March 9, 2017 Reference No. 082715

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

Dear Ms. Beverly McKeone:

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

GHD Services Inc. (GHD) would like to submit this G70-D General Permit Modification application that we prepared on behalf of Antero Resources Corporation for an oil and gas facility identified as Jonathan Davis Well Pad.

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

1. Decrease in production.
2. Addition of one 1.5 MMBTU/hr GPU heater
3. Removal of one 1.0 MMBTU/hr GPU heater
4. Removal of 3 condensate tanks.
5. Removal of 1 Kubota engine

Please refer to Table 13 in Attachment S - Emissions Calculations for the summary of changes in emissions of regulated air pollutants that will result from the above operational changes.

Enclosed are the following documents:

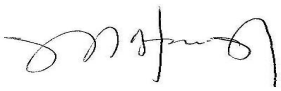
- Original copy of the G70-D General Permit Application.
- Two CD copies of the G70-D General Permit Application.
- The application fee with check no. 468474 in the amount of $1,500.00.

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

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

Sincerely,

GHD Services Inc.



Manuel Bautista

MB/ma/299

Encl.

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

General Permit G70-D Modification Application

Decrease in production, addition of 1-1.5 MMBtu/hr GPU heater, and removal of 1-1.0 MMBtu/hr GPU heater, 1- Kubota engine, and 3 condensate tanks

Jonathan Davis Well Pad

Antero Resources Corporation

GHD | 6320 Rothway Suite 100 Houston Texas 77040
082715 | Report No 299 | March 2017

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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: Jonathan Davis Well Pad

Operating Site Physical Address: 612 Ramseys Ridge Rd

City: West Union	Zip Code: 26456	County: Doddridge

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.29929
Longitude: -80.82890

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities) 085-00030

CERTIFICATION OF INFORMATION

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

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

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

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

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

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

OPERATING SITE INFORMATION
Briefly describe the proposed new operation and/or any change(s) to the facility: Decrease in production, addition of 1-1.5 MMBtu/hr GPU heater and removal of 1-1.0 MMBtu/hr GPU heater, 1- Kubota engine, and 3 condensate tanks.
Directions to the facility: Fro West Union, head north on Neely Ave toward Marie St/Old U.S. 50 E for 36 ft, Turn left at the 1st cross street onto Marie St/Old U.S. 50 W and continue to follow Old U.S. 50 W for 2.3 mi, Turn right onto US-50 W and go for 2.0 mi, Turn right onto Wilhelm Run Rd and go 0.1 mi, Continue onto Stone Valley Rd for 1.4 mi, Turn left onto Depot Rd and go 0.2 mi to find the destination 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 ☒

Jonathan Davis Well Pad calculation of potential to emit included all of the emission sources that belong to the same industrial grouping, are located on contiguous or adjacent properties, and are under the control of the same person. The nearest emission source that belongs to the same industrial grouping and under the control of the same person but not located on contiguous or adjacent property is Diane Davis well pad. This well pad is approximately of 0.46 mi northeast of the facility

Attachment B
Siting Criteria Waiver

Attachment B

Siting Waiver
Jonathan Davis 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 Jonathan Davis Well Pad.

Attachment C
Current Business Certificate

State of West Virginia

Certificate

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

ANTERO RESOURCES CORPORATION

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

Therefore, I issue this

CERTIFICATE OF AMENDMENT TO CERTIFICATE OF AUTHORITY

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

Natalie E Tennant

Secretary of State

FILED

JUN 10 2013

IN THE OFFICE OF SECRETARY OF STATE

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

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

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

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

APPLICATION FOR AMENDED CERTIFICATE OF AUTHORITY

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

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

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

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

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

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

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

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

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

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

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

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

Delaware

The First State

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

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

Jeffrey W. Bullock, Secretary of State

4520810 8100

130754186

AUTHENTICATION: 0496546

DATE: 06-10-13

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

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

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

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

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

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

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

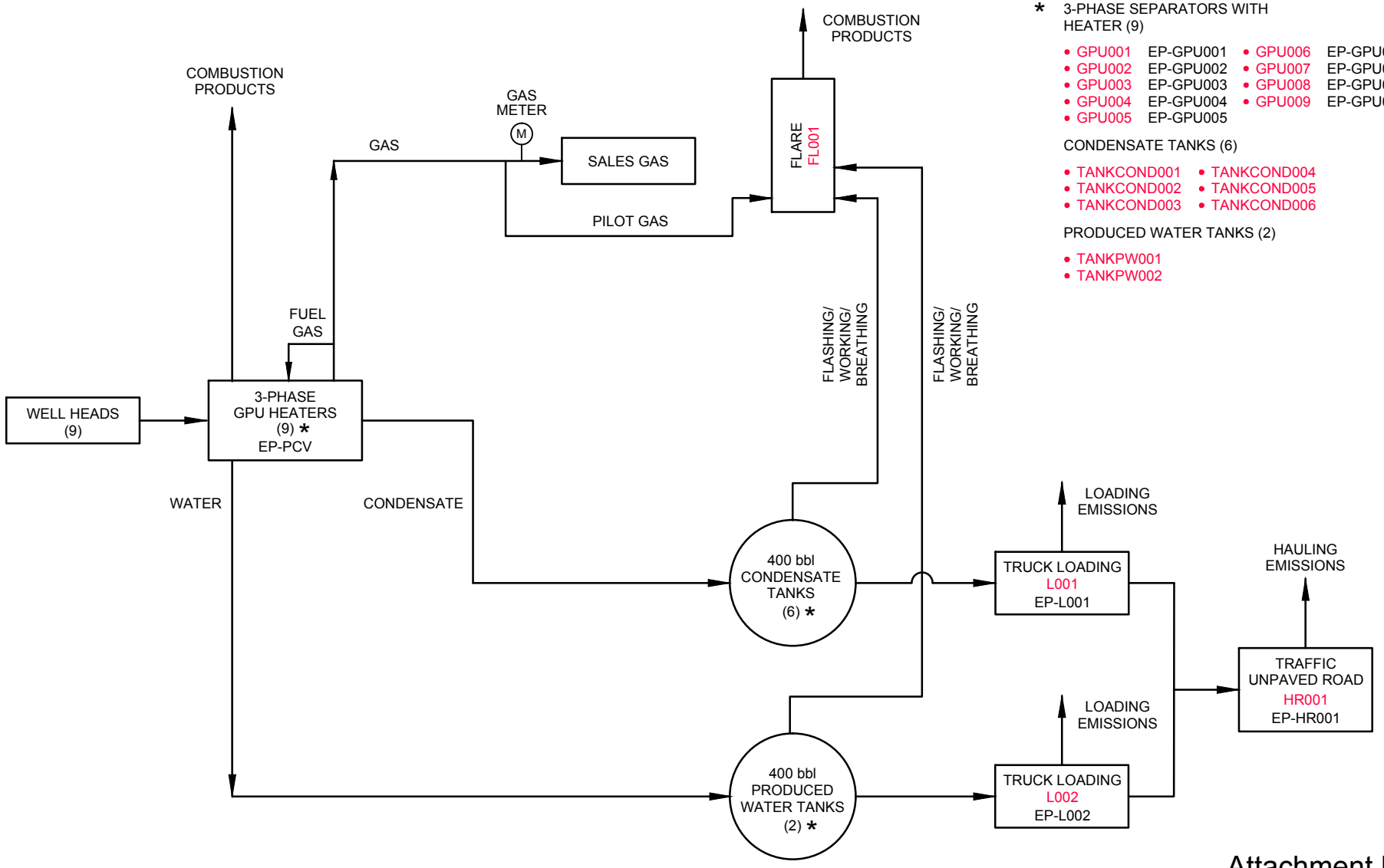
FIRST. The name of the Corporation is Antero Resources Corporation.

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

ANTERO RESOURCES APPALACHIAN CORPORATION

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

Attachment D
Process Flow Diagram



* 3-PHASE SEPARATORS WITH HEATER (9)

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

CONDENSATE TANKS (6)

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

PRODUCED WATER TANKS (2)

- TANKPW001
- TANKPW002

Attachment D

PROCESS FLOW DIAGRAM - ANTERO RESOURCES JONATHAN DAVIS WELL PAD

Doddridge County, West Virginia

82715-00(299)GN-WA001 FEB 15, 2017

Attachment E
Process Description

Attachment E

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

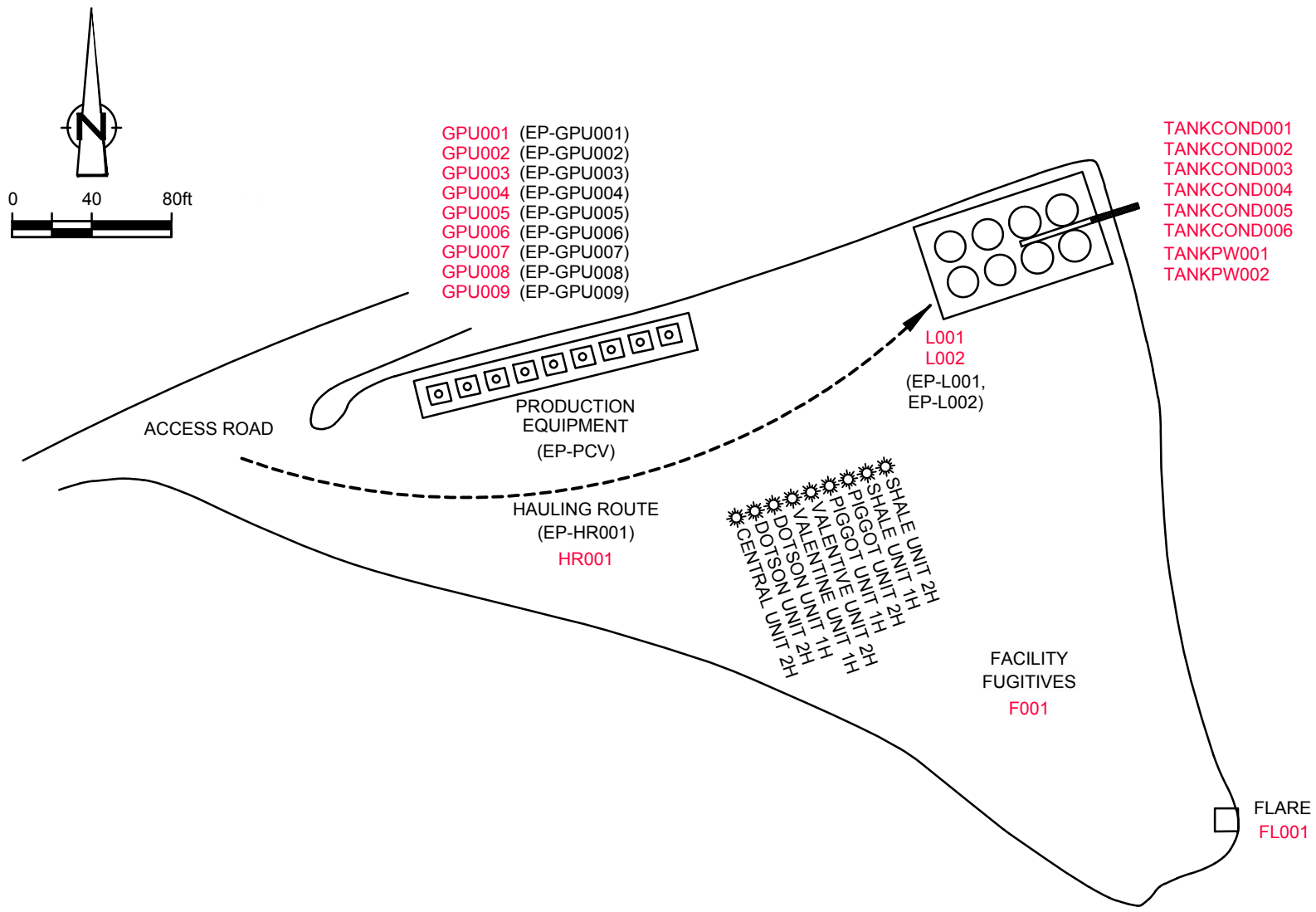
A mixture of condensate, water, and entrained gas from the condensate and gas wells enters the facility through a series of gas production units (GPU001-GPU009) which are 3 phase separators where the gas, condensate, and produced water are separated. The GPUs are fueled by a slip stream of the separated gas. The separated gas is then metered and sent to the sales gas pipeline. The separated condensate and water from the separators flow to their respective storage tanks (TANKCOND001-006 and TANKPW001-002).

The facility has six (6) tanks (TANKCOND001-006) on site to store condensate and two (2) tanks (TANKPW001-002) to store produced water prior to removal from the site. The flashing, working and breathing losses from the tanks are routed to the enclosed combustor (EC001) to control the emissions. The enclosed combustor that will be used to control emissions is designed to achieve a VOC destruction efficiency of 98 percent.

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

Emissions from the facility's emission sources were calculated using the site specific extended analysis of condensate and gas from Central Unit 2H well, one of the wells in Jonathan Davis Well Pad.

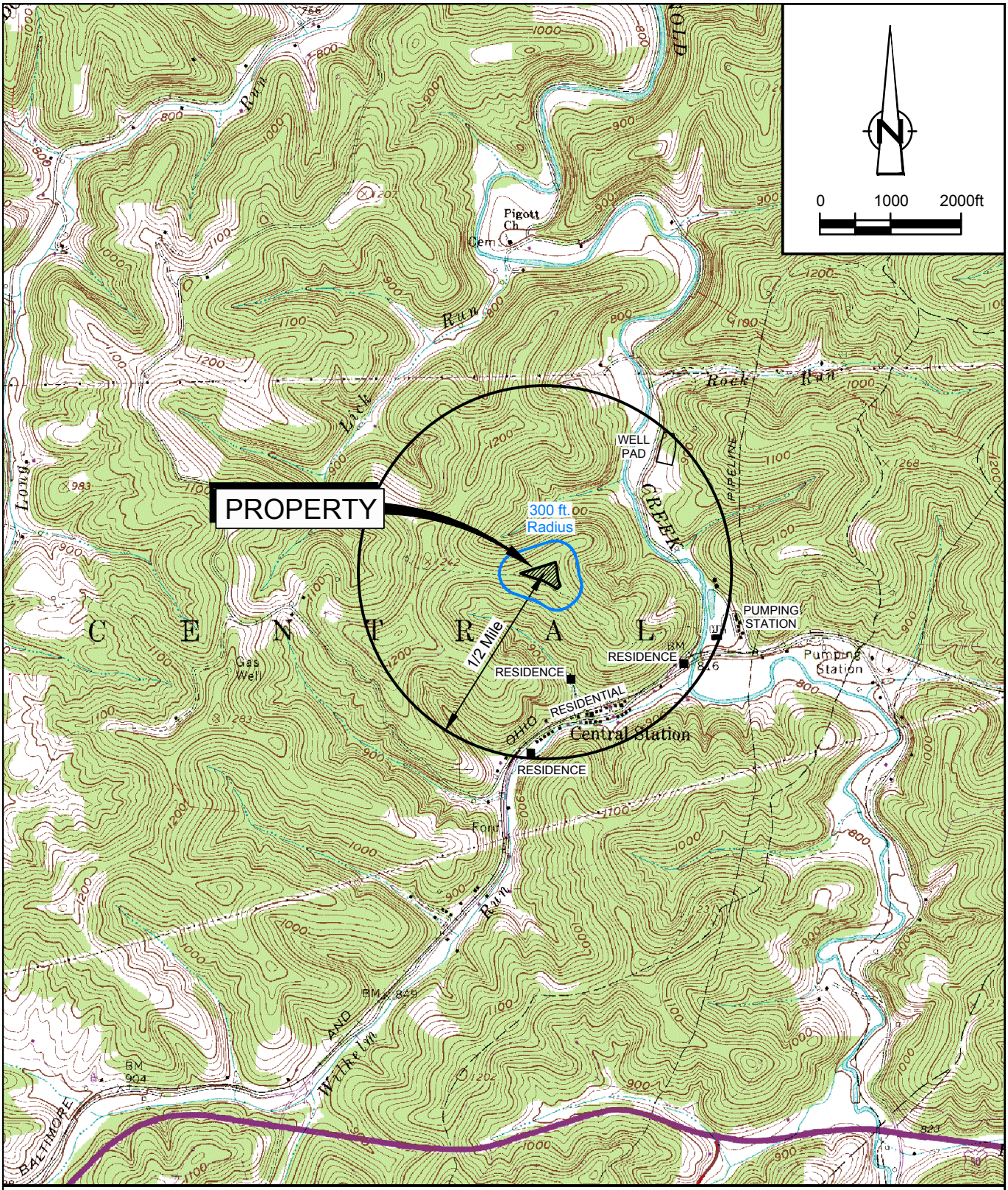
Attachment F
Plot Plan



Attachment F

PLOT PLAN
JONATHAN DAVIS WELL PAD
ANTERO RESOURCES
Doddridge County, West Virginia

Attachment G
Area Map



SOURCE: USGS QUADRANGLE MAP;
WEST UNION, WEST VIRGINIA

SITE COORDINATES: LAT. 39.299297, LONG. -80.828906
SITE ELEVATION: 1147 ft AMSL

GHD

Attachment G

AREA MAP
JONATHAN DAVIS 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	EP-GPU001, EP-GPU002, EP-GPU003, EP-GPU004, EP-GPU005, EP-GPU006	Gas Production Unit Heater	GPU001-006 (2014)		1.5 MMBtu/hr	Existing	N/A	
GPU007	EP-GPU007	Gas Production Unit Heater	GPU007 (2014)		1.5 MMBtu/hr	New	N/A	
GPU008, GPU009	EP-GPU008, EP-GPU009	Gas Production Unit Heater	GPU008 (2013); GPU009(2014)		1.0 MMBtu/hr	Existing	N/A	
GPU007	EP-GPU007	Gas Production Unit Heater	GPU007 (2013)		1.0 MMBtu/hr	Removal (2017)	N/A	
F001	F001	Fugitives	2014		N/A	Existing	N/A	
TANKCOND001-006	EP-EC001	Condensate Tank F/W/B	TANKCOND001-004 (2013); TANKCOND005-006 (2014);		400 bbl each	Modification[1]	EP-EC001	
TANKCOND007-009	EP-EC001	Condensate Tank F/W/B	TANKCOND007-009 (2014);		400 bbl each	Removal-2017	EP-EC001	
TANKPW001-002	EP-EC001	PW Tank F/W/B	2013		400 bbl each	Modification[2]	EP-EC001	
L001	EP-L001	Loading (Condensate)	2013		10,080 gal/hr 1,149,750 gal/yr	Modification[3]	N/A	
L002	EP-L002	Loading (Produced Water)	2013		10,080 gal/hr 2,299,500 gal/yr	Modification[4]	N/A	
HR001	EP-HR001	Haul Road	2013		Tanker Trucks Condensate: 137 trips per year Tanker Trucks PW: 274 trips per year Pick Up Truck: 730 trips per year	Modification[5]	N/A	
EC001	EP-EC001	Enclosed Combustor	2013		12 MMBtu/hr	Modification[6]	N/A	
PCV	EP-PCV	Pneumatic CV	2013		6.6 scf/day/PCV	Existing	N/A	
ENG001	EP-ENG001	Compressor Engine	2013	2013	24 HP	Removal-2017	Non-Selective Catalytic Reduction	

Notes:
1. This is a physical modification. Change in emissions due to removal of 3 condensate tanks and decrease in condensate throughput.
2. This is not a physical modification. Change in emissions due to decrease in produced water throughput.
3. This is not physical modification. Change in emissions due to decrease in condensate loading throughput.
4. This is not physical modification. Change in emissions due to decrease in produced water loading throughput.
5. This is not physical modification. Change in emissions due to decrease in loading throughput.
6. This is not physical modification. Change in emissions due to decrease in condensate and produced water throughput.

