February 12, 2016 Reference No. 082715

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

Dear Mr. Jay Fedczak:

Re: General Permit Registration G70-B Modification Application
Ruddy Alt Well Pad
Antero Resources Corporation

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

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

1. Removal of the Kubota compressor 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-B General Permit Modification Application
- Two CD copies of the G70-B General Permit Modification Application
- The application fee with check no. 432193 in the amount of $1,500.00

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

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

Sincerely,

GHD

Manuel Bautista

MB/ma/233

Encl.

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

General Permit G70-B Modification Application

Removal of the Kubota Compressor Engine.

Ruddy Alt Well Pad

Antero Resources Corporation

GHD Services Inc.
6320 Rothway Suite 100 Houston Texas 77040
082715 | Report No 233 | February 2016

Table of Contents

west virginia department of environmental protection

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

G70-B 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: Ruddy Alt Well Pad

Operating Site Physical Address: 596 Brushy Fork Rd.

City: New Milton	Zip Code: 26411	County: Doddridge

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.15670
Longitude: -80.69591

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities) 017-00074

CERTIFICATION OF INFORMATION

This G70-B 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-B Registration Application will be returned to the applicant. Furthermore, if the G70-B 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-B 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: Senior Environmental & Regulatory Manager Phone: 303-357-7276 Fax: 303-357-7315
Email: bschatz@anteroresources.com Date: 2/12/2016

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

OPERATING SITE INFORMATION
Briefly describe the proposed new operation and/or any change(s) to the facility: Removal of the Kubota compressor engine.
Directions to the facility: Go 0.4 mi West from the intersection of Tom Fork - Brushy Fork Road and Buck Run. Road Entrance to the Facility will be on the left.

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 and/or OOOO [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-B 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	
☒ Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment R	
☒ Emission Calculations (please be specific and include all calculation methodologies used) – Attachment S	
☒ Facility-wide Emission Summary Sheet(s) – Attachment T	
☒ Class I Legal Advertisement – Attachment U	
☒ One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments	

GHD SERVICES INC.

▼ PLEASE DETACH AND RETAIN FOR YOUR RECORDS ▼

INVOICE NUMBER	DATE		VOUCHER NO.	AMOUNT
Account Number:		40WVDEPAQ	432193	
CR111315	11/13/2015	400979733		1,500.00

TOTAL: 1,500.00

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

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

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

11/13/2015 NO. 432193

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

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

GHD SERVICES INC.

AUTHORIZED SIGNATURES

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

⑈432193⑈ ⑆221370632⑆6100000011891O⑈

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).

Is there a facility owned by or associated with the natural gas industry located within one (1) mile of the proposed facility? Yes ☒ No ☐

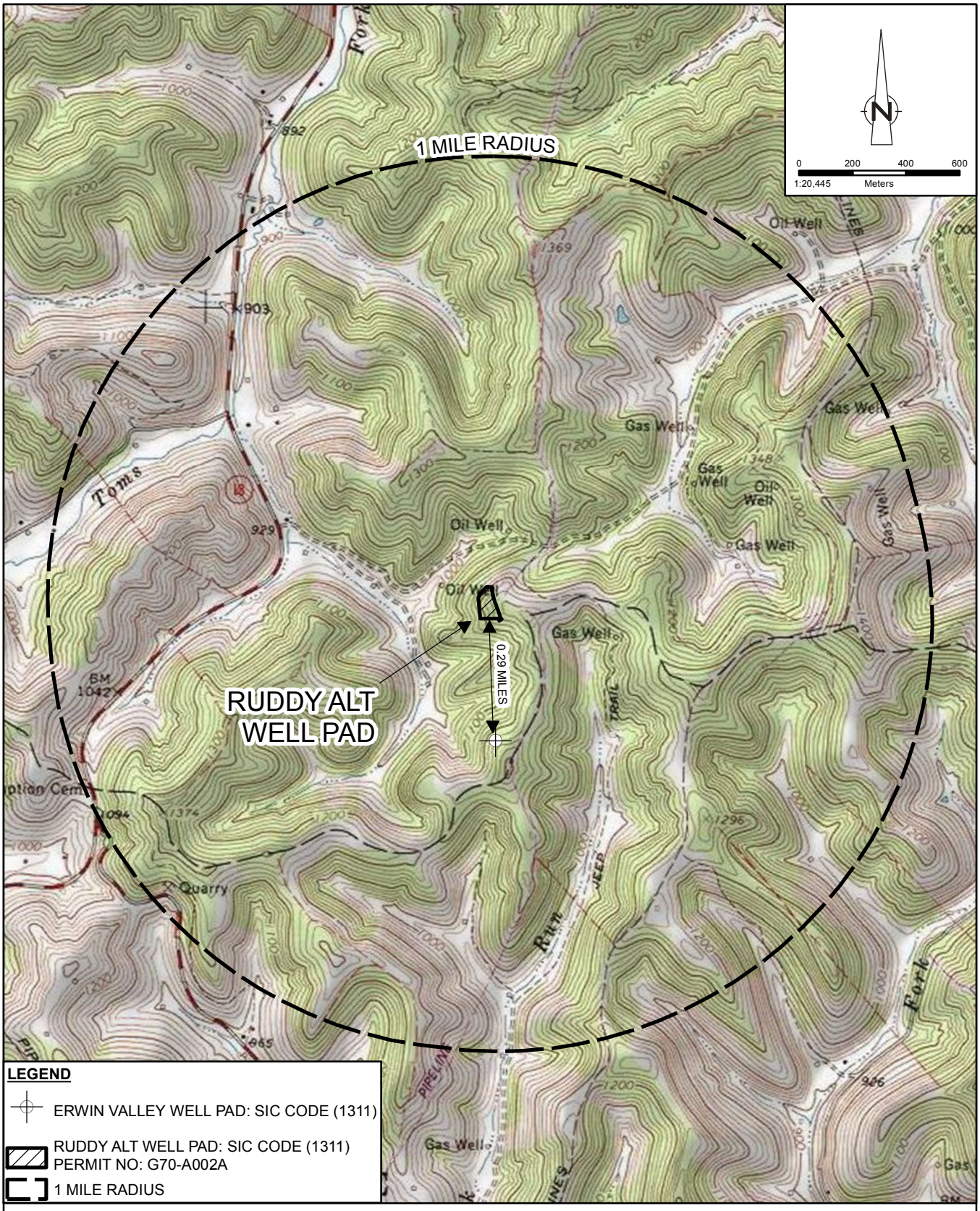
If Yes, please complete the questionnaire on the following page (Attachment A).

Please provide a source aggregation analysis for the proposed facility below:

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

Answer each question with a detailed explanation to determine contiguous or adjacent properties which are under a common control and any support facilities. This section must be completed in its entirety.

Provide a map of contiguous or adjacent facilities (production facilities, compressor stations, dehydration facilities, etc.) which are under common control and those facilities that are not under common control but are support facilities. Please indicate the SIC code, permit number (if applicable), and the distance between facilities in question on the map.	
Are the facilities owned by the same parent company or a subsidiary of the parent company? Provide the owners identity and the percentage of ownership of each facility. **Antero Resources has 100% ownership of each facility.**	Yes ☒ No ☐
Does an entity such as a corporation have decision making authority over the operation of a second entity through a contractual agreement or voting interest? Please explain.	Yes ☐ No ☒
Is there a contract for service relationship between the two (2) companies or, a support/dependency relationship that exists between the two (2) companies? Please explain.	Yes ☐ No ☒
Do the facilities share common workforces, plant managers, security forces, corporate executive officers or board executives?	Yes ☒ No ☐
Will managers or other workers frequently shuttle back and forth to be involved actively at both facilities?	Yes ☐ No ☒
Do the facilities share common payroll activities, employee benefits, health plans, retirement funds, insurance coverage, or other administrative functions? Please explain.	Yes ☐ No ☒
Does one (1) facility operation support the operation of the other facility?	Yes ☐ No ☒
Is one (1) facility dependent on the other? If one (1) facility shuts down, what are the limitations on the other to pursue outside business? Please explain. **No, these facilities operate completely independently.**	Yes ☐ No ☒
Are there any financial arrangements between the two (2) entities?	Yes ☐ No ☒
Are there any legal or lease agreements between the two (2) facilities?	Yes ☐ No ☒
Do the facilities share products, byproducts, equipment, or other manufacturing or air pollution control device equipment? Please explain. **No, these facilities operate completely independently.**	Yes ☐ No ☒
Do all the pollutant-emitting activities at the facilities belong to the same SIC Code? Please provide the SIC Codes. **1311**	Yes ☒ No ☐
Was the location of the new facility chosen primarily because of its proximity to the existing facility to integrate the operation of the two (2) facilities? Please explain. **No, these facilities operate completely indenpendently.**	Yes ☐ No ☒
Will materials be routinely transferred between the two (2) facilities? Please explain the amount of transfer and how often the transfers take place and what percentages go to the various entities.	Yes ☐ No ☒
Does the facility influence production levels or compliance with environmental regulations at other facilities? Who accepts the responsibility for compliance with air quality requirements? Please explain. **No, these facilities operate completely independently.**	Yes ☐ No ☒



Source: ESRI USA Topo Maps, Accessed 2016;
Coordinate System: NAD 1983 StatePlane West Virginia North FIPS 4701 Feet

Attachment A

SINGLE SOURCE DETERMINATION MAP
RUDDY ALT WELL PAD
ANTERO RESOURCES
Doddridge County, West Virginia

GHD

082715-00(233)GIS-OT001 Jan 25/2016

Attachment B
Siting Criteria Waiver

Attachment B

Siting Waiver
Ruddy Alt 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 Ruddy Alt 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:

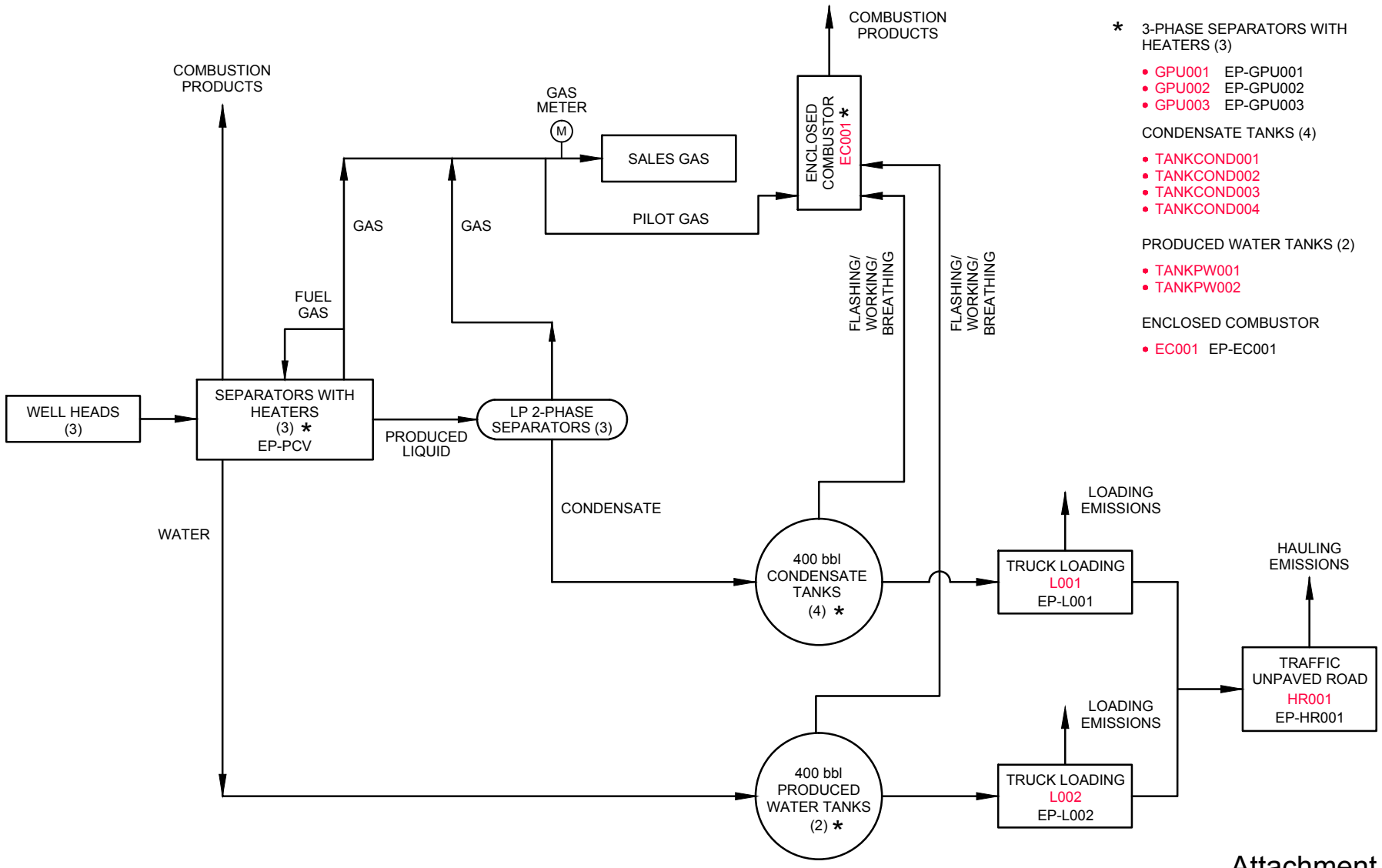
FIRST. The name of the Corporation is Antero Resources Corporation.

