP-GPU006, EP-GPU007, EP-GPU008, EP-GPU009, EP-GPU010	Gas Production Unit Heater	(8) 2014; (2) TBD		1.5 MMBtu/hr	Existing	N/A	
LH001, LH002, LH003, LH004, LH005, LH006, LH007, LH008, LH009, LH010	EP-LH001, EP-LH002, EP-LH003, EP-LH004, EP-LH005, EP-LH006, EP-LH007, EP-LH008, EP-LH009, EP-LH010	Line Heater	(8) 2015; (2) TBD		2.0 MMBtu/hr	Existing	N/A	
F001	F001	Fugitives	2014-2015		N/A	Existing	N/A	
TANKCOND001-010	EP-EC001, EP-EC002, EP-EC003	Condensate Tank F/W/B	(8) 2014; (2) 2015		400 bbl each	Existing	EP-EC001, EP-EC002, EP-EC003	
TANKPW001-02	EP-EC001, EP-EC002, EP-EC003	PW Tank F/W/B	2014		400 bbl each	Existing	EP-EC001, EP-EC002, EP-EC003	
L001	EP-L001	Loading (Condensate)	2014		10080 gal/hr 13030500 gal/yr	Existing	N/A	
L002	EP-L002	Loading (Produced Water)	2014		10080 gal/hr 26061000 gal/yr	Existing	N/A	
HR001	EP-HR001	Haul Road	2014		Tanker Trucks Condensate: 1552 trips per year Tanker Trucks PW: 3103 trips per year Pick Up Truck: 730 trips per year	Existing	N/A	
EC001	EP-EC001	Enclosed Combustor	2014		12 MMBtu/hr	Existing	N/A	
EC002	EP-EC002	Enclosed Combustor	2015		12 MMBtu/hr	Existing	N/A	
EC003	EP-EC003	Enclosed Combustor	2015		12 MMBtu/hr	Existing	N/A	
EC004	EP-EC004	Enclosed Combustor	2015		12 MMBtu/hr	Removal-2018		
PCV	EP-PCV	Pneumatic CV	2014-2015		6.6 scf/day/PCV	Existing	N/A	
ENG001	EP-ENG001	VRU/Compressor Engine	2014	2014	24HP	Removal - 2018	Non-Selective Catalytic Reduction	

Notes:

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

Attachment J
Fugitive Emissions Summary Sheet

ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

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

Source/Equipment:

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	500	EPA	gas	3.207	0.591	14.074	351.843
Valves	☐ Yes ☑ No	520	EPA	liquid	12.205	0.896	0.099	2.471
Connections (Not sampling)	☐ Yes ☑ No	590	EPA	gas	0.168	0.031	0.738	18.452
Flanges	☐ Yes ☑ No	130	EPA	gas	0.072	0.013	0.317	7.928

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?
47017062930000	11/15/2014	11/15/2014	Green Completion	OOOO
47017062920000	11/9/2014	11/9/2014	Green Completion	OOOO
47017062940000	11/15/2014	11/15/2014	Green Completion	OOOO
47017062890000	11/7/2014	11/7/2014	Green Completion	OOOO
47017066220000	6/26/2015	6/26/2015	Green Completion	OOOO
47017066210000	6/21/2015	6/21/2015	Green Completion	OOOO
47017066200000	7/1/2015	7/1/2015	Green Completion	OOOO
47017066190000	7/7/2015	7/7/2015	Green Completion	OOOO
2 wells not yet permitted	TBD			

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

This is the same API (American Petroleum Institute) well number(s) provided in the well completion notification and as provided to the WVDEP, Office of Oil and Gas for the well permit. The API number 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 Sheets

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 001-010
3. Emission Unit ID number: TANKCOND001-010	4. Emission Point ID number. EP-EC001, EP-EC002, EP-EC003
5. Date Installed , Modified or Relocated (for existing tanks)	6. Type of change:
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	☑ 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): 13,030,500	13B. Maximum daily throughput (gal/day): 35,700
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 78	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 (8)- 2014; (2) - 2015

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)	1.2640
39A. Average Liquid Surface Temperature (°F)	72.10	39B. Corresponding Vapor Pressure (psia)	2.1856
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	2.3626

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)	5.9300		
41D. Liquid Molecular Weight (lb/lb-mole)	108.70		
41E. Vapor Molecular Weight (lb/lb-mole)	42.5827		
Maximum Vapor Pressure 41F. True (psia)	2.3626		
41G. Reid (psia)	3.41		
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.	176 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, EP-EC002, EP-EC003
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): 26,061,000	13B. Maximum daily throughput (gal/day): 71,400
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 776	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 resilient ☐ 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 ☐ O

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)	0.2281
39A. Average Liquid Surface Temperature (°F)	72.10	39B. Corresponding Vapor Pressure (psia)	0.4526
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	0.4990

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)	18.4839		
Maximum Vapor Pressure 41F. True (psia)	0.4990		
41G. Reid (psia)	1.0336		
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.	176 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	1227.4562
GPU002	EP-GPU002	Gas Production Unit Heater	2014	Existing	1.5	1227.4562
GPU003	EP-GPU003	Gas Production Unit Heater	2014	Existing	1.5	1227.4562
GPU004	EP-GPU004	Gas Production Unit Heater	2014	Existing	1.5	1227.4562
GPU005	EP-GPU005	Gas Production Unit Heater	2014	Existing	1.5	1227.4562
GPU006	EP-GPU006	Gas Production Unit Heater	2014	Existing	1.5	1227.4562
GPU007	EP-GPU007	Gas Production Unit Heater	2014	Existing	1.5	1227.4562
GPU008	EP-GPU008	Gas Production Unit Heater	2014	Existing	1.5	1227.4562
GPU009	EP-GPU009	Gas Production Unit Heater	TBD	Existing	1.5	1227.4562
GPU010	EP-GPU010	Gas Production Unit Heater	TBD	Existing	1.5	1227.4562
LH001	EP-LH001	Line Heater	2015	Existing	2	1227.4562
LH002	EP-LH002	Line Heater	2015	Existing	2	1227.4562
LH003	EP-LH003	Line Heater	2015	Existing	2	1227.4562
LH004	EP-LH004	Line Heater	2015	Existing	2	1227.4562
LH005	EP-LH005	Line Heater	2015	Existing	2	1227.4562
LH006	EP-LH006	Line Heater	2015	Existing	2	1227.4562
LH007	EP-LH007	Line Heater	2015	Existing	2	1227.4562
LH008	EP-LH008	Line Heater	2015	Existing	2	1227.4562
LH009	EP-LH009	Line Heater	TBD	Existing	2	1227.4562
LH010	EP-LH010	Line Heater	TBD	Existing	2	1227.4562

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 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	6	6	6	6
Days/week	7	7	7	7

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		Condensate	Produced Water	
Max. Daily Throughput (1000 gal/day)		35.70	71.40	
Max. Annual Throughput (1000 gal/yr)		13,031	26,061	
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		2.2	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)	8.7254	0.0007	
	Annual (ton/yr)	5.6397	0.0009	
Max HAP Emission Rate	Loading (lb/hr)	1.3414	2.18E-05	
	Annual (ton/yr)	0.8670	2.82E-05	
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 Q
Pneumatic Controllers Data Sheet

ATTACHMENT Q – PNEUMATIC CONTROLLERS DATA SHEET

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Attachment R
Pneumatic Pump Data Sheet

ATTACHMENT R – PNEUMATIC PUMP DATA SHEET

Are there any natural gas-driven diaphragm pumps located at a well site that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list.

Source ID #	Date	Pump Make/Model	Pump Size

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		Maximum Design Heating Input (from mfg. spec sheet)	Design Heat Content
5458 scfh	131000 scfd	12.0 MMBTU/hr	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
TANKCOND001-010	Condensate Tanks		
TANKPW001-02	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
81.02 (scfm)	2,108.67 BTU/ft^3	0.1550 (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?
3	17 scfh	20867 BTU/hr	☑ Yes ☐ No

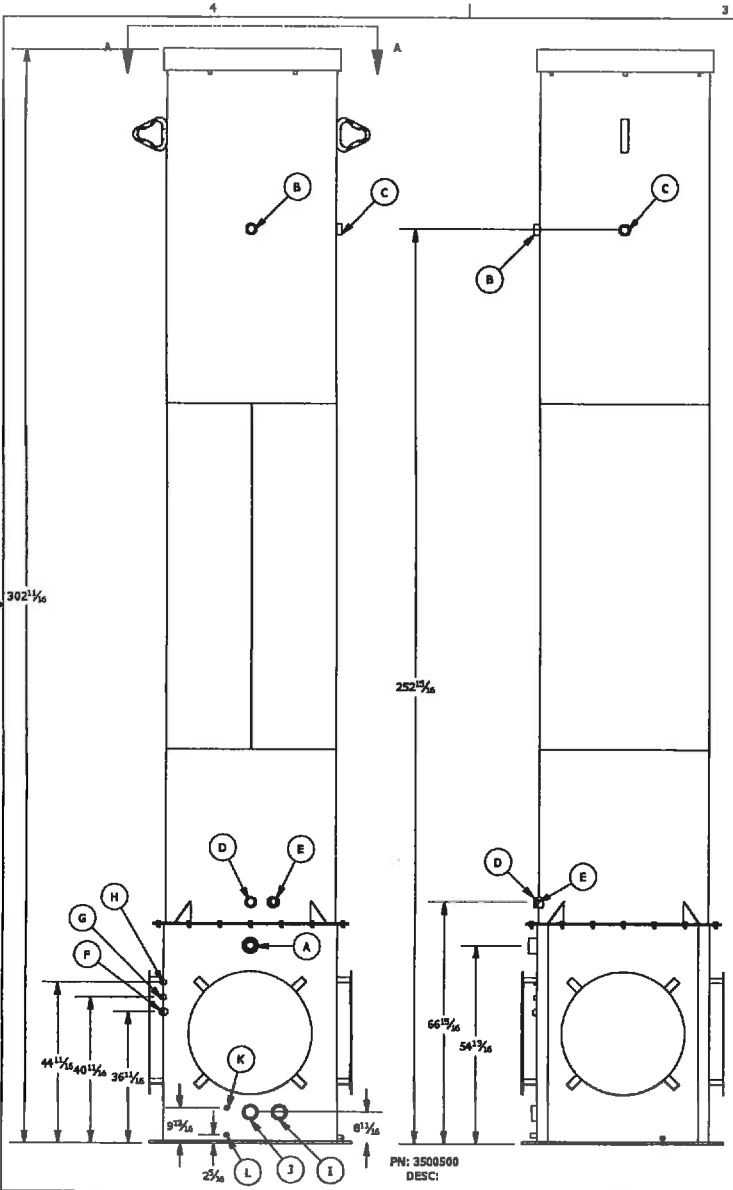
If automatic re-ignition is used, please describe the method. Flame Rectification, a thermocouple equivalent

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).*

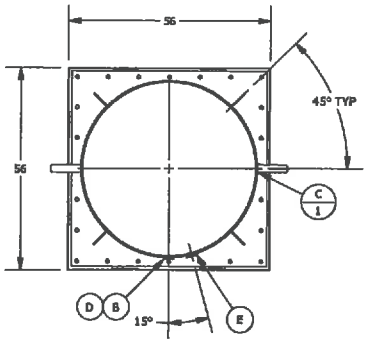
Additional information attached? ☑ Yes ☐ No Manufacturer's specs sheet

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
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Oil and Gas Site General Information

Administrative Information	
Company Name	Antero Resources Corporation
Facility/Well Name	Robert Williams Well Pad
Nearest City/Town	Greenwood
API Number/SIC Code	1311
Latitude/Longitude	39.237675, -80.862658
County	Doddridge

Technical Information	
Max Condensate Site Throughput (bbl/day):	850
Max Produced Water Site Throughput (bbl/day):	1,700
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	10
Gas Production Unit Heaters	10
Line Heaters	10
Condensate Tanks	10
Produced Water Tanks	2
Loading Jobs	2
Enclosed Combustors	3

Table 2

Uncontrolled/Controlled Emissions Summary
Robert Williams Well Pad
Doddridge, 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, Engines, Gas Production Unit Heaters, Line Heaters)																										
Fugitive Emissions (Component Count, PCV and Hauling)[1]	3.6591	16.0269			3.8517	16.8706	96.295	421.77							0.5512	0.6129			0.3653	1.6000	0.0065	0.0286	0.0492	0.2155		
Flashing, Working and Breathing (F/W/B) Losses[2]	338.2769	1481.6530			74.2572	325.2467	1857.7726	8137.0441											57.1726	250.4161	0.3228	1.4137	0.3681	1.6125		
Gas Production Unit Heater Emissions[3]	0.0672	0.2944	1.2220	5.3525	0.0281	0.1231	1,466.45	6,423.04	1.0265	4.4961	0.0073	0.0321	0.0929	0.4068	0.0929	0.4068	6.11E-06	2.68E-05	0.023	0.101	2.57E-05	1.12E-04			0.0009	0.0040
Line Heater Emissions[3]	0.0896	0.3925	1.6294	7.1367	0.0375	0.1641	1,955.26	8,564.05	1.3687	5.9948	0.0098	0.0428	0.1238	0.5424	0.1238	0.5424	8.15E-06	3.57E-05	0.031	0.134	3.42E-05	1.50E-04			0.0012	0.0054
TOTALS:	**342.0929**	**1498.3668**	**2.8514**	**12.4892**	**78.1746**	**342.4045**	**5375.7786**	**23545.9103**	**2.3952**	**10.4910**	**0.0171**	**0.0749**	**0.2167**	**0.9492**	**0.7680**	**1.5620**	**1.43E-05**	**6.24E-05**	**57.5916**	**252.2512**	**0.3293**	**1.4425**	**0.4173**	**1.8279**	**0.0021**	**0.0094**
UNCONTROLLED (Truck Loading Emissions)																										
Truck Loading Emissions[4]	8.7262	5.6407			0.4966	0.3453	12.4841	8.7065											1.3414	0.8670	0.0048	3.14E-03	0.0066	0.0043		
CONTROLLED EMISSIONS																										
Enclosed Combustor Emissions (from F/W/B losses)[5]	6.7658	29.6343	2.4531	10.7446	1.3403	5.8706	1422.0630	6228.6358	11.1643	48.8996	3.06E-05	0.0001	0.0280	0.1226	0.0373	0.1635	2.46E-06	1.08E-05	1.1435	5.0087	0.0065	0.0283	0.0074	0.0322	3.83E-06	1.68E-05
Controlled Fugitive Emissions from Hauling															0.2756	0.3064										
TOTALS:	**6.766**	**29.634**	**2.453**	**10.745**	**1.340**	**5.871**	**1422.063**	**6228.636**	**11.164**	**48.900**	**3.06E-05**	**1.34E-04**	**0.028**	**0.123**	**0.313**	**0.470**	**2.46E-06**	**1.08E-05**	**1.144**	**5.009**	**6.46E-03**	**0.0283**	**0.0074**	**0.032**	**3.83E-06**	**1.68E-05**
POTENTIAL TO EMIT[6]	**19.3079**	**51.9888**	**5.3045**	**23.2338**	**5.7542**	**23.3737**	**4952.5531**	**21646.2086**	**13.5595**	**59.3905**	**0.0171**	**0.0751**	**0.2447**	**1.0718**	**0.5297**	**1.4191**	**1.67E-05**	**7.32E-05**	**2.9039**	**7.7109**	**0.0179**	**0.0603**	**0.0632**	**0.2520**	**0.0021**	**0.0094**
POTENTIAL TO EMIT (Excluding Fugitives)	**15.6488**	**35.9619**	**5.3045**	**23.2338**	**1.9025**	**6.5032**	**4856.2578**	**21224.4351**	**13.5595**	**59.3905**	**0.0171**	**0.0751**	**0.2447**	**1.0718**	**0.2540**	**1.1127**	**1.67E-05**	**7.32E-05**	**2.5386**	**6.1109**	**0.0114**	**0.0317**	**0.0140**	**0.0365**	**0.0021**	**0.0094**

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 and line heater emissions 4 - The maximum emission was calculated based on actual filling rate of 4 barrels per miniute. At a production rate of 850 barrels per day, VOC emissions would be 8.7262 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 1.2878 pound per hour. 5 - See Table 10 and 11 for enclosed combustion emission calculations. 6 - The maximum hourly potential to emit is the sum of emissions from gas production unit heaters, line heaters, storage tanks, engines, enclosed combustors, loading, and fugitives. PM 10 TPY is the sum of uncontrolled hauling and other PM10 sources.