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	450	EPA	gas	3.187	0.187	12.157	303.915
Valves	☐ Yes ☑ No	468	EPA	liquid	10.788	1.190	0.149	3.720
Connections (Not sampling)	☐ Yes ☑ No	531	EPA	gas	0.167	0.010	0.638	15.939
Flanges	☐ Yes ☑ No	117	EPA	gas	0.072	0.004	0.274	6.848

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?
47017062010000	6/11/2014	4/11/2014	Green	OOOO
47017061410000	6/30/2014	5/21/2014	Green	OOOO
47017061420000	6/24/2014	5/7/2014	Green	OOOO
47017062070000	6/17/2014	4/26/2014	Green	OOOO
47017061880000	8/11/2013	7/1/2013	Green	OOOO
47017061870000	8/10/2013	7/1/2013	Green	OOOO
47017061890000	8/10/2013	7/1/2013	Green	OOOO
47017060830000	11/14/2012	10/27/2012	Flared	OOOO
47017060790000	11/14/2012	10/30/2012	Flared	OOOO

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

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

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

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

Where,

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

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

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

Attachment L
Storage Vessel Data Sheet

ATTACHMENT L – STORAGE VESSEL DATA SHEET

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

The following information is REQUIRED:

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

Additional information may be requested if necessary.

GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name: Tanks	2. Tank Name: Condensate Tank 001-006
3. Emission Unit ID number: TANKCOND001-006	4. Emission Point ID number. EP-EC001
5. Date Installed , Modified or Relocated (for existing tanks) 2013, 2014 Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? ☑ Yes ☐ No Was the tank manufactured after September 18, 2015? ☐ Yes ☑ No	6. Type of change: ☐ New construction ☐ New stored material ☑ Other ☐ Relocation

7A. Description of Tank Modification (if applicable)

7B. Will more than one material be stored in this tank? If so, a separate form must be completed for each material.
☐ Yes ☑ No

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

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

TANK INFORMATION

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

9A. Tank Internal Diameter (ft): 12	9B. Tank Internal Height (or Length) (ft): 20
10A. Maximum Liquid Height (ft): 18	10B. Average Liquid Height (ft): 10
11A. Maximum Vapor Space Height (ft): 18	11B. Average Vapor Space Height (ft): 10

12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.: 400bbls

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

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

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

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

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

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

ATTACHMENT L – STORAGE VESSEL DATA SHEET

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply

☐ Inert Gas Blanket of

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

☐ Conservation Vent (psig)

Vacuum Setting Pressure Setting

☐ Emergency relief Valve (psig)

Vacuum Setting Pressure Setting

☐ Thief Hatch Weighted ☐ Yes ☐ No

Complete appropriate Air Pollution Control Device Sheet

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

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

TANK CONSTRUCTION & OPERATION INFORMATION

21. Tank Shell Construction:

☐ Riveted ☐ Gunite lined ☐ Epoxy-coated ☑ Other (describe): Steel

21A. Shell Color: Green	21B. Roof Color: Green	21C. Year Last Painted	TANKCOND001-004 (2013); TANKCOND005-006 (2014);

22. Shell Condition (if metal and unlined):

☑ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

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

23. Operating Pressure Range (psig): 0 psig, atmospheric

Must be listed for tanks using VRUs with closed vent system

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

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

25A. Year Internal Floaters Installed:

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

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

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

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

25F. Describe deck fittings

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

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

26C. Deck seam:

☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft wide ☐ 5 x 12 ft wide ☐ Other (describe)

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

27. Closed Vent System with VRU ☐ Yes ☑ No

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

ATTACHMENT L – STORAGE VESSEL DATA SHEET

SITE INFORMATION

29. Provide the city and state on which the data in this section are based.: West Union, WV			
30. Daily Average Ambient Temperature (°F):	72.10	31. Annual Average Maximum Temperature (°F):	75.94
32. Annual Average Minimum Temperature (°F):	46.56	33. Average Wind Speed (miles/hr): 18.5 mph	
34. Annual Average Solar Insulation Factor (BTU/(ftz·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)	1.8280
39A. Average Liquid Surface Temperature (°F)	72.10	39B. Corresponding Vapor Pressure (psia)	3.0683
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	3.3028

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)	5.4900		
41D. Liquid Molecular Weight (lb/lb-mole)	83.00		
41E. Vapor Molecular Weight (lb/lb-mole)	43.4219		
Maximum Vapor Pressure 41F. True (psia)	3.3028		
41G. Reid (psia)	4.41		
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.	238 psig; 70 F		

ATTACHMENT L – STORAGE VESSEL DATA SHEET

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

The following information is REQUIRED:

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

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

Additional information may be requested if necessary.

GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name: Tanks	2. Tank Name: Produced Water Tank 001-002
3. Emission Unit ID number: TANKPW001-002	4. Emission Point ID number. EP-EC001
5. Date Installed , Modified or Relocated (for existing tanks) 2013 Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? ☑ Yes ☐ No Was the tank manufactured after September 18, 2015? ☐ Yes ☑ No	6. Type of change: ☐ New construction ☐ New stored material ☑ Other ☐ Relocation

7A. Description of Tank Modification (if applicable)

7B. Will more than one material be stored in this tank? If so, a separate form must be completed for each material.
☐ Yes ☑ No

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

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

TANK INFORMATION

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

9A. Tank Internal Diameter (ft): 12	9B. Tank Internal Height (or Length) (ft): 20
10A. Maximum Liquid Height (ft): 18	10B. Average Liquid Height (ft): 10
11A. Maximum Vapor Space Height (ft): 18	11B. Average Vapor Space Height (ft): 10

12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.: 400bbls

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

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

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

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

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

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

ATTACHMENT L – STORAGE VESSEL DATA SHEET

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does not apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket ☐ Carbon Adsorption

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

☐ Conservation Vent (psig)

Vacuum Setting Pressure Setting

☐ Emergency relief Valve (psig)

Vacuum Setting Pressure Setting

☐ Thief Hatch Weighted ☐ Yes ☐ No

Complete appropriate Air Pollution Control Device Sheet

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

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

TANK CONSTRUCTION & OPERATION INFORMATION

21. Tank Shell Construction:

☐ Riveted ☐ Gunite lined ☐ Epoxy-coated ☑ Other(describe): Steel

21A. Shell Color: Green	21B. Roof Color: Green	21C. Year Last Painted 2013

22. Shell Condition (if metal and unlined):

☑ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

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

23. Operating Pressure Range (psig): 0 psig, atmospheric

Must be listed for tanks using VRUs with closed vent system

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

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

25A. Year Internal Floaters Installed:

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

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

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

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

25F. Describe deck fittings

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

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

26C. Deck seam:

☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ Other (describe)

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

27. Closed Vent System with VRU ☐ Yes ☑ No

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

ATTACHMENT L – STORAGE VESSEL DATA SHEET

SITE INFORMATION

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

LIQUID INFORMATION

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

38A. Minimum Liquid Surface Temperature (°F)	46.56	38B. Corresponding Vapor Pressure (psia)	0.2281
39A. Average Liquid Surface Temperature (°F)	72.10	39B. Corresponding Vapor Pressure (psia)	0.4527
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	0.4990

41. Provide the following for each 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)	18.59		
41E. Vapor Molecular Weight (lb/lb-mole)	18.5943		
Maximum Vapor Pressure 41F. True (psia)	0.4990		
41G. Reid (psia)	1.0337		
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.	238 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	1.50	1221.9
GPU002	EP-GPU002	Gas Production Unit Heater	2014	Existing	1.50	1221.9
GPU003	EP-GPU003	Gas Production Unit Heater	2014	Existing	1.50	1221.9
GPU004	EP-GPU004	Gas Production Unit Heater	2014	Existing	1.50	1221.9
GPU005	EP-GPU005	Gas Production Unit Heater	2014	Existing	1.50	1221.9
GPU006	EP-GPU006	Gas Production Unit Heater	2014	Existing	1.50	1221.9
GPU007	EP-GPU007	Gas Production Unit Heater	2014	New	1.50	1221.9
GPU008	EP-GPU008	Gas Production Unit Heater	2013	Existing	1.00	1221.9
GPU009	EP-GPU009	Gas Production Unit Heater	2014	Existing	1.00	1221.9

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

Attachment N
Internal Combustion Engine Data Sheet

ATTACHMENT N – INTERNAL COMBUSTION ENGINE DATA SHEET

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

Emission Unit ID#	ENG001	
Engine Manufacturer/Model	Engine (Kubota DG972-E2)	
Manufacturers Rated bhp/rpm	24 HP @ 3600 rpm	
Source Status	REM	
Date Installed/ Modified/ Removed/ Relocated	2013	
Engine Manufacturer/ Reconstruction Date	2013	
Check all applicable Federal Rules for the engine (include EPA Certification of Conformity if applicable)	☑ 40CFR60 Subpart JJJJ ☑ JJJJ Certified? ☐ 40CFR60 Subpart IIII ☐ IIII Certified? ☑ 40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐ 40CFR60 Subpart JJJJ ☐ JJJJ Certified? ☐ 40CFR60 Subpart IIII ☐ IIII Certified? ☐ 40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources
Engine Type	4SRB	
APCD Type	NSCR	
Fuel Type	RG	
H2S (gr/ 100 scf)	0	
Operating bhp/rpm	16.5 HP @ 2400 rpm	
BSFC (BTU/bhp-hr)	9797	
Hourly Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	193 ft^3/hr gal/hr	ft^3/hr gal/hr
Fuel Usage or Hours of Operation Metered	1.6907 $MMft^3/yr$ gal/yr	$MMft^3/yr$ gal/yr

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

Attachment O
Tanker Truck Loading Data Sheet

ATTACHMENT O – TANKER TRUCK LOADING DATA S HEET

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

Truck Loadout Collection Efficiencies

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

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

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

Emission Unit ID#:	L001, L002	Emission Point ID#:	EP-L001, EP-L002	Year Installed/ Modified:	2013

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	2	2	2	2
Days/week	2	2	2	2

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		Condensate	Produced Water	
Max. Daily Throughput (1000 gal/day)		3.15	6.30	
Max. Annual Throughput (1000 gal/yr)		1149.75	2299.50	
Loading Method		BF	BF	
Max. Fill Rate (gal/min)		168	168	
Average Fill Time (min/loading)		50	50	
Max. Bulk Liquid Temperature (F)		72.1	72.1	
True Vapor Pressure		3.1	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)	13.4157	0.0010	
	Annual (ton/yr)	0.7651	0.0001	
Max HAP Emission Rate	Loading (lb/hr)	1.2339	1.09E-05	
	Annual (ton/yr)	0.0704	1.24E-06	
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	Installation Date: ☑ New ☐ Modified ☐ Relocated	
Maximum Rated Total Flow Capacity: 5458 scfh / 131000 scfd		Maximum Design Heating Input (from mfg. spec sheet): 12.0 MMBTU/hr	Design Heat Content: 2300 BTU/scf

Control Device Information

Type of Vapor Combustion Control?

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

Manufacturer: Cimarron Model: Model No. 48" HV ECD		Hours of operation per year?	8760

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

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

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

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

Waste Gas Information

Maximum Waste Gas Flow Rate	Heat Value of Waste Gas Stream	Exit Velocity of the Emission Stream
15.62 (scfm)	2,215.62 BTU/ft^3	0.0299 (ft/s)

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

Pilot Gas Information

Number of Pilot Lights	Fuel Flow Rate to Pilot Flame per Pilot	Heat Input per Pilot	Will automatic re-ignition be used?
1	17 scfh	20772 BTU/hr	☑ Yes ☐ No

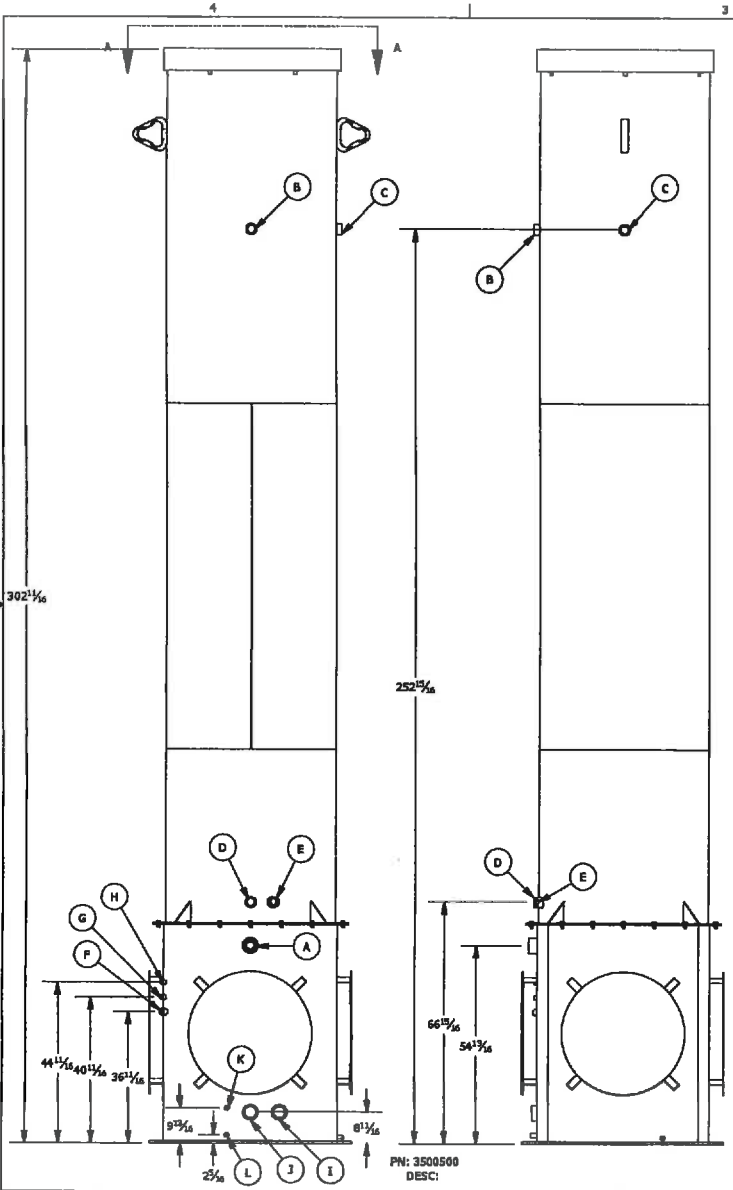
If automatic re-ignition is used, please describe the method. Flame Rectification, a thermocouple equivalent

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).*

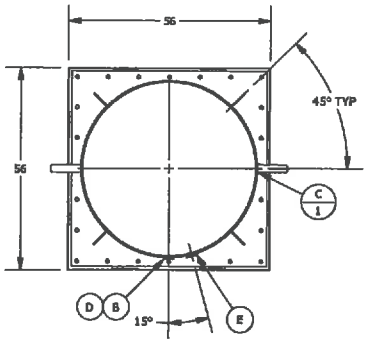
Additional information attached? ☑ Yes ☐ No Manufacturer's specs sheet

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
Jonathan Davis Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Oil and Gas Site General Information

Administrative Information	
Company Name	Antero Resources Corporation
Facility/Well Name	Jonathan Davis Well Pad
Nearest City/Town	West Union
API Number/SIC Code	1311
Latitude/Longitude	39.299297, -80.828906
County	Doddridge County

Technical Information	
Max Condensate Site Throughput (bbl/day):	75
Max Produced Water Site Throughput (bbl/day):	150
Are there any sour gas streams at this site?	No
Is this site currently operational/producing?	Yes

Equipment/Processes at Site	
Equipment/Process Types	**How many for this site?**
Fugitives	9
Gas Production Unit Heaters	9
Condensate Tanks	6
Produced Water Tanks	2
Loading Jobs	2
Enclosed Combustors	1

Table 2

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

Emission Source	VOC		NO_x		CH_4		CO_{2e}		CO		SO_2		$PM_{2.5}$		PM_{10}		Lead		Total HAPs		Benzene		Xylenes		Formaldehyde	
	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)
UNCONTROLLED (Fugitives, Storage Tanks, Gas Production Unit Heaters)																										
Fugitive Emissions (Component Count, PCV and Hauling)[1]	3.3265	14.5702			3.3280	14.5768	83.203	364.43							4.5742	0.4802			0.3223	1.4115	0.0023	0.0102	0.0609	0.2666		
Flashing, Working and Breathing (F/W/B) Losses[2]	73.5288	322.0562			11.0016	48.1871	275.2665	1205.6673											7.4108	32.4593	0.0179	0.0782	0.1176	0.5153		
Gas Production Unit Heater Emissions[3]	0.0563	0.2464	1.0230	4.4807	0.0235	0.1031	1,234.89	5,408.82	0.8593	3.7638	0.0061	0.0269	0.0777	0.3405	0.0777	0.3405	5.11E-06	2.24E-05	0.0193	0.0843	2.15E-05	9.41E-05			7.67E-04	0.0034
TOTALS:	**76.9206**	**336.9122**	**1.1867**	**5.1976**	**14.3532**	**62.8670**	**1789.7761**	**7839.2194**	**0.9968**	**4.3660**	**0.0071**	**0.0312**	**0.0902**	**0.3950**	**4.6644**	**0.8753**	**5.93E-06**	**2.60E-05**	**7.7554**	**33.9686**	**0.0202**	**0.0885**	**0.1785**	**0.7819**	**8.90E-04**	**0.0039**
UNCONTROLLED (Truck Loading Emissions)																										
Truck Loading Emissions[4]	13.4167	0.7652			0.5097	0.0311	12.8237	0.7865											1.2339	0.0704	0.0019	1.10E-04	0.0142	0.0008		
CONTROLLED EMISSIONS																										
Enclosed Combustor Emissions (from F/W/B losses)[5]	1.4707	6.4415	0.8177	3.5815	0.2042	0.8944	291.5275	1276.8906	3.7214	16.2999	1.02E-05	4.47E-05	0.0054	0.0238	0.0073	0.0318	4.77E-07	2.09E-06	0.1482	0.6493	0.0004	0.0016	0.0024	0.0103	1.28E-06	5.58E-06
TOTALS:	**1.4707**	**6.4415**	**0.8177**	**3.5815**	**0.2042**	**0.8944**	**291.528**	**1276.891**	**3.7214**	**16.300**	**1.02E-05**	**4.47E-05**	**0.0054**	**0.0238**	**2.2944**	**0.2719**	**4.77E-07**	**2.09E-06**	**0.1482**	**0.6493**	**3.57E-04**	**0.0016**	**0.0024**	**0.0103**	**1.28E-06**	**5.58E-06**
POTENTIAL TO EMIT[6]	**4.8625**	**22.0628**	**2.0044**	**8.7792**	**3.5558**	**15.6054**	**1806.0371**	**7911.2292**	**4.7182**	**20.6659**	**0.0071**	**0.0312**	**0.0956**	**0.4188**	**2.3846**	**0.6669**	**6.41E-06**	**2.81E-05**	**0.4928**	**2.2290**	**0.0027**	**0.0120**	**0.0632**	**0.2777**	**0.0009**	**0.0039**
POTENTIAL TO EMIT (Excluding Fugitives)	**1.5359**	**7.4926**	**2.0044**	**8.7792**	**0.2277**	**1.0286**	**1722.8343**	**7546.8008**	**4.7182**	**20.6659**	**0.0071**	**0.0312**	**0.0956**	**0.4188**	**0.0974**	**0.4268**	**6.41E-06**	**2.81E-05**	**0.1706**	**0.8175**	**0.0004**	**0.0018**	**0.0024**	**0.0111**	**0.0009**	**0.0039**

Enter any notes here:	1 - See Tables 4 and 5 for fugitive emission calculations; Table 12 for PM emissions from hauling. 2 - See Tables 6 and 7 for tanks emission calculations 3 - See Table 9 for gas production unit heater emission calculations 4 - The maximum emission was calculated based on tank truck capacity of 200 barrels and actual fill rate of 50 minutes per tank truck. At a production rate of 75 barrels per day, VOC emissions would be 13.4167 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 0.1747 pound per hour. 5- See Table 10 and 11 for enclosed combustion emission calculations. 6 - The hourly potential to emit is the sum of emissions from gas production unit heaters, storage tanks, enclosed combustors, and fugitives. Does not include emissions from loading (see footnote 5). The total TPY PTE is the sum of all emissions. PM 10 TPY is the sum of uncontrolled hauling and other PM10 sources.