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



Attachment D

PROCESS FLOW DIAGRAM - ANTERO RESOURCES
RUDDY ALT WELL PAD

Doddridge County, West Virginia

82715-00(233)GN-WA001 JAN 25, 2016

Attachment E
Process Description

Attachment E

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

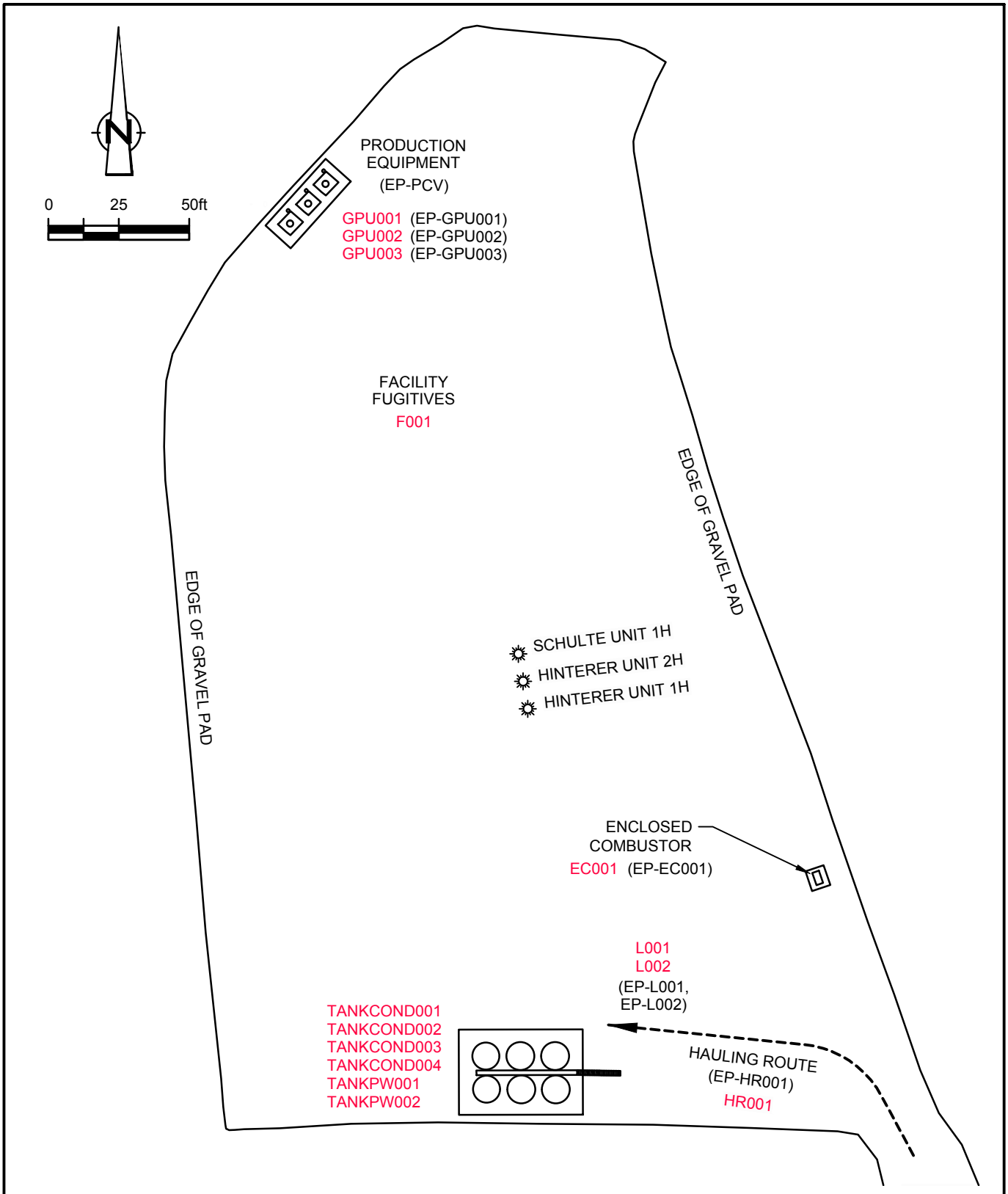
A mixture of condensate, water, and entrained gas from the condensate and gas wells enters the facility through a series of gas production unit (GPU) heaters (GPU001-003) which are 3-phase separators where the gas, condensate, and produced water are separated. The GPUs are fueled by a slip stream of the gas. The gas from the three phase separators is metered and sent to the sales gas pipeline. Water flows to the produced water storage tanks (TANKPW001-002). The condensate is then sent to two phase low pressure separators where gas is further separated. The gas is then metered sent to the sales gas line. The condensate from the two phase separators flows to the condensate storage tanks (TANKCOND001-004).

The facility has four (4) tanks (TANKCOND001-004) 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 one enclosed combustor (EC001) to control the emissions. The enclosed combustor that will be used to control emissions is designed to achieve a VOC destruction efficiency of 98 percent.

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

Emissions from the Facility's emission sources were calculated using the extended analysis of the condensate from Tom’s Fork No. 1H, one of the wells in the Erwin Hilltop pad. This extended analysis is considered representative of the materials from Ruddy Alt Wellpad, being in the same Marcellus rock formation. The gas extended analysis was taken from Hinterer Unit No. 1H, one of the wells in the Ruddy Alt pad.

Attachment F
Plot Plan

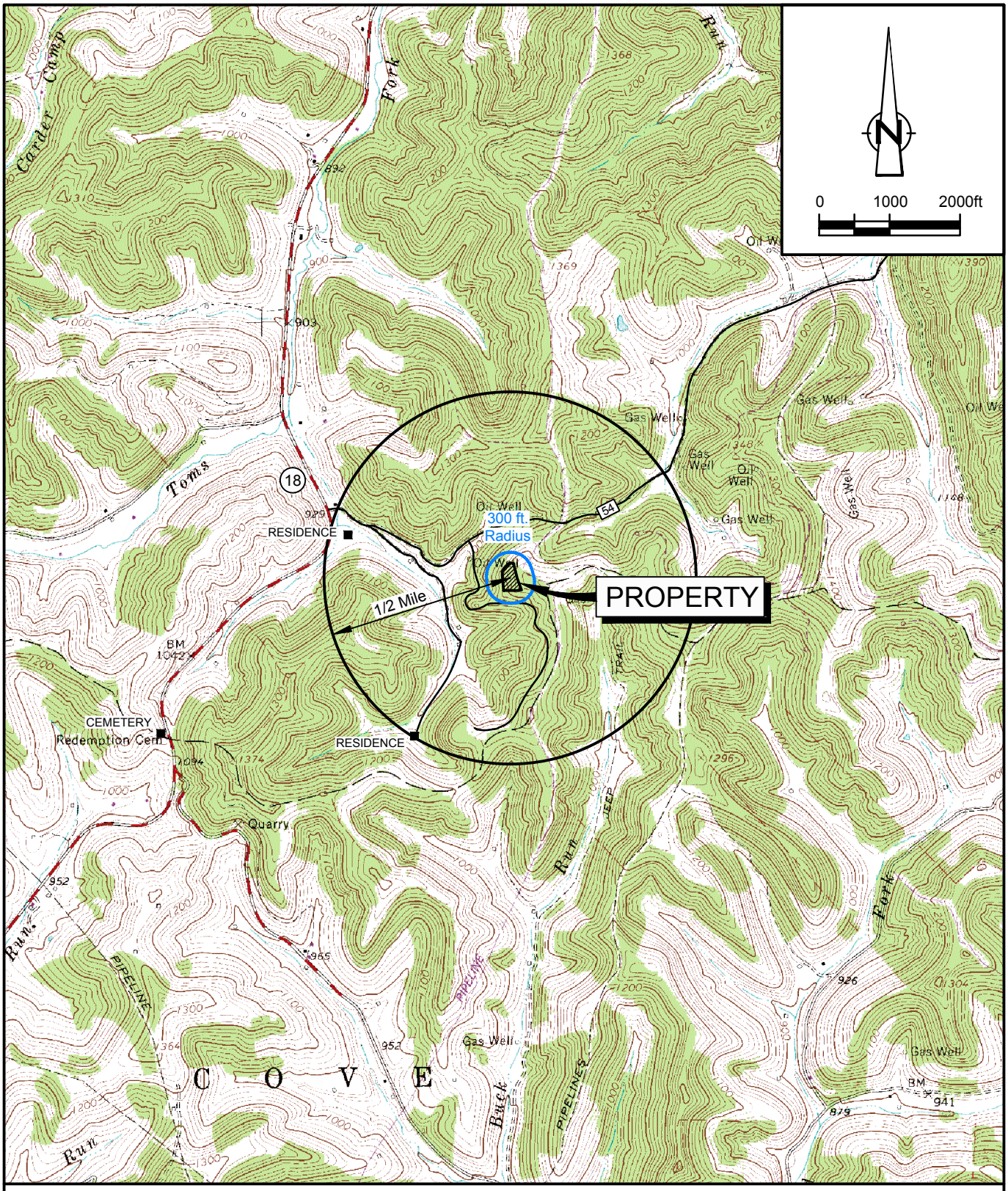


Attachment F

PLOT PLAN
RUDDY ALT WELL PAD
ANTERO RESOURCES
Doddridge County, West Virginia

82715-00(233)GN-WA002 FEB 8, 2016

Attachment G
Area Map



SOURCE: USGS QUADRANGLE MAP;
NEW MILTON, WEST VIRGINIA

SITE COORDINATES: UTM ZONE 17S 526283, 4334218 NAD 83
SITE ELEVATION: 1210 ft AMSL

GHD

Attachment G

AREA MAP
RUDDY ALT WELL PAD
ANTERO RESOURCES
Doddridge County, West Virginia

82715-00(233)GN-WA003 FEB 1, 2016

Attachment H
G70-B Section Applicability Form

ATTACHMENT H – G70-B SECTION APPLICABILITY FORM

General Permit G70-B Registration
Section Applicability Form

General Permit G70-B 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-B 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-B APPLICABLE SECTIONS	
☒Section 5.0	Gas Well Affected Facility (NSPS, Subpart OOOO)
☒Section 6.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☐Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO)
☒Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO 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)
☐Section 11.0	Centrifugal Compressor Affected Facility (NSPS, Subpart OOOO)[2]
☐Section 12.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO)[2]
☐Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines, Microturbines
☒Section 14.0	Tanker Truck Loading[3]
☐Section 15.0	Glycol Dehydration Units[4]

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

2 *Applicants that are subject to Section 11 and 12 may also be subject to the applicable RICE requirements of Section 13.*

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

4 *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	Emission Point ID	Emission Unit Description	Year Installed/Modified	Manufac. Date	Design Capacity	Type and Date of	Control Device(s)	ERD (s)
GPU001, GPU002, GPU003	EP-GPU001, EP-GPU002, EP-GPU003	Gas Production Unit Heater	2013	2013	(2) 1.5 MMMBtu/hr & (1) 1.0 MMBtu/hr	Existing	N/A	
F001	F001	Fugitives	2013	2013	N/A	Existing	N/A	
TANKCOND001-004	EP-EC001	Condensate Tank F/W/B	2013	2013	400 bbl each	Existing	EC001	
TANKPW001-002	EP-EC001	PW Tank F/W/B	2013	2013	400 bbl each	Existing	EC001	
L001	EP-L001	Loading (Condensate)	2013	2013	200 bbl capacity (each)	Existing	N/A	
L002	EP-L002	Loading (Water)	2013	2013	200 bbl capacity (each)	Existing	N/A	
HR001	EP-HR001	Haul Truck	2013	2013	40 ton capacity	Existing	N/A	
EC001	EP-EC001	Enclosed Combustor	2013	2013	90 scf/min	Existing	N/A	
ENG001	EP-ENG001	Compressor Engine	2013	2013	24 HP	Removal	N/A	
PCV	EP-PCV	Pneumatic CV	2013	2013	6.6 scf/day/PCV	Existing	N/A	

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

Attachment J
Fugitive Emissions Summary Sheet

ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

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

Source/Equipment:

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

Component Type	Closed Vent System	Count	Monitor Frequency	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)		
						VOC	HAP	GHG (CO2e)
Valves	☐ Yes ☑ No	150	Quarterly monitoring	EPA	gas	1.09	0.02	102.72
Valves	☐ Yes ☑ No	156	Quarterly monitoring	EPA	liquid	3.68	0.33	0.62
Connections (Not sampling)	☐ Yes ☑ No	177	Quarterly monitoring	EPA	gas	0.06	1.02E-03	5.39
Flanges	☐ Yes ☑ No	39	Quarterly monitoring	EPA	gas	0.02	4.40E-04	2.31
Loading	☐ Yes ☑ No	2	Quarterly monitoring	EPA	gas	0.18	5.25E-04	0.38

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

Please provide an explanation of the sources of fugitive emissions (e. g. pigging operations, equipment blowdowns, pneu matic 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**
47-017-06102-00	9/25/13	5/24/13	Green
47-017-06104-00	10/4/13	6/3/13	Green
47-017-06165-00	1/10/14	12/16/13	Green

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 may be provided on the application without the state code (047).