Table 3

Permits Summary
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Pollutant		Emissions		Threshold Exceeded?		
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	350.8190	19.3079	6	**Yes**	**Yes**
	tons/yr	1504.0075	51.9888	10	**Yes**	**Yes**
NO_X	lbs/hr	2.8514	5.3045	6		
	tons/yr	12.4892	23.2338	10	**Yes**	**Yes**
CH_4	lbs/hr	78.6711	5.7542			**Yes**
	tons/yr	342.7498	23.3737			**Yes**
CO	lbs/hr	2.3952	13.5595	6		**Yes**
	tons/yr	10.4910	59.3905	10	**Yes**	**Yes**
SO_2	lbs/hr	0.0171	0.0171	6		
	tons/yr	0.0749	0.0751	10		
$PM_{2.5}$	lbs/hr	0.2167	0.2447	6		
	tons/yr	0.9492	1.0718	10		
PM_{10}	lbs/hr	0.7680	0.5297	6		
	tons/yr	1.5620	1.4191	10		
Lead	lbs/hr	1.43E-05	1.67E-05	6		
	tons/yr	6.24E-05	7.32E-05	10		
Total HAPs	lbs/hr	58.9330	2.9039	2	**Yes**	**Yes**
	tons/yr	253.1183	7.7109	5	**Yes**	**Yes**
Total TAPs	lbs/hr	0.3363	0.0200	1.14		
n-Hexane	lbs/hr	57.5243	2.7629			
	tons/yr	247.0260	7.1711			
Toluene	lbs/hr	0.4918	0.0368			
	tons/yr	2.1274	0.1344			
Ethylbenzene	lbs/hr	0.1566	0.0210			
	tons/yr	0.6774	0.0836			
Xylenes	lbs/hr	0.4239	0.0632			
	tons/yr	1.8322	0.2520			
Benzene	lbs/hr	0.3342	0.0179			
	tons/yr	1.4456	0.0603			

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
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

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

Gas Weight Fraction From Analysis:	VOC frac	0.148
	Benzene frac	0.000
	Toluene	0.000
	Ethylbenzene	0.000
	Xylenes	0.000
	n-Hexane	0.027
	HAPs	0.027
	Methane	0.649

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
500	Valves	Gas VOC	0.004500	0.33	6,413.59
		Non VOC	0.004500	1.92	36,948.41
		HAPs	0.004500	0.06	1,181.14
		CO2e	0.004500	36.51	703,686.22
590	Connectors	VOC	0.000200	0.02	336.36
		Non-VOC	0.000200	0.10	1,937.74
		HAPs	0.000200	0.00	61.94
		CO2e	0.000200	1.91	36,904.43
130	Flanges	VOC	0.000390	0.01	144.52
		Non-VOC	0.000390	0.04	832.57
		HAPs	0.000390	0.00	26.62
		CO2e	0.000390	0.822769	15856.396245
			Total VOCs:	0.36	6894.47
			Total THC:	2.42	46613.19
			Total CH4:	1.57	30257.88

Light Liquid Weight Fraction From Analysis:	VOC frac	0.974
	Benzene frac	0.002
	Toluene	0.007
	Ethylbenzene	0.006
	Xylenes	0.017
	n-hexane	0.039
	HAPs	0.072
	Methane	0.008

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
520	Valves	Light Liquid VOC	0.002500	1.27	24,410.77
		Light Liquid Non-VOC	0.002500	0.03	642.83
		Light Liquid HAPs	0.002500	0.09	1,792.41
		CO2e	0.002500	0.26	4941.34
			Total VOC:	1.27	24,410.77
			Total THC:	1.30	25,053.60
			Total CH4:	0.01	197.65

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	31,305.24	3.57	15.65
Ethylbenzene		0.02	0.07
Toluene		0.02	0.09
Xylenes		0.05	0.22
n-Hexane		0.26	1.13
TAPs (Benzene)		0.01	0.03
HAPs		0.35	1.53
CH_4[3]		3.48	15.23
CO_{2e}	761,388.39	86.92	380.69

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
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Number of PCVs	40
Bleed Rate (scf/day/PCV)	6.6
Total Bleed Rate (scf/day)	264

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	0.4154	28.01	1.0967	2.89E-03	0.0809	0.0034	0.0148
Carbon Dioxide	0.1709	44.01	0.4512	1.19E-03	0.0523	0.0022	0.0095
Methane	80.6676	16.04	212.9625	0.5612	9.0016	0.3751	1.6428
Ethane	13.4543	30.07	35.5194	0.0936	2.8146	0.1173	0.5137
Propane	2.6759	44.10	7.0644	0.0186	0.8209	0.0342	0.1498
Isobutane	0.5461	58.12	1.4417	3.80E-03	0.2208	0.0092	0.0403
n-Butane	0.9324	58.12	2.4615	0.0065	0.3770	0.0157	0.0688
2,2 Dimethylpropane	0.00E+00	72.15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Isopentane	0.2731	72.15	0.7210	0.0019	0.1371	0.0057	0.0250
n-Pentane	0.2342	72.15	0.6183	0.0016	0.1176	0.0049	0.0215
2,2 Dimethylbutane	0.00E+00	86.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cyclopentane	0.00E+00	70.10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2,3 Dimethylbutane	0.00E+00	86.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	0.6301	86.17	1.6635	0.0044	0.3777	0.0157	0.0689
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
Cyclohexane	0.00E+00	84.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylhexane	0.00E+00	100.20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3-Methylhexane	0.00E+00	100.20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2,2,4 Trimethylpentane	0.00E+00	114.23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptane	0.00E+00	100.20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methylcyclohexane	0.00E+00	98.19	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	106.17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
o-Xylene	0.00E+00	106.17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nonane	0.00E+00	128.26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C10+	0.00E+00	159.20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	lb/hr	tpy
VOC Emissions	0.0855	0.3743
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	0.0157	0.0689
HAPs Emissions	0.0157	0.0689
TAPs Emissions	0.00E+00	0.00E+00
CH_4 Emissions	0.3751	1.6428
CO_{2e} emissions	9.3788	41.0792

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
Robert Williams Well Pad
Doddridge, 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	0.1853	0.9495	4.1588	2.6948	0.2369	1.0375
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0406	0.2082	0.9119	0.2782	0.0245	0.1071
Carbon Dioxide	0.2063	1.0575	4.6320	2.9167	0.2564	1.1230
Methane	13.3929	68.6408	300.6468	58.9165	5.1790	22.6839
Ethane	21.9518	112.5068	492.7797	25.3898	2.2319	9.7755
Propane	16.7815	86.0079	376.7148	5.1874	0.4560	1.9972
Isobutane	7.0239	35.9989	157.6750	0.9686	0.0851	0.3729
n-Butane	13.7734	70.5909	309.1881	2.0708	0.1820	0.7973
2,2 Dimethylpropane	0.0471	0.2414	1.0572	0.0033	0.0003	0.0013
Isopentane	5.9018	30.2477	132.4850	0.5249	0.0461	0.2021
n-Pentane	5.4490	27.9271	122.3207	0.1826	0.0161	0.0703
2,2 Dimethylbutane	0.0575	0.2947	1.2907	0.0017	0.0002	0.0007
Cyclopentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2,3 Dimethylbutane	0.1156	0.5924	2.5947	0.0077	0.0007	0.0030
2-Methylpentane	0.6923	3.5481	15.5407	0.0299	0.0026	0.0115
3-Methylpentane	0.4353	2.2311	9.7724	0.0450	0.0040	0.0173
n-Hexane	10.6551	54.6094	239.1891	0.2227	0.0196	0.0857
Methylcyclopentane	0.2202	1.1287	4.9439	0.0365	0.0032	0.0141
Benzene	0.0605	0.3102	1.3587	0.0908	0.0080	0.0350
Cyclohexane	0.1997	1.0233	4.4821	0.0684	0.0060	0.0263
2-Methylhexane	0.4329	2.2187	9.7177	0.0130	0.0011	0.0050
3-Methylhexane	0.3200	1.6398	7.1824	0.0115	0.0010	0.0044
2,2,4 Trimethylpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heptane	0.6811	3.4909	15.2903	0.0104	0.0009	0.0040
Methylcyclohexane	0.4802	2.4611	10.7796	0.0768	0.0068	0.0296
Toluene	0.0872	0.4469	1.9574	0.1212	0.0107	0.0467
Octane	0.5840	2.9931	13.1099	0.0036	0.0003	0.0014
Ethylbenzene	0.0260	0.1331	0.5828	0.0352	0.0031	0.0136
m & p-Xylene	0.0364	0.1866	0.8174	0.0449	0.0039	0.0173
o-Xylene	0.0326	0.1673	0.7327	0.0459	0.0040	0.0177
Nonane	0.1274	0.6527	2.8588	0.0008	0.0001	0.0003
C10+	0.0025	0.0127	0.0555	0.0002	0.0000	0.0001
Total VOCs	64.223	329.15	1,441.7	9.804	0.8618	3.7747
Total CO_{2e}		1,717.08	7,520.8		129.73	568.2
CH_4		68.64	300.65		5.18	22.68
Total TAPs (Benzene)		0.3102	1.3587		0.0080	0.0350
Toluene		0.4469	1.9574		0.0107	0.0467
Ethylbenzene		0.1331	0.5828		0.0031	0.0136
Xylenes		0.3539	1.5501		0.0080	0.0349
n-Hexane		54.609	239.189		0.0196	0.0857
Total HAPs		55.853	244.638		0.0493	0.2159
Total	100.00	512.52	2,244.8	100.00	8.790	38.50

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

Table 7

Uncontrolled Working and Breathing Losses
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Condensate Tank Information	
Number of Tanks	10
Maximum Working Losses (lbs/hr)	7.8854
Maximum Breathing Losses (lbs/hr)	4.6008
# 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	0.0022	1.71E-04	7.48E-04	0.0001	0.0004	0.0003	0.0012
Carbon Dioxide	0.1926	0.0152	0.0665	0.0089	0.0388	0.0241	0.1053
Methane	3.4794	0.2744	1.2017	0.1601	0.7012	0.4344	1.9029
Ethane	30.1697	2.3790	10.4200	1.3880	6.0796	3.7670	16.4997
Propane	19.0050	1.4986	6.5640	0.8744	3.8298	2.3730	10.3938
Isobutane	7.4943	0.5910	2.5884	0.3448	1.5102	0.9358	4.0986
n-Butane	14.6914	1.1585	5.0741	0.6759	2.9605	1.8344	8.0347
2,2 Dimethylpropane	0.0471	0.0037	0.0163	0.0022	0.0095	0.0059	0.0258
Isopentane	5.8619	0.4622	2.0246	0.2697	1.1813	0.7319	3.2059
n-Pentane	5.3285	0.4202	1.8404	0.2452	1.0738	0.6653	2.9141
2,2 Dimethylbutane	0.0542	0.0043	0.0187	0.0025	0.0109	0.0068	0.0296
Cyclopentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2,3 Dimethylbutane	0.1071	0.0084	0.0370	0.0049	0.0216	0.0134	0.0586
2-Methylpentane	0.6367	0.0502	0.2199	0.0293	0.1283	0.0795	0.3482
3-Methylpentane	0.3992	0.0315	0.1379	0.0184	0.0805	0.0499	0.2183
n-Hexane	10.0120	0.7895	3.4579	0.4606	2.0176	1.2501	5.4755
Methylcyclopentane	0.1829	0.0144	0.0632	0.0084	0.0368	0.0228	0.1000
Benzene	0.0366	0.0029	0.0127	0.0017	0.0074	0.0046	0.0200
Cyclohexane	0.1643	0.0130	0.0567	0.0076	0.0331	0.0205	0.0898
2-Methylhexane	0.1077	0.0085	0.0372	0.0050	0.0217	0.0134	0.0589
3-Methylhexane	0.2903	0.0229	0.1002	0.0134	0.0585	0.0362	0.1587
2,2,4 Trimethylpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heptane	0.5867	0.0463	0.2027	0.0270	0.1182	0.0733	0.3209
Methylcyclohexane	0.4179	0.0330	0.1443	0.0192	0.0842	0.0522	0.2285
Toluene	0.0542	4.28E-03	1.87E-02	0.0025	0.0109	0.0068	0.0297
Octane	0.5033	0.0397	0.1738	0.0232	0.1014	0.0628	0.2752
Ethylbenzene	0.0174	1.37E-03	6.02E-03	0.0008	0.0035	0.0022	0.0095
m & p-Xylene	0.0319	2.51E-03	1.10E-02	0.0015	0.0064	0.0040	0.0174
o-Xylene	0.0182	1.44E-03	0.0063	0.0008	0.0037	0.0023	0.0100
Nonane	0.1060	0.0084	0.0366	0.0049	0.0214	0.0132	0.0579
C10+	0.0012	9.66E-05	0.0004	0.0001	0.0002	0.0002	0.0007
Total VOCs	66.156	5.2167	22.849	3.0437	13.3314	8.2604	36.180
Total CO_{2e}		6.8744	30.1097	4.0109	17.5676	10.8852	47.677
CH_4		0.2744	1.2017	0.1601	0.7012	0.4344	1.9029
Total TAPs (Benzene)		2.89E-03	1.27E-02	0.0017	0.0074	0.0046	0.0200
Toluene		4.28E-03	1.87E-02	0.0025	0.0109	0.0068	0.0297
Ethylbenzene		1.37E-03	6.02E-03	0.0008	0.0035	0.0022	0.0095
Xylenes		3.95E-03	0.0173	0.0023	0.0101	0.0063	0.0274
n-Hexane		0.7895	3.4579	0.4606	2.0176	1.2501	5.4755
Total HAPs		0.8020	3.5127	0.4679	2.0495	1.2699	5.5621
Total	100.00	7.8854	34.5381	4.6008	20.1514	12.4862	54.690

Table 7

Uncontrolled Working and Breathing Losses
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Produced Water Tank Information	
Number of Tanks	2
Maximum Working Losses (lbs/hr)	0.0864
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	91.3533	0.0790	0.3458	0.0076	0.0334	0.0866	0.3792
H2S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0054	4.66E-06	2.04E-05	4.49E-07	1.97E-06	5.11E-06	2.24E-05
Carbon Dioxide	3.7917	0.0033	0.0144	0.0003	0.0014	0.0036	0.0157
Methane	3.1749	0.0027	0.0120	0.0003	0.0012	0.0030	0.0132
Ethane	1.6140	0.0014	0.0061	0.0001	0.0006	0.0015	0.0067
Propane	0.0514	4.44E-05	0.0002	4.28E-06	1.88E-05	4.87E-05	0.0002
Isobutane	0.0024	2.08E-06	9.09E-06	2.00E-07	8.77E-07	2.28E-06	9.97E-06
n-Butane	0.0046	4.00E-06	1.75E-05	3.86E-07	1.69E-06	4.38E-06	1.92E-05
2,2 Dimethylpropane	0.0000	2.10E-09	9.22E-09	2.03E-10	8.89E-10	2.31E-09	1.01E-08
Isopentane	0.0003	2.62E-07	1.15E-06	2.53E-08	1.11E-07	2.87E-07	1.26E-06
n-Pentane	0.0000	2.69E-08	1.18E-07	2.59E-09	1.13E-08	2.94E-08	1.29E-07
2,2 Dimethylbutane	0.0000	1.43E-10	6.28E-10	1.38E-11	6.05E-11	1.57E-10	6.88E-10
Cyclopentane	0.0000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2,3 Dimethylbutane	0.0000	1.04E-09	4.57E-09	1.01E-10	4.40E-10	1.14E-09	5.01E-09
2-Methylpentane	2.80E-06	2.42E-09	1.06E-08	2.33E-10	1.02E-09	2.65E-09	1.16E-08
3-Methylpentane	9.33E-06	8.06E-09	3.53E-08	7.78E-10	3.41E-09	8.84E-09	3.87E-08
n-Hexane	7.32E-06	6.33E-09	2.77E-08	6.10E-10	2.67E-09	6.94E-09	3.04E-08
Methylcyclopentane	9.06E-06	7.83E-09	3.43E-08	7.55E-10	3.31E-09	8.58E-09	3.76E-08
Benzene	1.34E-03	1.16E-06	5.06E-06	1.12E-07	4.88E-07	1.27E-06	5.55E-06
Cyclohexane	2.77E-05	2.39E-08	1.05E-07	2.31E-09	1.01E-08	2.62E-08	1.15E-07
2-Methylhexane	7.03E-08	6.07E-11	2.66E-10	5.86E-12	2.56E-11	6.66E-11	2.92E-10
3-Methylhexane	2.45E-07	2.12E-10	9.27E-10	2.04E-11	8.94E-11	2.32E-10	1.02E-09
2,2,4 Trimethylpentane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptane	7.22E-08	6.24E-11	2.73E-10	6.02E-12	2.64E-11	6.84E-11	3.00E-10
Methylcyclohexane	6.10E-06	5.27E-09	2.31E-08	5.08E-10	2.23E-09	5.78E-09	2.53E-08
Toluene	3.87E-04	3.34E-07	1.46E-06	3.22E-08	1.41E-07	3.66E-07	1.60E-06
Octane	3.18E-09	2.75E-12	1.20E-11	2.65E-13	1.16E-12	3.01E-12	1.32E-11
Ethylbenzene	3.36E-05	2.91E-08	1.27E-07	2.80E-09	1.23E-08	3.19E-08	1.40E-07
m & p-Xylene	3.29E-05	2.84E-08	1.25E-07	2.74E-09	1.20E-08	3.12E-08	1.37E-07
o-Xylene	4.29E-05	3.71E-08	1.62E-07	3.58E-09	1.57E-08	4.07E-08	1.78E-07
Nonane	2.24E-10	1.94E-13	8.50E-13	1.87E-14	8.19E-14	2.13E-13	9.32E-13
C10+	1.52E-12	1.32E-15	5.77E-15	1.27E-16	5.57E-16	1.45E-15	6.33E-15
Total VOCs	0.0606	5.24E-05	0.0002	5.05E-06	2.21E-05	5.75E-05	0.0003
Total CO_{2e}		0.0719	0.3148	0.0069	0.0304	0.0788	0.3452
CH_4		0.0027	0.0120	0.0003	0.0012	0.0030	0.0132
Total TAPs (Benzene)		1.16E-06	5.06E-06	1.12E-07	4.88E-07	1.27E-06	5.55E-06
Toluene		3.34E-07	1.46E-06	3.22E-08	1.41E-07	3.66E-07	1.60E-06
Ethylbenzene		2.91E-08	1.27E-07	2.80E-09	1.23E-08	3.19E-08	1.40E-07
Xylenes		6.55E-08	2.87E-07	6.32E-09	2.77E-08	7.18E-08	3.15E-07
n-Hexane		6.33E-09	2.77E-08	6.10E-10	2.67E-09	6.94E-09	3.04E-08
Total HAPs		1.59E-06	6.97E-06	1.53E-07	6.72E-07	1.74E-06	7.64E-06
Total	100.00	0.0864	0.3786	0.0083	0.0365	0.0948	0.4151

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

Table 8

Loading Emissions
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	3.41	1.0336
Annual Average Temp (F)	72.1	72.1
S (saturation factor)	0.6	0.6
P (true vapor pressure)	2.19	0.45
M (MW of vapor)	42.58	18.48
Collection Efficiency (%)	0.00	0.00
Total Hydrocarbon Loading Loss (lb/10^3 gal)*	1.31	0.12
Maximum Throughput (gallons/hr)**	10,080	10,080
Average Throughput (gallons/yr)	13,030,500	26,061,000
Total Hydrocarbon Loading Emissions (lbs/hr)	13.19	1.19
Total Hydrocarbon Loading Emissions (tpy)	8.52	1.53