Table 3

Permits Summary
Jonathan Davis Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Pollutant		Emissions		Threshold Exceeded?		
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	76.9206	4.8625	6	**Yes**	
	tons/yr	337.6774	22.0628	10	**Yes**	**Yes**
NO_X	lbs/hr	1.1867	2.0044	6		
	tons/yr	5.1976	8.7792	10		
CH_4	lbs/hr	14.3532	3.5558			
	tons/yr	62.8981	15.6054			
CO	lbs/hr	0.9968	4.7182	6		
	tons/yr	4.3660	20.6659	10		**Yes**
SO_2	lbs/hr	0.0071	0.0071	6		
	tons/yr	0.0312	0.0312	10		
$PM_{2.5}$	lbs/hr	0.0902	0.0956	6		
	tons/yr	0.3950	0.4188	10		
PM_{10}	lbs/hr	4.6644	2.3846	6		
	tons/yr	0.8753	0.6669	10		
Lead	lbs/hr	5.93E-06	6.41E-06	6		
	tons/yr	2.60E-05	2.81E-05	10		
Total HAPs	lbs/hr	7.7554	0.4928	2	**Yes**	
	tons/yr	34.0390	2.2290	5	**Yes**	
Total TAPs	lbs/hr	0.0211	0.0036	1.14		
n-Hexane	lbs/hr	7.3637	0.3767			
	tons/yr	32.3216	1.7184			
Toluene	lbs/hr	0.1146	0.0220			
	tons/yr	0.5024	0.0969			
Ethylbenzene	lbs/hr	0.0745	0.0244			
	tons/yr	0.3267	0.1071			
Xylenes	lbs/hr	0.1785	0.0632			
	tons/yr	0.7827	0.2777			
Benzene	lbs/hr	0.0202	0.0027			
	tons/yr	0.0886	0.0120			

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
Jonathan Davis Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

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

Gas Weight Fraction From Analysis:	VOC frac	0.163
	Benzene frac	0.000
	Toluene	0.000
	Ethylbenzene	0.000
	Xylenes	0.000
	n-Hexane	0.010
	HAPs	0.010
	Methane	0.623

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
450	Valves	Gas VOC	0.004500	0.33	6,373.12
		Non VOC	0.004500	1.69	32,652.68
		HAPs	0.004500	0.02	374.08
		CO2e	0.004500	31.54	607,829.66
531	Connectors	VOC	0.000200	0.02	334.23
		Non-VOC	0.000200	0.09	1,712.45
		HAPs	0.000200	0.00	19.62
		CO2e	0.000200	1.65	31,877.29
117	Flanges	VOC	0.000390	0.01	143.61
		Non-VOC	0.000390	0.04	735.77
		HAPs	0.000390	0.00	8.43
		CO2e	0.000390	0.710691	13696.428439
			Total VOCs:	0.36	6850.96
			Total THC:	2.18	41951.87
			Total CH4:	1.36	26136.14

Light Liquid Weight Fraction From Analysis:	VOC frac	0.957
	Benzene frac	0.001
	Toluene	0.008
	Ethylbenzene	0.009
	Xylenes	0.024
	n-hexane	0.064
	HAPs	0.106
	Methane	0.013

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
468	Valves	Light Liquid VOC	0.002500	1.12	21,576.44
		Light Liquid Non-VOC	0.002500	0.05	971.80
		Light Liquid HAPs	0.002500	0.12	2,379.00
		CO2e	0.002500	0.39	7439.62
			Total VOC:	1.12	21,576.44
			Total THC:	1.17	22,548.24
			Total CH4:	0.02	297.58

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	28,427.40	3.25	14.21
Ethylbenzene		0.02	0.10
Toluene		0.02	0.09
Xylenes		0.06	0.27
n-Hexane		0.21	0.92
TAPs (Benzene)		0.00	0.01
HAPs		0.32	1.39
CH_4 [3]		3.02	13.22
CO_{2e}	660,843.00	75.44	330.42

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
Jonathan Davis Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Number of PCVs	34
Bleed Rate (scf/day/PCV)	6.6
Total Bleed Rate (scf/day)	224.4

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	0.3949	14.01	0.8861556	2.34E-03	0.03	1.36E-03	0.01
Carbon Dioxide	0.1866	44.01	0.4187304	1.10E-03	0.05	2.02E-03	8.86E-03
Methane	78.5619	16.04	176.2929036	0.46	7.45	0.31	1.36
Ethane	14.3741	30.07	32.2554804	0.08	2.56	0.11	0.47
Propane	4.2467	44.1	9.5295948	0.03	1.11	0.05	0.20
Isobutane	0.508	58.12	1.139952	3.00E-03	0.17	0.01	0.03
n-Butane	1.0206	58.12	2.2902264	6.04E-03	0.35	0.01	0.06
Isopentane	0.2715	72.15	0.609246	1.61E-03	0.12	4.83E-03	0.02
n-Pentane	0.2111	72.15	0.4737084	1.25E-03	0.09	3.75E-03	0.02
2-Methylpentane	0.00E+00	86.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3-Methylpentane	0.00E+00	86.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
n-Hexane	0.225	86.18	0.5049	1.33E-03	0.11	0.00	0.02
Methylcyclopentane	0.00E+00	84.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	0.00E+00	78.11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylhexane	0.00E+00	100.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3-Methylhexane	0.00E+00	100.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptane	0.00E+00	100.21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methylcyclohexane	0.00E+00	98.186	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	0.00E+00	92.14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Octane	0.00E+00	114.23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	0.00E+00	106.17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
m & p-Xylene	0.00E+00	106.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
o-Xylene	0.00E+00	106.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nonane	0.00E+00	128.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C10+	0.00E+00	174.28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	lb/hr	tpy
VOC Emissions	0.0814	0.3565
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	0.0048	0.0209
HAPs Emissions	0.0048	0.0209
TAPs Emissions	0.00E+00	0.00E+00
CH_4 Emissions	0.3105	1.3599
CO_{2e} emissions	7.7641	34.0068

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
Jonathan Davis Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

# Hours Operational	8760

	Condensate Tank Flashing Losses			Produced Water Tank Flashing Losses		
	Vapor Mass Fraction	Flashing Losses		Vapor Mass Fraction	Flashing Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
Water	0.0871	0.0865	0.3791	2.6356	0.0279	0.1222
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0288	0.0287	0.1256	0.2597	0.0027	0.0120
Carbon Dioxide	0.1807	0.1796	0.7866	3.5591	0.0377	0.1649
Methane	10.3369	10.2758	45.0082	55.9830	0.5924	2.5946
Ethane	19.3030	19.1889	84.0474	25.9371	0.2744	1.2021
Propane	23.6790	23.5391	103.1012	7.5472	0.0799	0.3498
Isobutane	6.4994	6.4610	28.2991	0.8210	0.0087	0.0380
n-Butane	15.6372	15.5448	68.0861	2.0471	0.0217	0.0949
Isopentane	6.7515	6.7116	29.3966	0.4654	0.0049	0.0216
n-Pentane	5.8639	5.8292	25.5321	0.1485	0.0016	0.0069
2-Methylpentane	0.5697	0.5664	2.4807	0.0176	0.0002	0.0008
3-Methylpentane	0.3869	0.3846	1.6845	0.0289	0.0003	0.0013
n-Hexane	6.8326	6.7922	29.7499	0.1008	0.0011	0.0047
Methylcyclopentane	0.1454	0.1446	0.6332	0.0176	0.0002	0.0008
Benzene	0.0172	0.0171	0.0747	0.0242	0.0003	0.0011
2-Methylhexane	0.5301	0.5270	2.3081	0.0111	0.0001	0.0005
3-Methylhexane	0.4334	0.4308	1.8869	0.0109	0.0001	0.0005
Heptane	0.8189	0.8140	3.5655	0.0087	0.0001	0.0004
Methylcyclohexane	0.4415	0.4389	1.9225	0.0510	0.0005	0.0024
Toluene	0.0909	0.0903	0.3957	0.1162	0.0012	0.0054
Octane	0.9091	0.9037	3.9582	0.0039	0.0000	0.0002
Ethylbenzene	0.0491	0.0489	0.2140	0.0606	0.0006	0.0028
m & p-Xylene	0.0520	0.0517	0.2262	0.0570	0.0006	0.0026
o-Xylene	0.0609	0.0606	0.2654	0.0788	0.0008	0.0037
Nonane	0.2062	0.2049	0.8977	0.0009	0.0000	0.0000
C10+	0.0888	0.0883	0.3867	0.0080	0.0001	0.0004
Total VOCs	70.064	69.65	305.1	11.626	0.1230	0.5388
Total CO_{2e}		257.08	1,126.0		14.85	65.0
CH_4		10.28	45.01		0.59	2.59
Total TAPs (Benzene)		0.0171	0.0747		0.0003	0.0011
Toluene		0.0903	0.3957		0.0012	0.0054
Ethylbenzene		0.0489	0.2140		0.0006	0.0028
Xylenes		0.1122	0.4916		0.0014	0.0063
n-Hexane		6.792	29.750		0.0011	0.0047
Total HAPs		7.061	30.926		0.0046	0.0203
Total	100.00	99.41	435.4	100.00	1.058	4.63

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

Table 7

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

Condensate Tank Information	
Number of Tanks	6
Maximum Working Losses (lbs/hr)	1.4747
Maximum Breathing Losses (lbs/hr)	3.8117
# 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	0.0013	1.91E-05	8.36E-05	0.0000	0.0002	0.0001	0.0003
Carbon Dioxide	0.1358	0.0020	0.0088	0.0052	0.0227	0.0072	0.0314
Methane	2.5065	0.0370	0.1619	0.0955	0.4185	0.1325	0.5804
Ethane	26.3004	0.3878	1.6987	1.0025	4.3909	1.3903	6.0896
Propane	26.6563	0.3931	1.7217	1.0160	4.4503	1.4091	6.1720
Isobutane	6.6143	0.0975	0.4272	0.2521	1.1043	0.3497	1.5315
n-Butane	16.0003	0.2359	1.0335	0.6099	2.6713	0.8458	3.7047
Isopentane	6.3034	0.0930	0.4071	0.2403	1.0524	0.3332	1.4595
n-Pentane	5.3930	0.0795	0.3483	0.2056	0.9004	0.2851	1.2487
2-Methylpentane	0.5186	0.0076	0.0335	0.0198	0.0866	0.0274	0.1201
3-Methylpentane	0.3517	0.0052	0.0227	0.0134	0.0587	0.0186	0.0814
n-Hexane	6.3633	0.0938	0.4110	0.2425	1.0623	0.3364	1.4733
Methylcyclopentane	0.1209	0.0018	0.0078	0.0046	0.0202	0.0064	0.0280
Benzene	0.0102	1.50E-04	0.0007	0.0004	0.0017	0.0005	0.0024
2-Methylhexane	0.1297	1.91E-03	0.0084	0.0049	0.0217	0.0069	0.0300
3-Methylhexane	0.3874	0.0057	0.0250	0.0148	0.0647	0.0205	0.0897
Heptane	0.6989	0.0103	0.0451	0.0266	0.1167	0.0369	0.1618
Methylcyclohexane	0.3865	0.0057	0.0250	0.0147	0.0645	0.0204	0.0895
Toluene	0.0551	8.12E-04	3.56E-03	0.0021	0.0092	0.0029	0.0127
Octane	0.7435	0.0110	0.0480	0.0283	0.1241	0.0393	0.1721
Ethylbenzene	0.0315	4.65E-04	2.04E-03	0.0012	0.0053	0.0017	0.0073
m & p-Xylene	0.0428	6.31E-04	2.76E-03	0.0016	0.0071	0.0023	0.0099
o-Xylene	0.0324	4.77E-04	0.0021	0.0012	0.0054	0.0017	0.0075
Nonane	0.1628	0.0024	0.0105	0.0062	0.0272	0.0086	0.0377
C10+	0.0533	7.86E-04	0.0034	0.0020	0.0089	0.0028	0.0123
Total VOCs	71.056	1.0478	4.589	2.7084	11.8628	3.7562	16.452
Total CO_{2e}		0.9261	4.0561	2.3936	10.4842	3.3197	14.540
CH_4		0.0370	0.1619	0.0955	0.4185	0.1325	0.5804
Total TAPs (Benzene)		1.50E-04	6.59E-04	0.0004	0.0017	0.0005	0.0024
Toluene		8.12E-04	3.56E-03	0.0021	0.0092	0.0029	0.0127
Ethylbenzene		4.65E-04	2.04E-03	0.0012	0.0053	0.0017	0.0073
Xylenes		1.11E-03	0.0049	0.0029	0.0126	0.0040	0.0174
n-Hexane		0.0938	0.4110	0.2425	1.0623	0.3364	1.4733
Total HAPs		0.0964	0.4221	0.2491	1.0911	0.3455	1.5132
Total	100.00	1.4747	6.4590	3.8117	16.6951	5.2863	23.154

Table 7

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

Produced Water Tank Information	
Number of Tanks	2
Maximum Working Losses (lbs/hr)	0.0215
Maximum Breathing Losses (lbs/hr)	0.0084

	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	90.4991	0.0195	0.0853	0.0076	0.0333	0.0271	0.1186
H2S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0051	1.10E-06	4.80E-06	4.29E-07	1.88E-06	1.52E-06	6.68E-06
Carbon Dioxide	4.6864	0.0010	0.0044	0.0004	0.0017	0.0014	0.0061
Methane	3.0558	0.0007	0.0029	0.0003	0.0011	0.0009	0.0040
Ethane	1.6699	0.0004	0.0016	0.0001	0.0006	0.0005	0.0022
Propane	0.0757	1.63E-05	0.0001	6.37E-06	2.79E-05	2.27E-05	0.0001
Isobutane	0.0021	4.44E-07	1.94E-06	1.73E-07	7.60E-07	6.17E-07	2.70E-06
n-Butane	0.0046	9.97E-07	4.36E-06	3.90E-07	1.71E-06	1.39E-06	6.07E-06
Isopentane	0.0003	5.86E-08	2.57E-07	2.29E-08	1.00E-07	8.15E-08	3.57E-07
n-Pentane	0.0000	5.51E-09	2.41E-08	2.15E-09	9.43E-09	7.66E-09	3.35E-08
2-Methylpentane	1.67E-06	3.59E-10	1.57E-09	1.40E-10	6.15E-10	5.00E-10	2.19E-09
3-Methylpentane	6.06E-06	1.30E-09	5.71E-09	5.10E-10	2.23E-09	1.81E-09	7.95E-09
n-Hexane	3.36E-06	7.22E-10	3.16E-09	2.82E-10	1.24E-09	1.00E-09	4.40E-09
Methylcyclopentane	4.42E-06	9.52E-10	4.17E-09	3.72E-10	1.63E-09	1.32E-09	5.80E-09
Benzene	3.61E-04	7.76E-08	3.40E-07	3.03E-08	1.33E-07	1.08E-07	4.73E-07
2-Methylhexane	6.10E-08	1.31E-11	5.75E-11	5.13E-12	2.25E-11	1.83E-11	8.00E-11
3-Methylhexane	2.36E-07	5.07E-11	2.22E-10	1.98E-11	8.68E-11	7.05E-11	3.09E-10
Heptane	6.15E-08	1.32E-11	5.79E-11	5.17E-12	2.26E-11	1.84E-11	8.06E-11
Methylcyclohexane	4.10E-06	8.82E-10	3.86E-09	3.45E-10	1.51E-09	1.23E-09	5.37E-09
Toluene	3.75E-04	8.07E-08	3.53E-07	3.15E-08	1.38E-07	1.12E-07	4.92E-07
Octane	3.48E-09	7.50E-13	3.28E-12	2.93E-13	1.28E-12	1.04E-12	4.57E-12
Ethylbenzene	5.86E-05	1.26E-08	5.52E-08	4.93E-09	2.16E-08	1.75E-08	7.68E-08
m & p-Xylene	4.23E-05	9.10E-09	3.99E-08	3.56E-09	1.56E-08	1.27E-08	5.54E-08
o-Xylene	7.46E-05	1.61E-08	7.03E-08	6.28E-09	2.75E-08	2.23E-08	9.78E-08
Nonane	2.52E-10	5.41E-14	2.37E-13	2.12E-14	9.27E-14	7.53E-14	3.30E-13
C10+	7.05E-09	1.52E-12	6.65E-12	5.93E-13	2.60E-12	2.11E-12	9.24E-12
Total VOCs	0.0836	1.80E-05	0.0001	7.03E-06	3.08E-05	2.50E-05	0.0001
Total CO_{2e}		0.0174	0.0764	0.0068	0.0299	0.0243	0.1063
CH_4		0.0007	0.0029	0.0003	0.0011	0.0009	0.0040
Total TAPs (Benzene)		7.76E-08	3.40E-07	3.03E-08	1.33E-07	1.08E-07	4.73E-07
Toluene		8.07E-08	3.53E-07	3.15E-08	1.38E-07	1.12E-07	4.92E-07
Ethylbenzene		1.26E-08	5.52E-08	4.93E-09	2.16E-08	1.75E-08	7.68E-08
Xylenes		2.52E-08	1.10E-07	9.83E-09	4.31E-08	3.50E-08	1.53E-07
n-Hexane		7.22E-10	3.16E-09	2.82E-10	1.24E-09	1.00E-09	4.40E-09
Total HAPs		1.97E-07	8.62E-07	7.69E-08	3.37E-07	2.74E-07	1.20E-06
Total	100.00	0.0215	0.0943	0.0084	0.0368	0.0299	0.1311

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

Table 8

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

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	4.41	1.0337
Annual Average Temp (F)	72.1	72.1
S (saturation factor)	0.6	0.6
P (true vapor pressure)	3.07	0.45
M (MW of vapor)	43.42	18.59
Collection Efficiency (%)	0.00	0.00
Total Hydrocarbon Loading Loss (lb/10^3 gal)*	1.87	0.12
Maximum Throughput (gallons/hr)**	10,080	10,080
Average Throughput (gallons/yr)	1,149,750	2,299,500
Total Hydrocarbon Loading Emissions (lbs/hr)	18.88	1.19
Total Hydrocarbon Loading Emissions (tpy)	1.08	0.14