Every oil and gas well permitted in West Virginia since 1929 has been issued an API 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 1-4
3. Emission Unit ID number: TANKCOND001-004	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? ☑ Yes ☐ No	6. Type of change: ☑ New construction ☐ New stored mater ☐ 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): 459900	13B. Maximum daily throughput (gal/day): 1260
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 7	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 (describe)

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket of___ ☐ Carbon Adsorption

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

☐ Conservation Vent (psig)

Vacuum Pressure

☐ Emergency relief Valve (psig)

Vacuum Pressure

☐ 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 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 ☐ 5×7.5 ft. wide ☐ 5×12 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

SITE INFORMATION

29. Provide the city and state on which the data in this section are based.: Charleston, WV	
30. Daily Average Ambient Temperature (°F): 55.3	31. Annual Average Maximum Temperature (°F): 65.9
32. Annual Average Minimum Temperature (°F): 44.6	33. Average Wind Speed (miles/hr): 18.5mph
34. Annual Average Solar Insulation Factor (BTU/(ft^2·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):	51.7	36A. Minimum (°F):	39.5	36B. Maximum (°F)	63.8
37. Average operating pressure range of tank (psig):	0	37A. Minimum (psig)	0	37B. Maximum (psig)	0

38A. Minimum Liquid Surface Temperature (°F)	39.5	38B. Corresponding Vapor Pressure (psia)	1.0758
39A. Average Liquid Surface Temperature (°F)	51.7	39B. Corresponding Vapor Pressure (psia)	1.8401
40A. Maximum Liquid Surface Temperature (°F)	63.8	40B. Corresponding Vapor Pressure (psia)	1.4176

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

41A. Material Name or Composition	Condensate		
41B. CAS Number	mix of HC		
41C. Liquid Density (lb/gal)	5.9300		
41D. Liquid Molecular Weight (lb/lb-mole)	108.70		
41E. Vapor Molecular Weight (lb/lb-mole)	40.3486		
Maximum Vapor Pressure 41F. True (psia)	2.1856		
41G. Reid (psia)	3.4100		
Months Storage per Year 41H. From - To	year round		

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 1-2
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? ☑ Yes ☐ No	6. Type of change: ☑ New construction ☐ New stored mater ☐ 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): 5518800	13B. Maximum daily throughput (gal/day): 15120
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 165	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 (describe)

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket of___ ☐ Carbon Adsorption

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

☐ Conservation Vent (psig)

Vacuum Pressure

☐ Emergency relief Valve (psig)

Vacuum Pressure

☐ 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 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 ☐ 5×7.5 ft. wide ☐ 5×12 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

SITE INFORMATION

29. Provide the city and state on which the data in this section are based.: Charleston, WV	
30. Daily Average Ambient Temperature (°F): 51.7	31. Annual Average Maximum Temperature (°F): 63.8
32. Annual Average Minimum Temperature (°F): 39.5	33. Average Wind Speed (miles/hr): 5.9mph
34. Annual Average Solar Insulation Factor (BTU/(ft^2·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):	51.7	36A. Minimum (°F):	39.5	36B. Maximum (°F)	63.8
37. Average operating pressure range of tank (psig):	0	37A. Minimum (psig)	0	37B. Maximum (psig)	0

38A. Minimum Liquid Surface Temperature (°F)	39.5	38B. Corresponding Vapor Pressure (psia)	0.1840
39A. Average Liquid Surface Temperature (°F)	51.7	39B. Corresponding Vapor Pressure (psia)	0.2600
40A. Maximum Liquid Surface Temperature (°F)	63.8	40B. Corresponding Vapor Pressure (psia)	0.3605

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

41A. Material Name or Composition	Produced Water		
41B. CAS Number	mix of HC and water		
41C. Liquid Density (lb/gal)	8.3300		
41D. Liquid Molecular Weight (lb/lb-mole)	18.02		
41E. Vapor Molecular Weight (lb/lb-mole)	18.4572		
Maximum Vapor Pressure 41F. True (psia)	0.4473		
41G. Reid (psia)	1.0243		
Months Storage per Year 41H. From - To	year round		

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	2013	Existing	1.50	1247.06
GPU002	EP-GPU002	Gas Production Unit Heater	2013	Existing	1.50	1247.06
GPU003	EP-GPU003	Gas Production Unit Heater	2013	Existing	1.00	1247.06

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

Attachment O
Tanker Truck Loading Data Sheet

ATTACHMENT O – TANKER TRUCK LOADING DATA S HEET

Complete this data sheet for each new or modified bulk liquid transfer area or loading rack at the facility. This is to be used for bulk liquid transfer operations to tank er 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 and 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? Yes

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

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

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

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

Time	Jan - Mar	Apr - Jun	Jul - Sept	Oct - Dec
Hours/day	4	4	4	4
Days/week	3	3	3	3

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		Condensate	Produced Water	
Max. Daily Throughput (1000 gal/day)		1.26	15.12	
Max. Annual Throughput (1000 gal/yr)		459.90	5518.80	
Loading Method		BF	BF	
Max. Fill Rate (gal/min)		168	168	
Average Fill Time (min/loading)		50	50	
Max. Bulk Liquid Temperature (F)		72.1	72.1	
True Vapor Pressure		2.19	0.45	
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)	7.7704	0.0014	
	Annual (ton/yr)	0.1773	0.0004	
Max HAP Emission Rate	Loading (lb/hr)	0.0230	3.47E-06	
	Annual (ton/yr)	0.0005	9.51E-07	
Estimation Method		Promax	Promax	

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill

2 At maximum bulk liquid temperature

3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service) 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 Emi ssi on Fact or i n AP -42 MB Material Balance

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

Attachment R
Air Pollution Control Device – Emission Reduction Device Sheets

ATTACHMENT R – AIR POLLUTION CONTRO L 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 Efficienty (%):	NA	APCD/ERD Data Sheet Completed	☐ Yes ☐ No
Secondary Contro Device ID:	NA	Make/Model	NA
Control Efficienty (%):	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 sdfh 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	Hours of operation per year?	8760
Model:	48" HV ECD		

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

Emission Unit ID#	Emission Source Descripton	Emission Unit ID#	Emission Source Description
TANKCOND001-004	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
2.21 (scfm)	1,654.01 BTU/ft^3	0.0042 (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 Piolt	Will automatic re-ignition be used?
1.00	12.6 scfh	12800 BTU/hr	☑ Yes ☐ No

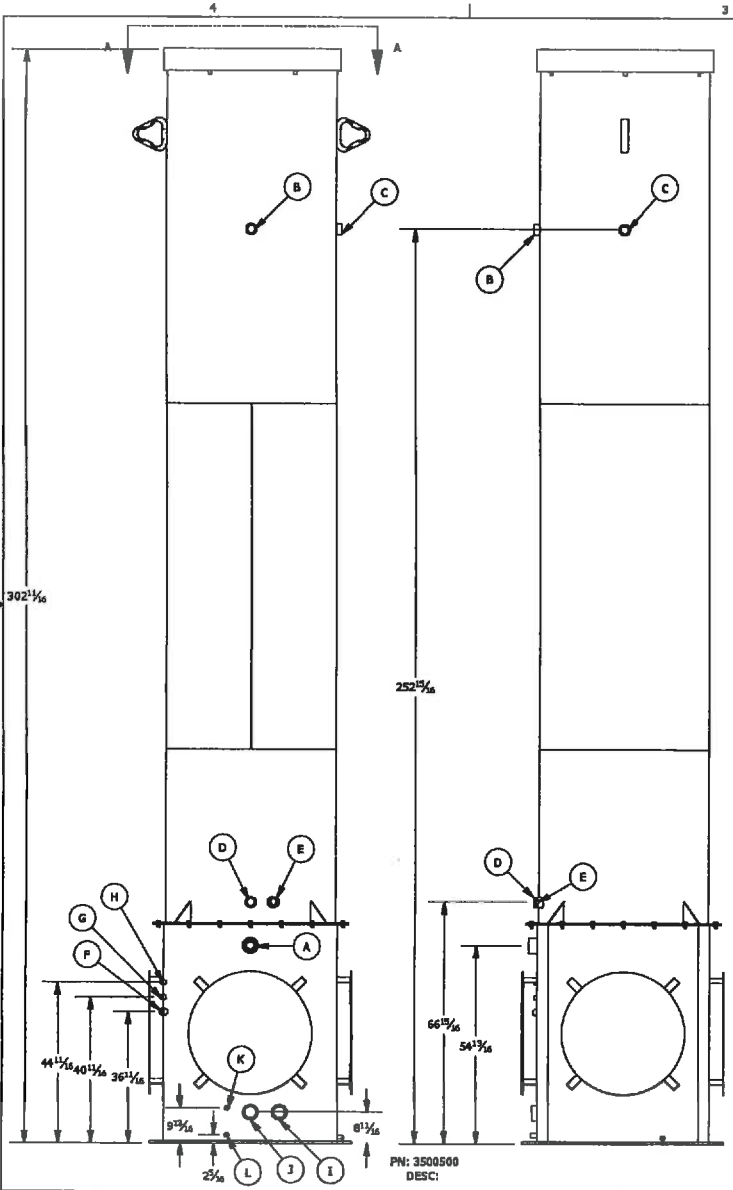
If automatic re-ignition is used, please describe the method. Flame Rectification, a thermocouple equivalent

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

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

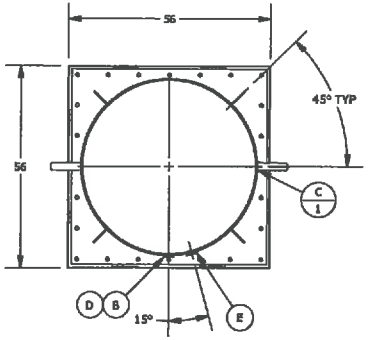
Additional information attached? ☑ Yes ☐ No Manufacturer's specs sheet

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 S
Emissions Calculations

Table 1

Facility Information
Ruddy Alt
Doddridge County, West Virginia
Antero Resources Corporation

Oil and Gas Site General Information

Administrative Information	
Company Name	Antero Resources Corporation
Facility/Well Name	Ruddy Alt
Nearest City/Town	New Milton
API Number/SIC Code	1311
Latitude/Longitude	39.156706, -80.695917
County	Doddridge County

Technical Information	
Max Condensate Site Throughput (bbl/day):	30
Max Produced Water Site Throughput (bbl/day):	360
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	3
Gas Production Unit Heaters	3
Condensate Tanks	4
Produced Water Tanks	2
Loading Jobs	2
Enclosed Combustors	1

Table 2

Uncontrolled/Controlled Emissions Summary
Ruddy Alt
Doddridge County, West Virginia
Antero Resources Corporation

Emission Source	VOC		NO_X		CO_{2e}		CO		SO_2		$PM_{2.5}$		PM_{10}		Lead		Total HAPs		Benzene		Xylenes		Formaldehyde	
	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)
UNCONTROLLED (Fugitives, Storage Tanks, Gas Production Unit Heaters,																								
Fugitive Emissions (Component Count, PCV and Hauling)[1]	1.1353	4.9727			27.879	122.11							0.1855	0.0394			0.0806	0.3531	0.0006	0.0027	2.82E-02	1.23E-01		
Flashing, Working and Breathing (F/W/B) Losses[2]	7.02	30.8			36.0	157.6											0.173	0.756	0.0035	0.0155	0.0131	0.0576		
Gas Production Unit Heater Emissions[3]	0.0176	0.0773	0.3208	1.4049	384.91	1,685.89	0.2694	1.1801	0.0019	0.0084	0.0244	0.1068	0.0244	0.1068	1.60E-06	7.02E-06	6.04E-03	2.64E-02	6.74E-06	2.95E-05			0.0002	0.0011
TOTALS:	**8.1747**	**35.8052**	**0.3208**	**1.4049**	**448.7764**	**1965.6405**	**0.2694**	**1.1801**	**0.0019**	**0.0084**	**0.0244**	**0.1068**	**0.2099**	**0.1462**	**0.0000**	**0.0000**	**0.2593**	**1.1356**	**0.0042**	**0.0182**	**0.0413**	**0.1810**	**0.0002**	**0.0011**
TOTALS (Excluding Fugitives):	**7.0394**	**30.8325**	**0.3208**	**1.4049**	**420.8969**	**1843.5284**	**0.2694**	**1.1801**	**0.0019**	**0.0084**	**0.0244**	**0.1068**	**0.0244**	**0.1068**	**0.0000**	**0.0000**	**0.1787**	**0.7825**	**0.0035**	**0.0155**	**0.0131**	**0.0576**	**0.0002**	**0.0011**
UNCONTROLLED (Truck Loading Emissions)																								
Truck Loading Emissions[4]	7.772	0.178			5.870	0.382											0.0230	0.0005	2.50E-04	5.94E-06	0.0041	0.0001		
CONTROLLED EMISSIONS																								
Enclosed Combustor Emissions (from F/W/B losses)[5]	0.1405	0.6154	0.0114	0.0500	32.7449	143.4226	0.0096	0.0420	7.56E-06	3.31E-05	0.0007	0.0029	0.0009	0.0038	5.71E-08	2.50E-07	0.0035	0.0152	7.07E-05	3.10E-04	0.0003	0.0012	9.45E-07	4.14E-06
Controlled Fugitive Emissions from Hauling													0.0927	0.0197										
TOTALS:	**0.1405**	**0.6154**	**0.0114**	**0.0500**	**32.7449**	**143.4226**	**0.0096**	**0.0420**	**7.56E-06**	**3.31E-05**	**0.0007**	**0.0029**	**0.0936**	**0.0235**	**5.71E-08**	**2.50E-07**	**0.0035**	**0.0152**	**0.0001**	**0.0003**	**0.0003**	**0.0012**	**9.45E-07**	**4.14E-06**
POTENTIAL TO EMIT[6]	**1.2935**	**5.8430**	**0.3322**	**1.4549**	**445.5297**	**1951.8016**	**0.2790**	**1.2221**	**0.0019**	**0.0085**	**0.0250**	**0.1096**	**0.1180**	**0.1303**	**0.0000**	**0.0000**	**0.0901**	**0.3953**	**0.0007**	**0.0030**	**0.0285**	**0.1247**	**0.0002**	**0.0011**
POTENTIAL TO EMIT (Excluding Fugitives)	**0.1581**	**0.6927**	**0.3322**	**1.4549**	**417.6502**	**1829.3078**	**0.2790**	**1.2221**	**0.0019**	**0.0085**	**0.0250**	**0.1096**	**0.0252**	**0.1106**	**0.0000**	**0.0000**	**0.0095**	**0.0417**	**0.0001**	**0.0003**	**0.0003**	**0.0012**	**0.0002**	**0.0011**

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 30 barrels per day, VOC emissions would be 7.7718 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 0.0406 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, fugitives and enclosed combustors. Does not include emissions from loading (see footnote 5). The total TPY PTE is the sum of all emissions.
PM 10 TPY is the sum of uncontrolled hauling and other PM10 sources.