	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	0.0022	2.86E-04	1.85E-04	0.0054	6.39E-05	8.26E-05
Carbon Dioxide	0.1926	0.0254	1.64E-02	3.7917	4.50E-02	5.81E-02
Methane	3.4794	0.4589	2.97E-01	3.1749	3.76E-02	4.87E-02
Ethane	30.1697	3.9791	2.5719	1.6140	1.91E-02	2.47E-02
Propane	19.0050	2.5066	1.62E+00	0.0514	6.09E-04	7.87E-04
Isobutane	7.4943	0.9884	6.39E-01	0.0024	2.85E-05	3.68E-05
n-Butane	14.6914	1.9377	1.25E+00	0.0046	5.48E-05	7.09E-05
2,2 Dimethylpropane	0.0471	0.0062	4.02E-03	0.0000	2.89E-08	3.73E-08
Isopentane	5.8619	0.7731	5.00E-01	0.0003	3.59E-06	4.65E-06
n-Pentane	5.3285	0.7028	4.54E-01	0.0000	3.68E-07	4.76E-07
2,2 Dimethylbutane	0.0542	0.0071	4.62E-03	0.0000	1.97E-09	2.54E-09
Cyclopentane	0.0000	0.0000	0.00E+00	0.0000	0.00E+00	0.00E+00
2,3 Dimethylbutane	0.1071	0.0141	9.13E-03	0.0000	1.43E-08	1.85E-08
2-Methylpentane	0.6367	0.0840	5.43E-02	2.80E-06	3.31E-08	4.28E-08
3-Methylpentane	0.3992	0.0527	3.40E-02	9.33E-06	1.11E-07	1.43E-07
n-Hexane	10.0120	1.3205	8.54E-01	7.32E-06	8.68E-08	1.12E-07
Methylcyclopentane	0.1829	0.0241	1.56E-02	9.06E-06	1.07E-07	1.39E-07
Benzene	0.0366	0.0048	3.12E-03	0.0013	1.59E-05	2.05E-05
Cyclohexane	0.1643	0.0217	1.40E-02	0.0000	3.28E-07	4.24E-07
2-Methylhexane	0.1077	0.0142	9.18E-03	0.0000	8.33E-10	1.08E-09
3-Methylhexane	0.2903	0.0383	2.47E-02	0.0000	2.90E-09	3.75E-09
2,2,4 Trimethylpentane	0.0000	0.0000	0.00E+00	0.0000	0.00E+00	0.00E+00
Heptane	0.5867	0.0774	5.00E-02	7.22E-08	8.56E-10	1.11E-09
Methylcyclohexane	0.4179	0.0551	3.56E-02	6.10E-06	7.23E-08	9.35E-08
Toluene	0.0542	0.0072	4.62E-03	0.0004	4.58E-06	5.93E-06
Octane	0.5033	0.0664	4.29E-02	3.18E-09	3.77E-11	4.87E-11
Ethylbenzene	0.0174	0.0023	1.49E-03	3.36E-05	3.99E-07	5.16E-07
m & p-Xylene	0.0319	0.0042	2.72E-03	3.29E-05	3.90E-07	5.04E-07
o-Xylene	0.0182	0.0024	1.55E-03	4.29E-05	5.09E-07	6.57E-07
Nonane	0.1060	0.0140	9.03E-03	2.24E-10	2.66E-12	3.44E-12
C10+	0.0012	0.0002	1.04E-04	1.52E-12	1.81E-14	2.34E-14
Total VOCs	66.1560	8.7254	5.6397	0.0606	0.0007	0.0009
Total CH_4		0.4589	0.2966		0.0376	0.0487
Total CO_{2e}		11.4981	7.4318		0.9860	1.2747
Total TAPs (Benzene)		0.0048	0.0031		1.59E-05	2.05E-05
Toluene		0.0072	0.0046		4.58E-06	5.93E-06
Ethylbenzene		0.0023	0.0015		3.99E-07	5.16E-07
Xylenes		0.0066	0.0043		8.99E-07	1.16E-06
n-Hexane		1.3205	0.8535		8.68E-08	1.12E-07
Total HAPs		1.3414	0.8670		2.18E-05	2.82E-05
Total	100.0000	13.1892	8.5249	100.0000	1.1856	1.5327

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 condensate throughput in gallons per hour is based on actual filling rate of 4 barrels per minute. (10080 gal/hr = 4 bbl/ 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
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Gas Production Unit Heater Emissions

Number of Units	10
GPU Heater Rating (MMBtu/hr)	1.50
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,227.46

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.222	5.353
CO	84	1.027	4.496
CO_2	120,000	1466.447	6423.040
Lead	0.0005	6.11E-06	2.68E-05
N_2O	2.2	0.027	0.118
PM (Total)	7.6	0.093	0.407
SO_2	0.6	0.007	0.032
TOC	11	0.134	0.589
Methane	2.3	0.028	0.123
VOC	5.5	0.067	0.294
HAPS			
2-Methylnaphthalene	2.40E-05	2.93E-07	1.28E-06
Benzene	2.10E-03	2.57E-05	1.12E-04
Dichlorobenzene	1.20E-03	1.47E-05	6.42E-05
Fluoranthene	3.00E-06	3.67E-08	1.61E-07
Fluorene	2.80E-06	3.42E-08	1.50E-07
Formaldehyde	7.50E-02	9.17E-04	4.01E-03
Hexane	1.80E+00	2.20E-02	9.63E-02
Naphthalene	6.10E-04	7.45E-06	3.27E-05
Phenanathrene	1.70E-05	2.08E-07	9.10E-07
Toluene	3.40E-03	4.15E-05	1.82E-04

Line Heater Emissions

Number of Units	10
Line Heater Rating (MMBtu/hr)	2.00
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,227.46

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.629	7.137
CO	84	1.369	5.995
CO_2	120,000	1955.263	8564.053
Lead	0.0005	8.15E-06	3.57E-05
N_2O	2.2	0.036	0.157
PM (Total)	7.6	0.124	0.542
SO_2	0.6	0.010	0.043
TOC	11	0.179	0.785
Methane	2.3	0.037	0.164
VOC	5.5	0.090	0.393
HAPS			
2-Methylnaphthalene	2.40E-05	3.91E-07	1.71E-06
Benzene	2.10E-03	3.42E-05	1.50E-04
Dichlorobenzene	1.20E-03	1.96E-05	8.56E-05
Fluoranthene	3.00E-06	4.89E-08	2.14E-07
Fluorene	2.80E-06	4.56E-08	2.00E-07
Formaldehyde	7.50E-02	1.22E-03	5.35E-03
Hexane	1.80E+00	2.93E-02	1.28E-01
Naphthalene	6.10E-04	9.94E-06	4.35E-05
Phenanathrene	1.70E-05	2.77E-07	1.21E-06
Toluene	3.40E-03	5.54E-05	2.43E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.157	0.687
TOTAL Uncontrolled HAPs	0.054	0.235
TOTAL Uncontrolled TAPs (Benzene)	5.99E-05	2.62E-04
TOTAL Uncontrolled Toluene	9.69E-05	4.25E-04
TOTAL Uncontrolled Hexane	0.051	0.225
TOTAL Uncontrolled TAPs (Formaldehyde)	0.002	0.009
TOTAL CH_4	0.066	0.287
TOTAL CO_{2e} Emissions	3,442.04	15,076.15

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

Table 10

Enclosed Combustor Emissions
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

General Information	
Unit Name:	EC001, EC002, EC003

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 weigl	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	3
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)	51	--	4,567.37	180.47	111.27	1.95	4,912.06
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	446,760.00	--	40,010,169.33	1,580,918.21	974,746.75	17,044.04	43,029,638.32
Heating Content (Btu/ft3)	1,227		2,162.45	1,168.29	2,427.69	102.30	2,108.67

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	-	-	329.155	0.862	8.260	0.000	338.28
Benzene	-	-	0.310	0.008	0.005	0.000	0.323
Toluene	-	-	0.447	0.011	0.007	0.000	0.464
Ethylbenzene	-	-	0.133	0.003	0.002	0.000	0.138
Xylenes	-	-	0.354	0.008	0.006	0.000	0.368
n-Hexane	-	-	54.609	0.020	1.250	0.000	55.879
HAPs	-	-	55.853	0.049	1.270	0.000	57.173
Total Mass Flow	-	-	512.518	8.790	12.486	0.095	533.889
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	-	-	1441.698	3.775	36.180	0.000	1481.653
Benzene	-	-	1.359	0.035	0.020	0.000	1.414
Toluene	-	-	1.957	0.047	0.030	0.000	2.034
Ethylbenzene	-	-	0.583	0.014	0.010	0.000	0.606
Xylenes	-	-	1.550	0.035	0.027	0.000	1.612
n-Hexane	-	-	239.189	0.086	5.476	0.000	244.750
HAP	-	-	244.638	0.216	5.562	0.000	250.416
Total Mass Flow	-	-	2244.827	38.502	54.690	0.415	2338.433

Table 10

Enclosed Combustor Emissions
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Controlled Emissions							
Hourly (lb/hr)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.005	-	2.448				2.45
CO	0.004	-	11.160				11.16
PM2.5	0.000	-	0.026	0.001	0.001	0.000	0.03
PM10	0.000	-	0.035	0.001	0.001	0.000	0.04
H2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	6.120	-	-	-	-	-	6.12
Total VOC	0.000	-	6.583	0.017	0.165	0.000	6.77
Benzene	0.000	-	0.006	0.000	0.000	0.000	0.01
Toluene	0.000	-	0.009	0.000	0.000	0.000	0.01
Ethylbenzene	0.000	-	0.003	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.007	0.000	0.000	0.000	0.01
n-Hexane	0.000	-	1.092	0.000	0.025	0.000	1.12
HAP	0.000	-	1.117	0.001	0.025	0.000	1.14
N_2O	0.000	-	0.010	0.000	0.000	0.000	0.01
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00
Annual (tpy)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.022	-	10.722				10.74
CO	0.019	-	48.881				48.90
PM2.5	0.001	-	0.114	0.005	0.003	0.000	0.12
PM10	0.002	-	0.152	0.006	0.004	0.000	0.16
H_2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	26.806	-	-	-	-	-	26.81
Total VOC	0.001	-	28.834	0.075	0.724	0.000	29.63
Benzene	0.000	-	0.027	0.001	0.000	0.000	0.03
Toluene	0.000	-	0.039	0.001	0.001	0.000	0.04
Ethylbenzene	0.000	-	0.012	0.000	0.000	0.000	0.01
Xylenes	0.000	-	0.031	0.001	0.001	0.000	0.03
n-Hexane	0.000	-	4.784	0.002	0.110	0.000	4.90
HAP	0.000	-	4.893	0.004	0.111	0.000	5.01
N_2O	0.000	-	0.044	0.002	0.001	0.000	0.05
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	6.77	29.63
NOx	2.453	10.745
CO	11.164	48.900
PM2.5	0.028	0.123
PM10	0.037	0.164
H_2S	1.63E-05	7.13E-05
SO_2	3.06E-05	1.34E-04
Benzene (TAPs)	6.46E-03	2.83E-02
Toluene	9.29E-03	4.07E-02
Ethylbenzene	2.77E-03	1.21E-02
Xylenes	7.36E-03	0.032
Hexanes	1.118	4.895
Formaldehyde (TAPs)	3.83E-06	1.68E-05
HAPs	1.14	5.01
CH_4	1.34	5.87
CO_2e	1422.06	6228.64
N_2O	0.011	0.04733
Lead	2.46E-06	1.08E-05

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
Robert Williams Well Pad
Doddridge, 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	40,010,169	0.0134	1,580,918	0.0019	974,747	0.016	17,044	94,050	1	0	--	94,050	104,187,694
Methane	0.315	40,010,169	0.7432	1,580,918	0.0924	974,747	0.037	17,044	13,867,930	1	0.98	13,590,572	277,359	277,359
Ethane	0.275	40,010,169	0.1708	1,580,918	0.4272	974,747	0.010	17,044	11,705,138	2	0.98	22,942,070	--	
Propane	0.144	40,010,169	0.0238	1,580,918	0.1835	974,747	0.000	17,044	5,960,001	3	0.98	17,522,402	--	
i-Butane	0.046	40,010,169	0.0034	1,580,918	0.0549	974,747	0.000	17,044	1,882,907	4	0.98	7,380,994	--	
n-Butane	0.089	40,010,169	0.0072	1,580,918	0.1076	974,747	0.000	17,044	3,693,142	4	0.98	14,477,117	--	
Pentane	0.060	40,010,169	0.0020	1,580,918	0.0663	974,747	0.000	17,044	2,452,162	5	0.98	12,015,595	--	
Hexane	0.054	40,010,169	0.0010	1,580,918	0.0571	974,747	0.000	17,044	2,226,453	6	0.98	13,091,542	--	
Benzene	0.000	40,010,169	0.0002	1,580,918	0.0002	974,747	0.000	17,044	12,262	6	0.98	72,099	--	
Heptanes	0.007	40,010,169	0.0002	1,580,918	0.0060	974,747	0.000	17,044	296,016	7	0.98	2,030,667	--	
Toluene	0.000	40,010,169	0.0003	1,580,918	0.0003	974,747	0.000	17,044	14,949	7	0.98	102,549	--	
Octane	0.002	40,010,169	0.0000	1,580,918	0.0019	974,747	0.000	17,044	79,004	8	0.98	619,391	--	
Ethyl benzene	0.000	40,010,169	0.0001	1,580,918	0.0001	974,747	0.000	17,044	3,865	8	0.98	30,304	--	
Xylenes	0.000	40,010,169	0.0002	1,580,918	0.0002	974,747	0.000	17,044	10,287	8	0.98	80,649	--	
Nonane	0.000	40,010,169	0.0000	1,580,918	0.0004	974,747	0.000	17,044	15,338	9	0.98	135,285	--	
Decane plus	0.000	40,010,169	0.0000	1,580,918	0.0000	974,747	0.000	17,044	246	10	0.98	2,408	--	
Subtotal												**104,093,644**	--	

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	104,187,694	0.12	2000	1	1379.21	6,040.96
CH_4	277,359	0.04	2000	25	1.34	5.87
				CO_2e Emissions	**1,412.7**	**6187.71**

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
Robert Williams Well Pad
Doddridge, 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)	850
PW Production (bbl/day)	1,700
Condensate Truck Capacity (bbl)	200
PW 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	0.1500	1	1552	0.1500	232.8000	3.8175	1.7179
Tanker Trucks PW	10	40	10	0.1500	1	3103	0.1500	465.4500	3.8175	1.7179
Pick Up Truck	4	3	10	0.2300	1	730	0.2300	167.9000	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	0.5726	888.7208	0.4444	0.2577	399.9244	0.2000	0.2863	444.3604	0.2222	0.1288	199.9622	0.1000
Tanker Trucks PW	0.5726	1776.8691	0.8884	0.2577	799.5911	0.3998	0.2863	888.4345	0.4442	0.1288	399.7955	0.1999
Pick Up Truck	0.0797	58.2075	0.0291	0.0359	26.1934	0.0131	0.0399	29.1038	0.0146	0.0179	13.0967	0.0065
Total Emissions	1.2250	2,723.7974	1.3619	0.5512	1,225.7088	0.6129	0.6125	1,361.8987	0.6809	0.2756	612.8544	0.3064

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

Bryan Research & Engineering, Inc.

ProMax® 4.0

Simulation Report

Project: PROMAX SCENARIO 3.pmx

Licensed to GHD Limited and Affiliates

Client Name: Antero Resources Corporation
Location: West Virginia
Job: Robert Williams

ProMax Filename: I:\Air Quality\6-chars\08----\0827--\082715\ANTERO RESOURCES\01-ProMax\Model 2017-2018\HP\PROMAX SCENARIO 3.pmx
ProMax Version: 4.0.16071.0
Simulation Initiated: 1/15/2018 10:23:06 AM

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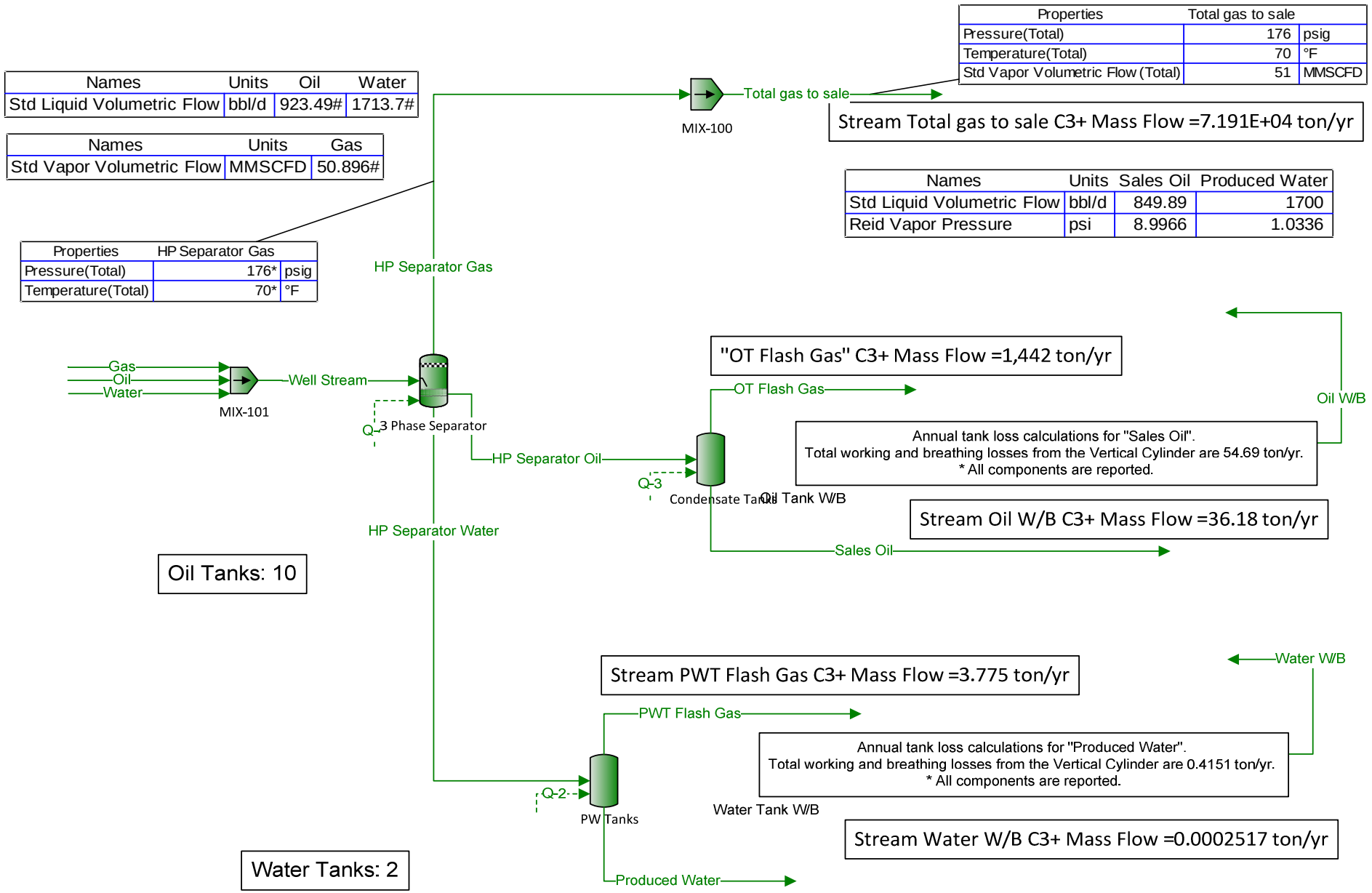
Report Navigator can be activated via the ProMax Navigator Toolbar.
An asterisk (*), throughout the report, denotes a user specified value.
A question mark (?) after a value, throughout the report, denotes an extrapolated or approximate value.