	Condensate Tank Loading Losses			Produced Water Tank Loading Losses		
	Vapor Mass Fraction	Loading Losses		Vapor Mass Fraction	Loading Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
H2S	0.0000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0013	2.44E-04	1.39E-05	0.0051	6.08E-05	6.93E-06
Carbon Dioxide	0.1358	0.0256	1.46E-03	4.6864	5.59E-02	6.38E-03
Methane	2.5065	0.4732	2.70E-02	3.0558	3.65E-02	4.16E-03
Ethane	26.3004	4.9656	0.2832	1.6699	1.99E-02	2.27E-03
Propane	26.6563	5.0328	2.87E-01	0.0757	9.03E-04	1.03E-04
Isobutane	6.6143	1.2488	7.12E-02	0.0021	2.46E-05	2.81E-06
n-Butane	16.0003	3.0209	1.72E-01	0.0046	5.52E-05	6.30E-06
Isopentane	6.3034	1.1901	6.79E-02	0.0003	3.25E-06	3.70E-07
n-Pentane	5.3930	1.0182	5.81E-02	0.0000	3.05E-07	3.48E-08
2-Methylpentane	0.5186	0.0979	5.58E-03	1.67E-06	1.99E-08	2.27E-09
3-Methylpentane	0.3517	0.0664	3.79E-03	6.06E-06	7.23E-08	8.25E-09
n-Hexane	6.3633	1.2014	6.85E-02	3.36E-06	4.00E-08	4.57E-09
Methylcyclopentane	0.1209	0.0228	1.30E-03	4.42E-06	5.28E-08	6.02E-09
Benzene	0.0102	0.0019	1.10E-04	0.0004	4.30E-06	4.91E-07
2-Methylhexane	0.1297	0.0245	1.40E-03	6.10E-08	7.28E-10	8.30E-11
3-Methylhexane	0.3874	0.0732	4.17E-03	2.36E-07	2.81E-09	3.21E-10
Heptane	0.6989	0.1320	7.53E-03	6.15E-08	7.33E-10	8.36E-11
Methylcyclohexane	0.3865	0.0730	4.16E-03	4.10E-06	4.89E-08	5.58E-09
Toluene	0.0551	0.0104	5.93E-04	0.0004	4.47E-06	5.10E-07
Octane	0.7435	0.1404	8.01E-03	3.48E-09	4.16E-11	4.74E-12
Ethylbenzene	0.0315	0.0060	3.40E-04	5.86E-05	6.99E-07	7.97E-08
m & p-Xylene	0.0428	0.0081	4.61E-04	4.23E-05	5.04E-07	5.75E-08
o-Xylene	0.0324	0.0061	3.49E-04	7.46E-05	8.90E-07	1.02E-07
Nonane	0.1628	0.0307	1.75E-03	2.52E-10	3.00E-12	3.42E-13
C10+	0.0533	0.0101	5.74E-04	7.05E-09	8.41E-11	9.59E-12
Total VOCs	71.0560	13.4157	0.7651	0.0836	9.97E-04	1.14E-04
Total CH_4		0.4732	0.0270		0.0365	0.0042
Total CO_{2e}		11.8565	0.6762		0.9672	0.1103
Total TAPs (Benzene)		0.0019	1.10E-04		4.30E-06	4.91E-07
Toluene		0.0104	5.93E-04		4.47E-06	5.10E-07
Ethylbenzene		0.0060	3.40E-04		6.99E-07	7.97E-08
Xylenes		0.0142	8.09E-04		1.39E-06	1.59E-07
n-Hexane		1.2014	6.85E-02		4.00E-08	4.57E-09
Total HAPs		1.2339	7.04E-02		1.09E-05	1.24E-06
Total	100.0000	18.8804	1.0768	100.0000	1.1929	0.1361

Enter any notes here

Vapor mass fractions and loading losses from Promax output

Using equation L_L = 12.46 SPM/T from AP-42, Chapter 5, Section 5.2-4
MW was obtained by Promax; RVP was taken from laboratory reports
Annual Average Temp (F) obtained from Charleston, WV (preset in Promax)
S (saturation factor) is based on submerged loading, dedicated service as it was most representative
True vapor pressure (TVP) equation from AP-42, Chapter 7, Figure 7.1-13a

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

Loading emissions are vented to the atmosphere.

Table 9

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

Gas Production Unit Heater Emissions

Number of Units	7
GPU Heater Rating (MMBtu/hr)	1.50
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,221.9

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	0.859	3.764
CO	84	0.722	3.162
CO_2	120,000	1031.181	4516.573
Lead	0.0005	4.30E-06	1.88E-05
N_2O	2.2	0.019	0.083
PM (Total)	7.6	0.065	0.286
SO_2	0.6	0.005	0.023
TOC	11	0.095	0.414
Methane	2.3	0.020	0.087
VOC	5.5	0.047	0.207
HAPS			
2-Methylnaphthalene	2.40E-05	2.06E-07	9.03E-07
Benzene	2.10E-03	1.80E-05	7.90E-05
Dichlorobenzene	1.20E-03	1.03E-05	4.52E-05
Fluoranthene	3.00E-06	2.58E-08	1.13E-07
Fluorene	2.80E-06	2.41E-08	1.05E-07
Formaldehyde	7.50E-02	6.44E-04	2.82E-03
Hexane	1.80E+00	1.55E-02	6.77E-02
Naphthalene	6.10E-04	5.24E-06	2.30E-05
Phenanathrene	1.70E-05	1.46E-07	6.40E-07
Toluene	3.40E-03	2.92E-05	1.28E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.056	0.246
TOTAL Uncontrolled HAPs	0.019	0.084
TOTAL Uncontrolled TAPs (Benzene)	2.15E-05	9.41E-05
TOTAL Uncontrolled Toluene	3.48E-05	1.52E-04
TOTAL Uncontrolled Hexane	0.018	0.081
TOTAL Uncontrolled TAPs (Formaldehyde)	0.001	0.003
TOTAL CH_4	0.024	0.103
TOTAL CO_{2e} Emissions	1,234.89	5,408.82

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

Gas Production Unit Heater Emissions

Number of Units	2
GPU Heater Rating (MMBtu/hr)	1.00
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,221.9

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	0.164	0.717
CO	84	0.137	0.602
CO_2	120,000	196.415	860.300
Lead	0.0005	8.18E-07	3.58E-06
N_2O	2.2	0.004	0.016
PM (Total)	7.6	0.012	0.054
SO_2	0.6	0.001	0.004
TOC	11	0.018	0.079
Methane	2.3	0.004	0.016
VOC	5.5	0.009	0.039
HAPS			
2-Methylnaphthalene	2.40E-05	3.93E-08	1.72E-07
Benzene	2.10E-03	3.44E-06	1.51E-05
Dichlorobenzene	1.20E-03	1.96E-06	8.60E-06
Fluoranthene	3.00E-06	4.91E-09	2.15E-08
Fluorene	2.80E-06	4.58E-09	2.01E-08
Formaldehyde	7.50E-02	1.23E-04	5.38E-04
Hexane	1.80E+00	2.95E-03	1.29E-02
Naphthalene	6.10E-04	9.98E-07	4.37E-06
Phenanathrene	1.70E-05	2.78E-08	1.22E-07
Toluene	3.40E-03	5.57E-06	2.44E-05

Table 10

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

General Information	
Unit Name:	EC001

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

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

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

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

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

Stream Information							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed/Vapor Combustor (Enter Name of Each Stream Here)	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
Maximum Expected Hourly Volumetric Flow Rate of Stream (scf/hr)	17	--	868.78	21.59	46.20	0.61	954.18
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	148,920.00	--	7,610,487.62	189,169.39	404,705.27	5,351.06	8,358,633.35
Heating Content (Btu/ft3)	1,222		2,272.23	1,184.63	2,476.13	101.93	2,215.62

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	-	-	69.650	0.123	3.756	0.000	73.53
Benzene	-	-	0.017	0.000	0.001	0.000	0.018
Toluene	-	-	0.090	0.001	0.003	0.000	0.094
Ethylbenzene	-	-	0.049	0.001	0.002	0.000	0.051
Xylenes	-	-	0.112	0.001	0.004	0.000	0.118
n-Hexane	-	-	6.792	0.001	0.336	0.000	7.130
HAPs	-	-	7.061	0.005	0.345	0.000	7.411
Total Mass Flow	-	-	99.409	1.058	5.286	0.030	105.783
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	-	-	305.065	0.539	16.452	0.000	322.056
Benzene	-	-	0.075	0.001	0.002	0.000	0.078
Toluene	-	-	0.396	0.005	0.013	0.000	0.414
Ethylbenzene	-	-	0.214	0.003	0.007	0.000	0.224
Xylenes	-	-	0.492	0.006	0.017	0.000	0.515
n-Hexane	-	-	29.750	0.005	1.473	0.000	31.228
HAP	-	-	30.926	0.020	1.513	0.000	32.459
Total Mass Flow	-	-	435.412	4.635	23.154	0.131	463.331

Table 10

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

Controlled Emissions							
Hourly (lb/hr)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.002	-	0.816				0.82
CO	0.001	-	3.720				3.72
PM2.5	0.000	-	0.005	0.000	0.000	0.000	0.01
PM10	0.000	-	0.007	0.000	0.000	0.000	0.01
H2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	2.040	-	-	-	-	-	2.04
Total VOC	0.000	-	1.393	0.002	0.075	0.000	1.47
Benzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.002	0.000	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.001	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.002	0.000	0.000	0.000	0.00
n-Hexane	0.000	-	0.136	0.000	0.007	0.000	0.14
HAP	0.000	-	0.141	0.000	0.007	0.000	0.15
N_2O	0.000	-	0.002	0.000	0.000	0.000	0.00
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00
Annual (tpy)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.007	-	3.574				3.58
CO	0.006	-	16.294				16.30
PM2.5	0.000	-	0.022	0.001	0.001	0.000	0.02
PM10	0.001	-	0.029	0.001	0.002	0.000	0.03
H_2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	8.935	-	-	-	-	-	8.94
Total VOC	0.000	-	6.101	0.011	0.329	0.000	6.44
Benzene	0.000	-	0.001	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.008	0.000	0.000	0.000	0.01
Ethylbenzene	0.000	-	0.004	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.010	0.000	0.000	0.000	0.01
n-Hexane	0.000	-	0.595	0.000	0.029	0.000	0.62
HAP	0.000	-	0.619	0.000	0.030	0.000	0.65
N_2O	0.000	-	0.008	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

Enclosed Combustor/Vapor Combustor Total Emissions		
	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Total VOC	1.47	6.44
NOx	0.818	3.582
CO	3.721	16.300
PM2.5	0.005	0.024
PM10	0.007	0.032
H_2S	5.43E-06	2.38E-05
SO_2	1.02E-05	4.47E-05
Benzene (TAPs)	3.57E-04	1.56E-03
Toluene	1.89E-03	8.28E-03
Ethylbenzene	1.02E-03	4.48E-03
Xylenes	2.35E-03	0.0103
Hexanes	0.143	0.625
Formaldehyde (TAPs)	1.28E-06	5.58E-06
HAPs	0.15	0.65
CH_4	0.20	0.89
CO_2e	291.53	1276.89
N_2O	0.002	0.009
Lead	4.77E-07	2.09E-06

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
Jonathan Davis Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Enclosed Combustor CO_2 and CH_4 Emissions

Components	Mole fraction of oil flash gas constituents[a]	Volume of oil flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of water flash gas constituents[a]	Volume of water flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of oil tank vapors constituents[a]	Volume of oil tank vapor sent to Enclosed Combustor *scf/year*	Mole fraction of water tank vapors constituents[a]	Volume of water tank vapors sent to Enclosed Combustor *scf/year*	Component volume of gas sent to Enclosed Combustor *scf/year*	Number of carbon atoms	Combustion Efficiency	Combusted CO_2 Volume[b] *scf/year*	Uncombusted CO_2 and CH_4 Volume[b] *scf/year*	Volume GHGs Emitted *scf/year*
CO_2	0.002	7,610,488	0.0167	189,169	0.0013	404,705	0.020	5,351	16,224	1	0	--	16,224	21,435,446
Methane	0.256	7,610,488	0.7221	189,169	0.0679	404,705	0.035	5,351	2,112,596	1	0.98	2,070,344	42,252	42,252
Ethane	0.255	7,610,488	0.1784	189,169	0.3801	404,705	0.010	5,351	2,128,377	2	0.98	4,171,620	--	
Propane	0.213	7,610,488	0.0354	189,169	0.2627	404,705	0.000	5,351	1,736,327	3	0.98	5,104,802	--	
i-Butane	0.044	7,610,488	0.0029	189,169	0.0495	404,705	0.000	5,351	358,651	4	0.98	1,405,911	--	
n-Butane	0.107	7,610,488	0.0073	189,169	0.1196	404,705	0.000	5,351	863,203	4	0.98	3,383,755	--	
Pentane	0.069	7,610,488	0.0018	189,169	0.0705	404,705	0.000	5,351	557,460	5	0.98	2,731,553	--	
Hexane	0.036	7,610,488	0.0004	189,169	0.0365	404,705	0.000	5,351	288,082	6	0.98	1,693,920	--	
Benzene	0.000	7,610,488	0.0001	189,169	0.0001	404,705	0.000	5,351	699	6	0.98	4,111	--	
Heptanes	0.008	7,610,488	0.0001	189,169	0.0059	404,705	0.000	5,351	61,406	7	0.98	421,245	--	
Toluene	0.000	7,610,488	0.0003	189,169	0.0003	404,705	0.000	5,351	3,136	7	0.98	21,514	--	
Octane	0.005	7,610,488	0.0001	189,169	0.0045	404,705	0.000	5,351	39,514	8	0.98	309,791	--	
Ethyl benzene	0.000	7,610,488	0.0001	189,169	0.0001	404,705	0.000	5,351	1,474	8	0.98	11,557	--	
Xylenes	0.000	7,610,488	0.0003	189,169	0.0003	404,705	0.000	5,351	3,390	8	0.98	26,576	--	
Nonane	0.001	7,610,488	0.0000	189,169	0.0006	404,705	0.000	5,351	5,085	9	0.98	44,854	--	
Decane plus	0.000	7,610,488	0.0000	189,169	0.0001	404,705	0.000	5,351	1,803	10	0.98	17,668	--	
											Subtotal	**21,419,222**	--	

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	21,435,446	0.12	2000	1	283.76	1,242.86
CH_4	42,252	0.04	2000	25	0.20	0.89
				CO_2e Emissions	**288.9**	**1265.22**

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
Jonathan Davis Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

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

Tanker Truck Trip Calculation	
Condensate Production (bbl/day)	75
PW Production (bbl/day)	150
Truck Capacity (bbl)	200

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

	# of Wheels	Mean Vehicle Weight (W) (tons)	Mean Vehicle Speed (S) (mph)	Miles Per Trip (miles)	Maximum Trips per Hour	Maximum Trips per Year	Vehicle Miles Travelled (miles/hr)	Vehicle Miles Travelled (miles/year)	PM (lbs/VMT)	PM10 (lbs/VMT)
Tanker Trucks Condensate	10	40	10	1.3200	1	137	1.3200	180.8400	3.8175	1.7179
Tanker Trucks PW	10	40	10	1.3200	1	274	1.3200	361.6800	3.8175	1.7179
Pick Up Truck	4	3	10	0.2500	1	730	0.2500	182.5000	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	5.0391	690.3620	0.3452	2.2676	310.6629	0.1553	2.5196	345.1810	0.1726	1.1338	155.3315	0.0777
Tanker Trucks PW	5.0391	1380.7240	0.6904	2.2676	621.3258	0.3107	2.5196	690.3620	0.3452	1.1338	310.6629	0.1553
Pick Up Truck	0.0867	63.2690	0.0316	0.0390	28.4711	0.0142	0.0433	31.6345	0.0158	0.0195	14.2355	0.0071
Total Emissions	10.1649	2,134.3551	1.0672	4.5742	960.4598	0.4802	5.0825	1,067.1775	0.5336	2.2871	480.2299	0.2401

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

Table 13

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

	Potential Emissions		Previous Permit Application Emissions		Change in Emissions	
Pollutant	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**
$PM_{2.5}$	0.0956	0.4188	1.9178	8.4000	-1.8222	-7.9812
PM_{10}	2.3846	0.6669	1.9178	8.4000	0.4667	-7.7331
VOC (uncontrolled)	76.9206	337.6774	295.9817	1296.4000	-219.0611	-958.7226
CO	4.7182	20.6659	10.3653	45.4000	-5.6471	-24.7341
NOx	2.0044	8.7792	1.8037	7.9000	0.2007	0.8792
SO2	0.0071	0.0312	0.0059	0.0260	1.19E-03	5.23E-03
Pb	6.41E-06	2.81E-05	5.02E-06	2.20E-05	1.39E-06	6.08E-06
HAPs	0.4928	2.2290	0.5479	2.4000	-0.0551	-0.1710
TAPs	0.0036	0.0159	0.0248	0.0540	-0.0212	-0.0381

Notes:
1. Change in emissions due to decrease in condensate and PW production rate, addition of 1-1.5 MMBtu/hr GPU Heater, and removal of 1 Kubota engine, 1-1.0 MMBtu/hr GPU heater, and 3 condensate tanks.

Bryan Research & Engineering, Inc.

ProMax® 3.2

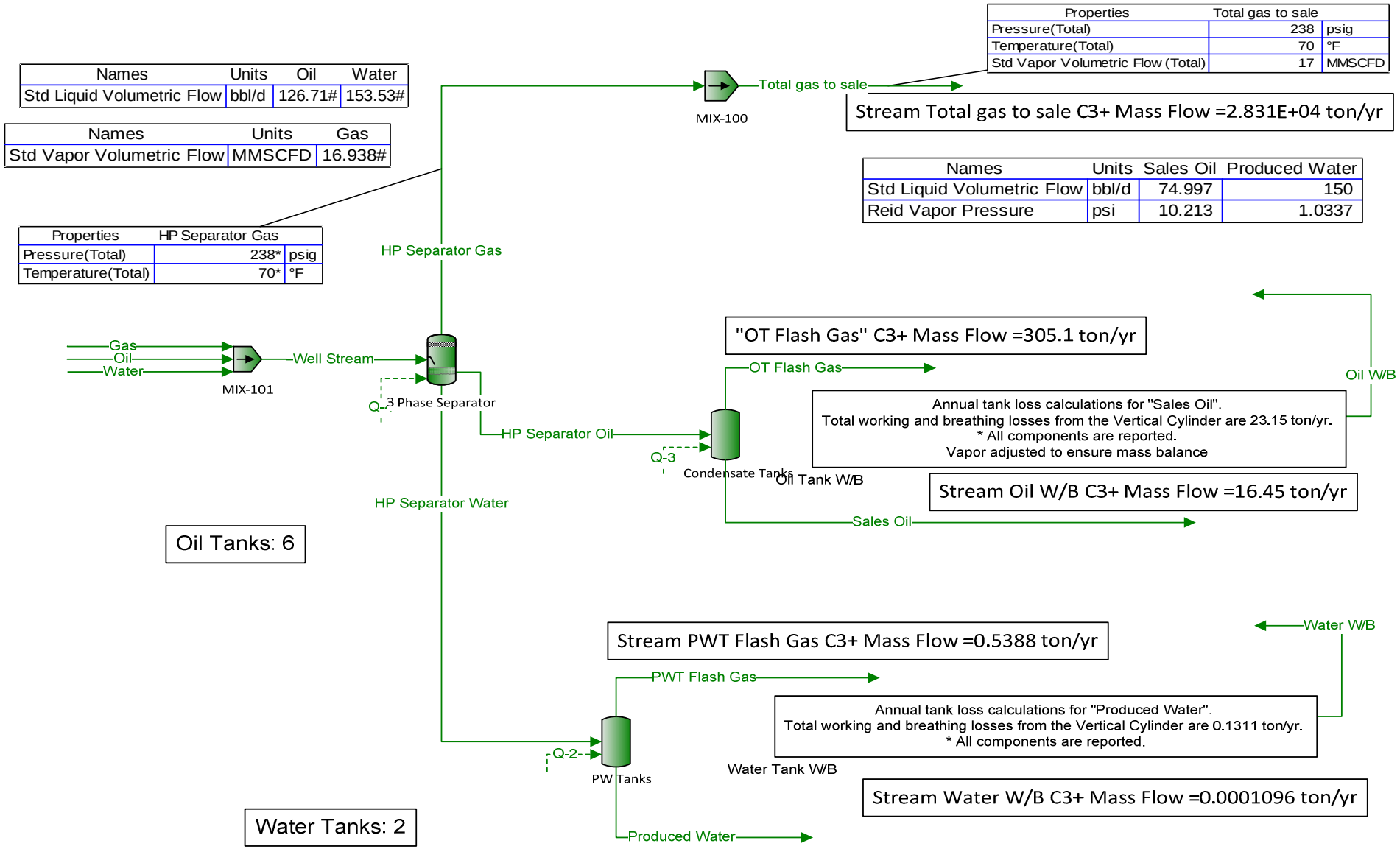
with

TSWEET® & PROSIM®

Simulation Report	
Client Name:	Antero Resources
Location:	Doddridge County, WV
Job:	Jonathan Davis Well Pad