Table 3

Permits Summary

Ruddy Alt

Doddridge County, West Virginia

Antero Resources Corporation

Pollutant		Emissions		Threshold Exceeded?		
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	8.1747	1.2935	6	**Yes**	
	tons/yr	35.9829	5.8430	10	**Yes**	
NO_X	lbs/hr	0.3208	0.3353	6		
	tons/yr	1.4049	1.4685	10		
CO	lbs/hr	0.2694	0.2816	6		
	tons/yr	1.1801	1.2335	10		
SO_2	lbs/hr	0.0019	0.0019	6		
	tons/yr	0.0084	0.0085	10		
$PM_{2.5}$	lbs/hr	0.0244	0.0252	6		
	tons/yr	0.1068	0.1104	10		
PM_{10}	lbs/hr	0.2099	0.1182	6		
	tons/yr	0.1462	0.1313	10		
Lead	lbs/hr	1.60E-06	1.68E-06	6		
	tons/yr	7.02E-06	7.34E-06	10		
Total HAPs	lbs/hr	0.2593	0.0901	2		
	tons/yr	1.1362	0.3953	5		
Total TAPs	lbs/hr	0.0044	0.0009	1.14		
n-Hexane	lbs/hr	0.1795	0.0432			
	tons/yr	0.7865	0.1894			
Toluene	lbs/hr	0.0164	0.0063			
	tons/yr	0.0717	0.0276			
Ethylbenzene	lbs/hr	0.0177	0.0113			
	tons/yr	0.0776	0.0495			
Xylenes	lbs/hr	0.0413	0.0285			
	tons/yr	0.1811	0.1247			
Benzene	lbs/hr	0.0042	0.0007			
	tons/yr	0.0182	0.0030			

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

Table 4

Fugitive Emissions
Ruddy Alt
Doddridge County, West Virginia
Antero Resources Corporation

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

Gas Weight Fraction From Analysis:	VOC frac	0.167
	Benzene frac	0.000
	Toluene	0.000
	Ethylbenzene	0.000
	Xylenes	0.000
	n-Hexane	0.003
	HAPs	0.003
	Methane	0.632

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
150	Valves	Gas VOC	0.004500	0.11	2,177.69
		Non VOC	0.004500	0.56	10,830.91
		HAPs	0.004500	0.00	39.07
		CO2e	0.004500	10.66	205,433.30
177	Connectors	VOC	0.000200	0.01	114.21
		Non-VOC	0.000200	0.03	568.02
		HAPs	0.000200	0.00	2.05
		CO2e	0.000200	0.56	10,773.84
39	Flanges	VOC	0.000390	0.00	49.07
		Non-VOC	0.000390	0.01	244.06
		HAPs	0.000390	0.00	0.88
		CO2e	0.000390	0.240198	4629.097032
			Total VOCs:	0.12	2340.97
			Total THC:	0.73	13983.96

Light Liquid Weight Fraction From Analysis:	VOC frac	0.981
	Benzene frac	0.001
	Toluene	0.007
	Ethylbenzene	0.013
	Xylenes	0.033
	n-hexane	0.034
	HAPs	0.088
	Methane	0.007

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
156	Valves	Light Liquid VOC	0.002500	0.38	7,369.63
		Light Liquid Non-VOC	0.002500	0.01	146.45
		Light Liquid HAPs	0.002500	0.03	660.01
		CO2e	0.002500	0.06	1233.47
			Total VOC:	0.38	7,369.63
			Total THC:	0.39	7,516.08

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	9,710.60	1.11	4.86
Ethylbenzene		0.01	0.05
Toluene		0.01	0.03
Xylenes		0.03	0.12
n-Hexane		0.03	0.15
TAPs (Benzene)		0.00	0.00
HAPs		0.08	0.35
CO_{2e}	222,069.71	25.35	111.03

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

Table 5

Pneumatic Control Valve Emissions
Ruddy Alt
Doddridge County, West Virginia
Antero Resources Corporation

Number of PCVs	11
Bleed Rate (scf/day/PCV)	6.6
Total Bleed Rate (scf/day)	72.6

Component	Mol%	Molecular Weight (lb/lb-mole)	Component Flow (scf/day)	Component Moles (lb-moles)	Component Emissions (lbs/day)	(lbs/hr)	(tons/year)
H2S	0	34.08	0	0.00	0.00	0.00	0.00
Nitrogen	0.67	14.01	0.48642	0.00	0.02	0.00	0.00
Carbon Dioxide	0.17	44.01	0.12342	0.00	0.01	0.00	0.00
Methane	79.1	16.04	57.4266	0.15	2.43	0.10	0.44
Ethane	13.42	30.07	9.74292	0.03	0.77	0.03	0.14
Propane	4.43	44.1	3.21618	0.01	0.37	0.02	0.07
Isobutane	0.49	58.12	0.35574	0.00	0.05	0.00	0.01
n-Butane	0.99	58.12	0.71874	0.00	0.11	0.00	0.02
Isopentane	0.26	72.15	0.18876	0.00	0.04	0.00	0.01
n-Pentane	0.27	72.15	0.19602	0.00	0.04	0.00	0.01
2-Methylpentane	0.06	86.18	0.04356	0.00	0.01	0.00	0.00
3-Methylpentane	0.03	86.18	0.02178	0.00	0.00	0.00	0.00
n-Hexane	0.07	86.18	0.05082	0.00	0.01	0.00	0.00
Methylcyclopentane	0.01	84.16	0.00726	0.00	0.00	0.00	0.00
Benzene	0	78.11	0	0.00	0.00	0.00	0.00
2-Methylhexane	0	100.2	0	0.00	0.00	0.00	0.00
3-Methylhexane	0.01	100.2	0.00726	0.00	0.00	0.00	0.00
Heptane	0.01	100.21	0.00726	0.00	0.00	0.00	0.00
Methylcyclohexane	0	98.186	0	0.00	0.00	0.00	0.00
Toluene	0	92.14	0	0.00	0.00	0.00	0.00
Octane	0	114.23	0	0.00	0.00	0.00	0.00
Ethylbenzene	0	106.17	0	0.00	0.00	0.00	0.00
m & p-Xylene	0	106.16	0	0.00	0.00	0.00	0.00
o-Xylene	0	106.16	0	0.00	0.00	0.00	0.00
Nonane	0	128.2	0	0.00	0.00	0.00	0.00
C10+	0	174.28	0	0.00	0.00	0.00	0.00

	lb/hr	tpy
VOC Emissions	0.0268	0.1174
Benzene Emissions	0.0000	0.0000
Toluene Emissions	0.0000	0.0000
Ethylbenzene Emissions	0.0000	0.0000
Xylene Emissions	0.0000	0.0000
n-Hexane Emissions	0.0005	0.0021
HAPs Emissions	0.0005	0.0021
TAPs Emissions	0.0000	0.0000
CO_{2e} emissions	2.5291	11.0773

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
Ruddy Alt
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	0.1886	0.0124	0.0543	2.6743	0.0000	0.0000
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0153	0.0010	0.0044	0.5662	0.0088	0.0384
Carbon Dioxide	0.3040	0.0200	0.0876	2.9491	0.0457	0.2000
Methane	6.8952	0.4535	1.9862	59.2462	0.9175	4.0188
Ethane	28.1997	1.8545	8.1228	20.9756	0.3248	1.4228
Propane	28.4615	1.8717	8.1982	9.0431	0.1400	0.6134
Isobutane	6.6023	0.4342	1.9018	0.5564	0.0086	0.0377
n-Butane	12.1395	0.7983	3.4967	1.9776	0.0306	0.1341
Isopentane	4.7433	0.3119	1.3663	0.4927	0.0076	0.0334
n-Pentane	3.7032	0.2435	1.0667	0.3676	0.0057	0.0249
2-Methylpentane	1.2395	0.0815	0.3570	0.0571	0.0009	0.0039
3-Methylpentane	0.8070	0.0531	0.2325	0.0976	0.0015	0.0066
n-Hexane	2.0205	0.1329	0.5820	0.0739	0.0011	0.0050
Methylcyclopentane	0.3960	0.0260	0.1141	0.1329	0.0021	0.0090
Benzene	0.0381	0.0025	0.0110	0.0609	0.0009	0.0041
2-Methylhexane	0.6639	0.0437	0.1912	0.0271	0.0004	0.0018
3-Methylhexane	0.5175	0.0340	0.1491	0.0220	0.0003	0.0015
Heptane	0.8278	0.0544	0.2384	0.0369	0.0006	0.0025
Methylcyclohexane	0.5943	0.0391	0.1712	0.1340	0.0021	0.0091
Toluene	0.1094	0.0072	0.0315	0.1660	0.0026	0.0113
Octane	0.9574	0.0630	0.2758	0.0254	0.0004	0.0017
Ethylbenzene	0.0670	0.0044	0.0193	0.1012	0.0016	0.0069
m & p-Xylene	0.0522	0.0034	0.0150	0.0779	0.0012	0.0053
o-Xylene	0.0800	0.0053	0.0231	0.1221	0.0019	0.0083
Nonane	0.2724	0.0179	0.0785	0.0112	0.0002	0.0008
C10+	0.1042	0.0068	0.0300	0.0050	0.0001	0.0003
Total VOCs	64.397	4.24	18.5	13.589	0.2104	0.9217
Total CO_{2e}		11.36	49.7		22.98	100.7
Total TAPs (Benzene)		0.0025	0.0110		0.0009	0.0041
Toluene		0.0072	0.0315		0.0026	0.0113
Ethylbenzene		0.0044	0.0193		0.0016	0.0069
Xylenes		0.0087	0.0381		0.0031	0.0136
n-Hexane		0.133	0.582		0.0011	0.0050
Total HAPs		0.156	0.682		0.0093	0.0408
Total	100.00	6.58	28.8	100.00	1.507	6.60

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

Table 7

Uncontrolled Working and Breathing Losses
Ruddy Alt
Doddridge County, West Virginia
Antero Resources Corporation

Condensate Tank Information	
Number of Tanks	4
Maximum Working Losses (lbs/hr)	0.5993
Maximum Breathing Losses (lbs/hr)	3.5441

	Condensate Tank W/B Losses						
	Vapor Mass Fraction	Working Losses		Breathing Losses		Max W/B Losses	
	wt%	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0006	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001
Carbon Dioxide	0.3310	0.0020	0.0087	0.0117	0.0514	0.0137	0.0601
Methane	1.5498	0.0093	0.0407	0.0549	0.2406	0.0642	0.2813
Ethane	35.9414	0.2154	0.9434	1.2738	5.5793	1.4892	6.5227
Propane	30.8198	0.1847	0.8090	1.0923	4.7842	1.2770	5.5932
Isobutane	6.6167	0.0397	0.1737	0.2345	1.0271	0.2742	1.2008
n-Butane	11.9566	0.0717	0.3138	0.4238	1.8560	0.4954	2.1699
Isopentane	4.4313	0.0266	0.1163	0.1570	0.6879	0.1836	0.8042
n-Pentane	3.4201	0.0205	0.0898	0.1212	0.5309	0.1417	0.6207
2-Methylpentane	1.1155	0.0067	0.0293	0.0395	0.1732	0.0462	0.2024
3-Methylpentane	0.7247	0.0043	0.0190	0.0257	0.1125	0.0300	0.1315
n-Hexane	0.1234	0.0007	0.0032	0.0044	0.0191	0.0051	0.0224
Methylcyclopentane	0.3309	0.0020	0.0087	0.0117	0.0514	0.0137	0.0601
Benzene	0.0020	0.0000	0.0001	0.0001	0.0003	0.0001	0.0004
2-Methylhexane	0.0380	0.0002	0.0010	0.0013	0.0059	0.0016	0.0069
3-Methylhexane	0.4458	0.0027	0.0117	0.0158	0.0692	0.0185	0.0809
Heptane	0.6568	0.0039	0.0172	0.0233	0.1020	0.0272	0.1192
Methylcyclohexane	0.4768	0.0029	0.0125	0.0169	0.0740	0.0198	0.0865
Toluene	0.0121	0.0001	0.0003	0.0004	0.0019	0.0005	0.0022
Octane	0.7157	0.0043	0.0188	0.0254	0.1111	0.0297	0.1299
Ethylbenzene	0.0139	0.0001	0.0004	0.0005	0.0022	0.0006	0.0025
m & p-Xylene	0.0140	0.0001	0.0004	0.0005	0.0022	0.0006	0.0025
o-Xylene	0.0185	0.0001	0.0005	0.0007	0.0029	0.0008	0.0034
Nonane	0.1840	0.0011	0.0048	0.0065	0.0286	0.0076	0.0334
C10+	0.0606	0.0004	0.0016	0.0021	0.0094	0.0025	0.0110
Total VOCs	62.177	0.3726	1.632	2.2036	9.6519	2.5762	11.284
Total CO_{2e}		0.2342	1.0257	1.3849	6.0657	1.6190	7.091
Total TAPs (Benzene)		0.0000	0.0001	0.0001	0.0003	0.0001	0.0004
Toluene		0.0001	0.0003	0.0004	0.0019	0.0005	0.0022
Ethylbenzene		0.0001	0.0004	0.0005	0.0022	0.0006	0.0025
Xylenes		0.0002	0.0009	0.0012	0.0050	0.0013	0.0059
n-Hexane		0.0007	0.0032	0.0044	0.0191	0.0051	0.0224
Total HAPs		0.0011	0.0048	0.0065	0.0285	0.0076	0.0334
Total	100.00	0.5993	2.6248	3.5441	15.5232	4.1434	18.148

Table 7

Uncontrolled Working and Breathing Losses
Ruddy Alt
Doddridge County, West Virginia
Antero Resources Corporation

Produced Water Tank Information	
Number of Tanks	2
Maximum Working Losses (lbs/hr)	0.0300
Maximum Breathing Losses (lbs/hr)	0.0083

	Produced Water Tank W/B Losses						
	Vapor Mass Fraction	Working Losses		Breathing Losses		Max W/B Losses	
	wt%	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0111	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide	3.8856	0.0012	0.0051	0.0003	0.0014	0.0015	0.0065
Methane	3.2196	0.0010	0.0042	0.0003	0.0012	0.0012	0.0054
Ethane	1.0519	0.0003	0.0014	0.0001	0.0004	0.0004	0.0018
Propane	0.1105	0.0000	0.0001	0.0000	0.0000	0.0000	0.0002
Isobutane	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Butane	0.0046	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Isopentane	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Methylpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Methylpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Methylcyclopentane	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Methylhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Methylhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heptane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Methylcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Octane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethylbenzene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m & p-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
o-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nonane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C10+	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total VOCs	0.1168	0.0000	0.0002	0.0000	0.0000	0.0000	0.0002
Total CO_{2e}		0.0253	0.1110	0.0070	0.0307	0.0323	0.1416
Total TAPs (Benzene)		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethylbenzene		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Xylenes		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total HAPs		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	100.00	0.0300	0.1315	0.0083	0.0364	0.0383	0.1679