Names | Units | Oil | Water
Std Liquid Volumetric Flow | bbl/d | 923.49# | 1713.7#
Names | Units | Gas
Std Vapor Volumetric Flow | MMSCFD | 50.896#
Properties | HP Separator Gas
Pressure(Total) | 176* | psig
Temperature(Total) | 70* | °F
Gas
Oil
Water
MIX-101
Well Stream
3 Phase Separator
Q-1
HP Separator Gas
HP Separator Oil
HP Separator Water
MIX-100
Total gas to sale
Properties | Total gas to sale
Pressure(Total) | 176 | psig
Temperature(Total) | 70 | °F
Std Vapor Volumetric Flow (Total) | 51 | MMSCFD
Stream Total gas to sale C3+ Mass Flow =7.191E+04 ton/yr
Names | Units | Sales Oil | Produced Water
Std Liquid Volumetric Flow | bbl/d | 849.89 | 1700
Reid Vapor Pressure | psi | 8.9966 | 1.0336
"OT Flash Gas" C3+ Mass Flow =1,442 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 54.69 ton/yr.
* All components are reported.
Q-3
Condensate Tanks
Oil Tank W/B
Stream Oil W/B C3+ Mass Flow =36.18 ton/yr
Sales Oil
Oil Tanks: 10
Water W/B
Stream PWT Flash Gas C3+ Mass Flow =3.775 ton/yr
PWT Flash Gas
Annual tank loss calculations for "Produced Water".
Total working and breathing losses from the Vertical Cylinder are 0.4151 ton/yr.
* All components are reported.
Q-2
PW Tanks
Water Tank W/B
Stream Water W/B C3+ Mass Flow =0.0002517 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*	0.200294	0.0699835	99.9661	0*	0.000332462*	0.388154	99.9966	3.03282	0.0111352	0.200294	100*	93.7294*	19.6477
H2S		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen		0.4154*	0.414673	0.00861541	6.57579E-05	0.018*	0.00329253*	0.0547317	2.35845E-06	0.201379	8.58123E-05	0.414673	0*	0.00355565*	0.328846
Carbon Dioxide		0.1709*	0.170307	0.0296739	0.00107402	0.031*	0.186371*	0.176969	0.000651182	1.34371	0.00243035	0.170307	0*	1.59250*	0.135584
Methane		80.6676*	80.4909	5.04714	0.0252359	4.766*	9.23569*	31.5112	0.00179381	74.4613	0.152380	80.4909	0*	3.65809*	63.8753
Ethane		13.4543*	13.4370	5.00264	0.00600500	5.726*	42.7253*	27.5558	0.000615304	17.1200	0.831245	13.4370	0*	0.992157*	10.7148
Propane		2.6759*	2.71690	3.59434	0.000811433	6.545*	18.3530*	14.3647	6.05346E-05	2.38516	1.60227	2.71690	0*	0.0215329*	2.19822
Isobutane		0.5461*	0.548834	1.83482	0.000112351	2.067*	5.49062*	4.56143	5.97544E-06	0.337891	1.33052	0.548834	0*	0.000763982*	0.457699
n-Butane		0.9324*	0.951380	4.61149	0.000244228	5.909*	10.7635*	8.94459	1.68147E-05	0.722356	3.81004	0.951380	0*	0.00147105*	0.811033
2,2-Dimethylpropane		0*	0.00248281	0.0157092	3.01658E-07	0.174*	0.0277996*	0.0246386	1.01899E-08	0.000925807	0.0140577	0.00248281	0*	6.23876E-07*	0.00216173
Isopentane		0.2731*	0.280241	3.30653	4.88707E-05	3.77*	3.45975*	3.08758	2.42792E-06	0.147520	3.34702	0.280241	0*	7.76735E-05*	0.262887
n-Pentane		0.2342*	0.249010	3.93034	1.64971E-05	4.872*	3.14491*	2.85070	3.37792E-07	0.0513275	4.13003	0.249010	0*	7.95998E-06*	0.245804
2,2-Dimethylbutane		0*	0.00213800	0.0520327	1.31971E-07	0.188*	0.0267732*	0.0251844	2.44625E-09	0.000411414	0.0569985	0.00213800	0*	3.55551E-08*	0.00233567
Cyclopentane		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
2,3-Dimethylbutane		0*	0.00423692	0.138859	5.98239E-07	0.408*	0.0529352*	0.0506282	2.45132E-08	0.00182236	0.155178	0.00423692	0*	2.58736E-07*	0.00506889
2-Methylpentane		0*	0.0252855	0.919609	2.27751E-06	2.525*	0.314609*	0.303226	6.36615E-08	0.00703197	1.03361	0.0252855	0*	5.99551E-07*	0.0313700
3-Methylpentane		0*	0.0158395	0.639865	3.56852E-06	1.645*	0.197285*	0.190676	2.37016E-07	0.0105822	0.722947	0.0158395	0*	2.00123E-06*	0.0204371
n-Hexane		0.6301*	0.385846	20.1085	1.67327E-05	4.43*	4.94732*	4.66700	2.35600E-07	0.0524004	22.9645	0.385846	0*	1.57039E-06*	0.553509
Methylcyclopentane		0*	0.00805594	0.413545	3.09737E-06	0.924*	0.0925216*	0.0987740	3.27770E-07	0.00879748	0.471764	0.00805594	0*	1.98888E-06*	0.0114795
Benzene		0*	0.00236960	0.131629	8.45420E-05	0.283*	0.0199687*	0.0292463	7.71441E-05	0.0235750	0.150565	0.00236960	0*	0.000316553*	0.00351592
Cyclohexane		0*	0.00735096	0.525455	6.62014E-06	0.99*	0.0831125*	0.0895495	1.43230E-06	0.0164797	0.606080	0.00735096	0*	6.07686E-06*	0.0122995
2-Methylhexane		0*	0.0136950	1.52451	8.42093E-07	2.385*	0.0457706*	0.163068	1.62566E-08	0.00262314	1.77632	0.0136950	0*	1.29596E-08*	0.0296307
3-Methylhexane		0*	0.0100870	1.24629	7.49719E-07	1.879*	0.123350*	0.120523	1.72135E-08	0.00232669	1.45451	0.0100870	0*	4.51640E-08*	0.0233442
2,2,4-Trimethylpentane		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Heptane		0*	0.0216866	3.43838	6.66978E-07	4.792*	0.249348*	0.256578	6.95291E-09	0.00209646	4.02688	0.0216866	0*	1.33198E-08*	0.0595346
Methylcyclohexane		0*	0.0152642	2.44943	5.57965E-06	3.402*	0.181225*	0.184600	5.87425E-07	0.0158575	2.86833	0.0152642	0*	1.14825E-06*	0.0422656
Toluene		0*	0.00293986	0.560165	7.41119E-05	0.744*	0.0250640*	0.0357212	6.57329E-05	0.0266799	0.657166	0.00293986	0*	7.75624E-05*	0.00924327
Octane		0*	0.0168691	8.68886	2.03615E-07	9.689*	0.187608*	0.192977	9.08756E-10	0.000643862	10.2602	0.0168691	0*	5.14076E-10*	0.120374
Ethylbenzene		0*	0.000788270	0.463504	1.69371E-05	0.51*	0.00699233*	0.00923097	1.48232E-05	0.00672920	0.547525	0.000788270	0*	5.85659E-06*	0.00633611
m-Xylene		0*	0.00111011	0.712182	1.48803E-05	0.777*	0.0127853*	0.0129455	1.21857E-05	0.00857120	0.841512	0.00111011	0*	5.72778E-06*	0.00965326
o-Xylene		0*	0.000993783	0.735549	3.14638E-05	0.793*	0.00730971*	0.0116050	2.87138E-05	0.00876368	0.869449	0.000993783	0*	7.46847E-06*	0.00985204
Nonane		0*	0.00338322	5.48929	4.23341E-08	5.657*	0.0351777*	0.0374795	1.93101E-10	0.000133854	6.49765	0.00338322	0*	3.23429E-11*	0.0702812
C10+		0*	5.11953E-05	24.3111	7.65384E-09	24.101*	0.000255091*	0.000456056	5.02839E-10	2.27144E-05	28.8075	5.11953E-05	0*	1.37753E-13*	0.299425
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*	11.2162	0.0608794	1376.64	0*	9.74853E-07*	0.0527048	1376.62	0.0131489	0.00817463	11.2162	1387.91*	0.00480566*	1387.91
H2S		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen		23.2139*	23.2213	0.00749464	0.000905553	0.0157970*	9.65442E-06*	0.00743165	3.24681E-05	0.000873085	6.29973E-05	23.2213	0*	1.82304E-07*	23.2297
Carbon Dioxide		9.55043*	9.53703	0.0258137	0.0147903	0.0272060*	0.000546480*	0.0240295	0.00896462	0.00582568	0.00178419	9.53703	0*	8.16503E-05*	9.57764
Methane		4507.96*	4507.40	4.39056	0.347524	4.18270*	0.0270811*	4.27870	0.0246949	0.322829	0.111866	4507.40	0*	0.000187556*	4512.14
Ethane		751.869*	752.459	4.35186	0.0826950	5.02521*	0.125280*	3.74162	0.00847070	0.0742243	0.610240	752.459	0*	5.08695E-05*	756.894
Propane		149.538*	152.144	3.12676	0.0111743	5.74398*	0.0538150*	1.95049	0.000833361	0.0103409	1.17627	152.144	0*	1.10403E-06*	155.282
Isobutane		30.5178*	30.7341	1.59613	0.00154720	1.81403*	0.0160997*	0.619365	8.22620E-05	0.00146493	0.976769	30.7341	0*	3.91706E-08*	32.3318
n-Butane		52.1055*	53.2763	4.01159	0.00336328	5.18581*	0.0315611*	1.21453	0.000231483	0.00313179	2.79706	53.2763	0*	7.54234E-08*	57.2913
2,2-Dimethylpropane		0*	0.139035	0.0136656	4.15414E-06	0.152705*	8.15144E-05*	0.00334551	1.40281E-07	4.01386E-06	0.0103201	0.139035	0*	3.19871E-11*	0.152705
Isopentane		15.2617*	15.6932	2.87639	0.000673000	3.30860*	0.0101447*	0.419241	3.34245E-05	0.000639575	2.45714	15.6932	0*	3.98245E-09*	18.5703
n-Pentane		13.0878*	13.9443	3.41905	0.000227182	4.27573*	0.00922155*	0.387077	4.65027E-06	0.000222532	3.03197	13.9443	0*	4.08121E-10*	17.3636
2,2-Dimethylbutane		0*	0.119726	0.0452638	1.81737E-06	0.164991*	7.85049E-05*	0.00341962	3.36768E-08	1.78370E-06	0.0418442	0.119726	0*	1.82297E-12*	0.164991
Cyclopentane		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
2,3-Dimethylbutane		0*	0.237263	0.120795	8.23837E-06	0.358066*	0.000155218*	0.00687445	3.37465E-07	7.90090E-06	0.113920	0.237263	0*	1.32658E-11*	0.358066
2-Methylpentane		0*	1.41596	0.799978	3.13637E-05	2.21597*	0.000922503*	0.0411730	8.76408E-07	3.04873E-05	0.758805	1.41596	0*	3.07400E-11*	2.21597
3-Methylpentane		0*	0.886998	0.556626	4.91422E-05	1.44367*	0.000578483*	0.0258906	3.26293E-06	4.58793E-05	0.530736	0.886998	0*	1.02606E-10*	1.44367
n-Hexane		35.2120*	21.6070	17.4926	0.000230427	3.88783*	0.0145066*	0.633701	3.24343E-06	0.000227183	16.8589	21.6070	0*	8.05164E-11*	39.0998
Methylcyclopentane		0*	0.451124	0.359747	4.26540E-05	0.810914*	0.000271294*	0.0134119	4.51230E-06	3.81417E-05	0.346335	0.451124	0*	1.01973E-10*	0.810914
Benzene		0*	0.132695	0.114505	0.00116423	0.248364*	5.85526E-05*	0.00397115	0.00106202	0.000102210	0.110534	0.132695	0*	1.62302E-08*	0.248364
Cyclohexane		0*	0.411646	0.457100	9.11662E-05	0.868837*	0.000243704*	0.0121593	1.97180E-05	7.14482E-05	0.444940	0.411646	0*	3.11571E-10*	0.868837
2-Methylhexane		0*	0.766906	1.32619	1.15965E-05	2.09311*	0.000134210*	0.0221419	2.23799E-07	1.13727E-05	1.30405	0.766906	0*	6.64463E-13*	2.09311
3-Methylhexane		0*	0.564863	1.08416	1.03244E-05	1.64903*	0.000361690*	0.0163650	2.36974E-07	1.00874E-05	1.06780	0.564863	0*	2.31563E-12*	1.64903
2,2,4-Trimethylpentane		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Heptane		0*	1.21443	2.99108	9.18497E-06	4.20552*	0.000731144*	0.0348389	9.57186E-08	9.08925E-06	2.95624	1.21443	0*	6.82930E-13*	4.20552
Methylcyclohexane		0*	0.854778	2.13078	7.68375E-05	2.98564*	0.000531392*	0.0250656	8.08689E-06	6.87506E-05	2.10572	0.854778	0*	5.88726E-11*	2.98564
Toluene		0*	0.164629	0.487294	0.00102060	0.652944*	7.34932E-05*	0.00485033	0.000904925	0.000115671	0.482444	0.164629	0*	3.97675E-09*	0.652944
Octane		0*	0.944650	7.55854	2.80399E-06	8.50319*	0.000550109*	0.0262030	1.25106E-08	2.79148E-06	7.53234	0.944650	0*	2.63575E-14*	8.50319
Ethylbenzene		0*	0.0441423	0.403207	0.000233241	0.447583*	2.05031E-05*	0.00125341	0.000204066	2.91746E-05	0.401954	0.0441423	0*	3.00277E-10*	0.447583
m-Xylene		0*	0.0621651	0.619535	0.000204917	0.681905*	3.74893E-05*	0.00175778	0.000167757	3.71606E-05	0.617777	0.0621651	0*	2.93673E-10*	0.681905
o-Xylene		0*	0.0556508	0.639863	0.000433289	0.695947*	2.14337E-05*	0.00157577	0.000395294	3.79952E-05	0.638287	0.0556508	0*	3.82921E-10*	0.695947
Nonane		0*	0.189457	4.77520	5.82984E-07	4.96466*	0.000103149*	0.00508908	2.65836E-09	5.80326E-07	4.77011	0.189457	0*	1.65827E-15*	4.96466
C10+		0*	0.00286688	21.1485	1.05401E-07	21.1513*	7.47982E-07*	6.19247E-05	6.92243E-09	9.84789E-08	21.1484	0.00286688	0*	7.06280E-18*	21.1513
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		0*	0.179411	0.0114082	99.9601	0*	0.000140653*	0.185260	99.9945	2.69478	0.00161811	0.179411	100*	91.3533*	17.0034
H2S		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen		0.578181*	0.577579	0.00218385	0.000102246	0.00462242*	0.00216602*	0.0406202	3.66726E-06	0.278238	1.93904E-05	0.577579	0*	0.00538881*	0.442529
Carbon Dioxide		0.373697*	0.372666	0.0118169	0.00262355	0.0125066*	0.192615*	0.206339	0.00159074	2.91666	0.000862753	0.372666	0*	3.79171*	0.286641
Methane		64.2986*	64.2033	0.732653	0.0224710	0.700900*	3.47942*	13.3929	0.00159734	58.9165	0.0197183	64.2033	0*	3.17492*	49.2252
Ethane		20.1007*	20.0892	1.36113	0.0100223	1.57834*	30.1697*	21.9518	0.00102697	25.3898	0.201614	20.0892	0*	1.61402*	15.4770
Propane		5.86269*	5.95675	1.43416	0.00198601	2.64567*	19.0050*	16.7815	0.000148166	5.18738	0.569903	5.95675	0*	0.0513696*	4.65639
Isobutane		1.57705*	1.58607	0.964980	0.000362454	1.10132*	7.49428*	7.02393	1.92780E-05	0.968620	0.623783	1.58607	0*	0.00240233*	1.27793
n-Butane		2.69262*	2.74939	2.42530	0.000787900	3.14838*	14.6914*	13.7734	5.42478E-05	2.07075	1.78626	2.74939	0*	0.00462571*	2.26446
2,2-Dimethylpropane		0*	0.00890661	0.0102557	1.20803E-06	0.115082*	0.0471013*	0.0470959	4.08082E-08	0.00329446	0.00818113	0.00890661	0*	2.43520E-06*	0.00749229
Isopentane		0.978998*	1.00531	2.15865	0.000195709	2.49345*	5.86192*	5.90179	9.72331E-06	0.524945	1.94787	1.00531	0*	0.000303186*	0.911132
n-Pentane		0.839551*	0.893275	2.56591	6.60646E-05	3.22231*	5.32848*	5.44901	1.35278E-06	0.182648	2.40356	0.893275	0*	3.10705E-05*	0.851925
2,2-Dimethylbutane		0*	0.00916073	0.0405734	6.31238E-07	0.148515*	0.0541813*	0.0574979	1.17013E-08	0.00174863	0.0396203	0.00916073	0*	1.65765E-07*	0.00966891
Cyclopentane		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
2,3-Dimethylbutane		0*	0.0181540	0.108278	2.86148E-06	0.322310*	0.107126*	0.115588	1.17255E-07	0.00774556	0.107866	0.0181540	0*	1.20628E-06*	0.0209836
2-Methylpentane		0*	0.108341	0.717081	1.08937E-05	1.99469*	0.636679*	0.692288	3.04516E-07	0.0298879	0.718477	0.108341	0*	2.79522E-06*	0.129862