Project Name:	Antero Promax Model - VRT
File Name:	\\det-s1.cra.int\Shared\AirQuality\ANTERO RESOURCES\ProMax\Antero WV_1 HP\PROMAX SCENARIO 3.pmx
ProMax Version:	4.0.16071.0

Report Created:	2/15/2017 17:42


Names | Units | Oil | Water
Std Liquid Volumetric Flow | bbl/d | 126.71# | 153.53#
Names | Units | Gas
Std Vapor Volumetric Flow | MMSCFD | 16.938#
Properties | HP Separator Gas
Pressure(Total) | 238* | psig
Temperature(Total) | 70* | °F
Properties | Total gas to sale
Pressure(Total) | 238 | psig
Temperature(Total) | 70 | °F
Std Vapor Volumetric Flow (Total) | 17 | MMSCFD
Names | Units | Sales Oil | Produced Water
Std Liquid Volumetric Flow | bbl/d | 74.997 | 150
Reid Vapor Pressure | psi | 10.213 | 1.0337
MIX-100
Total gas to sale
Stream Total gas to sale C3+ Mass Flow =2.831E+04 ton/yr
HP Separator Gas
Gas
Oil
Water
MIX-101
Well Stream
Q-1
3 Phase Separator
"OT Flash Gas" C3+ Mass Flow =305.1 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 23.15 ton/yr.
* All components are reported.
Vapor adjusted to ensure mass balance
HP Separator Oil
Q-3
Condensate Tanks
Oil Tank W/B
Stream Oil W/B C3+ Mass Flow =16.45 ton/yr
HP Separator Water
Sales Oil
Oil Tanks: 6
Stream PWT Flash Gas C3+ Mass Flow =0.5388 ton/yr
Water W/B
PWT Flash Gas
Annual tank loss calculations for "Produced Water".
Total working and breathing losses from the Vertical Cylinder are 0.1311 ton/yr.
* All components are reported.
Q-2
PW Tanks
Water Tank W/B
Stream Water W/B C3+ Mass Flow =0.0001096 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*	0.153477	0.0522145	99.9558	0*	0.000117534*	0.192059	99.9965	3.03277	0.00427843	0.153477	100*	93.4077*	6.22109
H2S		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen		0.394898*	0.393353	0.0104880	8.29717E-05	0.0150002*	0.00200760*	0.0409093	2.25091E-06	0.192178	6.01157E-05	0.393353	0*	0.00338189*	0.367565
Carbon Dioxide		0.186599*	0.185719	0.0433716	0.00151626	0.0260003*	0.134106*	0.163139	0.000812435	1.67643	0.00231731	0.185719	0*	1.98004*	0.173821
Methane		78.5616*	78.2598	6.63025	0.0321276	6.88607*	6.78993*	25.6074	0.00174280	72.3403	0.125222	78.2598	0*	3.54187*	73.1523
Ethane		14.3740*	14.3428	7.10777	0.00815312	8.32208*	38.0113*	25.5123	0.000642634	17.8812	0.799028	14.3428	0*	1.03267*	13.4358
Propane		4.24668*	4.25939	7.28991	0.00158030	8.76109*	26.2709*	21.3409	9.00371E-05	3.54803	2.47348	4.25939	0*	0.0319175*	4.01537
Isobutane		0.507998*	0.514662	2.09664	0.000128169	2.53203*	4.94552*	4.44402	5.17736E-06	0.292816	1.29200	0.514662	0*	0.000659674*	0.491134
n-Butane		1.02060*	1.04012	6.12905	0.000323668	7.16507*	11.9634*	10.6920	1.69925E-05	0.730133	4.56493	1.04012	0*	0.00148151*	1.00185
Isopentane		0.271499*	0.283152	3.89767	5.83688E-05	4.26104*	3.79679*	3.71889	2.20040E-06	0.133725	3.95895	0.283152	0*	7.01529E-05*	0.283660
n-Pentane		0.211099*	0.232381	4.24869	1.82045E-05	5.70106*	3.24843*	3.23000	2.80758E-07	0.0426721	4.59788	0.232381	0*	6.59330E-06*	0.237944
2-Methylpentane		0*	0.0173767	0.756767	1.81979E-06	2.73903*	0.261553*	0.262742	3.83817E-08	0.00424111	0.926110	0.0173767	0*	3.60230E-07*	0.0199452
3-Methylpentane		0*	0.0117307	0.567221	3.07156E-06	1.88702*	0.177369*	0.178415	1.55444E-07	0.00694270	0.700497	0.0117307	0*	1.30798E-06*	0.0137410
n-Hexane		0.224999*	0.205641	12.7597	1.02969E-05	6.22406*	3.20898*	3.15099	1.09014E-07	0.0242550	16.0534	0.205641	0*	7.24139E-07*	0.254686
Methylcyclopentane		0*	0.00441278	0.273014	1.98430E-06	0.750008*	0.0624272*	0.0686727	1.61622E-07	0.00433950	0.343059	0.00441278	0*	9.77345E-07*	0.00546146
Benzene		0*	0.000562579	0.0365710	2.36727E-05	0.0970010*	0.00567477*	0.00873008	2.09868E-05	0.00641536	0.0461144	0.000562579	0*	8.58218E-05*	0.000706348
2-Methylhexane		0*	0.0140548	1.80572	9.80700E-07	3.01903*	0.0562479*	0.210245	1.42533E-08	0.00230088	2.35261	0.0140548	0*	1.13237E-08*	0.0219842
3-Methylhexane		0*	0.0114553	1.63421	9.66318E-07	2.57003*	0.168038*	0.171874	1.67187E-08	0.00226077	2.13547	0.0114553	0*	4.37152E-08*	0.0187146
Heptane		0*	0.0220093	4.01203	7.62923E-07	5.52506*	0.303131*	0.324779	5.97418E-09	0.00180211	5.27596	0.0220093	0*	1.14056E-08*	0.0402327
Methylcyclohexane		0*	0.0117784	2.21868	4.91953E-06	3.00503*	0.171064*	0.178717	3.98571E-07	0.0107637	2.91795	0.0117784	0*	7.76420E-07*	0.0218822
Toluene		0*	0.00259353	0.556418	7.53104E-05	0.708007*	0.0259653*	0.0391961	6.43607E-05	0.0261328	0.733712	0.00259353	0*	7.56827E-05*	0.00515561
Octane		0*	0.0226071	12.4966	3.00593E-07	11.3141*	0.282859*	0.316277	1.00617E-09	0.000713242	16.6718	0.0226071	0*	5.67230E-10*	0.0823879
Ethylbenzene		0*	0.00128758	0.816240	3.10108E-05	0.715007*	0.0129130*	0.0183980	2.60520E-05	0.0118318	1.08973	0.00128758	0*	1.02577E-05*	0.00520659
m-Xylene		0*	0.00136617	0.930616	2.04773E-05	0.802008*	0.0175226*	0.0194500	1.58107E-05	0.0111258	1.24295	0.00136617	0*	7.40618E-06*	0.00584012
o-Xylene		0*	0.00160516	1.27080	5.68547E-05	1.06201*	0.0132507*	0.0228131	5.04105E-05	0.0153924	1.69859	0.00160516	0*	1.30668E-05*	0.00773342
Nonane		0*	0.00476711	8.19502	6.38948E-08	6.12906*	0.0551690*	0.0638833	2.18563E-10	0.000151597	10.9822	0.00476711	0*	3.64821E-11*	0.0446310
C10+		0*	0.00193071	14.1644	4.88844E-07	9.78410*	0.0152567*	0.0232496	3.23875E-08	0.00108674	19.0117	0.00193071	0*	8.63606E-10*	0.0712465
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*	2.86595	0.00511635	121.468	0*	1.42971E-07*	0.00480414	121.466	0.00154803	0.000312210	2.86595	124.339*	0.00150358*	124.339
H2S		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen		7.34420*	7.34526	0.00102769	0.000100828	0.00218312*	2.44208E-06*	0.00102330	2.73419E-06	9.80942E-05	4.38683E-06	7.34526	0*	5.44381E-08*	7.34639
Carbon Dioxide		3.47032*	3.46801	0.00424986	0.00184258	0.00378408*	0.000163128*	0.00408075	0.000986867	0.000855708	0.00169101	3.46801	0*	3.18727E-05*	3.47410
Methane		1461.07*	1461.38	0.649678	0.0390419	1.00220*	0.00825937*	0.640540	0.00211699	0.0369249	0.00913786	1461.38	0*	5.70134E-05*	1462.07
Ethane		267.324*	267.829	0.696469	0.00990778	1.21120*	0.0462376*	0.638162	0.000780609	0.00912717	0.0583076	267.829	0*	1.66229E-05*	268.535
Propane		78.9786*	79.5374	0.714317	0.00192040	1.27509*	0.0319564*	0.533819	0.000109368	0.00181104	0.180497	79.5374	0*	5.13775E-07*	80.2536
Isobutane		9.44760*	9.61051	0.205444	0.000155752	0.368511*	0.00601581*	0.111162	6.28896E-06	0.000149463	0.0942814	9.61051	0*	1.06188E-08*	9.81611
n-Butane		18.9807*	19.4226	0.600567	0.000393326	1.04280*	0.0145525*	0.267450	2.06408E-05	0.000372685	0.333117	19.4226	0*	2.38477E-08*	20.0235
Isopentane		5.04926*	5.28742	0.381921	7.09306E-05	0.620152*	0.00461848*	0.0930239	2.67283E-06	6.82577E-05	0.288897	5.28742	0*	1.12925E-09*	5.66941
n-Pentane		3.92596*	4.33935	0.416316	2.21223E-05	0.829732*	0.00395144*	0.0807948	3.41038E-07	2.17813E-05	0.335521	4.33935	0*	1.06132E-10*	4.75569
2-Methylpentane		0*	0.324483	0.0741533	2.21143E-06	0.398638*	0.000318157*	0.00657221	4.66223E-08	2.16481E-06	0.0675811	0.324483	0*	5.79862E-12*	0.398638
3-Methylpentane		0*	0.219053	0.0555803	3.73261E-06	0.274637*	0.000215755*	0.00446285	1.88818E-07	3.54379E-06	0.0511174	0.219053	0*	2.10545E-11*	0.274637
n-Hexane		4.18447*	3.84002	1.25029	1.25130E-05	0.905850*	0.00390345*	0.0788185	1.32420E-07	1.23806E-05	1.17147	3.84002	0*	1.16564E-11*	5.09032
Methylcyclopentane		0*	0.0824018	0.0267519	2.41135E-06	0.109156*	7.59375E-05*	0.00171777	1.96323E-07	2.21503E-06	0.0250341	0.0824018	0*	1.57323E-11*	0.109156
Benzene		0*	0.0105053	0.00358348	2.87674E-05	0.0141175*	6.90288E-06*	0.000218373	2.54928E-05	3.27462E-06	0.00336511	0.0105053	0*	1.38147E-09*	0.0141175
2-Methylhexane		0*	0.262452	0.176937	1.19176E-06	0.439390*	6.84209E-05*	0.00525906	1.73136E-08	1.17445E-06	0.171678	0.262452	0*	1.82277E-13*	0.439390
3-Methylhexane		0*	0.213909	0.160131	1.17428E-06	0.374042*	0.000204405*	0.00429924	2.03083E-08	1.15397E-06	0.155832	0.213909	0*	7.03683E-13*	0.374042
Heptane		0*	0.410989	0.393127	9.27114E-07	0.804117*	0.000368734*	0.00812398	7.25686E-09	9.19857E-07	0.385003	0.410989	0*	1.83596E-13*	0.804117
Methylcyclohexane		0*	0.219944	0.217402	5.97828E-06	0.437352*	0.000208085*	0.00447041	4.84145E-07	5.49413E-06	0.212932	0.219944	0*	1.24980E-11*	0.437352
Toluene		0*	0.0484301	0.0545217	9.15183E-05	0.103043*	3.15846E-05*	0.000980449	7.81792E-05	1.33391E-05	0.0535413	0.0484301	0*	1.21826E-09*	0.103043
Octane		0*	0.422152	1.22450	3.65285E-07	1.64666*	0.000344074*	0.00791132	1.22220E-09	3.64063E-07	1.21659	0.422152	0*	9.13068E-15*	1.64666
Ethylbenzene		0*	0.0240436	0.0799809	3.76848E-05	0.104062*	1.57076E-05*	0.000460205	3.16454E-05	6.03936E-06	0.0795207	0.0240436	0*	1.65118E-10*	0.104062
m-Xylene		0*	0.0255110	0.0911883	2.48843E-05	0.116724*	2.13147E-05*	0.000486519	1.92053E-05	5.67901E-06	0.0907018	0.0255110	0*	1.19217E-10*	0.116724
o-Xylene		0*	0.0299738	0.124522	6.90907E-05	0.154565*	1.61183E-05*	0.000570644	6.12338E-05	7.85683E-06	0.123951	0.0299738	0*	2.10336E-10*	0.154565
Nonane		0*	0.0890183	0.803005	7.76458E-08	0.892024*	6.71084E-05*	0.00159797	2.65490E-10	7.73803E-08	0.801407	0.0890183	0*	5.87251E-16*	0.892024
C10+		0*	0.0360531	1.38792	5.94050E-07	1.42398*	1.85585E-05*	0.000581564	3.93412E-08	5.54708E-07	1.38734	0.0360531	0*	1.39014E-14*	1.42398
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		0*	0.134558	0.0105516	99.9471	0*	4.87232E-05*	0.0870623	99.9941	2.63564	0.000726562	0.134558	100*	90.4991*	5.40621
H2S		0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen		0.541713*	0.536256	0.00329567	0.000129008	0.00503353*	0.00129412*	0.0288366	3.50004E-06	0.259701	1.58745E-05	0.536256	0*	0.00509501*	0.496690
Carbon Dioxide		0.402137*	0.397764	0.0214110	0.00370374	0.0137068*	0.135807*	0.180660	0.00198465	3.55908	0.000961339	0.397764	0*	4.68642*	0.369007
Methane		61.7162*	61.0988	1.19312	0.0286069	1.32329*	2.50649*	10.3369	0.00155191	55.9830	0.0189365	61.0988	0*	3.05580*	56.6088
Ethane		21.1649*	20.9883	2.39738	0.0136071	2.99752*	26.3004*	19.3030	0.00107258	25.9371	0.226479	20.9883	0*	1.66995*	19.4880
Propane		9.16987*	9.14042	3.60580	0.00386773	4.62769*	26.6563*	23.6790	0.000220377	7.54723	1.02814	9.14042	0*	0.0756911*	8.54094
Isobutane		1.44585*	1.45575	1.36694	0.000413471	1.76287*	6.61430*	6.49940	1.67032E-05	0.820997	0.707867	1.45575	0*	0.00206202*	1.37698
n-Butane		2.90478*	2.94204	3.99594	0.00104415	4.98854*	16.0003*	15.6372	5.48211E-05	2.04715	2.50106	2.94204	0*	0.00463091*	2.80885
Isopentane		0.959213*	0.994195	3.15441	0.000233739	3.68261*	6.30341*	6.75146	8.81208E-06	0.465421	2.69250	0.994195	0*	0.000272205*	0.987216
n-Pentane		0.745819*	0.815930	3.43849	7.29001E-05	4.92715*	5.39302*	5.86390	1.12437E-06	0.148518	3.12704	0.815930	0*	2.55831E-05*	0.828110
2-Methylpentane		0*	0.0728742	0.731526	8.70411E-06	2.82742*	0.518647*	0.569729	1.83593E-07	0.0176306	0.752303	0.0728742	0*	1.66949E-06*	0.0829101
3-Methylpentane		0*	0.0491961	0.548302	1.46914E-05	1.94792*	0.351715*	0.386874	7.43542E-07	0.0288613	0.569031	0.0491961	0*	6.06183E-06*	0.0571199
n-Hexane		0.949472*	0.862414	12.3341	4.92507E-05	6.42493*	6.36325*	6.83258	5.21451E-07	0.100830	13.0406	0.862414	0*	3.35603E-06*	1.05870
Methylcyclopentane		0*	0.0180734	0.257735	9.26897E-06	0.756101*	0.120895*	0.145426	7.55010E-07	0.0176176	0.272157	0.0180734	0*	4.42355E-06*	0.0221716
Benzene		0*	0.00213857	0.0320434	0.000102633	0.0907620*	0.0101999*	0.0171589	9.09939E-05	0.0241737	0.0339547	0.00213857	0*	0.000360525*	0.00266147
2-Methylhexane		0*	0.0685370	2.02960	5.45423E-06	3.62372*	0.129692*	0.530100	7.92759E-08	0.0111218	2.22215	0.0685370	0*	6.10218E-08*	0.106260
3-Methylhexane		0*	0.0558605	1.83683	5.37424E-06	3.08478*	0.387449*	0.433353	9.29883E-08	0.0109279	2.01705	0.0558605	0*	2.35575E-07*	0.0904568
Heptane		0*	0.107326	4.50946	4.24305E-06	6.63168*	0.698935*	0.818878	3.32279E-08	0.00871087	4.98338	0.107326	0*	6.14631E-08*	0.194465
Methylcyclohexane		0*	0.0562809	2.44360	2.68099E-05	3.53435*	0.386490*	0.441541	2.17222E-06	0.0509817	2.70069	0.0562809	0*	4.09985E-06*	0.103640
Toluene		0*	0.0116293	0.575077	0.000385139	0.781429*	0.0550508*	0.0908740	0.000329162	0.116153	0.637255	0.0116293	0*	0.000375023*	0.0229143
Octane		0*	0.125673	16.0122	1.90579E-06	15.4813*	0.743487*	0.909070	6.37962E-09	0.00393021	17.9516	0.125673	0*	3.48461E-09*	0.453966
Ethylbenzene		0*	0.00665242	0.972038	0.000182732	0.909291*	0.0315456*	0.0491481	0.000153522	0.0605951	1.09055	0.00665242	0*	5.85670E-05*	0.0266636
m-Xylene		0*	0.00705844	1.10825	0.000120663	1.01993*	0.0428064*	0.0519584	9.31709E-05	0.0569795	1.24389	0.00705844	0*	4.22860E-05*	0.0299080