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

Table 8

Loading Emissions
Ruddy Alt
Doddridge County, West Virginia
Antero Resources Corporation

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	3.41	1.0243
Annual Average Temp (F)	72.1	72.1
S (saturation factor)	0.6	0.6
P (true vapor pressure)	2.19	0.45
M (MW of vapor)	40.35	18.46
Collection Efficiency (%)	0	0
Loading Loss (lb/10^3 gal)*	1.24	0.12
Maximum Throughput (gallons/hr)**	10,080	10,080
Average Throughput (gallons/yr)	459,900	5,518,800
Loading Emissions (lbs/hr)	12.50	1.17
Loading Emissions (tpy)	0.29	0.32

	Condensate Tank Loading Losses			Produced Water Tank Loading Losses		
	Vapor Mass Fraction	Loading Losses		Vapor Mass Fraction	Loading Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
H2S	0.0000	0.00	0.00	0.0000	0.00E+00	0.00E+00
Nitrogen	0.0006	0.00	0.00	0.0111	1.30E-04	3.55E-05
Carbon Dioxide	0.3310	0.04	0.00	3.8856	4.55E-02	1.24E-02
Methane	1.5498	0.19	0.00	3.2196	3.77E-02	1.03E-02
Ethane	35.9414	4.49	0.10	1.0519	1.23E-02	3.37E-03
Propane	30.8198	3.85	0.09	0.1105	1.29E-03	3.54E-04
Isobutane	6.6167	0.83	0.02	0.0009	9.96E-06	2.73E-06
n-Butane	11.9566	1.49	0.03	0.0046	5.33E-05	1.46E-05
Isopentane	4.4313	0.55	0.01	0.0003	3.33E-06	9.11E-07
n-Pentane	3.4201	0.43	0.01	0.0002	1.81E-06	4.96E-07
2-Methylpentane	1.1155	0.14	0.00	0.0000	5.37E-08	1.47E-08
3-Methylpentane	0.7247	0.09	0.00	0.0000	2.23E-07	6.09E-08
n-Hexane	0.1234	0.02	0.00	0.0000	2.69E-09	7.37E-10
Methylcyclopentane	0.3309	0.04	0.00	0.0001	6.52E-07	1.78E-07
Benzene	0.0020	0.00	0.00	0.0001	9.17E-07	2.51E-07
2-Methylhexane	0.0380	0.00	0.00	0.0000	4.17E-10	1.14E-10
3-Methylhexane	0.4458	0.06	0.00	0.0000	5.08E-09	1.39E-09
Heptane	0.6568	0.08	0.00	0.0000	6.25E-09	1.71E-09
Methylcyclohexane	0.4768	0.06	0.00	0.0000	1.40E-07	3.84E-08
Toluene	0.0121	0.00	0.00	0.0001	1.20E-06	3.30E-07
Octane	0.7157	0.09	0.00	0.0000	8.38E-10	2.29E-10
Ethylbenzene	0.0139	0.00	0.00	0.0000	4.13E-07	1.13E-07
m & p-Xylene	0.0140	0.00	0.00	0.0000	3.55E-07	9.71E-08
o-Xylene	0.0185	0.00	0.00	0.0000	5.81E-07	1.59E-07
Nonane	0.1840	0.02	0.00	0.0000	1.74E-10	4.77E-11
C10+	0.0606	0.01	0.00	0.0000	1.17E-11	3.21E-12
Total VOCs	62.1772	7.770	0.177	0.1168	1.37E-03	3.74E-04
Total CO_{2e}		4.883	0.1114		0.9872	0.2702
Total TAPs (Benzene)		0.0002	0.0000		0.0000	0.0000
Toluene		0.0015	0.0000		0.0000	0.0000
Ethylbenzene		0.0017	0.0000		0.0000	0.0000
Xylenes		0.0041	0.0001		0.0000	0.0000
n-Hexane		0.0154	0.0004		0.0000	0.0000
Total HAPs		0.0230	0.0005		0.0000	0.0000
Total	100.0000	12.4972	0.2851	100.0000	1.1700	0.3203

Enter any notes here

Vapor mass fractions and loading losses from Promax output

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

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

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

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

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

** 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 Emissions
Ruddy Alt
Doddridge County, West Virginia
Antero Resources Corporation

Gas Production Unit Heater Emissions	Horizontal Heater	Vertical Heater
Number of Units	2	1
GPU Heater Rating (MMBtu/hr)	1.50	1.00
Operating hours/year	8760	8760
Fuel Heat Value (Btu/scf)	1,247	1,247

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	0.321	1.405
CO	84	0.269	1.180
CO_2	120,000	384.905	1685.885
Lead	0.0005	1.60E-06	7.02E-06
N_2O	2.2	0.007	0.031
PM (Total)	7.6	0.024	0.107
SO_2	0.6	0.002	0.008
TOC	11	0.035	0.155
Methane	2.3	0.007	0.032
VOC	5.5	0.018	0.077
HAPS			
2-Methylnaphthalene	2.40E-05	7.70E-08	3.37E-07
Benzene	2.10E-03	6.74E-06	2.95E-05
Dichlorobenzene	1.20E-03	3.85E-06	1.69E-05
Fluoranthene	3.00E-06	9.62E-09	4.21E-08
Fluorene	2.80E-06	8.98E-09	3.93E-08
Formaldehyde	7.50E-02	2.41E-04	1.05E-03
Hexane	1.80E+00	5.77E-03	2.53E-02
Naphthalene	6.10E-04	1.96E-06	8.57E-06
Phenanathrene	1.70E-05	5.45E-08	2.39E-07
Toluene	3.40E-03	1.09E-05	4.78E-05

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.018	0.077
TOTAL Uncontrolled HAPs	0.006	0.026
TOTAL Uncontrolled TAPs (Benzene)	6.74E-06	2.95E-05
TOTAL Uncontrolled Toluene	1.09E-05	4.78E-05
TOTAL Uncontrolled Hexane	5.77E-03	2.53E-02
TOTAL Uncontrolled TAPs (Formaldehyde)	0.000	0.001
TOTAL CO_{2e} Emissions	387.19	1,695.90

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

Table 10

Enclosed Combustor Emissions
Ruddy Alt
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

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

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

Enclosed Combustor operating hours	8760
No. of Enclosed Combustors	1

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)	12.6	--	61.85	30.99	38.97	0.79	145.20
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	110,376.00	--	541,820.50	271,464.44	341,367.51	6,902.81	1,271,931.26
Heating Content (Btu/ft3)	1,247		2,047.89	1,060.17	2,047.89	1,060.17	1,654.01

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	-	-	4.235	0.210	2.576	0.000	7.02
Benzene	-	-	0.003	0.001	0.000	0.000	0.004
Toluene	-	-	0.007	0.003	0.000	0.000	0.010
Ethylbenzene	-	-	0.004	0.002	0.001	0.000	0.007
Xylenes	-	-	0.009	0.003	0.001	0.000	0.013
n-Hexane	-	-	0.133	0.001	0.005	0.000	0.139
HAPs	-	-	0.156	0.009	0.008	0.000	0.173
Total Mass Flow	-	-	6.576	1.507	4.143	0.038	12.265
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	-	-	18.549	0.922	11.284	0.000	30.755
Benzene	-	-	0.011	0.004	0.000	0.000	0.015
Toluene	-	-	0.032	0.011	0.002	0.000	0.045
Ethylbenzene	-	-	0.019	0.007	0.003	0.000	0.029
Xylenes	-	-	0.038	0.014	0.006	0.000	0.058
n-Hexane	-	-	0.582	0.005	0.022	0.000	0.609
HAP	-	-	0.682	0.041	0.033	0.000	0.756
Total Mass Flow	-	-	28.805	6.602	18.148	0.168	53.722

Table 10

Enclosed Combustor Emissions
Ruddy Alt
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	0.001	-	0.006	0.003	0.004	0.000	0.01
CO	0.001	-	0.005	0.003	0.003	0.000	0.01
PM2.5	0.000	-	0.000	0.000	0.000	0.000	0.00
PM10	0.000	-	0.000	0.000	0.000	0.000	0.00
H2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	1.512	-	-	-	-	-	1.51
Total VOC	0.000	-	0.085	0.004	0.052	0.000	0.14
Benzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.000	0.000	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.000	0.000	0.000	0.000	0.00
n-Hexane	0.000	-	0.003	0.000	0.000	0.000	0.00
HAP	0.000	-	0.003	0.000	0.000	0.000	0.00
N_2O	0.000	-	0.000	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	0.006	-	0.027	0.014	0.017	0.000	0.06
CO	0.005	-	0.023	0.011	0.014	0.000	0.05
PM2.5	0.000	-	0.002	0.001	0.001	0.000	0.00
PM10	0.000	-	0.002	0.001	0.001	0.000	0.00
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	6.623	-	-	-	-	-	6.62
Total VOC	0.000	-	0.371	0.018	0.226	0.000	0.62
Benzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.001	0.000	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.001	0.000	0.000	0.000	0.00
n-Hexane	0.000	-	0.012	0.000	0.000	0.000	0.01
HAP	0.000	-	0.014	0.001	0.001	0.000	0.02
N_2O	0.000	-	0.001	0.000	0.000	0.000	0.00
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00

Enclosed Combustor/Vapor Combustor Total Emissions		
	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Total VOC	0.14	0.62
NOx	1.45E-02	6.36E-02
CO	1.22E-02	5.34E-02
PM2.5	8.28E-04	3.63E-03
PM10	1.10E-03	4.83E-03
H_2S	4.02E-06	1.76E-05
SO_2	7.56E-06	3.31E-05
Benzene (TAPs)	7.07E-05	3.10E-04
Toluene	2.05E-04	8.99E-04
Ethylbenzene	1.31E-04	5.74E-04
Xylenes	2.63E-04	1.15E-03
Hexanes	2.81E-03	1.23E-02
Formaldehyde (TAPs)	9.45E-07	4.14E-06
HAPs	0.00	0.02
CO_2e	38.21	167.36
N_2O	3.19E-04	1.40E-03
Lead	7.26E-08	3.18E-07

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

Table 11

Enclosed Combustor GHG Emissions
Ruddy Alt
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	0.003	541,821	0.0136	271,464	0.0030	341,368	0.016	6,903	6,305	1	0	--	6,305	2,641,085
Methane	0.168	541,821	0.7508	271,464	0.0390	341,368	0.037	6,903	308,218	1	0.98	302,054	6,164	6,164
Ethane	0.366	541,821	0.1418	271,464	0.4823	341,368	0.006	6,903	401,358	2	0.98	786,661	--	
Propane	0.252	541,821	0.0417	271,464	0.2820	341,368	0.000	6,903	243,981	3	0.98	717,303	--	
i-Butane	0.044	541,821	0.0019	271,464	0.0459	341,368	0.000	6,903	40,216	4	0.98	157,646	--	
n-Butane	0.081	541,821	0.0069	271,464	0.0830	341,368	0.000	6,903	74,354	4	0.98	291,468	--	
Pentane	0.046	541,821	0.0024	271,464	0.0439	341,368	0.000	6,903	40,387	5	0.98	197,899	--	
Hexane	0.018	541,821	0.0005	271,464	0.0092	341,368	0.000	6,903	13,258	6	0.98	77,958	--	
Benzene	0.000	541,821	0.0002	271,464	0.0000	341,368	0.000	6,903	150	6	0.98	880	--	
Heptanes	0.010	541,821	0.0005	271,464	0.0062	341,368	0.000	6,903	7,476	7	0.98	51,286	--	
Toluene	0.000	541,821	0.0004	271,464	0.0001	341,368	0.000	6,903	368	7	0.98	2,527	--	
Octane	0.006	541,821	0.0003	271,464	0.0045	341,368	0.000	6,903	4,670	8	0.98	36,611	--	
Ethyl benzene	0.000	541,821	0.0002	271,464	0.0001	341,368	0.000	6,903	204	8	0.98	1,600	--	
Xylenes	0.000	541,821	0.0004	271,464	0.0001	341,368	0.000	6,903	409	8	0.98	3,210	--	
Nonane	0.001	541,821	0.0000	271,464	0.0006	341,368	0.000	6,903	652	9	0.98	5,747	--	
Decane plus	0.000	541,821	0.0000	271,464	0.0002	341,368	0.000	6,903	197	10	0.98	1,931	--	
											Subtotal	**2,634,780**	--	

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	2,641,085	0.12	2000	1	34.96	153.13
CH_4	6,164	0.09	2000	25	0.07	0.29
				CO_2e Emissions	**36.6**	**160.30**

GHG Emissions Summary

Notes
a Flashing/Working/Breathing Losses from ProMax output reports
b 40 CFR 98.233 (n)(4): Eqns: W-19, W-20 and W-21
c 40 CFR 98.233(v) Eqn W-36 - density at 60F and 14.7 psia

Table 12

Haul Road Emissions
Ruddy Alt
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)	30
PW Production (bbl/day)	360
Truck Capacity (bbl)	200

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

	# of Wheels	Mean Vehicle Weight (W) (tons)	Mean Vehicle Speed (S) (mph)	Miles Per Trip (miles)	Maximum Trips per Hour	Maximum Trips per Year	Vehicle Miles Travelled (miles/hr)	Vehicle Miles Travelled (miles/year)	PM (lbs/VMT)	PM10 (lbs/VMT)
Tanker Trucks Condensate	10	40	10	0.0440	1	55	0.0440	2.4200	3.8175	1.7179
Tanker Trucks PW	10	40	10	0.0440	1	657	0.0440	28.9080	3.8175	1.7179
Pick Up Truck	4	3	10	0.2200	1	730	0.2200	160.6000	0.3467	0.1560

	Uncontrolled Emissions						Controlled Emissions					
	PM			PM10			PM			PM10		
	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)
Tanker Trucks Condensate	0.1680	9.2384	0.0046	0.0756	4.1573	0.0021	0.0840	4.6192	0.0023	0.0378	2.0786	0.0010
Tanker Trucks PW	0.1680	110.3571	0.0552	0.0756	49.6607	0.0248	0.0840	55.1786	0.0276	0.0378	24.8304	0.0124
Pick Up Truck	0.0763	55.6768	0.0278	0.0343	25.0545	0.0125	0.0381	27.8384	0.0139	0.0172	12.5273	0.0063
Total Emissions	0.4122	175.2723	0.0876	0.1855	78.8725	0.0394	0.2061	87.6362	0.0438	0.0927	39.4363	0.0197

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
Ruddy Alt
Doddridge County, West Virginia
Antero Resources Corporation

	Potential Emissions		Initial Permit Application Emissions		Change in Emissions	
Pollutant	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**
PM	0.2316	0.1554	0.2346	0.1687	-3.03E-03	-0.0133
PM10	0.1182	0.1313	0.1212	0.1365	-0.0029	-0.0052
VOC (uncontrolled)	8.1747	35.9829	14.7510	64.8108	-6.5763	-28.8279
CO	0.2816	1.2335	5.9333	25.9879	-5.6517	-24.7544
NOx	0.3353	1.4685	0.6596	2.8892	-0.3244	-1.4207
SO2	0.0019	0.0085	0.0021	0.0091	-1.41E-04	-6.18E-04
Pb	1.68E-06	7.34E-06	1.72E-06	7.53E-06	-4.29E-08	-1.88E-07
HAPs	0.0901	0.3953	0.1001	0.4389	-0.0100	-0.0436
TAPs	0.0009	0.0041	0.0010	0.0270	-7.84E-05	-0.0229

Notes: 1.) The change in emissions is due to the removal of the compressor engine.
2) Change from G70A to G70B General Permit

Bryan Research & Engineering, Inc.