3-Methylpentane	0*	0.0678681	0.498946	1.70688E-05	1.29951*	0.399249*	0.435328	1.13373E-06	0.0449773	0.502529	0.0678681	0*	9.33011E-06*	0.0846029
n-Hexane	2.69789*	1.65324	15.6799	8.00354E-05	3.49959*	10.0120*	10.6551	1.12696E-06	0.222717	15.9629	1.65324	0*	7.32146E-06*	2.29135
Methylcyclopentane	0*	0.0337100	0.314925	1.44687E-05	0.712863*	0.182857*	0.220233	1.53116E-06	0.0365171	0.320258	0.0337100	0*	9.05562E-06*	0.0464100
Benzene	0*	0.00920303	0.0930357	0.000366540	0.202644*	0.0366297*	0.0605236	0.000334480	0.0908247	0.0948665	0.00920303	0*	0.00133774*	0.0131929
Cyclohexane	0*	0.0307600	0.400148	3.09245E-05	0.763781*	0.164262*	0.199666	6.69092E-06	0.0684050	0.411438	0.0307600	0*	2.76688E-05*	0.0497250
2-Methylhexane	0*	0.0682304	1.38226	4.68348E-06	2.19076*	0.107703*	0.432894	9.04179E-08	0.0129638	1.43572	0.0682304	0*	7.02549E-08*	0.142627
3-Methylhexane	0*	0.0502550	1.13000	4.16972E-06	1.72597*	0.290257*	0.319951	9.57406E-08	0.0114987	1.17561	0.0502550	0*	2.44836E-07*	0.112367
2,2,4-Trimethylpentane	0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Heptane	0*	0.108046	3.11754	3.70954E-06	4.40173*	0.586745*	0.681134	3.86716E-08	0.0103609	3.25474	0.108046	0*	7.22075E-08*	0.286569
Methylcyclohexane	0*	0.0745183	2.17619	3.04081E-05	3.06207*	0.417864*	0.480196	3.20149E-06	0.0767927	2.27169	0.0745183	0*	6.09949E-06*	0.199352
Toluene	0*	0.0134681	0.467024	0.000379019	0.628412*	0.0542323*	0.0871974	0.000336181	0.121244	0.488413	0.0134681	0*	0.000386633*	0.0409119
Octane	0*	0.0958088	8.98089	1.29097E-06	10.1458*	0.503261*	0.584006	5.76198E-09	0.00362746	9.45374	0.0958088	0*	3.17694E-09*	0.660526
Ethylbenzene	0*	0.00416099	0.445263	9.98049E-05	0.496343*	0.0174329*	0.0259637	8.73519E-05	0.0352355	0.468875	0.00416099	0*	3.36383E-05*	0.0323138
m-Xylene	0*	0.00585987	0.684155	8.76852E-05	0.756194*	0.0318757*	0.0364114	7.18094E-05	0.0448805	0.720631	0.00585987	0*	3.28984E-05*	0.0492310
o-Xylene	0*	0.00524581	0.706603	0.000185407	0.771765*	0.0182242*	0.0326411	0.000169208	0.0458884	0.744555	0.00524581	0*	4.28964E-05*	0.0502448
Nonane	0*	0.0215747	6.37049	3.01368E-07	6.65107*	0.105952*	0.127352	1.37470E-09	0.000846720	6.72206	0.0215747	0*	2.24420E-10*	0.433009
C10+	0*	0.000520806	45.0082	8.69196E-08	45.2034*	0.00122565*	0.00247207	5.71063E-09	0.000229214	47.5426	0.000520806	0*	1.52480E-12*	2.94291
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*	202.064	1.09676	24800.5	0*	1.75622E-05*	0.949491	24800.3	0.236881	0.147268	202.064	25003.7*	0.0865753*	25003.7
H2S	0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen	650.299*	650.506	0.209950	0.0253676	0.442529*	0.000270453*	0.208186	0.000909540	0.0244581	0.00176477	650.506	0*	5.10696E-06*	650.742
Carbon Dioxide	420.310*	419.720	1.13605	0.650914	1.19732*	0.0240503*	1.05753	0.394528	0.256385	0.0785212	419.720	0*	0.00359339*	421.507
Methane	72318.8*	72309.9	70.4354	5.57514	67.1008*	0.434447*	68.6408	0.396166	5.17897	1.79461	72309.9	0*	0.00300886*	72385.9
Ethane	22608.0*	22625.7	130.856	2.48656	151.103*	3.76705*	112.507	0.254706	2.23185	18.3493	22625.7	0*	0.00152960*	22759.1
Propane	6593.96*	6708.87	137.876	0.492736	253.284*	2.37301*	86.0079	0.0367476	0.455989	51.8683	6708.87	0*	4.86829E-05*	6847.24
Isobutane	1773.76*	1786.34	92.7708	0.0899264	105.435*	0.935751*	35.9989	0.00478125	0.0851452	56.7720	1786.34	0*	2.27668E-06*	1879.20
n-Butane	3028.48*	3096.54	233.162	0.195481	301.411*	1.83440*	70.5909	0.0134543	0.182027	162.571	3096.54	0*	4.38377E-06*	3329.89
2,2-Dimethylpropane	0*	10.0312	0.985959	0.000299716	11.0175*	0.00588117*	0.241375	1.01211E-05	0.000289595	0.744584	10.0312	0*	2.30783E-09*	11.0175
Isopentane	1101.11*	1132.25	207.528	0.0485561	238.711*	0.731931*	30.2477	0.00241154	0.0461446	177.280	1132.25	0*	2.87329E-07*	1339.82
n-Pentane	944.271*	1006.06	246.680	0.0163909	308.489*	0.665324*	27.9271	0.000335512	0.0160554	218.753	1006.06	0*	2.94455E-08*	1252.76
2,2-Dimethylbutane	0*	10.3174	3.90063	0.000156613	14.2182*	0.00676519*	0.294687	2.90211E-06	0.000153711	3.60594	10.3174	0*	1.57095E-10*	14.2182
Cyclopentane	0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
2,3-Dimethylbutane	0*	20.4462	10.4095	0.000709944	30.8565*	0.0133759*	0.592409	2.90812E-05	0.000680863	9.81713	20.4462	0*	1.14319E-09*	30.8565
2-Methylpentane	0*	122.021	68.9384	0.00270278	190.962*	0.0794970*	3.54810	7.55248E-05	0.00262725	65.3903	122.021	0*	2.64903E-09*	190.962
3-Methylpentane	0*	76.4374	47.9675	0.00423485	124.409*	0.0498510*	2.23113	0.000281184	0.00395367	45.7363	76.4374	0*	8.84213E-09*	124.409
n-Hexane	3034.40*	1861.99	1507.43	0.0198571	335.035*	1.25011*	54.6094	0.000279504	0.0195776	1452.82	1861.99	0*	6.93853E-09*	3369.44
Methylcyclopentane	0*	37.9664	30.2761	0.00358974	68.2461*	0.0228319*	1.12873	0.000379753	0.00320999	29.1474	37.9664	0*	8.58199E-09*	68.2461
Benzene	0*	10.3650	8.94422	0.0909401	19.4002*	0.00457365*	0.310194	0.0829563	0.00798381	8.63403	10.3650	0*	1.26777E-06*	19.4002
Cyclohexane	0*	34.6439	38.4693	0.00767250	73.1208*	0.0205100*	1.02332	0.00165946	0.00601304	37.4459	34.6439	0*	2.62216E-08*	73.1208
2-Methylhexane	0*	76.8455	132.887	0.00116199	209.733*	0.0134481*	2.21866	2.24251E-05	0.00113957	130.668	76.8455	0*	6.65804E-11*	209.733
3-Methylhexane	0*	56.6004	108.635	0.00103452	165.236*	0.0362421*	1.63981	2.37452E-05	0.00101078	106.995	56.6004	0*	2.32031E-10*	165.236
2,2,4-Trimethylpentane	0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Heptane	0*	121.688	299.712	0.000920352	421.401*	0.0732621*	3.49093	9.59119E-06	0.000910761	296.221	121.688	0*	6.84309E-11*	421.401
Methylcyclohexane	0*	83.9273	209.213	0.00754437	293.148*	0.0521753*	2.46109	0.000794020	0.00675035	206.752	83.9273	0*	5.78047E-09*	293.148
Toluene	0*	15.1687	44.8985	0.0940362	60.1612*	0.00677155*	0.446902	0.0833784	0.0106578	44.4516	15.1687	0*	3.66412E-07*	60.1612
Octane	0*	107.906	863.401	0.000320295	971.307*	0.0628381*	2.99313	1.42906E-06	0.000318866	860.407	107.906	0*	3.01078E-12*	971.307
Ethylbenzene	0*	4.68637	42.8065	0.0247620	47.5176*	0.00217671*	0.133068	0.0216647	0.00309732	42.6734	4.68637	0*	3.18789E-08*	47.5176
m-Xylene	0*	6.59976	65.7729	0.0217550	72.3945*	0.00398006*	0.186615	0.0178099	0.00394516	65.5863	6.59976	0*	3.11778E-08*	72.3945
o-Xylene	0*	5.90817	67.9310	0.0460002	73.8852*	0.00227551*	0.167291	0.0419664	0.00403376	67.7638	5.90817	0*	4.06528E-08*	73.8852
Nonane	0*	24.2988	612.444	7.47707E-05	636.742*	0.0132294*	0.652701	3.40948E-07	7.44297E-05	611.791	24.2988	0*	2.12682E-13*	636.742
C10+	0*	0.586564	4326.98	2.15651E-05	4327.57*	0.000153037*	0.0126698	1.41633E-06	2.01488E-05	4326.97	0.586564	0*	1.44505E-15*	4327.57

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*	86.5890
Pressure	psig	1000*	176*	176	176	1000*	2.10878	0*	0	0*	0	176	1000*	-14.2223	1000
Mole Fraction Vapor	%	100	100	0	0	0	100*	100	0	100	0	100	0	100*	77.9672
Mole Fraction Light Liquid	%	0	0	100	100	100	0	0	100	0	100	0	100	0	2.42420
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0	0	0	0	0	0	0	19.6086
Molecular Weight	lb/lbmol	20.1265	20.1122	110.514	18.0164	109.086	42.5827	37.7453	18.0157	20.2752	123.973	20.1122	18.0153	18.4839	20.8169
Mass Density	lb/ft^3	4.38236	0.707202	45.0252	62.2666	45.0238	0.126738	0.0976774	62.2225	0.0520185	45.6749	0.707202	62.1852	0.00152394	5.58842
Molar Flow	lbmol/h	5588.32	5599.90	86.9911	1377.10	87.7613	0.293222	13.5783	1376.67	0.433553	73.4128	5599.90	1387.91	0.00512716	7063.99
Mass Flow	lb/h	112473	112626	9613.76	24810.4	9573.53	12.4862*	512.518	24801.6	8.79036	9101.24	112626	25003.7	0.0947697*	147051
Vapor Volumetric Flow	ft^3/h	25665.0	159256	213.520	398.454	212.633	98.5194	5247.04	398.595	168.985	199.261	159256	402.084	62.1875	26313.4
Liquid Volumetric Flow	gpm	3199.80	19855.3	26.6206	49.6774	26.5101	12.2829	654.177	49.6950	21.0683	24.8430	19855.3	50.1299	7.75325	3280.63
Std Vapor Volumetric Flow	MMSCFD	50.8962*	51.0017	0.792282	12.5421	0.799296	0.00267055	0.123666	12.5382	0.00394863	0.668616	51.0017	12.6406	4.66962E-05	64.3361
Std Liquid Volumetric Flow	sgpm	669.918	670.195	27.0076	49.6347	26.9351*	0.0525916	2.21911	49.5833	0.0513328	24.7885	670.195	49.9841*	0.000210735	746.837
Compressibility		0.797260	0.954091	0.0823446	0.00970700	0.420597	0.982296	0.987994	0.000740267	0.996535	0.00693964	0.954091	0.0502914	0.999551	0.644764
Specific Gravity		0.694914	0.694421	0.721916	0.998358	0.721893	1.47027	1.30324	0.997651	0.700047	0.732333	0.694421	0.997052	0.638197	
API Gravity				63.1843	10.0331	61.3042			10.0026		59.7880		9.87799		
Enthalpy	Btu/h	-1.93375E+08	-1.91385E+08	-8.41547E+06	-1.69348E+08	-8.22939E+06	-13214.2	-587172	-1.69197E+08	-16201.5	-7.72636E+06	-1.91385E+08	-1.70289E+08	-521.400	-3.71893E+08
Mass Enthalpy	Btu/lb	-1719.29	-1699.29	-875.357	-6825.68	-859.598	-1058.31	-1145.66	-6822.03	-1843.10	-848.935	-1699.29	-6810.58	-5501.75	-2529.02
Mass Cp	Btu/(lb*°F)	0.669229	0.507729	0.498523	0.982118	0.501758	0.410462	0.420989	0.981761	0.477212	0.495373	0.507729	0.979420	0.441636	0.708328
Ideal Gas CpCv Ratio		1.25275	1.25707	1.04977	1.32581	1.04947	1.12941	1.14387	1.32555	1.25940	1.04394	1.25707	1.32512	1.32164	1.25054
Dynamic Viscosity	cP	0.0131400	0.0107932	0.537307	0.995414	0.528012	0.00851873	0.00891795	0.924423	0.0107794	0.652779	0.0107932	0.840378	0.0102824	
Kinematic Viscosity	cSt	0.187183	0.952764	0.744983	0.997993	0.732118	4.19610	5.69967	0.927475	12.9364	0.892212	0.952764	0.843659	421.217	
Thermal Conductivity	Btu/(h*ft*°F)	0.0225357	0.0179569	0.0691396	0.346544	0.0675088	0.0110616	0.0125596	0.349776	0.0172517	0.0697380	0.0179569	0.353848	0.0122584	
Surface Tension	lbf/ft			0.00144081?	0.005029?0?	0.000822055			0.00498763?		0.00158971		0.00492045		
Net Ideal Gas Heating Value	Btu/ft^3	1104.36	1101.57	5556.91	0.369833	5481.86	2232.68	1985.09	0.0369373	1057.42	6217.55	1101.57	0	49.9149	941.760
Net Liquid Heating Value	Btu/lb	20768.8	20728.8	18916.5	-1051.57	18900.1	19744.6	19817.4	-1058.93	19706.8	18865.7	20728.8	-1059.76	51.3086	16935.5
Gross Ideal Gas Heating Value	Btu/ft^3	1218.63	1215.65	5967.46	50.7006	5885.86	2427.69	2162.45	50.3486	1168.29	6671.23	1215.65	50.3101	102.295	1047.07
Gross Liquid Heating Value	Btu/lb	22923.4	22881.3	20325.4	8.56005	20304.3	21482.3	21600.3	0.842997	21781.9	20253.6	22881.3	0	1126.71	18855.1

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	0.200294				0.000332462	0.388154		3.03282		0.200294		93.7294	0.0796138
H2S		0	0				0	0		0		0		0	0
Nitrogen		0.4154	0.414673				0.00329253	0.0547317		0.201379		0.414673		0.00355565	0.420031
Carbon Dioxide		0.1709	0.170307				0.186371	0.176969		1.34371		0.170307		1.59250	0.169666
Methane		80.6676	80.4909				9.23569	31.5112		74.4613		80.4909		3.65809	81.1516
Ethane		13.4543	13.4370				42.7253	27.5558		17.1200		13.4370		0.992157	13.2829
Propane		2.6759	2.71690				18.3530	14.3647		2.38516		2.71690		0.0215329	2.59838
Isobutane		0.5461	0.548834				5.49062	4.56143		0.337891		0.548834		0.000763982	0.505406
n-Butane		0.9324	0.951380				10.7635	8.94459		0.722356		0.951380		0.00147105	0.856284
2,2-Dimethylpropane		0	0.00248281				0.0277996	0.0246386		0.000925807		0.00248281		6.23876E-07	0.00222179
Isopentane		0.2731	0.280241				3.45975	3.08758		0.147520		0.280241		7.76735E-05	0.243983
n-Pentane		0.2342	0.249010				3.14491	2.85070		0.0513275		0.249010		7.95998E-06	0.212151
2,2-Dimethylbutane		0	0.00213800				0.0267732	0.0251844		0.000411414		0.00213800		3.55551E-08	0.00178201
Cyclopentane		0	0				0	0		0		0		0	0
2,3-Dimethylbutane		0	0.00423692				0.0529352	0.0506282		0.00182236		0.00423692		2.58736E-07	0.00351312
2-Methylpentane		0	0.0252855				0.314609	0.303226		0.00703197		0.0252855		5.99551E-07	0.0211058
3-Methylpentane		0	0.0158395				0.197285	0.190676		0.0105822		0.0158395		2.00123E-06	0.0131738
n-Hexane		0.6301	0.385846				4.94732	4.66700		0.0524004		0.385846		1.57039E-06	0.327978
Methylcyclopentane		0	0.00805594				0.0925216	0.0987740		0.00879748		0.00805594		1.98888E-06	0.00653051
Benzene		0	0.00236960				0.0199687	0.0292463		0.0235750		0.00236960		0.000316553	0.00191295
Cyclohexane		0	0.00735096				0.0831125	0.0895495		0.0164797		0.00735096		6.07686E-06	0.00618011
2-Methylhexane		0	0.0136950				0.0457706	0.163068		0.00262314		0.0136950		1.29596E-08	0.0128611
3-Methylhexane		0	0.0100870				0.123350	0.120523		0.00232669		0.0100870		4.51640E-08	0.00957227
2,2,4-Trimethylpentane		0	0				0	0		0		0		0	0
Heptane		0	0.0216866				0.249348	0.256578		0.00209646		0.0216866		1.33198E-08	0.0219060
Methylcyclohexane		0	0.0152642				0.181225	0.184600		0.0158575		0.0152642		1.14825E-06	0.0143985
Toluene		0	0.00293986				0.0250640	0.0357212		0.0266799		0.00293986		7.75624E-05	0.00278888
Octane		0	0.0168691				0.187608	0.192977		0.000643862		0.0168691		5.14076E-10	0.0230809
Ethylbenzene		0	0.000788270				0.00699233	0.00923097		0.00672920		0.000788270		5.85659E-06	0.00101522
m-Xylene		0	0.00111011				0.0127853	0.0129455		0.00857120		0.00111011		5.72778E-06	0.00146513
o-Xylene		0	0.000993783				0.00730971	0.0116050		0.00876368		0.000993783		7.46847E-06	0.00134084
Nonane		0	0.00338322				0.0351777	0.0374795		0.000133854		0.00338322		3.23429E-11	0.00654568
C10+		0	5.11953E-05				0.000255091	0.000456056		2.27144E-05		5.11953E-05		1.37753E-13	0.000586144
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	11.2162				9.74853E-07	0.0527048		0.0131489		11.2162		0.00480566	4.38481
H2S		0	0				0	0		0		0		0	0
Nitrogen		23.2139	23.2213				9.65442E-06	0.00743165		0.000873085		23.2213		1.82304E-07	23.1336
Carbon Dioxide		9.55043	9.53703				0.000546480	0.0240295		0.00582568		9.53703		8.16503E-05	9.34453
Methane		4507.96	4507.40				0.0270811	4.27870		0.322829		4507.40		0.000187556	4469.50
Ethane		751.869	752.459				0.125280	3.74162		0.0742243		752.459		5.08695E-05	731.568
Propane		149.538	152.144				0.0538150	1.95049		0.0103409		152.144		1.10403E-06	143.108
Isobutane		30.5178	30.7341				0.0160997	0.619365		0.00146493		30.7341		3.91706E-08	27.8357
n-Butane		52.1055	53.2763				0.0315611	1.21453		0.00313179		53.2763		7.54234E-08	47.1606
2,2-Dimethylpropane		0	0.139035				8.15144E-05	0.00334551		4.01386E-06		0.139035		3.19871E-11	0.122367
Isopentane		15.2617	15.6932				0.0101447	0.419241		0.000639575		15.6932		3.98245E-09	13.4376
n-Pentane		13.0878	13.9443				0.00922155	0.387077		0.000222532		13.9443		4.08121E-10	11.6844
2,2-Dimethylbutane		0	0.119726				7.85049E-05	0.00341962		1.78370E-06		0.119726		1.82297E-12	0.0981458
Cyclopentane		0	0				0	0		0		0		0	0
2,3-Dimethylbutane		0	0.237263				0.000155218	0.00687445		7.90090E-06		0.237263		1.32658E-11	0.193488
2-Methylpentane		0	1.41596				0.000922503	0.0411730		3.04873E-05		1.41596		3.07400E-11	1.16242
3-Methylpentane		0	0.886998				0.000578483	0.0258906		4.58793E-05		0.886998		1.02606E-10	0.725558
n-Hexane		35.2120	21.6070				0.0145066	0.633701		0.000227183		21.6070		8.05164E-11	18.0637
Methylcyclopentane		0	0.451124				0.000271294	0.0134119		3.81417E-05		0.451124		1.01973E-10	0.359674
Benzene		0	0.132695				5.85526E-05	0.00397115		0.000102210		0.132695		1.62302E-08	0.105358
Cyclohexane		0	0.411646				0.000243704	0.0121593		7.14482E-05		0.411646		3.11571E-10	0.340375
2-Methylhexane		0	0.766906				0.000134210	0.0221419		1.13727E-05		0.766906		6.64463E-13	0.708337
3-Methylhexane		0	0.564863				0.000361690	0.0163650		1.00874E-05		0.564863		2.31563E-12	0.527201
2,2,4-Trimethylpentane		0	0				0	0		0		0		0	0
Heptane		0	1.21443				0.000731144	0.0348389		9.08925E-06		1.21443		6.82930E-13	1.20649
Methylcyclohexane		0	0.854778				0.000531392	0.0250656		6.87506E-05		0.854778		5.88726E-11	0.793009
Toluene		0	0.164629				7.34932E-05	0.00485033		0.000115671		0.164629		3.97675E-09	0.153600
Octane		0	0.944650				0.000550109	0.0262030		2.79148E-06		0.944650		2.63575E-14	1.27120
Ethylbenzene		0	0.0441423				2.05031E-05	0.00125341		2.91746E-05		0.0441423		3.00277E-10	0.0559144
m-Xylene		0	0.0621651				3.74893E-05	0.00175778		3.71606E-05		0.0621651		2.93673E-10	0.0806935
o-Xylene		0	0.0556508				2.14337E-05	0.00157577		3.79952E-05		0.0556508		3.82921E-10	0.0738483
Nonane		0	0.189457				0.000103149	0.00508908		5.80326E-07		0.189457		1.65827E-15	0.360510
C10+		0	0.00286688				7.47982E-07	6.19247E-05		9.84789E-08		0.00286688		7.06280E-18	0.0322824
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		0	0.179411				0.000140653	0.185260		2.69478		0.179411		91.3533	0.0720106
H2S		0	0				0	0		0		0		0	0
Nitrogen		0.578181	0.577579				0.00216602	0.0406202		0.278238		0.577579		0.00538881	0.590764
Carbon Dioxide		0.373697	0.372666				0.192615	0.206339		2.91666		0.372666		3.79171	0.374894
Methane		64.2986	64.2033				3.47942	13.3929		58.9165		64.2033		3.17492	65.3634
Ethane		20.1007	20.0892				30.1697	21.9518		25.3898		20.0892		1.61402	20.0530
Propane		5.86269	5.95675				19.0050	16.7815		5.18738		5.95675		0.0513696	5.75260
Isobutane		1.57705	1.58607				7.49428	7.02393		0.968620		1.58607		0.00240233	1.47485
n-Butane		2.69262	2.74939				14.6914	13.7734		2.07075		2.74939		0.00462571	2.49877
2,2-Dimethylpropane		0	0.00890661				0.0471013	0.0470959		0.00329446		0.00890661		2.43520E-06	0.00804819
Isopentane		0.978998	1.00531				5.86192	5.90179		0.524945		1.00531		0.000303186	0.883802
n-Pentane		0.839551	0.893275				5.32848	5.44901		0.182648		0.893275		3.10705E-05	0.768495
2,2-Dimethylbutane		0	0.00916073				0.0541813	0.0574979		0.00174863		0.00916073		1.65765E-07	0.00771009
Cyclopentane		0	0				0	0		0		0		0	0
2,3-Dimethylbutane		0	0.0181540				0.107126	0.115588		0.00774556		0.0181540		1.20628E-06	0.0152000
2-Methylpentane		0	0.108341				0.636679	0.692288		0.0298879		0.108341		2.79522E-06	0.0913171
3-Methylpentane		0	0.0678681				0.399249	0.435328		0.0449773		0.0678681		9.33011E-06	0.0569981
n-Hexane		2.69789	1.65324				10.0120	10.6551		0.222717		1.65324		7.32146E-06	1.41904