o-Xylene	0*	0.00829321	1.51336	0.000335019	1.35058*	0.0323704*	0.0609425	0.000297065	0.0788304	1.69988	0.00829321	0*	7.46056E-05*	0.0396039
Nonane	0*	0.0297545	11.7899	4.54843E-07	9.41629*	0.162817*	0.206166	1.55597E-09	0.000937930	13.2774	0.0297545	0*	2.51637E-10*	0.276119
C10+	0*	0.0142631	24.1187	4.11873E-06	17.7911*	0.0532922*	0.0888062	2.72897E-07	0.00795796	27.2044	0.0142631	0*	7.05030E-09*	0.521699
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*	51.6309	0.0921724	2188.27	0*	2.57566E-06*	0.0865479	2188.25	0.0278882	0.00562456	51.6309	2240.00*	0.0270874*	2240.00
H2S	0*	0	0	0	0*	0*	0	0	0	0	0	0*	0*	0
Nitrogen	205.736*	205.766	0.0287891	0.00282455	0.0611567*	6.84110E-05*	0.0286662	7.65940E-05	0.00274795	0.000122890	205.766	0*	1.52500E-06*	205.797
Carbon Dioxide	152.727*	152.625	0.187034	0.0810908	0.166535*	0.00717920*	0.179592	0.0434315	0.0376593	0.00744205	152.625	0*	0.00140270*	152.893
Methane	23439.1*	23444.1	10.4224	0.626329	16.0777*	0.132501*	10.2758	0.0339617	0.592367	0.146594	23444.1	0*	0.000914635*	23455.2
Ethane	8038.18*	8053.36	20.9422	0.297918	36.4195*	1.39032*	19.1889	0.0234722	0.274445	1.75325	8053.36	0*	0.000499834*	8074.60
Propane	3482.61*	3507.25	31.4982	0.0846814	56.2258*	1.40914*	23.5391	0.00482266	0.0798587	7.95915	3507.25	0*	2.26552E-05*	3538.83
Isobutane	549.115*	558.584	11.9408	0.00905266	21.4187*	0.349652*	6.46099	0.000365528	0.00868714	5.47984	558.584	0*	6.17186E-07*	570.534
n-Butane	1103.20*	1128.88	34.9063	0.0228610	60.6101*	0.845824*	15.5448	0.00119969	0.0216613	19.3615	1128.88	0*	1.38608E-06*	1163.81
Isopentane	364.298*	381.481	27.5551	0.00511755	44.7432*	0.333218*	6.71156	0.000192841	0.00492471	20.8436	381.481	0*	8.14740E-08*	409.041
n-Pentane	283.253*	313.079	30.0367	0.00159610	59.8641*	0.285091*	5.82925	2.46055E-05	0.00157149	24.2075	313.079	0*	7.65731E-09*	343.117
2-Methylpentane	0*	27.9624	6.39019	0.000190571	34.3528*	0.0274173*	0.566363	4.01770E-06	0.000186553	5.82383	27.9624	0*	4.99698E-10*	34.3528
3-Methylpentane	0*	18.8769	4.78965	0.000321659	23.6669*	0.0185928*	0.384588	1.62715E-05	0.000305387	4.40506	18.8769	0*	1.81438E-09*	23.6669
n-Hexane	360.598*	330.915	107.744	0.00107831	78.0620*	0.336381*	6.79221	1.14113E-05	0.00106690	100.952	330.915	0*	1.00450E-09*	438.660
Methylcyclopentane	0*	6.93489	2.25142	0.000202938	9.18652*	0.00639086*	0.144567	1.65225E-05	0.000186416	2.10686	6.93489	0*	1.32402E-09*	9.18652
Benzene	0*	0.820586	0.279912	0.00224707	1.10275*	0.000539196*	0.0170575	0.00199129	0.000255787	0.262855	0.820586	0*	1.07909E-07*	1.10275
2-Methylhexane	0*	26.2982	17.7294	0.000119417	44.0277*	0.00685590*	0.526968	1.73485E-06	0.000117682	17.2024	26.2982	0*	1.82645E-11*	44.0277
3-Methylhexane	0*	21.4341	16.0455	0.000117665	37.4797*	0.0204817*	0.430792	2.03493E-06	0.000115630	15.6147	21.4341	0*	7.05104E-11*	37.4797
Heptane	0*	41.1818	39.3921	9.28986E-05	80.5740*	0.0369478*	0.814039	7.27151E-07	9.21715E-05	38.5781	41.1818	0*	1.83966E-11*	80.5740
Methylcyclohexane	0*	21.5954	21.3459	0.000586984	42.9419*	0.0204311*	0.438932	4.75363E-05	0.000539447	20.9069	21.5954	0*	1.22713E-09*	42.9419
Toluene	0*	4.46227	5.02355	0.00843235	9.49425*	0.00291015*	0.0903370	0.00720331	0.00122904	4.93321	4.46227	0*	1.12249E-07*	9.49425
Octane	0*	48.2218	139.873	4.17260E-05	188.095*	0.0393030*	0.903698	1.39610E-07	4.15864E-05	138.970	48.2218	0*	1.04298E-12*	188.095
Ethylbenzene	0*	2.55259	8.49117	0.00400080	11.0478*	0.00166760*	0.0488577	0.00335963	0.000641168	8.44231	2.55259	0*	1.75298E-08*	11.0478
m-Xylene	0*	2.70838	9.68101	0.00264184	12.3920*	0.00226288*	0.0516513	0.00203893	0.000602912	9.62936	2.70838	0*	1.26567E-08*	12.3920
o-Xylene	0*	3.18217	13.2199	0.00733501	16.4094*	0.00171120*	0.0605824	0.00650089	0.000834120	13.1593	3.18217	0*	2.23303E-08*	16.4094
Nonane	0*	11.4171	102.990	9.95847E-06	114.407*	0.00860700*	0.204948	3.40504E-08	9.92442E-06	102.785	11.4171	0*	7.53179E-14*	114.407
C10+	0*	5.47285	210.687	9.01767E-05	216.160*	0.00281719*	0.0882814	5.97200E-06	8.42047E-05	210.599	5.47285	0*	2.11024E-12*	216.160

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*	83.9350
Pressure	psig	1000*	238*	238	238	1000*	2.12352	0*	0	0*	0	238	1000*	-14.2206	1000
Mole Fraction Vapor	%	100	100	0	0	0	100*	100	0	100	0	100	0	100*	92.9048
Mole Fraction Light Liquid	%	0	0	100	100	100	0	0	100	0	100	0	100	0	0.934698
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0	0	0	0	0	0	0	6.16053
Molecular Weight	lb/lbmol	20.4212	20.5483	89.1488	18.0169	83.4812	43.4581	39.7415	18.0157	20.7298	106.085	20.5483	18.0153	18.5943	20.7307
Mass Density	lb/ft^3	4.49476	0.975633	42.6218	62.2626	41.8210	0.129556	0.102979	62.2226	0.0531924	43.9994	0.975633	62.1852	0.00153832	4.90682
Molar Flow	lbmol/h	1859.77	1867.34	9.79870	121.521	14.5540	0.121642	2.50139	121.470	0.0510434	7.29731	1867.34	124.339	0.00160970	1998.66
Mass Flow	lb/h	37978.8	38370.8	873.543	2189.43	1214.99	5.28631*	99.4091	2188.37	1.05812	774.134	38370.8	2240.00	0.0299312*	41433.8
Vapor Volumetric Flow	ft^3/h	8449.58	39329.1	20.4952	35.1645	29.0520	40.8033	965.333	35.1701	19.8923	17.5942	39329.1	36.0214	19.4570	8444.11
Liquid Volumetric Flow	gpm	1053.45	4903.37	2.55525	4.38415	3.62207	5.08716	120.353	4.38484	2.48008	2.19356	4903.37	4.49098	2.42581	1052.77
Std Vapor Volumetric Flow	MMSCFD	16.9381*	17.0070	0.0892428	1.10677	0.132552	0.00110786	0.0227817	1.10631	0.000464884	0.0664611	17.0070	1.13243	1.46605E-05	18.2031
Std Liquid Volumetric Flow	sgpm	224.846	226.031	2.60704	4.38110	3.69581*	0.0219310	0.419614	4.37500	0.00610018	2.18742	226.031	4.47792*	6.65843E-05	233.019
Compressibility		0.788705	0.936310	0.0929852	0.0128642	0.346524	0.981548	0.986690	0.000740268	0.996394	0.00616442	0.936310	0.0502914	0.999550	0.734858
Specific Gravity		0.705090	0.709479	0.683380	0.998294	0.670542	1.50049	1.37217	0.997652	0.715744	0.705468	0.709479	0.997052	0.642010	
API Gravity				73.9761	10.0422	75.4800			10.0024		66.9259		9.87799		
Enthalpy	Btu/h	-6.46119E+07	-6.42363E+07	-806098	-1.49426E+07	-1.13257E+06	-5527.38	-110291	-1.49291E+07	-1938.52	-678343	-6.42363E+07	-1.52557E+07	-164.184	-8.10001E+07
Mass Enthalpy	Btu/lb	-1701.26	-1674.09	-922.792	-6824.87	-932.168	-1045.60	-1109.47	-6822.01	-1832.04	-876.261	-1674.09	-6810.58	-5485.39	-1954.93
Mass Cp	Btu/(lb*°F)	0.673005	0.513865	0.514627	0.982090	0.524319	0.409054	0.417038	0.981760	0.472316	0.504454	0.513865	0.979420	0.439296	0.689176
Ideal Gas CpCv Ratio		1.25017	1.25280	1.06185	1.32580	1.06469	1.12699	1.13718	1.32555	1.25558	1.05149	1.25280	1.32512	1.32136	1.24882
Dynamic Viscosity	cP	0.0131744	0.0108416	0.348754	0.995378	0.311388	0.00843369	0.00873657	0.924417	0.0107456	0.461194	0.0108416	0.840378	0.0103171	
Kinematic Viscosity	cSt	0.182980	0.693724	0.510819	0.998022	0.464821	4.06387	5.29628	0.927468	12.6113	0.654360	0.693724	0.843659	418.687	
Thermal Conductivity	Btu/(h*ft*°F)	0.0224334	0.0179987	0.0678719	0.346375	0.0657875	0.0108207	0.0120276	0.349774	0.0170513	0.0693795	0.0179987	0.353848	0.0122245	
Surface Tension	lbf/ft			0.00120021?	0.00502873?	0.000654120			0.00498761?		0.00142989		0.00492045		
Net Ideal Gas Heating Value	Btu/ft^3	1119.21	1123.98	4519.04	0.487809	4240.58	2277.84	2087.53	0.0372225	1072.77	5352.52	1123.98	0	49.7429	1072.32
Net Liquid Heating Value	Btu/lb	20740.2	20696.9	19065.4	-1048.96	19095.0	19735.4	19787.8	-1058.92	19550.1	18972.6	20696.9	-1059.76	49.9767	19513.4
Gross Ideal Gas Heating Value	Btu/ft^3	1234.54	1239.66	4866.34	50.8253	4569.96	2476.13	2272.23	50.3489	1184.63	5755.55	1239.66	50.3101	101.926	1185.16
Gross Liquid Heating Value	Btu/lb	22883.3	22833.2	20542.5	11.2870	20590.2	21466.7	21551.2	0.849583	21597.8	20413.0	22833.2	0	1114.96	21579.0

Process Streams		Gas	HP Separator Gas	HP Separator Oil	HP Separator Water	Oil	Oil W/B	OT Flash Gas	Produced Water	PWT Flash Gas	Sales Oil	Total gas to sale	Water	Water W/B	Well Stream
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Vapor**	From Block:	--	3 Phase Separator	3 Phase Separator	3 Phase Separator	--	--	Condensate Tanks	PW Tanks	PW Tanks	Condensate Tanks	MIX-100	--	--	MIX-101
	To Block:	MIX-101	MIX-100	Condensate Tanks	PW Tanks	MIX-101	--	--	--	--	--	--	MIX-101	--	3 Phase Separator
Mole Fraction	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water	0	0.153477				0.000117534	0.192059		3.03277		0.153477		93.4077	0.0731021	
H2S	0	0				0	0		0		0		0	0	
Nitrogen	0.394898	0.393353				0.00200760	0.0409093		0.192178		0.393353		0.00338189	0.395079	
Carbon Dioxide	0.186599	0.185719				0.134106	0.163139		1.67643		0.185719		1.98004	0.185592	
Methane	78.5616	78.2598				6.78993	25.6074		72.3403		78.2598		3.54187	78.4791	
Ethane	14.3740	14.3428				38.0113	25.5123		17.8812		14.3428		1.03267	14.2942	
Propane	4.24668	4.25939				26.2709	21.3409		3.54803		4.25939		0.0319175	4.20377	
Isobutane	0.507998	0.514662				4.94552	4.44402		0.292816		0.514662		0.000659674	0.502809	
n-Butane	1.02060	1.04012				11.9634	10.6920		0.730133		1.04012		0.00148151	1.01002	
Isopentane	0.271499	0.283152				3.79679	3.71889		0.133725		0.283152		7.01529E-05	0.272962	
n-Pentane	0.211099	0.232381				3.24843	3.23000		0.0426721		0.232381		6.59330E-06	0.223127	
2-Methylpentane	0	0.0173767				0.261553	0.262742		0.00424111		0.0173767		3.60230E-07	0.0167642	
3-Methylpentane	0	0.0117307				0.177369	0.178415		0.00694270		0.0117307		1.30798E-06	0.0113310	

n-Hexane	0.224999	0.205641				3.20898	3.15099		0.0242550		0.205641		7.24139E-07	0.201619
Methylcyclopentane	0	0.00441278				0.0624272	0.0686727		0.00433950		0.00441278		9.77345E-07	0.0042546
Benzene	0	0.000562579				0.00567477	0.00873008		0.00641536		0.000562579		8.58218E-05	0.000544593
2-Methylhexane	0	0.0140548				0.0562479	0.210245		0.00230088		0.0140548		1.13237E-08	0.0149052
3-Methylhexane	0	0.0114553				0.168038	0.171874		0.00226077		0.0114553		4.37152E-08	0.0122998
Heptane	0	0.0220093				0.303131	0.324779		0.00180211		0.0220093		1.14056E-08	0.0248376
Methylcyclohexane	0	0.0117784				0.171064	0.178717		0.0107637		0.0117784		7.76420E-07	0.0129309
Toluene	0	0.00259353				0.0259653	0.0391961		0.0261328		0.00259353		7.56827E-05	0.00289559
Octane	0	0.0226071				0.282859	0.316277		0.000713242		0.0226071		5.67230E-10	0.0339454
Ethylbenzene	0	0.00128758				0.0129130	0.0183980		0.0118318		0.00128758		1.02577E-05	0.00191242
m-Xylene	0	0.00136617				0.0175226	0.0194500		0.0111258		0.00136617		7.40618E-06	0.00206933
o-Xylene	0	0.00160516				0.0132507	0.0228131		0.0153924		0.00160516		1.30668E-05	0.00252228
Nonane	0	0.00476711				0.0551690	0.0638833		0.000151597		0.00476711		3.64821E-11	0.0103273
C10+	0	0.00193071				0.0152567	0.0232496		0.00108674		0.00193071		8.63606E-10	0.00703610
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	2.86595				1.42971E-07	0.00480414		0.00154803		2.86595		0.00150358	1.35740
H2S	0	0				0	0		0		0		0	0
Nitrogen	7.34420	7.34526				2.44208E-06	0.00102330		9.80942E-05		7.34526		5.44381E-08	7.33604
Carbon Dioxide	3.47032	3.46801				0.000163128	0.00408075		0.000855708		3.46801		3.18727E-05	3.44617
Methane	1461.07	1461.38				0.00825937	0.640540		0.0369249		1461.38		5.70134E-05	1457.24
Ethane	267.324	267.829				0.0462376	0.638162		0.00912717		267.829		1.66229E-05	265.422
Propane	78.9786	79.5374				0.0319564	0.533819		0.00181104		79.5374		5.13775E-07	78.0579
Isobutane	9.44760	9.61051				0.00601581	0.111162		0.000149463		9.61051		1.06188E-08	9.33642
n-Butane	18.9807	19.4226				0.0145525	0.267450		0.000372685		19.4226		2.38477E-08	18.7547
Isopentane	5.04926	5.28742				0.00461848	0.0930239		6.82577E-05		5.28742		1.12925E-09	5.06851
n-Pentane	3.92596	4.33935				0.00395144	0.0807948		2.17813E-05		4.33935		1.06132E-10	4.14314
2-Methylpentane	0	0.324483				0.000318157	0.00657221		2.16481E-06		0.324483		5.79862E-12	0.311286
3-Methylpentane	0	0.219053				0.000215755	0.00446285		3.54379E-06		0.219053		2.10545E-11	0.210400
n-Hexane	4.18447	3.84002				0.00390345	0.0788185		1.23806E-05		3.84002		1.16564E-11	3.74377
Methylcyclopentane	0	0.0824018				7.59375E-05	0.00171777		2.21503E-06		0.0824018		1.57323E-11	0.0790032
Benzene	0	0.0105053				6.90288E-06	0.000218373		3.27462E-06		0.0105053		1.38147E-09	0.0101123
2-Methylhexane	0	0.262452				6.84209E-05	0.00525906		1.17445E-06		0.262452		1.82277E-13	0.276768
3-Methylhexane	0	0.213909				0.000204405	0.00429924		1.15397E-06		0.213909		7.03683E-13	0.228390
Heptane	0	0.410989				0.000368734	0.00812398		9.19857E-07		0.410989		1.83596E-13	0.461197
Methylcyclohexane	0	0.219944				0.000208085	0.00447041		5.49413E-06		0.219944		1.24980E-11	0.240108
Toluene	0	0.0484301				3.15846E-05	0.000980449		1.33391E-05		0.0484301		1.21826E-09	0.0537669
Octane	0	0.422152				0.000344074	0.00791132		3.64063E-07		0.422152		9.13068E-15	0.630317
Ethylbenzene	0	0.0240436				1.57076E-05	0.000460205		6.03936E-06		0.0240436		1.65118E-10	0.0355108
m-Xylene	0	0.0255110				2.13147E-05	0.000486519		5.67901E-06		0.0255110		1.19217E-10	0.0384245
o-Xylene	0	0.0299738				1.61183E-05	0.000570644		7.85683E-06		0.0299738		2.10336E-10	0.0468350
Nonane	0	0.0890183				6.71084E-05	0.00159797		7.73803E-08		0.0890183		5.87251E-16	0.191763
C10+	0	0.0360531				1.85585E-05	0.000581564		5.54708E-07		0.0360531		1.39014E-14	0.130650
Mass Fraction	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water	0	0.134558				4.87232E-05	0.0870623		2.63564		0.134558		90.4991	0.0641678
H2S	0	0				0	0		0		0		0	0
Nitrogen	0.541713	0.536256				0.00129412	0.0288366		0.259701		0.536256		0.00509501	0.539257
Carbon Dioxide	0.402137	0.397764				0.135807	0.180660		3.55908		0.397764		4.68642	0.397971
Methane	61.7162	61.0988				2.50649	10.3369		55.9830		61.0988		3.05580	61.3439
Ethane	21.1649	20.9883				26.3004	19.3030		25.9371		20.9883		1.66995	20.9424
Propane	9.16987	9.14042				26.6563	23.6790		7.54723		9.14042		0.0756911	9.03194
Isobutane	1.44585	1.45575				6.61430	6.49940		0.820997		1.45575		0.00206202	1.42394
n-Butane	2.90478	2.94204				16.0003	15.6372		2.04715		2.94204		0.00463091	2.86035
Isopentane	0.959213	0.994195				6.30341	6.75146		0.465421		0.994195		0.000272205	0.959572
n-Pentane	0.745819	0.815930				5.39302	5.86390		0.148518		0.815930		2.55831E-05	0.784381
2-Methylpentane	0	0.0728742				0.518647	0.569729		0.0176306		0.0728742		1.66949E-06	0.0703900
3-Methylpentane	0	0.0491961				0.351715	0.386874		0.0288613		0.0491961		6.06183E-06	0.0475770
n-Hexane	0.949472	0.862414				6.36325	6.83258		0.100830		0.862414		3.35603E-06	0.846566
Methylcyclopentane	0	0.0180734				0.120895	0.145426		0.0176176		0.0180734		4.42355E-06	0.0174468
Benzene	0	0.00213857				0.0101999	0.0171589		0.0241737		0.00213857		0.000360525	0.00207269
2-Methylhexane	0	0.0685370				0.129692	0.530100		0.0111218		0.0685370		6.10218E-08	0.0727714
3-Methylhexane	0	0.0558605				0.387449	0.433353		0.0109279		0.0558605		2.35575E-07	0.0600512
Heptane	0	0.107326				0.698935	0.818878		0.00871087		0.107326		6.14631E-08	0.121264
Methylcyclohexane	0	0.0562809				0.386490	0.441541		0.0509817		0.0562809		4.09985E-06	0.0618621
Toluene	0	0.0116293				0.0550508	0.0908740		0.116153		0.0116293		0.000375023	0.0129994
Octane	0	0.125673				0.743487	0.909070		0.00393021		0.125673		3.48461E-09	0.188931
Ethylbenzene	0	0.00665242				0.0315456	0.0491481		0.0605951		0.00665242		5.85670E-05	0.00989261
m-Xylene	0	0.00705844				0.0428064	0.0519584		0.0569795		0.00705844		4.22860E-05	0.0107043
o-Xylene	0	0.00829321				0.0323704	0.0609425		0.0788304		0.00829321		7.46056E-05	0.0130473
Nonane	0	0.0297545				0.162817	0.206166		0.000937930		0.0297545		2.51637E-10	0.0645368
C10+	0	0.0142631				0.0532922	0.0888062		0.00795796		0.0142631		7.05030E-09	0.0520416
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	51.6309				2.57566E-06	0.0865479		0.0278882		51.6309		0.0270874	24.4539
H2S	0	0				0	0		0		0		0	0
Nitrogen	205.736	205.766				6.84110E-05	0.0286662		0.00274795		205.766		1.52500E-06	205.507
Carbon Dioxide	152.727	152.625				0.00717920	0.179592		0.0376593		152.625		0.00140270	151.664
Methane	23439.1	23444.1				0.132501	10.2758		0.592367		23444.1		0.000914635	23377.8
Ethane	8038.18	8053.36				1.39032	19.1889		0.274445		8053.36		0.000499834	7980.99
Propane	3482.61	3507.25				1.40914	23.5391		0.0798587		3507.25		2.26552E-05	3442.01
Isobutane	549.115	558.584				0.349652	6.46099		0.00868714		558.584		6.17186E-07	542.653
n-Butane	1103.20	1128.88				0.845824	15.5448		0.0216613		1128.88		1.38608E-06	1090.06
Isopentane	364.298	381.481				0.333218	6.71156		0.00492471		381.481		8.14740E-08	365.687
n-Pentane	283.253	313.079				0.285091	5.82925		0.00157149		313.079		7.65731E-09	298.922
2-Methylpentane	0	27.9624				0.0274173	0.566363		0.000186553		27.9624		4.99698E-10	26.8252
3-Methylpentane	0	18.8769				0.0185928	0.384588		0.000305387		18.8769		1.81438E-09	18.1313
n-Hexane	360.598	330.915				0.336381	6.79221		0.00106690		330.915		1.00450E-09	322.621
Methylcyclopentane	0	6.93489				0.00639086	0.144567		0.000186416		6.93489		1.32402E-09	6.64887