ProMax® 3.2

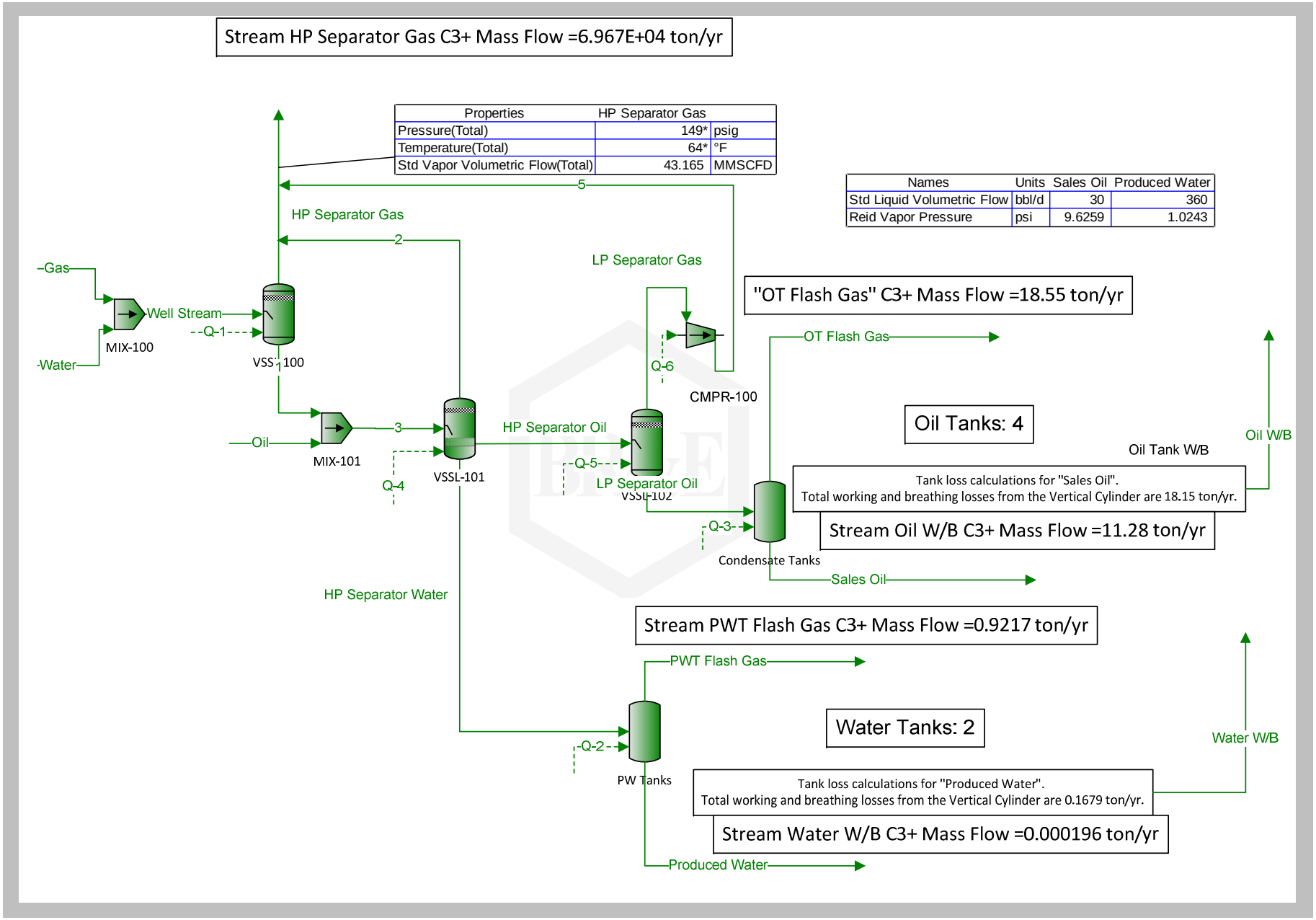
with

TSWEET® & PROSIM®

Simulation Report	
Client Name:	Antero Resources Corporation
Location:	West Virginia
Job:	Ruddy Alt

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

Report Created:	1/14/2016 17:12


Stream HP Separator Gas C3+ Mass Flow =6.967E+04 ton/yr
Properties | HP Separator Gas
Pressure(Total) | 149* | psig
Temperature(Total) | 64* | °F
Std Vapor Volumetric Flow(Total) | 43.165 | MMSCFD
Names | Units | Sales Oil | Produced Water
Std Liquid Volumetric Flow | bbl/d | 30 | 360
Reid Vapor Pressure | psi | 9.6259 | 1.0243
"OT Flash Gas" C3+ Mass Flow =18.55 ton/yr
Oil Tanks: 4
Oil Tank W/B
Tank loss calculations for "Sales Oil".
Total working and breathing losses from the Vertical Cylinder are 18.15 ton/yr.
Stream Oil W/B C3+ Mass Flow =11.28 ton/yr
Stream PWT Flash Gas C3+ Mass Flow =0.9217 ton/yr
Water Tanks: 2
Tank loss calculations for "Produced Water".
Total working and breathing losses from the Vertical Cylinder are 0.1679 ton/yr.
Stream Water W/B C3+ Mass Flow =0.000196 ton/yr
Gas
Water
MIX-100
Well Stream
Q-1
VSS-100
HP Separator Gas
2
5
LP Separator Gas
Q-6
CMPR-100
OT Flash Gas
Oil
MIX-101
3
VSSL-101
HP Separator Oil
Q-4
Q-5
LP Separator Oil
VSSL-102
Q-3
Condensate Tanks
Oil W/B
Sales Oil
HP Separator Water
PWT Flash Gas
Q-2
PW Tanks
Water W/B
Produced Water