Methylcyclopentane	0	0.0337100				0.182857	0.220233		0.0365171		0.0337100		9.05562E-06	0.0275941
Benzene	0	0.00920303				0.0366297	0.0605236		0.0908247		0.00920303		0.00133774	0.00750219
Cyclohexane	0	0.0307600				0.164262	0.199666		0.0684050		0.0307600		2.76688E-05	0.0261136
2-Methylhexane	0	0.0682304				0.107703	0.432894		0.0129638		0.0682304		7.02549E-08	0.0647024
3-Methylhexane	0	0.0502550				0.290257	0.319951		0.0114987		0.0502550		2.44836E-07	0.0481568
2,2,4-Trimethylpentane	0	0				0	0		0		0		0	0
Heptane	0	0.108046				0.586745	0.681134		0.0103609		0.108046		7.22075E-08	0.110206
Methylcyclohexane	0	0.0745183				0.417864	0.480196		0.0767927		0.0745183		6.09949E-06	0.0709795
Toluene	0	0.0134681				0.0542323	0.0871974		0.121244		0.0134681		0.000386633	0.0129014
Octane	0	0.0958088				0.503261	0.584006		0.00362746		0.0958088		3.17694E-09	0.132371
Ethylbenzene	0	0.00416099				0.0174329	0.0259637		0.0352355		0.00416099		3.36383E-05	0.00541141
m-Xylene	0	0.00585987				0.0318757	0.0364114		0.0448805		0.00585987		3.28984E-05	0.00780953
o-Xylene	0	0.00524581				0.0182242	0.0326411		0.0458884		0.00524581		4.28964E-05	0.00714704
Nonane	0	0.0215747				0.105952	0.127352		0.000846720		0.0215747		2.24420E-10	0.0421499
C10+	0	0.000520806				0.00122565	0.00247207		0.000229214		0.000520806		1.52480E-12	0.00602111
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	202.064				1.75622E-05	0.949491		0.236881		202.064		0.0865753	78.9935
H2S	0	0				0	0		0		0		0	0
Nitrogen	650.299	650.506				0.000270453	0.208186		0.0244581		650.506		5.10696E-06	648.051
Carbon Dioxide	420.310	419.720				0.0240503	1.05753		0.256385		419.720		0.00359339	411.248
Methane	72318.8	72309.9				0.434447	68.6408		5.17897		72309.9		0.00300886	71701.8
Ethane	22608.0	22625.7				3.76705	112.507		2.23185		22625.7		0.00152960	21997.5
Propane	6593.96	6708.87				2.37301	86.0079		0.455989		6708.87		4.86829E-05	6310.44
Isobutane	1773.76	1786.34				0.935751	35.9989		0.0851452		1786.34		2.27668E-06	1617.87
n-Butane	3028.48	3096.54				1.83440	70.5909		0.182027		3096.54		4.38377E-06	2741.08
2,2-Dimethylpropane	0	10.0312				0.00588117	0.241375		0.000289595		10.0312		2.30783E-09	8.82863
Isopentane	1101.11	1132.25				0.731931	30.2477		0.0461446		1132.25		2.87329E-07	969.505
n-Pentane	944.271	1006.06				0.665324	27.9271		0.0160554		1006.06		2.94455E-08	843.016
2,2-Dimethylbutane	0	10.3174				0.00676519	0.294687		0.000153711		10.3174		1.57095E-10	8.45775
Cyclopentane	0	0				0	0		0		0		0	0
2,3-Dimethylbutane	0	20.4462				0.0133759	0.592409		0.000680863		20.4462		1.14319E-09	16.6739
2-Methylpentane	0	122.021				0.0794970	3.54810		0.00262725		122.021		2.64903E-09	100.172
3-Methylpentane	0	76.4374				0.0498510	2.23113		0.00395367		76.4374		8.84213E-09	62.5252
n-Hexane	3034.40	1861.99				1.25011	54.6094		0.0195776		1861.99		6.93853E-09	1556.65
Methylcyclopentane	0	37.9664				0.0228319	1.12873		0.00320999		37.9664		8.58199E-09	30.2700
Benzene	0	10.3650				0.00457365	0.310194		0.00798381		10.3650		1.26777E-06	8.22969
Cyclohexane	0	34.6439				0.0205100	1.02332		0.00601304		34.6439		2.62216E-08	28.6458
2-Methylhexane	0	76.8455				0.0134481	2.21866		0.00113957		76.8455		6.65804E-11	70.9767
3-Methylhexane	0	56.6004				0.0362421	1.63981		0.00101078		56.6004		2.32031E-10	52.8266
2,2,4-Trimethylpentane	0	0				0	0		0		0		0	0
Heptane	0	121.688				0.0732621	3.49093		0.000910761		121.688		6.84309E-11	120.893
Methylcyclohexane	0	83.9273				0.0521753	2.46109		0.00675035		83.9273		5.78047E-09	77.8624
Toluene	0	15.1687				0.00677155	0.446902		0.0106578		15.1687		3.66412E-07	14.1525
Octane	0	107.906				0.0628381	2.99313		0.000318866		107.906		3.01078E-12	145.208
Ethylbenzene	0	4.68637				0.00217671	0.133068		0.00309732		4.68637		3.18789E-08	5.93615
m-Xylene	0	6.59976				0.00398006	0.186615		0.00394516		6.59976		3.11778E-08	8.56682
o-Xylene	0	5.90817				0.00227551	0.167291		0.00403376		5.90817		4.06528E-08	7.84010
Nonane	0	24.2988				0.0132294	0.652701		7.44297E-05		24.2988		2.12682E-13	46.2372
C10+	0	0.586564				0.000153037	0.0126698		2.01488E-05		0.586564		1.44505E-15	6.60498

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		86.5890
Pressure	psig	1000	176			2.10878	0		0		176		-14.2223		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	20.1265	20.1122			42.5827	37.7453		20.2752		20.1122		18.4839		19.9174
Mass Density	lb/ft^3	4.38236	0.707202			0.126738	0.0976774		0.0520185		0.707202		0.00152394		4.28494
Molar Flow	lbmol/h	5588.32	5599.90			0.293222	13.5783		0.433553		5599.90		0.00512716		5507.59
Mass Flow	lb/h	112473	112626			12.4862	512.518		8.79036		112626		0.0947697		109697
Vapor Volumetric Flow	ft^3/h	25665.0	159256			98.5194	5247.04		168.985		159256		62.1875		25600.6
Liquid Volumetric Flow	gpm	3199.80	19855.3			12.2829	654.177		21.0683		19855.3		7.75325		3191.76
Std Vapor Volumetric Flow	MMSCFD	50.8962	51.0017			0.00267055	0.123666		0.00394863		51.0017		4.66962E-05		50.1610
Std Liquid Volumetric Flow	sgpm	669.918	670.195			0.0525916	2.21911		0.0513328		670.195		0.000210735		656.978
Compressibility		0.797260	0.954091			0.982296	0.987994		0.996535		0.954091		0.999551		0.804567
Specific Gravity		0.694914	0.694421			1.47027	1.30324		0.700047		0.694421		0.638197		0.687695
API Gravity															
Enthalpy	Btu/h	-1.93375E+08	-1.91385E+08			-13214.2	-587172		-16201.5		-1.91385E+08		-521.400		-1.90000E+08
Mass Enthalpy	Btu/lb	-1719.29	-1699.29			-1058.31	-1145.66		-1843.10		-1699.29		-5501.75		-1732.04
Mass Cp	Btu/(lb*°F)	0.669229	0.507729			0.410462	0.420989		0.477212		0.507729		0.441636		0.664737
Ideal Gas CpCv Ratio		1.25275	1.25707			1.12941	1.14387		1.25940		1.25707		1.32164		1.25485
Dynamic Viscosity	cP	0.0131400	0.0107932			0.00851873	0.00891795		0.0107794		0.0107932		0.0102824		0.0131261
Kinematic Viscosity	cSt	0.187183	0.952764			4.19610	5.69967		12.9364		0.952764		421.217		0.191236
Thermal Conductivity	Btu/(h*ft*°F)	0.0225357	0.0179569			0.0110616	0.0125596		0.0172517		0.0179569		0.0122584		0.0225985
Surface Tension	lbf/ft														
Net Ideal Gas Heating Value	Btu/ft^3	1104.36	1101.57			2232.68	1985.09		1057.42		1101.57		49.9149		1092.99
Net Liquid Heating Value	Btu/lb	20768.8	20728.8			19744.6	19817.4		19706.8		20728.8		51.3086		20771.4
Gross Ideal Gas Heating Value	Btu/ft^3	1218.63	1215.65			2427.69	2162.45		1168.29		1215.65		102.295		1206.44
Gross Liquid Heating Value	Btu/lb	22923.4	22881.3			21482.3	21600.3		21781.9		22881.3		1126.71		22933.0

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: **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			0.0699835	99.9661	0			99.9966		0.0111352		100		0.0820587
H2S			0	0	0			0		0		0		0
Nitrogen			0.00861541	6.57579E-05	0.018			2.35845E-06		8.58123E-05		0		0.0534187
Carbon Dioxide			0.0296739	0.00107402	0.031			0.000651182		0.00243035		0		0.107376
Methane			5.04714	0.0252359	4.766			0.00179381		0.152380		0		24.0529
Ethane			5.00264	0.00600500	5.726			0.000615304		0.831245		0		14.6578
Propane			3.59434	0.000811433	6.545			6.05346E-05		1.60227		0		7.09581
Isobutane			1.83482	0.000112351	2.067			5.97544E-06		1.33052		0		2.62428
n-Butane			4.61149	0.000244228	5.909			1.68147E-05		3.81004		0		5.91304
2,2-Dimethylpropane			0.0157092	3.01658E-07	0.174			1.01899E-08		0.0140577		0		0.0177131
Isopentane			3.30653	4.88707E-05	3.77			2.42792E-06		3.34702		0		2.99691
n-Pentane			3.93034	1.64971E-05	4.872			3.37792E-07		4.13003		0		3.31624
2,2-Dimethylbutane			0.0520327	1.31971E-07	0.188			2.44625E-09		0.0569985		0		0.0390340
Cyclopentane			0	0	0			0		0		0		0
2,3-Dimethylbutane			0.138859	5.98239E-07	0.408			2.45132E-08		0.155178		0		0.0961029
2-Methylpentane			0.919609	2.27751E-06	2.525			6.36615E-08		1.03361		0		0.615213
3-Methylpentane			0.639865	3.56852E-06	1.645			2.37016E-07		0.722947		0		0.419325
n-Hexane			20.1085	1.67327E-05	4.43			2.35600E-07		22.9645		0		12.2841
Methylcyclopentane			0.413545	3.09737E-06	0.924			3.27770E-07		0.471764		0		0.263485
Benzene			0.131629	8.45420E-05	0.283			7.71441E-05		0.150565		0		0.0829694
Cyclohexane			0.525455	6.62014E-06	0.99			1.43230E-06		0.606080		0		0.308559
2-Methylhexane			1.52451	8.42093E-07	2.385			1.62566E-08		1.77632		0		0.808643
3-Methylhexane			1.24629	7.49719E-07	1.879			1.72135E-08		1.45451		0		0.655100
2,2,4-Trimethylpentane			0	0	0			0		0		0		0
Heptane			3.43838	6.66978E-07	4.792			6.95291E-09		4.02688		0		1.75130
Methylcyclohexane			2.44943	5.57965E-06	3.402			5.87425E-07		2.86833		0		1.28037
Toluene			0.560165	7.41119E-05	0.744			6.57329E-05		0.657166		0		0.291161
Octane			8.68886	2.03615E-07	9.689			9.08756E-10		10.2602		0		4.22317
Ethylbenzene			0.463504	1.69371E-05	0.51			1.48232E-05		0.547525		0		0.228625
m-Xylene			0.712182	1.48803E-05	0.777			1.21857E-05		0.841512		0		0.350995
o-Xylene			0.735549	3.14638E-05	0.793			2.87138E-05		0.869449		0		0.363101
Nonane			5.48929	4.23341E-08	5.657			1.93101E-10		6.49765		0		2.68863
C10+			24.3111	7.65384E-09	24.101			5.02839E-10		28.8075		0		12.3326
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			0.0608794	1376.64	0			1376.62		0.00817463		1387.91		0.140522
H2S			0	0	0			0		0		0		0
Nitrogen			0.00749464	0.000905553	0.0157970			3.24681E-05		6.29973E-05		0		0.0914770
Carbon Dioxide			0.0258137	0.0147903	0.0272060			0.00896462		0.00178419		0		0.183876
Methane			4.39056	0.347524	4.18270			0.0246949		0.111866		0		41.1894
Ethane			4.35186	0.0826950	5.02521			0.00847070		0.610240		0		25.1007
Propane			3.12676	0.0111743	5.74398			0.000833361		1.17627		0		12.1512
Isobutane			1.59613	0.00154720	1.81403			8.22620E-05		0.976769		0		4.49396
n-Butane			4.01159	0.00336328	5.18581			0.000231483		2.79706		0		10.1258
2,2-Dimethylpropane			0.0136656	4.15414E-06	0.152705			1.40281E-07		0.0103201		0		0.0303329
Isopentane			2.87639	0.000673000	3.30860			3.34245E-05		2.45714		0		5.13206
n-Pentane			3.41905	0.000227182	4.27573			4.65027E-06		3.03197		0		5.67890
2,2-Dimethylbutane			0.0452638	1.81737E-06	0.164991			3.36768E-08		0.0418442		0		0.0668439
Cyclopentane			0	0	0			0		0		0		0
2,3-Dimethylbutane			0.120795	8.23837E-06	0.358066			3.37465E-07		0.113920		0		0.164572
2-Methylpentane			0.799978	3.13637E-05	2.21597			8.76408E-07		0.758805		0		1.05352
3-Methylpentane			0.556626	4.91422E-05	1.44367			3.26293E-06		0.530736		0		0.718075
n-Hexane			17.4926	0.000230427	3.88783			3.24343E-06		16.8589		0		21.0359
Methylcyclopentane			0.359747	4.26540E-05	0.810914			4.51230E-06		0.346335		0		0.451205
Benzene			0.114505	0.00116423	0.248364			0.00106202		0.110534		0		0.142081
Cyclohexane			0.457100	9.11662E-05	0.868837			1.97180E-05		0.444940		0		0.528392
2-Methylhexane			1.32619	1.15965E-05	2.09311			2.23799E-07		1.30405		0		1.38476
3-Methylhexane			1.08416	1.03244E-05	1.64903			2.36974E-07		1.06780		0		1.12183
2,2,4-Trimethylpentane			0	0	0			0		0		0		0
Heptane			2.99108	9.18497E-06	4.20552			9.57186E-08		2.95624		0		2.99902
Methylcyclohexane			2.13078	7.68375E-05	2.98564			8.08689E-06		2.10572		0		2.19258
Toluene			0.487294	0.00102060	0.652944			0.000904925		0.482444		0		0.498599
Octane			7.55854	2.80399E-06	8.50319			1.25106E-08		7.53234		0		7.23199
Ethylbenzene			0.403207	0.000233241	0.447583			0.000204066		0.401954		0		0.391509
m-Xylene			0.619535	0.000204917	0.681905			0.000167757		0.617777		0		0.601062
o-Xylene			0.639863	0.000433289	0.695947			0.000395294		0.638287		0		0.621794
Nonane			4.77520	5.82984E-07	4.96466			2.65836E-09		4.77011		0		4.60415
C10+			21.1485	1.05401E-07	21.1513			6.92243E-09		21.1484		0		21.1191
Mass Fraction	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water			0.0114082	99.9601	0			99.9945		0.00161811		100		0.0204202
H2S			0	0	0			0		0		0		0
Nitrogen			0.00218385	0.000102246	0.00462242			3.66726E-06		1.93904E-05		0		0.0206706
Carbon Dioxide			0.0118169	0.00262355	0.0125066			0.00159074		0.000862753		0		0.0652750
Methane			0.732653	0.0224710	0.700900			0.00159734		0.0197183		0		5.33006
Ethane			1.36113	0.0100223	1.57834			0.00102697		0.201614		0		6.08809
Propane			1.43416	0.00198601	2.64567			0.000148166		0.569903		0		4.32206
Isobutane			0.964980	0.000362454	1.10132			1.92780E-05		0.623783		0		2.10691
n-Butane			2.42530	0.000787900	3.14838			5.42478E-05		1.78626		0		4.74730
2,2-Dimethylpropane			0.0102557	1.20803E-06	0.115082			4.08082E-08		0.00818113		0		0.0176530
Isopentane			2.15865	0.000195709	2.49345			9.72331E-06		1.94787		0		2.98673
n-Pentane			2.56591	6.60646E-05	3.22231			1.35278E-06		2.40356		0		3.30498
2,2-Dimethylbutane			0.0405734	6.31238E-07	0.148515			1.17013E-08		0.0396203		0		0.0464644
Cyclopentane			0	0	0			0		0		0		0
2,3-Dimethylbutane			0.108278	2.86148E-06	0.322310			1.17255E-07		0.107866		0		0.114397
2-Methylpentane			0.717081	1.08937E-05	1.99469			3.04516E-07		0.718477		0		0.732322
3-Methylpentane			0.498946	1.70688E-05	1.29951			1.13373E-06		0.502529		0		0.499147
n-Hexane			15.6799	8.00354E-05	3.49959			1.12696E-06		15.9629		0		14.6224
Methylcyclopentane			0.314925	1.44687E-05	0.712863			1.53116E-06		0.320258		0		0.306304
Benzene			0.0930357	0.000366540	0.202644			0.000334480		0.0948665		0		0.0895218
Cyclohexane			0.400148	3.09245E-05	0.763781			6.69092E-06		0.411438		0		0.358703