Benzene	0	0.820586	0.000539196	0.0170575	0.000255787	0.820586	1.07909E-07	0.789889			
2-Methylhexane	0	26.2982	0.00685590	0.526968	0.000117682	26.2982	1.82645E-11	27.7327			
3-Methylhexane	0	21.4341	0.0204817	0.430792	0.000115630	21.4341	7.05104E-11	22.8851			
Heptane	0	41.1818	0.0369478	0.814039	9.21715E-05	41.1818	1.83966E-11	46.2128			
Methylcyclohexane	0	21.5954	0.0204311	0.438932	0.000539447	21.5954	1.22713E-09	23.5752			
Toluene	0	4.46227	0.00291015	0.0903370	0.00122904	4.46227	1.12249E-07	4.95399			
Octane	0	48.2218	0.0393030	0.903698	4.15864E-05	48.2218	1.04298E-12	72.0002			
Ethylbenzene	0	2.55259	0.00166760	0.0488577	0.000641168	2.55259	1.75298E-08	3.77001			
m-Xylene	0	2.70838	0.00226288	0.0516513	0.000602912	2.70838	1.26567E-08	4.07933			
o-Xylene	0	3.18217	0.00171120	0.0605824	0.000834120	3.18217	2.23303E-08	4.97223			
Nonane	0	11.4171	0.00860700	0.204948	9.92442E-06	11.4171	7.53179E-14	24.5946			
C10+	0	5.47285	0.00281719	0.0882814	8.42047E-05	5.47285	2.11024E-12	19.8327			

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	83.9350
Pressure	psig	1000	238				2.12352	0		0		238		-14.2206	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	20.4212	20.5483				43.4581	39.7415		20.7298		20.5483		18.5943	20.5236
Mass Density	lb/ft^3	4.49476	0.975633				0.129556	0.102979		0.0531924		0.975633		0.00153832	4.54858
Molar Flow	lbmol/h	1859.77	1867.34				0.121642	2.50139		0.0510434		1867.34		0.00160970	1856.85
Mass Flow	lb/h	37978.8	38370.8				5.28631	99.4091		1.05812		38370.8		0.0299312	38109.3
Vapor Volumetric Flow	ft^3/h	8449.58	39329.1				40.8033	965.333		19.8923		39329.1		19.4570	8378.29
Liquid Volumetric Flow	gpm	1053.45	4903.37				5.08716	120.353		2.48008		4903.37		2.42581	1044.57
Std Vapor Volumetric Flow	MMSCFD	16.9381	17.0070				0.00110786	0.0227817		0.000464884		17.0070		1.46605E-05	16.9115
Std Liquid Volumetric Flow	sgpm	224.846	226.031				0.0219310	0.419614		0.00610018		226.031		6.65843E-05	224.733
Compressibility		0.788705	0.936310				0.981548	0.986690		0.996394		0.936310		0.999550	0.784814
Specific Gravity		0.705090	0.709479				1.50049	1.37217		0.715744		0.709479		0.642010	0.708625
API Gravity															
Enthalpy	Btu/h	-6.46119E+07	-6.42363E+07				-5527.38	-110291		-1938.52		-6.42363E+07		-164.184	-6.47442E+07
Mass Enthalpy	Btu/lb	-1701.26	-1674.09				-1045.60	-1109.47		-1832.04		-1674.09		-5485.39	-1698.91
Mass Cp	Btu/(lb**F)	0.673005	0.513865				0.409054	0.417038		0.472316		0.513865		0.439296	0.675474
Ideal Gas CpCv Ratio		1.25017	1.25280				1.12699	1.13718		1.25558		1.25280		1.32136	1.24931
Dynamic Viscosity	cP	0.0131744	0.0108416				0.00843369	0.00873657		0.0107456		0.0108416		0.0103171	0.0131863
Kinematic Viscosity	cSt	0.182980	0.693724				4.06387	5.29628		12.6113		0.693724		418.687	0.180978
Thermal Conductivity	Btu/(h*ft**F)	0.0224334	0.0179987				0.0108207	0.0120276		0.0170513		0.0179987		0.0122245	0.0224098
Surface Tension	lbf/ft														
Net Ideal Gas Heating Value	Btu/ft^3	1119.21	1123.98				2277.84	2087.53		1072.77		1123.98		49.7429	1123.51
Net Liquid Heating Value	Btu/lb	20740.2	20696.9				19735.4	19787.8		19550.1		20696.9		49.9767	20714.2
Gross Ideal Gas Heating Value	Btu/ft^3	1234.54	1239.66				2476.13	2272.23		1184.63		1239.66		101.926	1239.13
Gross Liquid Heating Value	Btu/lb	22883.3	22833.2				21466.7	21551.2		21597.8		22833.2		1114.96	22852.1

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: **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				0.0522145	99.9558	0			99.9965		0.00427843		100		0.0605569
H2S				0	0	0			0		0		0		0
Nitrogen				0.0104880	8.29717E-05	0.0150002			2.25091E-06		6.01157E-05		0		0.0532868
Carbon Dioxide				0.0433716	0.00151626	0.0260003			0.000812435		0.00231731		0		0.123358
Methane				6.63025	0.0321276	6.88607			0.00174280		0.125222		0		25.1462
Ethane				7.10777	0.00815312	8.32208			0.000642634		0.799028		0		16.5477
Propane				7.28991	0.00158030	8.76109			9.00371E-05		2.47348		0		11.7365
Isobutane				2.09664	0.000128169	2.53203			5.17736E-06		1.29200		0		2.56670
n-Butane				6.12905	0.000323668	7.16507			1.69925E-05		4.56493		0		6.78963
Isopentane				3.89767	5.83688E-05	4.26104			2.20040E-06		3.95895		0		3.21624
n-Pentane				4.24869	1.82045E-05	5.70106			2.80758E-07		4.59788		0		3.27881
2-Methylpentane				0.756767	1.81979E-06	2.73903			3.83817E-08		0.926110		0		0.467578
3-Methylpentane				0.567221	3.07156E-06	1.88702			1.55444E-07		0.700497		0		0.343840
n-Hexane				12.7597	1.02969E-05	6.22406			1.09014E-07		16.0534		0		7.20788
Methylcyclopentane				0.273014	1.98430E-06	0.750008			1.61622E-07		0.343059		0		0.161395
Benzene				0.0365710	2.36727E-05	0.0970010			2.09868E-05		0.0461144		0		0.0213178
2-Methylhexane				1.80572	9.80700E-07	3.01903			1.42533E-08		2.35261		0		0.870493
3-Methylhexane				1.63421	9.66318E-07	2.57003			1.67187E-08		2.13547		0		0.779656
Heptane				4.01203	7.62923E-07	5.52506			5.97418E-09		5.27596		0		1.83561
Methylcyclohexane				2.21868	4.91953E-06	3.00503			3.98571E-07		2.91795		0		1.05581
Toluene				0.556418	7.53104E-05	0.708007			6.43607E-05		0.733712		0		0.263422
Octane				12.4966	3.00593E-07	11.3141			1.00617E-09		16.6718		0		5.44036
Ethylbenzene				0.816240	3.10108E-05	0.715007			2.60520E-05		1.08973		0		0.366814
m-Xylene				0.930616	2.04773E-05	0.802008			1.58107E-05		1.24295		0		0.419037
o-Xylene				1.27080	5.68547E-05	1.06201			5.04105E-05		1.69859		0		0.576412
Nonane				8.19502	6.38948E-08	6.12906			2.18563E-10		10.9822		0		3.74843
C10+				14.1644	4.88844E-07	9.78410			3.23875E-08		19.0117		0		6.92305
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				0.00511635	121.468	0			121.466		0.000312210		124.339		0.0113129
H2S				0	0	0			0		0		0		0
Nitrogen				0.00102769	0.000100828	0.00218312			2.73419E-06		4.38683E-06		0		0.00995475
Carbon Dioxide				0.00424986	0.00184258	0.00378408			0.000986867		0.000169101		0		0.0230451

Methane			0.649678	0.0390419	1.00220			0.00211699		0.00913786		0		4.69767
Ethane			0.696469	0.00990778	1.21120			0.000780609		0.0583076		0		3.09134
Propane			0.714317	0.00192040	1.27509			0.000109368		0.180497		0		2.19255
Isobutane			0.205444	0.000155752	0.368511			6.28896E-06		0.0942814		0		0.479498
n-Butane			0.600567	0.000393326	1.04280			2.06408E-05		0.333117		0		1.26840
Isopentane			0.381921	7.09306E-05	0.620152			2.67283E-06		0.288897		0		0.600840
n-Pentane			0.416316	2.21223E-05	0.829732			3.41038E-07		0.335521		0		0.612530
2-Methylpentane			0.0741533	2.21143E-06	0.398638			4.66223E-08		0.0675811		0		0.0873504
3-Methylpentane			0.0555803	3.73261E-06	0.274637			1.88818E-07		0.0511174		0		0.0642343
n-Hexane			1.25029	1.25130E-05	0.905850			1.32420E-07		1.17147		0		1.34654
Methylcyclopentane			0.0267519	2.41135E-06	0.109156			1.96323E-07		0.0250341		0		0.0301510
Benzene			0.00358348	2.87674E-05	0.0141175			2.54928E-05		0.00336511		0		0.00398247
2-Methylhexane			0.176937	1.19176E-06	0.439390			1.73136E-08		0.171678		0		0.162621
3-Methylhexane			0.160131	1.17428E-06	0.374042			2.03083E-08		0.155832		0		0.145651
Heptane			0.393127	9.27114E-07	0.804117			7.25686E-09		0.385003		0		0.342919
Methylcyclohexane			0.217402	5.97828E-06	0.437352			4.84145E-07		0.212932		0		0.197240
Toluene			0.0545217	9.15183E-05	0.103043			7.81792E-05		0.0535413		0		0.0492110
Octane			1.22450	3.65285E-07	1.64666			1.22220E-09		1.21659		0		1.01634
Ethylbenzene			0.0799809	3.76848E-05	0.104062			3.16454E-05		0.0795207		0		0.0685263
m-Xylene			0.0911883	2.48843E-05	0.116724			1.92053E-05		0.0907018		0		0.0782823
o-Xylene			0.124522	6.90907E-05	0.154565			6.12338E-05		0.123951		0		0.107682
Nonane			0.803005	7.76458E-08	0.892024			2.65490E-10		0.801407		0		0.700261
C10+			1.38792	5.94050E-07	1.42398			3.93412E-08		1.38734		0		1.29333
Mass Fraction	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water			0.0105516	99.9471	0			99.9941		0.000726562		100		0.0184275
H2S			0	0	0			0		0		0		0
Nitrogen			0.00329567	0.000129008	0.00503353			3.50004E-06		1.58745E-05		0		0.0252144
Carbon Dioxide			0.0214110	0.00370374	0.0137068			0.00198465		0.000961339		0		0.0917017
Methane			1.19312	0.0286069	1.32329			0.00155191		0.0189365		0		6.81406
Ethane			2.39738	0.0136071	2.99752			0.00107258		0.226479		0		8.40463
Propane			3.60580	0.00386773	4.62769			0.000220377		1.02814		0		8.74170
Isobutane			1.36694	0.000413471	1.76287			1.67032E-05		0.707867		0		2.51988
n-Butane			3.99594	0.00104415	4.98854			5.48211E-05		2.50106		0		6.66578
Isopentane			3.15441	0.000233739	3.68261			8.81208E-06		2.69250		0		3.91958
n-Pentane			3.43849	7.29001E-05	4.92715			1.12437E-06		3.12704		0		3.99584
2-Methylpentane			0.731526	8.70411E-06	2.82742			1.83593E-07		0.752303		0		0.680612
3-Methylpentane			0.548302	1.46914E-05	1.94792			7.43542E-07		0.569031		0		0.500497
n-Hexane			12.3341	4.92507E-05	6.42493			5.21451E-07		13.0406		0		10.4919
Methylcyclopentane			0.257735	9.26897E-06	0.756101			7.55010E-07		0.272157		0		0.229433
Benzene			0.0320434	0.000102633	0.0907620			9.09939E-05		0.0339547		0		0.0281269
2-Methylhexane			2.02960	5.45423E-06	3.62372			7.92759E-08		2.22215		0		1.47334
3-Methylhexane			1.83683	5.37424E-06	3.08478			9.29883E-08		2.01705		0		1.31960
Heptane			4.50946	4.24305E-06	6.63168			3.32279E-08		4.98338		0		3.10684
Methylcyclohexane			2.44360	2.68099E-05	3.53435			2.17222E-06		2.70069		0		1.75105
Toluene			0.575077	0.000385139	0.781429			0.000329162		0.637255		0		0.409973
Octane			16.0122	1.90579E-06	15.4813			6.37962E-09		17.9516		0		10.4970
Ethylbenzene			0.972038	0.000182732	0.909291			0.000153522		1.09055		0		0.657794
m-Xylene			1.10825	0.000120663	1.01993			9.31709E-05		1.24389		0		0.751444
o-Xylene			1.51336	0.000335019	1.35058			0.000297065		1.69988		0		1.03366
Nonane			11.7899	4.54843E-07	9.41629			1.55597E-09		13.2774		0		8.12057
C10+			24.1187	4.11873E-06	17.7911			2.72897E-07		27.2044		0		17.7514
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			0.0921724	2188.27	0			2188.25		0.00562456		2240.00		0.203805
H2S			0	0	0			0		0		0		0
Nitrogen			0.0287891	0.00282455	0.0611567			7.65940E-05		0.000122890		0		0.278866
Carbon Dioxide			0.187034	0.0810908	0.166535			0.0434315		0.00744205		0		1.01420
Methane			10.4224	0.626329	16.0777			0.0339617		0.146594		0		75.3622
Ethane			20.9422	0.297918	36.4195			0.0234722		1.75325		0		92.9537
Propane			31.4982	0.0846814	56.2258			0.00482266		7.95915		0		96.6816
Isobutane			11.9408	0.00905266	21.4187			0.000365528		5.47984		0		27.8695
n-Butane			34.9063	0.0228610	60.6101			0.00119969		19.3615		0		73.7223
Isopentane			27.5551	0.00511755	44.7432			0.000192841		20.8436		0		43.3499
n-Pentane			30.0367	0.00159610	59.8641			2.46055E-05		24.2075		0		44.1933
2-Methylpentane			6.39019	0.000190571	34.3528			4.01770E-06		5.82383		0		7.52745
3-Methylpentane			4.78965	0.000321659	23.6669			1.62715E-05		4.40506		0		5.53541
n-Hexane			107.744	0.00107831	78.0620			1.14113E-05		100.952		0		116.038
Methylcyclopentane			2.25142	0.000202938	9.18652			1.65225E-05		2.10686		0		2.53749
Benzene			0.279912	0.00224707	1.10275			0.00199129		0.262855		0		0.311078
2-Methylhexane			17.7294	0.000119417	44.0277			1.73485E-06		17.2024		0		16.2949
3-Methylhexane			16.0455	0.000117665	37.4797			2.03493E-06		15.6147		0		14.5945
Heptane			39.3921	9.28986E-05	80.5740			7.27151E-07		38.5781		0		34.3611
Methylcyclohexane			21.3459	0.000586984	42.9419			4.75363E-05		20.9069		0		19.3662
Toluene			5.02355	0.00843235	9.49425			0.00720331		4.93321		0		4.53422
Octane			139.873	4.17260E-05	188.095			1.39610E-07		138.970		0		116.095
Ethylbenzene			8.49117	0.00400080	11.0478			0.00335963		8.44231		0		7.27509
m-Xylene			9.68101	0.00264184	12.3920			0.00203893		9.62936		0		8.31084
o-Xylene			13.2199	0.00733501	16.4094			0.00650089		13.1593		0		11.4321
Nonane			102.990	9.95847E-06	114.407			3.40504E-08		102.785		0		89.8120
C10+			210.687	9.01767E-05	216.160			5.97200E-06		210.599		0		196.327

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	83.9350		
Pressure	psig	238	238	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	89.1488	18.0169	83.4812	18.0157	106.085	18.0153	59.2021		
Mass Density	lb/ft^3	42.6218	62.2626	41.8210	62.2226	43.9994	62.1852	36.7458		
Molar Flow	lbmol/h	9.79870	121.521	14.5540	121.470	7.29731	124.339	18.6815		
Mass Flow	lb/h	873.543	2189.43	1214.99	2188.37	774.134	2240.00	1105.98		
Vapor Volumetric Flow	ft^3/h	20.4952	35.1645	29.0520	35.1701	17.5942	36.0214	30.0982		
Liquid Volumetric Flow	gpm	2.55525	4.38415	3.62207	4.38484	2.19356	4.49098	3.75250		
Std Vapor Volumetric Flow	MMSCFD	0.0892428	1.10677	0.132552	1.10631	0.0664611	1.13243	0.170144		
Std Liquid Volumetric Flow	sgpm	2.60704	4.38110	3.69581	4.37500	2.18742	4.47792	3.83940		
Compressibility		0.0929852	0.0128642	0.346524	0.000740268	0.00616442	0.0502914	0.280233		
Specific Gravity		0.683380	0.998294	0.670542	0.997652	0.705468	0.997052	0.589167		
API Gravity		73.9761	10.0422	75.4800	10.0024	66.9259	9.87799	102.255		
Enthalpy	Btu/h	-806098	-1.49426E+07	-1.13257E+06	-1.49291E+07	-678343	-1.52557E+07	-1.15936E+06		
Mass Enthalpy	Btu/lb	-922.792	-6824.87	-932.168	-6822.01	-876.261	-6810.58	-1048.26		
Mass Cp	Btu/(lb*°F)	0.514627	0.982090	0.524319	0.981760	0.504454	0.979420	0.576929		
Ideal Gas CpCv Ratio		1.06185	1.32580	1.06469	1.32555	1.05149	1.32512	1.09078		
Dynamic Viscosity	cP	0.348754	0.995378	0.311388	0.924417	0.461194	0.840378	0.172815		
Kinematic Viscosity	cSt	0.510819	0.998022	0.464821	0.927468	0.654360	0.843659	0.293598		
Thermal Conductivity	Btu/(h*ft*°F)	0.0678719	0.346375	0.0657875	0.349774	0.0693795	0.353848	0.0626766		
Surface Tension	lbf/ft	0.00120021	0.00502873?	0.000654120	0.00498761?	0.00142989	0.00492045	0.000462587		
Net Ideal Gas Heating Value	Btu/ft^3	4519.04	0.487809	4240.58	0.0372225	5352.52	0	3042.99		
Net Liquid Heating Value	Btu/lb	19065.4	-1048.96	19095.0	-1058.92	18972.6	-1059.76	19347.8		
Gross Ideal Gas Heating Value	Btu/ft^3	4866.34	50.8253	4569.96	50.3489	5755.55	50.3101	3290.68		
Gross Liquid Heating Value	Btu/lb	20542.5	11.2870	20590.2	0.849583	20413.0	0	20934.5		