Process Streams		Well Stream	HP Separator Gas	HP Separator Water	HP Separator Oil	OT Flash Gas	Sales Oil	Gas	Water	Oil	Produced Water	PWT Flash Gas	Oil W/B	Water W/B	1	3	LP Separator Oil
Phase: Total	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		5.97238	0.188857	99.9714	0.0519321	0.408311	0.00838221	0	100	0	99.9967	3.03000	0.000208618	93.9650	99.9704	98.9072	0.0311818
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.630048	0.668808	0.000112166	0.0138171	0.0213673	3.14742E-05	0.670067	0	0.0170005	4.83293E-06	0.412529	0.000895524	0.00729553	9.49562E-05	0.000274756	0.00124781
Carbon Dioxide		0.159863	0.169638	0.00101891	0.0354217	0.269442	0.00468870	0.170017	0	0.0380011	0.000663202	1.36779	0.303435	1.62961	0.000994854	0.00138844	0.0197821
Methane		74.3833	78.9586	0.0214274	4.19587	16.7681	0.0795983	79.1079	0	4.27113	0.00181455	75.3822	3.89784	3.70421	0.0222401	0.0674294	1.03099
Ethane		12.6198	13.3960	0.00410407	4.47369	36.5872	1.11494	13.4213	0	4.48413	0.000399435	14.2388	48.2285	0.645693	0.00425314	0.0518992	3.13718
Propane		4.16584	4.42206	0.00121885	4.47141	25.1807	2.90892	4.43044	0	4.44113	0.000129744	4.18602	28.2009	0.0462678	0.00159955	0.0488165	4.17861
Isobutane		0.460781	0.489129	5.29449E-05	1.47915	4.43158	1.31197	0.490049	0	1.47904	2.10721E-06	0.195392	4.59337	0.000270431	5.71040E-05	0.0157870	1.48982
n-Butane		0.930967	0.988232	0.000197186	3.65063	8.14823	3.46668	0.990099	0	3.64611	1.64935E-05	0.694493	8.30032	0.00144658	0.000245696	0.0390215	3.73357
Isopentane		0.244496	0.259537	3.85365E-05	2.69131	2.56480	2.82772	0.260026	0	2.69008	2.26884E-06	0.139394	2.47817	7.27665E-05	4.38971E-05	0.0286539	2.81273
n-Pentane		0.253900	0.269519	2.87378E-05	2.77233	2.00240	2.96241	0.270027	0	2.77008	1.67622E-06	0.104011	1.91264	3.95990E-05	4.34250E-05	0.0295043	2.90768
2-Methylpentane		0.0564222	0.0598935	3.62466E-06	1.83285	0.561127	2.01704	0.0600060	0	1.83205	1.03846E-07	0.0135321	0.522304	9.83676E-07	4.36890E-06	0.0194893	1.93404
3-Methylpentane		0.0282111	0.0299465	6.49498E-06	1.32954	0.365355	1.46633	0.0300030	0	1.32904	4.81245E-07	0.0231138	0.339310	4.07357E-06	6.12892E-06	0.0141411	1.40356
n-Hexane		0.0658259	0.0698758	4.66113E-06	4.13676	0.914715	4.57930	0.0700070	0	4.13512	1.06816E-07	0.0175042	0.0577562	4.92794E-08	4.03975E-06	0.0439834	4.37038
Methylcyclopentane		0.00940370	0.00998186	1.04042E-05	0.864063	0.183591	0.957068	0.0100010	0	0.864026	2.01537E-06	0.0322439	0.158647	1.22200E-05	6.98361E-06	0.00919631	0.912973
Benzene		0	0	5.37085E-05	0.0910443	0.0190496	0.100866	0	0	0.0960029	4.95819E-05	0.0159099	0.00103050	1.85290E-05	0	0.00102104	0.0962015
2-Methylhexane		0	0	1.47080E-06	2.72912	0.258491	3.04727	0	0	2.72808	3.57988E-08	0.00551533	0.0152830	6.56693E-09	0	0.0290147	2.88828
3-Methylhexane		0.00940370	0.00998225	1.19631E-06	2.23499	0.201502	2.49630	0.0100010	0	2.23407	3.04016E-08	0.00448110	0.179520	7.99666E-08	7.14107E-07	0.0237613	2.36547
Heptane		0.00940370	0.00998225	2.00560E-06	4.50398	0.322287	5.03691	0.0100010	0	4.50214	5.12457E-08	0.00751144	0.264482	9.84193E-08	7.76049E-07	0.0478835	4.76813
Methylcyclohexane		0	0	8.40059E-06	3.27474	0.236132	3.66209	0	0	3.27410	1.15231E-06	0.0278593	0.195939	2.25502E-06	0	0.0348219	3.46678
Toluene		0	0	0.000104305	0.793670	0.0463096	0.888374	0	0	0.803024	9.47593E-05	0.0367828	0.00528280	2.06100E-05	0	0.00854061	0.840369
Octane		0	0	1.20013E-06	14.5298	0.326978	16.3029	0	0	14.5234	2.04136E-08	0.00453417	0.252789	1.15768E-08	0	0.154465	15.3922
Ethylbenzene		0	0	5.03890E-05	1.27392	0.0246310	1.42969	0	0	1.27804	4.53388E-05	0.0194552	0.00528638	6.13147E-06	0	0.0135927	1.34959
m-Xylene		0	0	4.00236E-05	1.18484	0.0191794	1.33000	0	0	1.18804	3.61360E-05	0.0149778	0.00530310	5.26980E-06	0	0.0126354	1.25527
o-Xylene		0	0	8.26888E-05	2.03528	0.0294142	2.28489	0	0	2.04206	7.65984E-05	0.0234846	0.00704584	8.63898E-06	0	0.0217185	2.15631
Nonane		0	0	4.76658E-07	11.2283	0.0828706	12.6114	0	0	11.2233	1.27661E-08	0.00178294	0.0578993	2.14359E-09	0	0.119366	11.8972
C10+		0	0	1.79083E-07	24.1215	0.0263647	27.1042	0	0	24.1107	5.60984E-09	0.000666735	0.0158697	1.20131E-10	0	0.256431	25.5605
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water		300.474	8.95078	291.522	0.00162722	0.000688297	0.000233725	0	300.474	0	291.519	0.00229890	2.14230E-07	0.00195118	291.523	291.523	0.000922022
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		31.6981	31.6978	0.000327081	0.000432938	3.60192E-05	8.77611E-07	31.6981	0	0.000532927	1.40894E-05	0.000312991	9.19611E-07	1.51491E-07	0.000276901	0.000809828	3.68968E-05
Carbon Dioxide		8.04280	8.03990	0.00297119	0.00110989	0.000454203	0.000130737	8.04280	0	0.00119125	0.00193343	0.00103776	0.000311597	3.38388E-05	0.00290109	0.00409234	0.000584941
Methane		3742.27	3742.20	0.0624834	0.131472	0.0282662	0.00221948	3742.27	0	0.133890	0.00528995	0.0571934	0.00400268	7.69176E-05	0.0648541	0.198744	0.0304857
Ethane		634.908	634.896	0.0119677	0.140177	0.0616756	0.0310883	634.908	0	0.140567	0.00116447	0.0108032	0.0495257	1.34078E-05	0.0124026	0.152970	0.0927639
Propane		209.586	209.581	0.00355423	0.140105	0.0424474	0.0811108	209.586	0	0.139219	0.000378243	0.00317599	0.0289594	9.60748E-07	0.00466443	0.143884	0.123558
Isobutane		23.1822	23.1820	0.000154390	0.0463471	0.00747038	0.0365824	23.1822	0	0.0463646	6.14313E-06	0.000148247	0.00471691	5.61549E-09	0.000166521	0.0465312	0.0440528
n-Butane		46.8375	46.8368	0.000575004	0.114387	0.0137356	0.0966631	46.8375	0	0.114297	4.80834E-05	0.000526921	0.00852357	3.00382E-08	0.000716473	0.115014	0.110399
Isopentane		12.3008	12.3006	0.000112374	0.0843284	0.00432353	0.0788466	12.3008	0	0.0843278	6.61433E-06	0.000105760	0.00254482	1.51099E-09	0.000128008	0.0844559	0.0831701
n-Pentane		12.7739	12.7737	8.38009E-05	0.0868670	0.00337547	0.0826024	12.7739	0	0.0868357	4.88666E-06	7.89143E-05	0.00196408	8.22270E-10	0.000126631	0.0869624	0.0859778
2-Methylpentane		2.83864	2.83862	1.05697E-05	0.0574297	0.000945900	0.0562421	2.83864	0	0.0574307	3.02742E-07	1.02670E-05	0.000536353	2.04260E-11	1.27401E-05	0.0574435	0.0571880
3-Methylpentane		1.41932	1.41930	1.89397E-05	0.0416592	0.000615884	0.0408864	1.41932	0	0.0416623	1.40297E-06	1.75367E-05	0.000348436	8.45874E-11	1.78725E-05	0.0416802	0.0415023
n-Hexane		3.31174	3.31173	1.35921E-05	0.129620	0.00154195	0.127687	3.31174	0	0.129627	3.11399E-07	1.32807E-05	5.93097E-05	1.02328E-12	1.17803E-05	0.129638	0.129229
Methylcyclopentane		0.473106	0.473086	3.03393E-05	0.0270742	0.000309482	0.0266864	0.473106	0	0.0270852	5.87538E-06	2.44639E-05	0.000162914	2.53747E-10	2.03649E-05	0.0271056	0.0269959
Benzene		0	0	0.000156617	0.00285275	3.21122E-05	0.00281249	0	0	0.00300947	0.000144546	1.20711E-05	1.05821E-06	3.84753E-10	0	0.00300947	0.00284460
2-Methylhexane		0	0	4.28892E-06	0.0855133	0.000435742	0.0849685	0	0	0.0855191	1.04364E-07	4.18455E-06	1.56941E-05	1.36362E-13	0	0.0855191	0.0854042
3-Methylhexane		0.473106	0.473104	3.48850E-06	0.0700303	0.000339675	0.0696055	0.473106	0	0.0700329	8.86295E-08	3.39987E-06	0.000184349	1.66050E-12	2.08240E-06	0.0700349	0.0699452
Heptane		0.473106	0.473104	5.84842E-06	0.141126	0.000543284	0.140447	0.473106	0	0.141132	1.49396E-07	5.69903E-06	0.000271596	2.04367E-12	2.26303E-06	0.141134	0.140990
Methylcyclohexane		0	0	2.44965E-05	0.102610	0.000398051	0.102112	0	0	0.102635	3.35930E-06	2.11372E-05	0.000201210	4.68254E-11	0	0.102635	0.102510
Toluene		0	0	0.000304158	0.0248685	7.80648E-05	0.0247710	0	0	0.0251730	0.000276251	2.79076E-05	5.42490E-06	4.27965E-10	0	0.0251730	0.0248490
Octane		0	0	3.49965E-06	0.455271	0.000551191	0.454582	0	0	0.455276	5.95116E-08	3.44013E-06	0.000259588	2.40392E-13	0	0.455276	0.455134
Ethylbenzene		0	0	0.000146937	0.0399165	4.15209E-05	0.0398647	0	0	0.0400636	0.000132176	1.47609E-05	5.42857E-06	1.27320E-10	0	0.0400636	0.0399062
m-Xylene		0	0	0.000116711	0.0371254	3.23310E-05	0.0370850	0	0	0.0372422	0.000105347	1.13639E-05	5.44574E-06	1.09427E-10	0	0.0372422	0.0371174
o-Xylene		0	0	0.000241125	0.0637726	4.95839E-05	0.0637108	0	0	0.0640139	0.000223307	1.78180E-05	7.23535E-06	1.79388E-10	0	0.0640139	0.0637604
Nonane		0	0	1.38996E-06	0.351824	0.000139696	0.351650	0	0	0.351826	3.72168E-08	1.35274E-06	5.94566E-05	4.45114E-14	0	0.351826	0.351790
C10+		0	0	5.22215E-07	0.755815	4.44435E-05	0.755760	0	0	0.755816	1.63543E-08	5.05860E-07	1.62966E-05	2.49451E-15	0	0.755816	0.755804
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		5.32322	0.167212	99.9654	0.00896049	0.188551	0.00133205	0	100	0	99.9940	2.67426	9.31462E-05	91.7150	99.9652	94.1037	0.00514772
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.873224	0.920788	0.000174405	0.00370711	0.0153430	7.77756E-06	0.922321	0	0.00456213	7.51491E-06	0.566163	0.000621749	0.0110728	0.000147647	0.000406491	0.000320322
Carbon Dioxide		0.348081	0.366912	0.00248894	0.0149303	0.303954	0.00182021	0.367652	0	0.0160208	0.00162009	2.94909	0.330967	3.88565	0.00243020	0.00322708	0.00797794
Methane		59.0381	62.2534	0.0190798	0.644685	6.89524	0.0112641	62.3575	0	0.656377	0.00161580	59.2462	1.54977	3.21958	0.0198036	0.0571292	0.151565
Ethane		18.7740	19.7964	0.00684962	1.28837	28.1997	0.295728	19.8296	0	1.29163	0.000666674	20.9756	35.9414	1.05191	0.00709848	0.0824172	0.864432
Propane		9.08833	9.58324	0.00298318	1.88840	28.4615	1.13149	9.59932	0	1.87598	0.000317564	9.04311	30.8198	0.110537	0.00391497	0.113684	1.68849
Isobutane		1.32502	1.39720	0.000170804	0.823395	6.60232	0.672651	1.39952	0	0.823499	6.79825E-06	0.556378	6.61675	0.000851594	0.000184223	0.0484595	0.793502
n-Butane		2.67708	2.82289	0.000636137	2.03219	12.1395	1.77737	2.82760	0	2.03007	5.32112E-05	1.97756	11.9566	0.00455531	0.000792641	0.119780	1.98856
Isopentane		0.872745	0.920281	0.000154324	1.85972	4.74328	1.79964	0.921815	0	1.85923	9.08616E-06	0.492713	4.43130	0.000284442	0.000175793	0.109182	1.85964
n-Pentane		0.906312	0.955677	0.000115084	1.91570	3.70318	1.88537	0.957269	0	1.91453	6.71285E-06	0.367644	3.42005	0.000154791	0.000173902	0.112422	1.92242
2-Methylpentane		0.240558	0.253662	1.73374E-05	1.51274	1.23948	1.53327	0.254083	0	1.51238	4.96731E-07	0.0571305	1.11552	4.59270E-06	2.08974E-05	0.0886985	1.52729
3-Methylpentane		0.120279	0.126830	3.10666E-05	1.09733	0.807038	1.11465	0.127042	0	1.09714	2.30196E-06	0.0975831	0.724688	1.90192E-05	2.93159E-05	0.0643585	1.10838
n-Hexane		0.280651	0.295939	2.22950E-05	3.41427	2.02053	3.48100	0.296430	0	3.41359	5.10936E-07	0.0739004	0.123354	2.30081E-07	1.93230E-05	0.200175	3.45123
Methylcyclopentane		0.0391551	0.0412864	4.86011E-05	0.696471	0.396049	0.710506	0.0413566	0	0.696578	9.41466E-06	0.132945	0.330907	5.57193E-05	3.26227E-05	0.0408747	0.704098
Benzene		0	0	0.000232859	0.0681121	0.0381415	0.0694997	0	0	0.0718358	0.000214975	0.0608843	0.00199496	7.84154E-05	0	0.00421211	0.0688606
2-Methylhexane		0	0	8.18016E-06	2.61911	0.663923	2.69345	0	0	2.61863	1.99110E-07	0.0270750	0.0379538	3.56510E-08	0	0.153544	2.65209
3-Methylhexane		0.0466188	0.0491583	6.65354E-06	2.14490	0.517548	2.20645	0.0492399	0	2.14443	1.69091E-07	0.0219979	0.445822	4.34128E-07	3.97169E-06	0.125743	2.17203
Heptane		0.0466188	0.0491583	1.11546E-05	4.32243	0.827780	4.45207	0.0492399	0	4.32150	2.85024E-07	0.0368740	0.656816	5.34306E-07	4.31620E-06	0.253396	4.37821
Methylcyclohexane		0	0	4.57817E-05	3.07951	0.594292	3.17177	0	0	3.07951	6.28008E-06	0.134011	0.476808	1.19959E-05	0	0.180568	3.11924
Toluene		0	0	0.000533431	0.700382	0.109372	0.722036	0	0	0.708776	0.000484630	0.166037	0.0120636	0.000102885	0	0.0415592	0.709549
Octane		0	0	7.60915E-06	15.8960	0.957389	16.4272	0	0	15.8922	1.29432E-07	0.0253742	0.715656	7.16470E-08	0	0.931842	16.1119

Ethylbenzene		0	0	0.000296927	1.29532	0.0670284	1.33889	0	0	1.29977	0.000267177	0.101190	0.0139095	3.52679E-05	0	0.0762120	1.31297
m-Xylene		0	0	0.000235847	1.20475	0.0521930	1.24553	0	0	1.20823	0.000212946	0.0779024	0.0139535	3.03116E-05	0	0.0708450	1.22121
o-Xylene		0	0	0.000487260	2.06947	0.0800449	2.13978	0	0	2.07678	0.000451387	0.122147	0.0185390	4.96909E-05	0	0.121772	2.09780
Nonane		0	0	3.39324E-06	13.7925	0.272440	14.2679	0	0	13.7891	9.08823E-08	0.0112030	0.184043	1.48953E-08	0	0.808528	13.9827
C10+		0	0	1.53200E-06	35.6066	0.104157	36.8494	0	0	35.5976	4.79921E-08	0.00503437	0.0606194	1.00314E-09	0	2.08727	36.1005
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water		5413.12	161.251	5251.84	0.0293149	0.0123999	0.00421063	0	5413.12	0	5251.80	0.0414153	3.85941E-06	0.0351510	5251.87	5251.87	0.0166105
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		887.972	887.964	0.00916264	0.0121281	0.00100902	2.45849E-05	887.972	0	0.0149291	0.000394692	0.00876795	2.57614E-05	4.24378E-06	0.00775695	0.0226860	0.00103361
Carbon Dioxide		353.960	353.832	0.130761	0.0488457	0.0199893	0.00575369	353.960	0	0.0524262	0.0850892	0.0456714	0.0137132	0.00148923	0.127675	0.180102	0.0257429
Methane		60035.2	60034.2	1.00239	2.10913	0.453459	0.0356059	60035.2	0	2.14793	0.0848639	0.917523	0.0642128	0.00123395	1.04042	3.18835	0.489065
Ethane		19091.1	19090.7	0.359856	4.21499	1.85453	0.934797	19091.1	0	4.22672	0.0350145	0.324841	1.48919	0.000403159	0.372933	4.59966	2.78932
Propane		9241.82	9241.62	0.156726	6.17803	1.87175	3.57663	9241.82	0	6.13896	0.0166788	0.140047	1.27698	4.23648E-05	0.205681	6.34464	5.44838
Isobutane		1347.40	1347.39	0.00897348	2.69379	0.434195	2.12625	1347.40	0	2.69482	0.000357052	0.00861642	0.274157	3.26385E-07	0.00967854	2.70449	2.56045
n-Butane		2722.30	2722.26	0.0334205	6.64845	0.798343	5.61827	2722.30	0	6.64320	0.00279471	0.0306258	0.495409	1.74588E-06	0.0416430	6.68484	6.41662
Isopentane		887.485	887.475	0.00810768	6.08419	0.311937	5.68868	887.485	0	6.08415	0.000477216	0.00763046	0.183606	1.09016E-07	0.00923562	6.09339	6.00062
n-Pentane		921.619	921.610	0.00604614	6.26735	0.243536	5.95966	921.619	0	6.26509	0.000352567	0.00569357	0.141706	5.93258E-08	0.00913630	6.27423	6.20320
2-Methylpentane		244.621	244.619	0.000910847	4.94902	0.0815133	4.84668	244.621	0	4.94911	2.60889E-05	0.000884759	0.0462204	1.76021E-09	0.00109789	4.95021	4.92820
3-Methylpentane		122.310	122.309	0.00163213	3.59000	0.0530741	3.52340	122.310	0	3.59027	0.000120901	0.00151123	0.0300266	7.28935E-09	0.00154017	3.59181	3.57647
n-Hexane		285.391	285.390	0.00117130	11.1700	0.132878	11.0035	285.391	0	11.1706	2.68349E-05	0.00114447	0.00511104	8.81817E-11	0.00101517	11.1716	11.1363
Methylcyclopentane		39.8164	39.8146	0.00255334	2.27855	0.0260458	2.24591	39.8164	0	2.27948	0.000494469	0.00205887	0.0137107	2.13552E-08	0.00171390	2.28119	2.27196
Benzene		0	0	0.0122336	0.222833	0.00250834	0.219689	0	0	0.235075	0.0112907	0.000942893	8.26589E-05	3.00538E-08	0	0.235075	0.222197
2-Methylhexane		0	0	0.000429758	8.56860	0.0436622	8.51401	0	0	8.56918	1.04575E-05	0.000419300	0.00157257	1.36637E-11	0	8.56918	8.55767
3-Methylhexane		47.4061	47.4059	0.000349554	7.01717	0.0340361	6.97461	47.4061	0	7.01743	8.88085E-06	0.000340673	0.0184721	1.66385E-10	0.000208661	7.01764	7.00865
Heptane		47.4061	47.4059	0.000586023	14.1411	0.0544382	14.0730	47.4061	0	14.1417	1.49698E-05	0.000571054	0.0272144	2.04780E-10	0.000226760	14.1419	14.1275
Methylcyclohexane		0	0	0.00240522	10.0748	0.0390830	10.0260	0	0	10.0774	0.000329837	0.00207538	0.0197560	4.59760E-09	0	10.0774	10.0650
Toluene		0	0	0.0280247	2.29135	0.00719277	2.28236	0	0	2.31940	0.0254533	0.00257136	0.000499841	3.94320E-08	0	2.31940	2.28955
Octane		0	0	0.000399759	52.0049	0.0629618	51.9263	0	0	52.0055	6.79792E-06	0.000392961	0.0296524	2.74597E-11	0	52.0055	51.9892
Ethylbenzene		0	0	0.0155995	4.23773	0.00440806	4.23223	0	0	4.25335	0.0140324	0.00156709	0.000576324	1.35169E-08	0	4.25335	4.23664
m-Xylene		0	0	0.0123906	3.94141	0.00343242	3.93713	0	0	3.95382	0.0111841	0.00120645	0.000578147	1.16173E-08	0	3.95382	3.94056
o-Xylene		0	0	0.0255990	6.77042	0.00526408	6.76386	0	0	6.79604	0.0237074	0.00189165	0.000768141	1.90447E-08	0	6.79604	6.76912
Nonane		0	0	0.000178269	45.1232	0.0179168	45.1009	0	0	45.1235	4.77324E-06	0.000173496	0.00762561	5.70881E-12	0	45.1235	45.1188
C10+		0	0	8.04859E-05	116.489	0.00684981	116.481	0	0	116.490	2.52060E-06	7.79653E-05	0.00251170	3.84465E-13	0	116.490	116.488