2-Methylhexane			1.38226	4.68348E-06	2.19076			9.04179E-08		1.43572		0		1.11925
3-Methylhexane			1.13000	4.16972E-06	1.72597			9.57406E-08		1.17561		0		0.906729
2,2,4-Trimethylpentane			0	0	0			0		0		0		0
Heptane			3.11754	3.70954E-06	4.40173			3.86716E-08		3.25474		0		2.42399
Methylcyclohexane			2.17619	3.04081E-05	3.06207			3.20149E-06		2.27169		0		1.73652
Toluene			0.467024	0.000379019	0.628412			0.000336181		0.488413		0		0.370567
Octane			8.98089	1.29097E-06	10.1458			5.76198E-09		9.45374		0		6.66358
Ethylbenzene			0.445263	9.98049E-05	0.496343			8.73519E-05		0.468875		0		0.335273
m-Xylene			0.684155	8.76852E-05	0.756194			7.18094E-05		0.720631		0		0.514726
o-Xylene			0.706603	0.000185407	0.771765			0.000169208		0.744555		0		0.532480
Nonane			6.37049	3.01368E-07	6.65107			1.37470E-09		6.72206		0		4.76320
C10+			45.0082	8.69196E-08	45.2034			5.71063E-09		47.5426		0		34.8542
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			1.09676	24800.5	0			24800.3		0.147268		25003.7		2.53154
H2S			0	0	0			0		0		0		0
Nitrogen			0.209950	0.0253676	0.442529			0.000909540		0.00176477		0		2.56258
Carbon Dioxide			1.13605	0.650914	1.19732			0.394528		0.0785212		0		8.09229
Methane			70.4354	5.57514	67.1008			0.396166		1.79461		0		660.780
Ethane			130.856	2.48656	151.103			0.254706		18.3493		0		754.755
Propane			137.876	0.492736	253.284			0.0367476		51.8683		0		535.816
Isobutane			92.7708	0.0899264	105.435			0.00478125		56.7720		0		261.199
n-Butane			233.162	0.195481	301.411			0.0134543		162.571		0		588.534
2,2-Dimethylpropane			0.985959	0.000299716	11.0175			1.01211E-05		0.744584		0		2.18848
Isopentane			207.528	0.0485561	238.711			0.00241154		177.280		0		370.272
n-Pentane			246.680	0.0163909	308.489			0.000335512		218.753		0		409.726
2,2-Dimethylbutane			3.90063	0.000156613	14.2182			2.90211E-06		3.60594		0		5.76029
Cyclopentane			0	0	0			0		0		0		0
2,3-Dimethylbutane			10.4095	0.000709944	30.8565			2.90812E-05		9.81713		0		14.1820
2-Methylpentane			68.9384	0.00270278	190.962			7.55248E-05		65.3903		0		90.7877
3-Methylpentane			47.9675	0.00423485	124.409			0.000281184		45.7363		0		61.8804
n-Hexane			1507.43	0.0198571	335.035			0.000279504		1452.82		0		1812.78
Methylcyclopentane			30.2761	0.00358974	68.2461			0.000379753		29.1474		0		37.9732
Benzene			8.94422	0.0909401	19.4002			0.0829563		8.63403		0		11.0982
Cyclohexane			38.4693	0.00767250	73.1208			0.00165946		37.4459		0		44.4692
2-Methylhexane			132.887	0.00116199	209.733			2.24251E-05		130.668		0		138.756
3-Methylhexane			108.635	0.00103452	165.236			2.37452E-05		106.995		0		112.409
2,2,4-Trimethylpentane			0	0	0			0		0		0		0
Heptane			299.712	0.000920352	421.401			9.59119E-06		296.221		0		300.508
Methylcyclohexane			209.213	0.00754437	293.148			0.000794020		206.752		0		215.280
Toluene			44.8985	0.0940362	60.1612			0.0833784		44.4516		0		45.9401
Octane			863.401	0.000320295	971.307			1.42906E-06		860.407		0		826.099
Ethylbenzene			42.8065	0.0247620	47.5176			0.0216647		42.6734		0		41.5646
m-Xylene			65.7729	0.0217550	72.3945			0.0178099		65.5863		0		63.8117
o-Xylene			67.9310	0.0460002	73.8852			0.0419664		67.7638		0		66.0128
Nonane			612.444	7.47707E-05	636.742			3.40948E-07		611.791		0		590.505
C10+			4326.98	2.15651E-05	4327.57			1.41633E-06		4326.97		0		4320.96

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		86.5890
Pressure	psig			176	176	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			110.514	18.0164	109.086			18.0157		123.973		18.0153		72.3946
Mass Density	lb/ft^3			45.0252	62.2666	45.0238			62.2225		45.6749		62.1852		39.8939
Molar Flow	lbmol/h			86.9911	1377.10	87.7613			1376.67		73.4128		1387.91		171.245
Mass Flow	lb/h			9613.76	24810.4	9573.53			24801.6		9101.24		25003.7		12397.2
Vapor Volumetric Flow	ft^3/h			213.520	398.454	212.633			398.595		199.261		402.084		310.755
Liquid Volumetric Flow	gpm			26.6206	49.6774	26.5101			49.6950		24.8430		50.1299		38.7435
Std Vapor Volumetric Flow	MMSCFD			0.792282	12.5421	0.799296			12.5382		0.668616		12.6406		1.55964
Std Liquid Volumetric Flow	sgpm			27.0076	49.6347	26.9351			49.5833		24.7885		49.9841		39.8333
Compressibility				0.0823446	0.00970700	0.420597			0.000740267		0.00693964		0.0502914		0.314104
Specific Gravity				0.721916	0.998358	0.721893			0.997651		0.732333		0.997052		0.639643
API Gravity				63.1843	10.0331	61.3042			10.0026		59.7880		9.87799		84.2057
Enthalpy	Btu/h			-8.41547E+06	-1.69348E+08	-8.22939E+06			-1.69197E+08		-7.72636E+06		-1.70289E+08		-1.21267E+07
Mass Enthalpy	Btu/lb			-875.357	-6825.68	-859.598			-6822.03		-848.935		-6810.58		-978.178
Mass Cp	Btu/(lb*°F)			0.498523	0.982118	0.501758			0.981761		0.495373		0.979420		0.546379
Ideal Gas CpCv Ratio				1.04977	1.32581	1.04947			1.32555		1.04394		1.32512		1.07377
Dynamic Viscosity	cP			0.537307	0.995414	0.528012			0.924423		0.652779		0.840378		0.240003
Kinematic Viscosity	cSt			0.744983	0.997993	0.732118			0.927475		0.892212		0.843659		0.375569
Thermal Conductivity	Btu/(h*ft*°F)			0.0691396	0.346544	0.0675088			0.349776		0.0697380		0.353848		0.0643970
Surface Tension	lbf/ft			0.00144081	0.00502970?	0.000822055			0.00498763?		0.00158971		0.00492045		0.00062419
Net Ideal Gas Heating Value	Btu/ft^3			5556.91	0.369833	5481.86			0.0369373		6217.55		0		3685.20
Net Liquid Heating Value	Btu/lb			18916.5	-1051.57	18900.1			-1058.93		18865.7		-1059.76		19161.5
Gross Ideal Gas Heating Value	Btu/ft^3			5967.46	50.7006	5885.86			50.3486		6671.23		50.3101		3972.89
Gross Liquid Heating Value	Btu/lb			20325.4	8.56005	20304.3			0.842997		20253.6		0		20668.9

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															99.8726

H2S														0
Nitrogen														0.000331268
Carbon Dioxide														0.00355396
Methane														0.104854
Ethane														0.0162705
Propane														0.00161563
Isobutane														0.000154441
n-Butane														0.00349279
2,2-Dimethylpropane														3.42548E-07
Isopentane														4.67618E-05
n-Pentane														1.81674E-05
2,2-Dimethylbutane														1.12158E-07
Cyclopentane														0
2,3-Dimethylbutane														4.54647E-07
2-Methylpentane														1.91722E-06
3-Methylpentane														2.87826E-06
n-Hexane														1.36926E-05
Methylcyclopentane														2.51934E-06
Benzene														6.68133E-05
Cyclohexane														5.01476E-06
2-Methylhexane														5.16990E-07
3-Methylhexane														4.50436E-07
2,2,4-Trimethylpentane														0
Heptane														4.61824E-07
Methylcyclohexane														3.87733E-06
Toluene														5.38092E-05
Octane														1.59240E-07
Ethylbenzene														1.14554E-05
m-Xylene														1.08162E-05
o-Xylene														2.19916E-05
Nonane														2.75507E-08
C10+														6.70901E-09
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														1383.39
H2S														0
Nitrogen														0.00458856
Carbon Dioxide														0.0492277
Methane														1.45238
Ethane														0.225372
Propane														0.0223790
Isobutane														0.00213924
n-Butane														0.00483804
2,2-Dimethylpropane														4.74482E-06
Isopentane														0.000647722
n-Pentane														0.000251646
2,2-Dimethylbutane														1.55356E-06
Cyclopentane														0
2,3-Dimethylbutane														6.29756E-06
2-Methylpentane														2.65564E-05
3-Methylpentane														3.98683E-05
n-Hexane														0.000189664
Methylcyclopentane														3.48968E-05
Benzene														0.000925467
Cyclohexane														6.94620E-05
2-Methylhexane														7.16111E-06
3-Methylhexane														6.23923E-06
2,2,4-Trimethylpentane														0
Heptane														6.39697E-06
Methylcyclohexane														5.37070E-05
Toluene														0.000745340
Octane														2.20571E-06
Ethylbenzene														0.000158675
m-Xylene														0.000149821
o-Xylene														0.000304618
Nonane														3.81620E-07
C10+														9.29300E-08
Mass Fraction	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water														99.8635
H2S														0
Nitrogen														0.000515068
Carbon Dioxide														0.00868116
Methane														0.0933626
Ethane														0.0271544
Propane														0.00395419
Isobutane														0.000498222
n-Butane														0.00112677
2,2-Dimethylpropane														1.37173E-06
Isopentane														0.000187258
n-Pentane														7.27514E-05
2,2-Dimethylbutane														5.36453E-07
Cyclopentane														0
2,3-Dimethylbutane														2.17459E-06
2-Methylpentane														9.17010E-06
3-Methylpentane														1.37668E-05
n-Hexane														6.54921E-05
Methylcyclopentane														1.17682E-05
Benzene														0.000289667
Cyclohexane														2.34246E-05
2-Methylhexane														2.87526E-06
3-Methylhexane														2.50512E-06
2,2,4-Trimethylpentane														0

Heptane															2.56846E-06
Methylcyclohexane															2.11301E-05
Toluene															0.000275180
Octane															1.00959E-06
Ethylbenzene															6.75012E-05
m-Xylene															6.37348E-05
o-Xylene															0.00129586
Nonane															1.96122E-07
C10+															7.61874E-08
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															24922.1
H2S															0
Nitrogen															0.128541
Carbon Dioxide															2.16649
Methane															23.2998
Ethane															6.77671
Propane															0.986816
Isobutane															0.124337
n-Butane															0.281198
2,2-Dimethylpropane															0.000342333
Isopentane															0.0467324
n-Pentane															0.0181560
2,2-Dimethylbutane															0.000133878
Cyclopentane															0
2,3-Dimethylbutane															0.000542694
2-Methylpentane															0.00228851
3-Methylpentane															0.00343566
n-Hexane															0.0163443
Methylcyclopentane															0.00293689
Benzene															0.0722899
Cyclohexane															0.00584589
2-Methylhexane															0.000717557
3-Methylhexane															0.000625183
2,2,4-Trimethylpentane															0
Heptane															0.000640989
Methylcyclohexane															0.00527327
Toluene															0.0686744
Octane															0.000251955
Ethylbenzene															0.0168457
m-Xylene															0.0159058
o-Xylene															0.0323397
Nonane															4.89447E-05
C10+															1.90135E-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														86.5890
Pressure	psig														1000
Mole Fraction Vapor	%														0
Mole Fraction Light Liquid	%														0
Mole Fraction Heavy Liquid	%														100
Molecular Weight	lb/lbmol														18.0169
Mass Density	lb/ft^3														62.0711
Molar Flow	lbmol/h														1385.15
Mass Flow	lb/h														24956.2
Vapor Volumetric Flow	ft^3/h														402.058
Liquid Volumetric Flow	gpm														50.1268
Std Vapor Volumetric Flow	MMSCFD														12.6154
Std Liquid Volumetric Flow	sgpm														50.0262
Compressibility															0.0502418
Specific Gravity															0.995223
API Gravity															10.0917
Enthalpy	Btu/h														-1.69766E+08
Mass Enthalpy	Btu/lb														-6802.58
Mass Cp	Btu/(lb*°F)														0.980387
Ideal Gas CpCv Ratio															1.32497
Dynamic Viscosity	cP														0.816643
Kinematic Viscosity	cSt														0.821339
Thermal Conductivity	Btu/(h*ft*°F)														0.352644
Surface Tension	lbf/ft														0.00489654?
Net Ideal Gas Heating Value	Btu/ft^3														1.28025
Net Liquid Heating Value	Btu/lb														-1031.41
Gross Ideal Gas Heating Value	Btu/ft^3														51.6614
Gross Liquid Heating Value	Btu/lb														29.7537

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															88.8930
H2S															0
Nitrogen															0.00617230
Carbon Dioxide															0.0149771

Methane														2.73978
Ethane														1.62723
Propane														0.782166
Isobutane														0.288879
n-Butane														0.650903
2,2-Dimethylpropane														0.00194922
Isopentane														0.329781
n-Pentane														0.364891
2,2-Dimethylbutane														0.00429488
Cyclopentane														0
2,3-Dimethylbutane														0.0105743
2-Methylpentane														0.0676915
3-Methylpentane														0.0461395
n-Hexane														1.35159
Methylcyclopentane														0.0289926
Benzene														0.00918831
Cyclohexane														0.0339541
2-Methylhexane														0.0889728
3-Methylhexane														0.0720788
2,2,4-Trimethylpentane														0
Heptane														0.192690
Methylcyclohexane														0.140878
Toluene														0.0320833
Octane														0.464662
Ethylbenzene														0.0251650
m-Xylene														0.0386284
o-Xylene														0.0399704
Nonane														0.295821
C10+														1.35692
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														1383.53
H2S														0
Nitrogen														0.0960655
Carbon Dioxide														0.233104
Methane														42.6418
Ethane														25.3261
Propane														12.1736
Isobutane														4.49610
n-Butane														10.1306
2,2-Dimethylpropane														0.0303377
Isopentane														5.13271
n-Pentane														5.67915
2,2-Dimethylbutane														0.0668454
Cyclopentane														0
2,3-Dimethylbutane														0.164578
2-Methylpentane														1.05355
3-Methylpentane														0.718115
n-Hexane														21.0361
Methylcyclopentane														0.451240
Benzene														0.143007
Cyclohexane														0.528461
2-Methylhexane														1.38477
3-Methylhexane														1.12183
2,2,4-Trimethylpentane														0
Heptane														2.99903
Methylcyclohexane														2.19263
Toluene														0.499344
Octane														7.23199
Ethylbenzene														0.391668
m-Xylene														0.601212
o-Xylene														0.622099
Nonane														4.60415
C10+														21.1191
Mass Fraction	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water														66.7266
H2S														0
Nitrogen														0.00720448
Carbon Dioxide														0.0274641
Methane														1.83137
Ethane														2.03872
Propane														1.43709
Isobutane														0.699597
n-Butane														1.57633
2,2-Dimethylpropane														0.00585977
Isopentane														0.991391
n-Pentane														1.09694
2,2-Dimethylbutane														0.0154214
Cyclopentane														0
2,3-Dimethylbutane														0.0379686
2-Methylpentane														0.243057
3-Methylpentane														0.165671
n-Hexane														4.85308
Methylcyclopentane														0.101667
Benzene														0.0299049
Cyclohexane														0.119065
2-Methylhexane														0.371470
3-Methylhexane														0.300936
2,2,4-Trimethylpentane														0
Heptane														0.804500
Methylcyclohexane														0.576348
Toluene														0.123171