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															99.8715
H2S															0
Nitrogen															0.000321364
Carbon Dioxide															0.00397201
Methane															0.103250
Ethane															0.0176215
Propane															0.00258577
Isobutane															0.000151933
n-Butane															0.000399689
Isopentane															5.05428E-05
n-Pentane															1.79949E-05
2-Methylpentane															1.42760E-06
3-Methylpentane															2.33177E-06
n-Hexane															7.80763E-06
Methylcyclopentane															1.55728E-06
Benzene															1.84890E-05
2-Methylhexane															5.65851E-07
3-Methylhexane															5.49125E-07
Heptane															4.82745E-07
Methylcyclohexane															3.27166E-06
Toluene															5.31799E-05
Octane															2.09804E-07
Ethylbenzene															2.03608E-05
m-Xylene															1.42243E-05
o-Xylene															3.88953E-05
Nonane															3.93789E-08
C10+															3.62508E-07
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water															122.970
H2S															0
Nitrogen															0.000395690
Carbon Dioxide															0.00489067
Methane															0.127130
Ethane															0.0216970
Propane															0.00318381
Isobutane															0.00187072
n-Butane															0.000492130
Isopentane															6.22324E-05
n-Pentane															2.21568E-05

October 7, 2013

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

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

Sample: Central No. 2H
Separator Hydrocarbon Liquid
Sampled @ 300 psig & 70 °F

Date Sampled: 09/20/13 Job Number: 35821.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.015	0.004	0.005
Carbon Dioxide	0.026	0.011	0.014
Methane	6.886	2.920	1.331
Ethane	8.322	5.569	3.014
Propane	8.761	6.040	4.653
Isobutane	2.532	2.073	1.772
n-Butane	7.165	5.652	5.015
2,2 Dimethylpropane	0.118	0.113	0.102
Isopentane	4.261	3.899	3.702
n-Pentane	5.583	5.064	4.851
2,2 Dimethylbutane	0.243	0.254	0.252
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.401	0.411	0.416
2 Methylpentane	2.739	2.845	2.843
3 Methylpentane	1.887	1.927	1.958
n-Hexane	4.725	4.862	4.904
Heptanes Plus	46.337	58.355	65.167
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

Specific Gravity	0.7352	(Water=1)
°API Gravity	60.96	@ 60°F
Molecular Weight	116.8	
Vapor Volume	19.98	CF/Gal
Weight	6.13	Lbs/Gal

Characteristics of Total Sample:

Specific Gravity	0.6584	(Water=1)
°API Gravity	83.42	@ 60°F
Molecular Weight	83.0	
Vapor Volume	25.17	CF/Gal
Weight	5.49	Lbs/Gal

Base Conditions: 14.850 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: XG
Processor: JCdjv
Cylinder ID: T-3044

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David Dannhaus 361-661-7015

TANKS DATA INPUT REPORT

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.026	0.011	0.014
Nitrogen	0.015	0.004	0.005
Methane	6.886	2.920	1.331
Ethane	8.322	5.569	3.014
Propane	8.761	6.040	4.653
Isobutane	2.532	2.073	1.772
n-Butane	7.282	5.765	5.118
Isopentane	4.261	3.899	3.702
n-Pentane	5.583	5.064	4.851
Other C-6's	5.270	5.438	5.470
Heptanes	12.718	14.211	15.025
Octanes	14.320	17.030	18.719
Nonanes	6.129	8.438	9.360
Decanes Plus	9.786	15.535	17.888
Benzene	0.097	0.068	0.091
Toluene	0.708	0.593	0.786
E-Benzene	0.715	0.690	0.914
Xylenes	1.865	1.790	2.384
n-Hexane	4.725	4.862	4.904
2,2,4 Trimethylpentane	0.000	0.000	0.000
Totals:	100.000	100.000	100.000

Characteristics of Total Sample:

Specific Gravity	0.6584	(Water=1)
°API Gravity	83.42	@ 60°F
Molecular Weight	83.0	
Vapor Volume	25.17	CF/Gal
Weight	5.49	Lbs/Gal

Characteristics of Decanes (C10) Plus:

Specific Gravity	0.7581	(Water=1)
Molecular Weight	151.8	

Characteristics of Atmospheric Sample:

°API Gravity	68.98	@ 60°F
Reid Vapor Pressure (ASTM D-5191)	4.41	psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
Cylinder Number	------	T-3044*	T-1105
Pressure, PSIG	300	246	238
Temperature, °F	70	70	70

* Sample used for analysis

TOTAL EXTENDED REPORT

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.015	0.004	0.005
Carbon Dioxide	0.026	0.011	0.014
Methane	6.886	2.920	1.331
Ethane	8.322	5.569	3.014
Propane	8.761	6.040	4.653
Isobutane	2.532	2.073	1.772
n-Butane	7.165	5.652	5.015
2,2 Dimethylpropane	0.118	0.113	0.102
Isopentane	4.261	3.899	3.702
n-Pentane	5.583	5.064	4.851
2,2 Dimethylbutane	0.243	0.254	0.252
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.401	0.411	0.416
2 Methylpentane	2.739	2.845	2.843
3 Methylpentane	1.887	1.927	1.958
n-Hexane	4.725	4.862	4.904
Methylcyclopentane	0.750	0.664	0.760
Benzene	0.097	0.068	0.091
Cyclohexane	0.855	0.728	0.866
2-Methylhexane	3.019	3.512	3.643
3-Methylhexane	2.570	2.952	3.101
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	1.170	1.328	1.398
n-Heptane	4.355	5.028	5.256
Methylcyclohexane	3.005	3.023	3.554
Toluene	0.708	0.593	0.786
Other C-8's	8.306	10.150	11.026
n-Octane	3.008	3.857	4.139
E-Benzene	0.715	0.690	0.914
M & P Xylenes	0.802	0.779	1.026
O-Xylene	1.062	1.011	1.358
Other C-9's	4.456	6.081	6.775
n-Nonane	1.673	2.356	2.585
Other C-10's	3.766	5.649	6.408
n-decane	0.826	1.268	1.415
Undecanes(11)	2.552	3.927	4.518
Dodecanes(12)	1.336	2.221	2.591
Tridecanes(13)	0.741	1.321	1.563
Tetradecanes(14)	0.329	0.627	0.752
Pentadecanes(15)	0.124	0.253	0.307
Hexadecanes(16)	0.056	0.123	0.151
Heptadecanes(17)	0.026	0.061	0.075
Octadecanes(18)	0.012	0.028	0.035
Nonadecanes(19)	0.006	0.015	0.019
Eicosanes(20)	0.002	0.005	0.006
Heneicosanes(21)	0.001	0.003	0.004
Docosanes(22)	0.001	0.002	0.002
Tricosanes(23)	0.000	0.001	0.002
Tetracosanes(24)	0.000	0.001	0.001
Pentacosanes(25)	0.000	0.001	0.001
Hexacosanes(26)	0.000	0.001	0.001
Heptacosanes(27)	0.000	0.001	0.001
Octacosanes(28)	0.000	0.001	0.001
Nonacosanes(29)	0.000	0.001	0.002
Triacontanes(30)	0.001	0.002	0.003
Hentriacontanes Plus(31+)	0.005	0.022	0.031
Total	100.000	100.000	100.000

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

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

Date Sampled: 09/20/13

Date Analyzed: 10/02/13

Sample: Central No. 2H

Job Number: J35821

FLASH LIBERATION OF HYDROCARBON LIQUID		
	Separator HC Liquid	**Stock Tank**
Pressure, psig	300	0
Temperature, °F	70	70
Gas Oil Ratio (1)	------	365
Gas Specific Gravity (2)	------	1.408
Separator Volume Factor (3)	1.2406	1.000

STOCK TANK FLUID PROPERTIES	
Shrinkage Recovery Factor (4)	0.8060
Oil API Gravity at 60 °F	68.98
Reid Vapor Pressure, psi (5)	4.41

Quality Control Check			
	Sampling Conditions	**Test Samples**	
Cylinder No.	------	T-3044*	T-1105
Pressure, psig	300	246	238
Temperature, °F	70	70	70

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

Certified: FESCO, Ltd. - Alice, Texas

David Dannhaus 361-661-7015

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

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

Sample: Central No. 2H
Gas Evolved from Hydrocarbon Liquid Flashed
From 300 psig & 70 °F to 0 psig & 70 °F

Date Sampled: 09/20/13 Job Number: 35821.001

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.053	
Carbon Dioxide	0.107	
Methane	23.624	
Ethane	26.392	7.114
Propane	22.728	6.311
Isobutane	4.750	1.567
n-Butane	10.798	3.431
2-2 Dimethylpropane	0.127	0.049
Isopentane	3.304	1.218
n-Pentane	3.382	1.236
Hexanes	2.805	1.165
Heptanes Plus	1.930	0.855
Totals	100.000	22.945

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.556	(Air=1)
Molecular Weight	101.39	
Gross Heating Value	5420	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.408	(Air=1)
Compressibility (Z)	0.9845	
Molecular Weight	40.14	
Gross Heating Value		
Dry Basis	2354	BTU/CF
Saturated Basis	2314	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: CYL-1

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.053		0.037
Carbon Dioxide	0.107		0.117
Methane	23.624		9.441
Ethane	26.392	7.114	19.772
Propane	22.728	6.311	24.970
Isobutane	4.750	1.567	6.879
n-Butane	10.798	3.431	15.637
2,2 Dimethylpropane	0.127	0.049	0.228
Isopentane	3.304	1.218	5.939
n-Pentane	3.382	1.236	6.080
2,2 Dimethylbutane	0.117	0.049	0.251
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.166	0.069	0.356
2 Methylpentane	0.881	0.369	1.892
3 Methylpentane	0.543	0.223	1.166
n-Hexane	1.098	0.455	2.358
Methylcyclopentane	0.079	0.027	0.166
Benzene	0.022	0.006	0.043
Cyclohexane	0.125	0.043	0.262
2-Methylhexane	0.233	0.109	0.582
3-Methylhexane	0.233	0.107	0.582
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.228	0.100	0.564
n-Heptane	0.296	0.138	0.739
Methylcyclohexane	0.195	0.079	0.477
Toluene	0.043	0.015	0.099
Other C8's	0.271	0.127	0.744
n-Octane	0.068	0.035	0.194
Ethylbenzene	0.002	0.001	0.005
M & P Xylenes	0.022	0.009	0.058
O-Xylene	0.003	0.001	0.008
Other C9's	0.076	0.039	0.239
n-Nonane	0.014	0.008	0.045
Other C10's	0.018	0.011	0.063
n-Decane	0.002	0.001	0.007
Undecanes (11)	0.000	0.000	0.000
Totals	100.000	22.945	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.408	(Air=1)
Compressibility (Z)	0.9845	
Molecular Weight	40.14	
Gross Heating Value		
Dry Basis	2354	BTU/CF
Saturated Basis	2314	BTU/CF

Antero Resources
Central Unit 2H - Jonathan Davis Pad

Tag Name	Value	Units	Timestamp
Accumulated Gas Flow	449204.7	MCF	10/16/2013 17:05:12
Casing Pressure	2090.66	PSIA	10/16/2013 17:05:11
Current Day Gas Flow	0	MCF	10/16/2013 17:05:12
Differential Pressure	0	inH2O	10/16/2013 17:05:12
Flow Rate	0	MCF Per Day	10/16/2013 17:05:12
Pressure	96.53	PSIA	10/16/2013 17:05:12
Previous Day Energy	116.29	MBTU	10/16/2013 17:05:13
Previous Day Gas Flow	95.17	MCF	10/16/2013 17:05:13
Temperature	62.78	F	10/16/2013 17:05:12
Tubing Pressure	2095.28	PSIA	10/16/2013 17:05:11
Daily AP	0.54	PSIA	10/16/2013 09:00:00
Daily DP	109.39	inH2O	10/16/2013 09:00:00
Daily Energy	116.29	MBTU	10/16/2013 09:00:00
Daily Flow	95.17	MCF	10/16/2013 09:00:00
Daily Tf	79.28	F	10/16/2013 09:00:00
Hourly AP	100.88	PSIA	10/16/2013 10:00:00
Hourly DP	0.02	Inches	10/16/2013 10:00:00
Hourly Energy	0	MBTU	10/16/2013 10:00:00
Hourly Flow Time	0	Seconds	10/16/2013 10:00:00
Hourly Tf	70.9	F	10/16/2013 10:00:00
Hourly Volume	0	MCF	10/16/2013 10:00:00
Audited Accumulated Gas Volume		MCF	
Audited Casing Pressure	2002	PSI	10/14/2013 09:00:00
Audited Gas Volume	542.7	MCF	10/14/2013 09:00:00
Audited Oil Volume	0	Barrels	10/14/2013 09:00:00
Audited Tubing Pressure	2006	PSI	10/14/2013 09:00:00
Audited Water Volume	0	Barrels	10/14/2013 09:00:00
Argon	0	%	10/16/2013 17:05:17
BTU	1221.91	BTU	10/16/2013 17:05:12
C02	0.1866	%	10/16/2013 17:05:17
Carbon Monoxide	0	%	10/16/2013 17:05:17
Decane	0	%	10/16/2013 17:05:17
Ethane	14.3741	%	10/16/2013 17:05:17
Helium	0	%	10/16/2013 17:05:17
Heptane	0	%	10/16/2013 17:05:17
Hexane	0.225	%	10/16/2013 17:05:17
Hydrogen	0	%	10/16/2013 17:05:17
Hydrogen Sulfide	0	%	10/16/2013 17:05:17
Iso-Butane	0.508	%	10/16/2013 17:05:17
Iso-Pentane	0.2715	%	10/16/2013 17:05:17
Methane	78.5619	%	10/16/2013 17:05:17
N2	0.3949	%	10/16/2013 17:05:17
N-Butane	1.0206	%	10/16/2013 17:05:17
Nonane	0	%	10/16/2013 17:05:17
N-Pentane	0.2111	%	10/16/2013 17:05:17
Octane	0	%	10/16/2013 17:05:17
Oxygen	0	%	10/16/2013 17:05:17
Plate Size	3.75	Inches	10/16/2013 17:05:15
Propane	4.2467	%	10/16/2013 17:05:17
SPG	0.7058		10/16/2013 17:05:12
Water	0	%	10/16/2013 17:05:17

Attachment U
Facility-wide Emissions Summary Sheet(s)

ATTACHMENT U – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

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

Emission Point ID#	NOx		CO		VOC		SO2		PM10		PM2.5		CH_4		GHG (CO2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
EP-HR001									2.2871	0.2401						
EP-PCV					0.0814	0.3565							0.3105	1.3599	7.7641	34.0068
F001					3.2451	14.2137							3.0175	13.2169	75.4387	330.4215
EP-L001					13.4157	0.7651							0.4732	0.0270	11.8565	0.6762
EP-L002					9.97E-04	1.14E-04							0.0365	0.0042	0.9672	0.1103
EP-GPU001, EP-GPU002, EP-GPU003, EP-GPU004, EP-GPU005, EP-GPU006,EP-GPU007 (emissions per EPN)	0.1228	0.5377	0.1031	0.4517	0.0068	0.0296	0.0007	0.0032	0.0093	0.0409	0.0093	0.0409	0.0028	0.0124	148.1870	649.0589
EP-GPU008, EP-GPU009 (emissions per EPN)	0.0818	0.3585	0.0687	0.3011	0.0045	0.0197	0.0005	0.0022	0.0062	0.0272	0.0062	0.0272	0.0019	0.0082	98.7913	432.7059
EP-EC001 -001(emissions per EPN)	0.8177	3.5815	3.7214	16.2999	1.4707	6.4415	1.02E-05	4.47E-05	0.0073	0.0318	0.0054	0.0238	0.2042	0.8944	291.5275	1276.8906
TOTAL	2.0044	8.7792	4.7182	20.6659	1.5359	7.4926	0.0071	0.0312	0.0974	0.4268	0.0956	0.4188	0.2277	1.0286	1722.8343	7546.8008

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	0.0048	0.0209	0.0048	0.0209
F001			0.0023	0.0102	0.0201	0.0879	0.0233	0.1023	0.0609	0.2666	0.2109	0.9236	0.3175	1.3906
EP-L001			1.93E-03	1.10E-04	1.04E-02	5.93E-04	5.96E-03	3.40E-04	0.014	8.09E-04	1.201	0.069	1.234	0.070
EP-L002			4.30E-06	4.91E-07	4.47E-06	5.10E-07	6.99E-07	7.97E-08	1.39E-06	1.59E-07	4.00E-08	4.57E-09	1.09E-05	1.24E-06
EP-GPU001, EP-GPU002, EP-GPU003, EP-GPU004, EP-GPU005, EP-GPU006,EP-GPU007 (emissions per EPN)	9.21E-05	4.03E-04	2.58E-06	1.13E-05	4.17E-06	1.83E-05			0.00E+00	0.00E+00	0.0022	0.0097	0.0023	0.0101
EP-GPU008, EP-GPU009 (emissions per EPN)	6.14E-05	2.69E-04	1.72E-06	7.53E-06	2.78E-06	1.22E-05			0.00E+00	0.00E+00	1.47E-03	6.45E-03	1.54E-03	6.75E-03
EP-EC001 -001(emissions per EPN)	1.28E-06	5.58E-06	3.57E-04	0.0016	0.0019	0.0083	0.0010	0.0045	0.0024	0.0103	0.1426	0.6247	0.1482	0.6493
TOTAL	0.0009	0.0039	3.82E-04	0.0018	0.0019	0.0090	0.0010	0.0048	0.0024	0.0111	0.1610	0.7739	0.1706	0.8175

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
Jonathan Davis Well Pad
Antero Resources Corporation
Doddridge County, West Virginia

Notice is given that Antero Resources Corporation has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-D General Permit Modification for an Oil and Natural Gas Production facility located at 612 Ramseys Ridge Rd West Union, WV 26456 , in Doddridge County, West Virginia.

The latitude and longitude coordinates are: 39.299297 and -80.828906

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

Pollutants	TOTALS (tpy):
NO_X	8.7792
CO	20.6659
$PM_{2.5}$	0.4188
PM_{10}	0.4268
VOC	7.4926
SO_2	0.0312
CO_{2e}	7546.8008
CH_4	1.0286
Formaldehyde	0.0039
Benzene	0.0018
Toluene	0.0090
Ethylbenzene	0.0048
Xylenes	0.0111
Hexane	0.7739
Total HAPs	0.8175

Facility will begin the operations with the proposed modifications upon 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 _____, 2017

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

www.ghd.com