Octane														2.21158
Ethylbenzene														0.111319
m-Xylene														0.170875
o-Xylene														0.176811
Nonane														1.58086
C10+														11.5678
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														24924.7
H2S														0
Nitrogen														2.69112
Carbon Dioxide														10.2588
Methane														684.080
Ethane														761.532
Propane														536.803
Isobutane														261.323
n-Butane														588.815
2,2-Dimethylpropane														2.18883
Isopentane														370.319
n-Pentane														409.744
2,2-Dimethylbutane														5.76043
Cyclopentane														0
2,3-Dimethylbutane														14.1826
2-Methylpentane														90.7900
3-Methylpentane														61.8838
n-Hexane														1812.79
Methylcyclopentane														37.9762
Benzene														11.1705
Cyclohexane														44.4750
2-Methylhexane														138.757
3-Methylhexane														112.410
2,2,4-Trimethylpentane														0
Heptane														300.508
Methylcyclohexane														215.286
Toluene														46.0088
Octane														826.099
Ethylbenzene														41.5814
m-Xylene														63.8276
o-Xylene														66.0451
Nonane														590.505
C10+														4320.96

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														86.5890
Pressure	psig														1000
Mole Fraction Vapor	%														0
Mole Fraction Light Liquid	%														11.0027
Mole Fraction Heavy Liquid	%														88.9973
Molecular Weight	lb/lbmol														23.9999
Mass Density	lb/ft^3														52.4028
Molar Flow	lbmol/h														1556.40
Mass Flow	lb/h														37353.4
Vapor Volumetric Flow	ft^3/h														712.814
Liquid Volumetric Flow	gpm														88.8703
Std Vapor Volumetric Flow	MMSCFD														14.1751
Std Liquid Volumetric Flow	sgpm														89.8594
Compressibility															0.0792737
Specific Gravity															0.840206
API Gravity															35.0372
Enthalpy	Btu/h														-1.81893E+08
Mass Enthalpy	Btu/lb														-4869.52
Mass Cp	Btu/(lb*°F)														0.836344
Ideal Gas CpCv Ratio															1.23640
Dynamic Viscosity	cP														0.565254
Kinematic Viscosity	cSt														0.673392
Thermal Conductivity	Btu/(h*ft*°F)														0.226981
Surface Tension	lbf/ft														0.00303399?
Net Ideal Gas Heating Value	Btu/ft^3														406.609
Net Liquid Heating Value	Btu/lb														5670.41
Gross Ideal Gas Heating Value	Btu/ft^3														483.101
Gross Liquid Heating Value	Btu/lb														6879.67

September 26, 2013

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

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

Sample: Prunty No. 1H (Lockhart Heirs Pad)
Separator Hydrocarbon Liquid
Sampled @ 200 psig & 66 oF

Date Sampled: 09/05/13 Job Number: 35453.002

CHROMATOGRAPH EXTENDED ANALYSIS- GPA 2186-M

COMPONENT	MOL%	LIQ VOL%	WT%
Nitrogen	0.018	0.004	0.005
Carbon Dioxide	0.031	0.011	0.013
Methane	4.766	1.667	0.703
Ethane	5.726	3.161	1.584
Propane	6.545	3.722	2.654
Isobutane	2.067	1.396	1.105
n-Butane	5.909	3.845	3.159
2,2 Dimethylpropane	0.174	0.138	0.116
Isopentane	3.770	2.846	2.502
n-Pentane	4.872	3.645	3.233
2,2 Dimethylbutane	0.188	0.162	0.149
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.408	0.345	0.323
2 Methylpentane	2.525	2.163	2.001
3 Methylpentane	1.645	1.386	1.304
n-Hexane	4.430	3.760	3.511
Heptanes Plus	56.925	71.749	77.639
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

Specific Gravity	0.7695	(Water-1)
°API Gravity	52.38	@ 60°F
Molecular Weight	148.3	
Vapor Volume	16.47	CF/Gal
Weight	6.41	Lbs/Gal

Characteristics of Total Sample:

Specific Gravity	0.7111	(Water=1)
°API Gravity	67.48	@ 60°F
Molecular Weight	108.7	
Vapor Volume	20.76	CF/Gal
Weight	5.93	Lbs/Gal

Base Conditions: 14.850 PSI & 60 oF

Certified: FESCO, Ltd. - Alice, Texas

Analyst: XG
Processor: JCdjv
Cylinder ID: W-1106

David Dannhaus 361-661-7015

TANKS DATA INPUT REPORT

COMPONENT	Mol%	LiqVol%	Wt%
Carbon Dioxide	0.031	0.011	0.013
Nitrogen	0.018	0.004	0.005
Methane	4.766	1.667	0.703
Ethane	5.726	3.161	1.584
Propane	6.545	3.722	2.654
Isobutane	2.067	1.396	1.105
n-Butane	6.083	3.983	3.274
Isopentane	3.770	2.846	2.502
n-Pentane	4.872	3.645	3.233
Other C-6's	4.766	4.057	3.778
Heptanes	10.970	9.986	9.818
Octanes	13.091	12.723	13.001
Nonanes	5.657	6.431	6.603
Decanes Plus	24.100	40.280	45.352
Benzene	0.283	0.163	0.203
Toluene	0.744	0.514	0.630
E-Benzene	0.510	0.406	0.498
Xylenes	1.570	1.245	1.533
n-Hexane	4.430	3.760	3.511
2,2,4 Trimethylpentane	0.000	0.000	0.000
Totals:	100.000	100.000	100.000

Characteristics of Total Sample:

Specific Gravity	0.7111	(Water-1)
°API Gravity	67.48	@ 60°F
Molecular Weight	108.7	
Vapor Volume	20.76	CF/Gal
Weight	5.93	Lbs/Gal

Characteristics of Decanes (C10) Plus:

Specific Gravity	0.8007	(Water-1)
Molecular Weight	204.6	

Characteristics of Atmospheric Sample:

°API Gravity	59.13	@ 60°F
Reid Vapor Pressure (ASTM D-5191)	3.41	psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
Cylinder Number	------	W-1106*	W-1020
Pressure, PSIG	200	176	173
Temperature, °F	66	70	70

* Sample used for analysis

TOTAL EXTENDED REPORT

COMPONENT	Mol%	LiqVol%	Wt%
Nitrogen	0.018	0.004	0.005
Carbon Dioxide	0.031	0.011	0.013
Methane	4.766	1.667	0.703
Ethane	5.726	3.161	1.584
Propane	6.545	3.722	2.654
Isobutane	2.067	1.396	1.105
n-Butane	5.909	3.845	3.159
2,2 Dimethylpropane	0.174	0.138	0.116
Isopentane	3.770	2.846	2.502
n-Pentane	4.872	3.645	3.233
2,2 Dimethylbutane	0.188	0.162	0.149
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.408	0.345	0.323
2 Methylpentane	2.525	2.163	2.001
3 Methylpentane	1.645	1.386	1.304
n-Hexane	4.430	3.760	3.511
Methylcyclopentane	0.924	0.675	0.715
Benzene	0.283	0.163	0.203
Cyclohexane	0.990	0.695	0.766
2-Methylhexane	2.385	2.288	2.198
3-Methylhexane	1.879	1.780	1.732
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	0.950	0.888	0.867
n-Heptane	3.842	3.658	3.540
Methylcyclohexane	3.402	2.823	3.072
Toluene	0.744	0.514	0.630
Other C-8's	6.777	6.822	6.870
n-Octane	2.912	3.079	3.059
E-Benzene	0.510	0.406	0.498
M & P Xylenes	0.777	0.622	0.758
0-Xylene	0.793	0.623	0.775
Other C-9's	3.760	4.227	4.366
n-Nonane	1.897	2.203	2.238
Other C-1O's	3.702	4.574	4.810
n-decane	1.350	1.710	1.766
Undecanes(11)	3.614	4.581	4.885
Dodecanes(12)	2.655	3.636	3.932
Tridecanes(13)	2.209	3.243	3.555
Tetradecanes(14)	1.728	2.718	3.020
Pentadecanes(15)	1.331	2.242	2.521
Hexadecanes(16)	1.068	1.923	2.181
Heptadecanes(17)	0.926	1.763	2.018
Octadecanes(18)	0.821	1.647	1.896
Nonadecanes(19)	0.691	1.442	1.670
Eicosanes(20)	0.601	1.304	1.519
Heneicosanes(21)	0.459	1.048	1.228
Docosanes(22)	0.372	0.884	1.042
Tricosanes(23)	0.349	0.862	1.021
Tetracosanes(24)	0.313	0.800	0.952
Pentacosanes(25)	0.261	0.693	0.829
Hexacosanes(26)	0.243	0.668	0.803
Heptacosanes(27)	0.193	0.550	0.664
Octacosanes(28)	0.192	0.565	0.684
Nonacosanes(29)	0.157	0.479	0.582
Triacontanes(30)	0.150	0.470	0.574
Hentriacontanes Plus(31+)	0.717	2.481	3.199
Total	100.000	100.000	100.000

October 7, 2013

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

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

Date Sampled: 09/05/13

Date Analyzed: 09/13/13

Job Number: J35434

Sample: Prunty No. 1H (Lockhart Heirs Pad)

FLASH LIBERATION OF SEPARATOR WATER		
	Separator	Stock Tank
Pressure, psig	200	0
Temperature, "F	66	70
Gas Water Ratio (1)	------	1.55
Gas Specific Gravity (2)	------	0.922

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

Piston No. : WF-133*

Base Conditions: 14.85 PSI & 60 "F

Certified: FESCO, Ltd. Alice, Texas

David Dannhaus 361-661-7015

September 18, 2013

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

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

Sample: Prunty No. 1H (Lockhart Heirs Pad)
Gas Liberated from Separator Water
From 200 psig & 66 oF to 0 psig & 70 oF

Date Sampled: 09/05/13 Job Number: 35453.001

CHROMATOGRAPH EXTENDED ANALYSIS SUMMATION REPORT

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.000	
Carbon Dioxide	1.891	
Methane	63.614	
Ethane	17.120	4.615
Propane	7.633	2.119
Isobutane	1.356	0.447
n-Butane	3.304	1.050
2-2 Dimethylpropane	0.064	0.025
Isopentane	1.192	0.439
n-Pentane	1.225	0.448
Hexanes	1.136	0.472
Heptanes Plus	1.465	0.652
Totals	100.000	10.266

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.602	(Air=1)
Molecular Weight	103.68	
Gross Heating Value	5501	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	0.922	(Air=1)
Compressibility (Z)	0.9937	
Molecular Weight	26.54	
Gross Heating Value		
Dry Basis	1548	BTU/CF
Saturated Basis	1522	BTU/CF

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

Base Conditions: 14.850 PSI & 60 Deg F

Certified: FESCO, Ltd. Alice, Texas

Analyst: MR
Processor: ANB
Cylinder ID: WF# 13 S

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT

COMPONENT	MOL%	GPM	WT%
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.000		0.000
Carbon Dioxide	1.891		3.135
Methane	63.614		38.445
Ethane	17.120	4.615	19.393
Propane	7.633	2.119	12.680
lsobutane	1.356	0.447	2.969
n-Butane	3.304	1.050	7.234
2,2 Dimethylpropane	0.064	0.025	0.174
lsopentane	1.192	0.439	3.240
n-Pentane	1.225	0.448	3.330
2,2 Dimethylbutane	0.035	0.015	0.114
Cyclopentane	0.019	0.008	0.050
2,3 Dimethylbutane	0.060	0.025	0.195
2 Methylpentane	0.334	0.140	1.084
3 Methylpentane	0.207	0.085	0.672
n-Hexane	0.481	0.199	1.562
Methylcyclopentane	0.071	0.025	0.225
Benzene	0.042	0.012	0.124
Cyclohexane	0.089	0.031	0.282
2-Methylhexane	0.113	0.053	0.427
3-Methylhexane	0.108	0.050	0.408
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C?'s	0.121	0.053	0.452
n-Heptane	0.183	0.085	0.691
Methylcyclohexane	0.161	0.065	0.596
Toluene	0.057	0.019	0.198
Other C8's	0.217	0.102	0.901
n-Octane	0.070	0.036	0.301
Ethylbenzene	0.003	0.001	0.012
M & P Xylenes	0.031	0.012	0.124
0-Xylene	0.005	0.002	0.020
Other C9's	0.099	0.051	0.471
n-Nonane	0.033	0.019	0.159
Other C10's	0.044	0.026	0.234
n-Decane	0.010	0.006	0.054
Undecanes (11)	0.008	0.005	0.044
Totals	100.000	10.266	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity----------	0.922	(Air-1)
Compressibility (Z) ----------	0.9937	
Molecular Weight----------	26.54	

Gross Heating Value

Dry Basis ----------	1548	BTU/CF
Saturated Basis ----------	1522	BTU/CF

GAS ANALYTICAL SERVICES

C6+ Gas Analysis Report

Gas Analytical

Report Date: Feb 26, 2016 7:27a

Client:	Antero Resources	Date Sampled:	Feb 18, 2016 9:40a
Site:	Pike Unit 2H	Analysis Date:	Feb 25, 2016 11:54a
Field No:	9998	Collected By:	M. Hileman
Meter:	40551	Date Effective:	Feb 18, 2016 12:00a
Source Laboratory	Clarksburg (Bridgeport), WV	Sample Pressure (PSI):	219.0
Lab File No:	**X_CH1-9841.CHR**	Sample Temp (°F):	61
Sample Type:	Spot	Field H2O:	No Test
Reviewed By:		Field H2S:	No Test

Component	Mol %	Gal/MSCF
Methane	80.6676	
Ethane	13.4543	3.58
Propane	2.6759	0.74
I-Butane	0.5461	0.18
N-Butane	0.9324	0.29
I-Pentane	0.2731	0.10
N-Pentane	0.2342	0.08
Nitrogen	0.4154	
Oxygen	<MDL	
Carbon Dioxide	0.1709	
Hexanes+	0.6301	0.26
TOTAL	100.0000	5.23

Analytical Results at Base Conditions (Real)		
BTU/SCF (Dry):	1,227.4562	BTU/ft³
BTU/SCF (Saturated):	1,206.9708	BTU/ft³
PSIA:	14.730	PSI
Temperature (°F):	60.00	°F
Z Factor (Dry):	0.99669	
Z Factor (Saturated):	0.99629	

Analytical Results at Contract Conditions (Real)		
BTU/SCF (Dry):	1,227.4562	BTU/ft³
BTU/SCF (Saturated):	1,206.9708	BTU/ft³
PSIA:	14.730	PSI
Temperature (°F):	60.00	°F
Z Factor (Dry):	0.99669	
Z Factor (Saturated):	0.99629	

Calculated Specific Gravities			
Ideal Gravity:	0.6964	Real Gravity:	0.6985
Molecular Wt:	20.1707	lb/lbmol	

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

Source	Date	Notes

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

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 (CO_2e)	
	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									0.2756	0.3064						
EP-PCV					0.0855	0.3743							0.3751	1.6428	9.3788	41.0792
F001					3.5737	15.6526							3.4767	15.2278	86.9165	380.6942
EP-L001					8.7254	5.6397							0.4589	0.2966	11.4981	7.4318
EP-L002					0.0007	0.0009							0.0376	0.0487	0.9860	1.2747
EP-GPU001, EP-GPU002, EP-GPU003, EP-GPU004, EP-GPU005, EP-GPU006, EP-GPU007, EP-GPU008, EP-GPU009, EP-GPU010 (emissions per EPN)	0.1222	0.5353	0.1027	0.4496	0.0067	0.0294	0.0007	0.0032	0.0093	0.0407	0.0093	0.0407	0.0028	0.0123	146.6447	642.3040
EP-LH001, EP-LH002, EP-LH003, EP-LH004, EP-LH005, EP-LH006, EP-LH007, EP-LH008, EP-LH009, EP-LH010 (emissions per EPN)	0.1629	0.7137	0.1369	0.5995	0.0090	0.0393	0.0010	0.0043	0.0124	0.0542	0.0124	0.0542	0.0037	0.0164	195.5263	856.4053
EP-EC001 -003 (emissions per EPN)	0.8177	3.5815	3.7214	16.2999	2.2553	9.8781	1.02E-05	4.47E-05	0.0124	0.0545	0.0093	0.0409	0.4468	1.9569	474.0210	2076.2119
TOTAL	5.3045	23.2338	13.5595	59.3905	15.6488	35.9619	0.0171	0.0751	0.2540	1.1127	0.2447	1.0718	1.9025	6.5032	4856.2578	21224.4351

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	0.0157	0.0689	0.0157	0.0689
F001			0.0065	0.0286	0.0202	0.0886	0.0160	0.0700	0.0492	0.2155	0.2576	1.1284	0.3496	1.5311
EP-L001			0.0048	0.0031	0.0072	0.0046	0.0023	0.0015	0.0066	0.0043	1.3205	0.8535	1.3414	0.8670
EP-L002			1.59E-05	2.05E-05	4.58E-06	5.93E-06	3.99E-07	5.16E-07	8.99E-07	1.16E-06	8.68E-08	1.12E-07	2.18E-05	2.82E-05
EP-GPU001, EP-GPU002, EP-GPU003, EP-GPU004, EP-GPU005, EP-GPU006, EP-GPU007, EP-GPU008, EP-GPU009, EP-GPU010 (emissions per EPN)	9.17E-05	4.01E-04	2.57E-06	1.12E-05	4.15E-06	1.82E-05			0.00E+00	0.00E+00	0.0022	0.0096	0.0023	0.0101
EP-LH001, EP-LH002, EP-LH003, EP-LH004, EP-LH005, EP-LH006, EP-LH007, EP-LH008, EP-LH009, EP-LH010 (emissions per EPN)	1.22E-04	5.35E-04	3.42E-06	1.50E-05	5.54E-06	2.43E-05			0.00E+00	0.00E+00	0.0029	0.0128	0.0031	0.0134
EP-EC001 -003 (emissions per EPN)	1.28E-06	5.58E-06	2.15E-03	9.42E-03	3.10E-03	0.0136	9.22E-04	0.0040	0.0025	0.0107	0.3726	1.6318	0.3812	1.6696
TOTAL	0.0021	0.0094	0.0114	0.0317	0.0165	0.0457	0.0051	0.0136	0.0140	0.0365	2.4895	5.9737	2.5386	6.1109

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
Robert Williams Well Pad
Antero Resources Corporation
Doddridge, 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 20 Cabin Run Rd West Union, WV 26456, in Doddridge, West Virginia.

The latitude and longitude coordinates are: 39.237675 and -80.862658

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

Pollutants	TOTALS (tpy):
NO_X	23.2338
CO	59.3905
$PM_{2.5}$	1.0718
PM_{10}	1.1127
VOC	35.9619
SO_2	0.0751
CO_{2e}	21,224.44
Formaldehyde	0.0094
Benzene	0.0317
Toluene	0.0457
Ethylbenzene	0.0136
Xylenes	0.0365
Hexane	5.9737
Total HAPs	6.1109

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

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.
Dated this the __ day of _____, 2018

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

www.ghd.com