Process Streams		Well Stream	HP Separator Gas	HP Separator Water	HP Separator Oil	OT Flash Gas	Sales Oil	Gas	Water	Oil	Produced Water	PWT Flash Gas	Oil W/B	Water W/B	1	3	LP Separator Oil
Phase: Total	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	Units																
Temperature	°F	160.3	64.0	70.0	70.0	75.9	75.9	200.0	200.0	200.0	75.9	75.94	75.9425	75.9425	64	68.4377	70
Pressure	psig	200	149	149	149	0	0	300	200	300	0	0	7.60758	-14.2240	149	149	40
Mole Fraction Vapor	%	96.2628	100	0	0	100	0	100	0	0	0	100	100	100	0	0.00111892	0
Mole Fraction Light Liquid	%	3.73717	0	100	100	0	100	0	100	100	100	0	0	0	100	1.06367	100
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98.9352	0
Molecular Weight	lb/lbmol	20.2	20.3	18.0	104.4	39.0	113.4	20.4	18.0	104.4	18.0	20.4117	40.3486	18.4572	18.0162	18.9349	109.126
Mass Density	lb/ft^3	0.7	0.6	62.3	44.5	0.1	44.9	0.9	60.2	40.4	62.2	0.0523702	0.159996	0.00151602	62.3166	60.7874	44.8221
Molar Flow	lbmol/h	5031.1	4739.5	291.6	3.1	0.2	2.8	4730.6	300.5	3.1	291.5	0.0758713	0.102690	0.00207649	291.609	294.744	2.95692
Mass Flow	lb/h	101688.9	96435.2	5253.7	327.2	6.6	316.1	96275.8	5413.1	327.2	5252.1	1.54866	4.14339	0.0383263	5253.70	5580.94	322.677
Vapor Volumetric Flow	MCFH	145.6	155.9	0.1	0.0	0.1	0.0	102.8	0.1	0.0	0.1	0.0295714	0.0258968	0.0252809	0.0843066	0.0918109	0.00719905
Liquid Volumetric Flow	Mbbl/d	622.5	666.4	0.4	0.0	0.3	0.0	439.5	0.4	0.0	0.4	0.126406	0.110698	0.108065	0.360376	0.392453	0.0307729
Std Vapor Volumetric Flow	MMSCFD	45.8	43.2	2.7	0.0	0.0	0.0	43.1	2.7	0.0	2.7	0.000691007	0.000935260	1.89119E-05	2.65587	2.68442	0.0269305
Std Liquid Volumetric Flow	Mbbl/d	19.9	19.5	0.4	0.0	0.0	0.0	19.5	0.4	0.0	0.4	0.000306217	0.000622012	2.90011E-06	0.360319	0.392131	0.0309803
Compressibility		0.934	0.958	0.008	0.068	0.987	0.006	0.966	0.009	0.115	0.001	0.996506	0.978541	0.999551	0.00842125	0.00899705	0.0234273
Specific Gravity			0.703	0.998	0.714	1.347	0.720	0.703	0.964	0.648	0.998	0.704761	1.39313	0.637278	0.999159		0.718660
API Gravity				10.0	65.4		62.9		10.0	65.1	10.0				10.0425		64.0944
Enthalpy	MMBtu/h	-191.0	-162.1	-35.9	-0.3	0.0	-0.3	-154.7	-36.3	-0.3	-35.8	-0.00283835	-0.00446622	-0.000211599	-35.8947	-36.1539	-0.274971
Mass Enthalpy	Btu/lb	-1878.2	-1680.8	-6826.4	-862.0	-1112.1	-840.7	-1607.1	-6699.9	-792.0	-6822.3	-1832.77	-1077.91	-5520.97	-6832.27	-6478.10	-852.157
Mass Cp	Btu/(lb*°F)	0.6	0.5	1.0	0.5	0.4	0.5	0.6	1.0	0.6	1.0	0.476059	0.409892	0.441586	0.983601	0.954164	0.486245
Ideal Gas CpCv Ratio		1.235	1.257	1.326	1.053	1.141	1.049	1.221	1.320	1.044	1.326	1.25800	1.13812	1.32230	1.32610	1.30911	1.05097
Dynamic Viscosity	cP		0.0	1.0	0.5	0.0	0.5	0.0	0.3	0.2	0.9	0.0107832	0.00864370	0.0102811	1.07544		0.518712
Kinematic Viscosity	cSt		1.1	1.0	0.7	5.4	0.7	0.9	0.3	0.4	0.9	12.8541	3.37264	423.365	1.07736		0.722458
Thermal Conductivity	Btu/(h*ft*°F)		0.0	0.3	0.1	0.0	0.1	0.0	0.4	0.1	0.3	0.0172620	0.0110136	0.0122241	0.343789		0.0693035
Surface Tension	lbf/ft			0.005	0.001		0.002		0.004	0.001	0.005				0.00508642		0.00147900
Net I.G. Heating Value	Btu/ft^3	1045.5	1109.8	0.3	5258.5	2047.9	5699.0	1111.9	0.0	5257.8	0.0	1060.17	2120.21	45.2701	0.321492	56.2377	5490.88
Net Liquid Heating Value	Btu/lb	19518.8	20639.6	-1052.8	18937.5	19768.5	18901.0	20675.9	-1059.8	18938.7	-1058.8	19626.1	19785.5	-45.8632	-1052.64	119.557	18918.7
Gross I.G. Heating Value	Btu/ft^3	1156.3	1224.4	50.6	5650.3	2229.5	6119.9	1226.6	50.3	5649.5	50.4	1171.11	2307.04	97.3413	50.6497	110.196	5898.12
Gross Liquid Heating Value	Btu/lb	21600.4	22776.7	7.3	20359.9	21534.9	20308.4	22814.9	0.0	20361.1	0.9	21688.7	21542.5	1024.7	7.4	1200.9	20333.4

Process Streams		Well Stream	HP Separator Gas	HP Separator Water	HP Separator Oil	OT Flash Gas	Sales Oil	Gas	Water	Oil	Produced Water	PWT Flash Gas	Oil W/B	Water W/B	1	3	LP Separator Oil
Phase: Vapor	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		2.32288	0.188857	0.232156	0.232156	0.408311	0.408311	0			3.03000	3.03000	0.000208618	93.9650	0.188857	0.220145	0.399679
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		0.654505	0.668808	0.824405	0.824405	0.0213673	0.0213673	0.670067			0.412529	0.412529	0.000895524	0.00729553	0.668808	0.843451	0.224460
Carbon Dioxide		0.166048	0.169638	0.186334	0.186334	0.269442	0.269442	0.170017			1.36779	1.36779	0.303435	1.62961	0.169638	0.183511	0.297519
Methane		77.2703	78.9586	79.2644	79.2644	16.7681	16.7681	79.1079			75.3822	75.3822	3.89784	3.70421	78.9586	79.5484	57.2348
Ethane		13.1096	13.3960	13.6577	13.6577	36.5872	36.5872	13.4213			14.2388	14.2388	48.2285	0.645693	13.3960	13.5008	26.8718
Propane		4.32754	4.42206	3.71002	3.71002	25.1807	25.1807	4.43044			4.18602	4.18602	28.2009	0.0462678	4.42206	3.63856	9.37822
Isobutane		0.478669	0.489129	0.491452	0.491452	4.43158	4.43158	0.490049			0.195392	0.195392	4.59337	0.000270431	0.489129	0.479907	1.30030
n-Butane		0.967103	0.988232	0.847947	0.847947	8.14823	8.14823	0.990099			0.694493	0.694493	8.30032	0.00144658	0.988232	0.826501	2.26063
Isopentane		0.253987	0.259537	0.249322	0.249322	2.56480	2.56480	0.260026			0.139394	0.139394	2.47817	7.27665E-05	0.259537	0.242007	0.656500

n-Pentane		0.263756	0.269519	0.191255	0.191255	2.00240	2.00240	0.270027			0.104011	0.104011	1.91264	3.95990E-05	0.269519	0.185329	0.503956
2-Methylpentane		0.0586126	0.0598935	0.0528780	0.0528780	0.561127	0.561127	0.0600060			0.0135321	0.0135321	0.522304	9.83676E-07	0.0598935	0.0510372	0.136982
3-Methylpentane		0.0293062	0.0299465	0.0343589	0.0343589	0.365355	0.365355	0.0300030			0.0231138	0.0231138	0.339310	4.07357E-06	0.0299465	0.0331477	0.0889450
n-Hexane		0.0683814	0.0698758	0.0862052	0.0862052	0.914715	0.914715	0.0700070			0.0175042	0.0175042	0.0577562	4.92794E-08	0.0698758	0.0830552	0.221562
Methylcyclopentane		0.00976871	0.00998186	0.0170921	0.0170921	0.183591	0.183591	0.0100010			0.0322439	0.0322439	0.158647	1.22200E-05	0.00998186	0.0164739	0.0444026
Benzene		0	0	0.00176711	0.00176711	0.0190496	0.0190496	0			0.0159099	0.0159099	0.00103050	1.85290E-05	0	0.00170373	0.00461607
2-Methylhexane		0	0	0.0247133	0.0247133	0.258491	0.258491	0			0.00551533	0.00551533	0.0152830	6.56693E-09	0	0.0236926	0.0618325
3-Methylhexane		0.00976877	0.00998225	0.0192641	0.0192641	0.201502	0.201502	0.0100010			0.00448110	0.00448110	0.179520	7.99666E-08	0.00998225	0.0184725	0.0482273
Heptane		0.00976877	0.00998225	0.0311363	0.0311363	0.322287	0.322287	0.0100010			0.00751144	0.00751144	0.264482	9.84193E-08	0.00998225	0.0298430	0.0772602
Methylcyclohexane		0	0	0.0224388	0.0224388	0.236132	0.236132	0			0.0278593	0.0278593	0.195939	2.25502E-06	0	0.0215217	0.0564737
Toluene		0	0	0.00437647	0.00437647	0.0463096	0.0463096	0			0.0367828	0.0367828	0.00528280	2.06100E-05	0	0.00419500	0.0110562
Octane		0	0	0.0324307	0.0324307	0.326978	0.326978	0			0.00453417	0.00453417	0.252789	1.15768E-08	0	0.0309154	0.0777694
Ethylbenzene		0	0	0.00239387	0.00239387	0.0246310	0.0246310	0			0.0194552	0.0194552	0.00528638	6.13147E-06	0	0.00228263	0.00583707
m-Xylene		0	0	0.00186858	0.00186858	0.0191794	0.0191794	0			0.0149778	0.0149778	0.00530310	5.26980E-06	0	0.00177969	0.00453386
o-Xylene		0	0	0.00286399	0.00286399	0.0294142	0.0294142	0			0.0234846	0.0234846	0.00704584	8.63898E-06	0	0.00272705	0.00694834
Nonane		0	0	0.00841133	0.00841133	0.0828706	0.0828706	0			0.00178294	0.00178294	0.0578993	2.14359E-09	0	0.00797646	0.0194989
C10+		0	0	0.00280685	0.00280685	0.0263647	0.0263647	0			0.000666735	0.000666735	0.0158697	1.20131E-10	0	0.00263827	0.00615963
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water		112.498	8.95078	0	0	0.000688297	0	0			0	0.00229890	2.14230E-07	0.00195118	0	7.26027E-06	0
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		31.6980	31.6978	0	0	3.60192E-05	0	31.6981			0	0.000312991	9.19611E-07	1.51491E-07	0	2.78166E-05	0
Carbon Dioxide		8.04176	8.03990	0	0	0.000454203	0	8.04280			0	0.00103776	0.000311597	3.38388E-05	0	6.05209E-06	0
Methane		3742.23	3742.20	0	0	0.0282662	0	3742.27			0	0.0571934	0.00400268	7.69176E-05	0	0.00262346	0
Ethane		634.903	634.896	0	0	0.0616756	0	634.908			0	0.0108032	0.0495257	1.34078E-05	0	0.000445248	0
Propane		209.585	209.581	0	0	0.0424474	0	209.586			0	0.00317599	0.0289594	9.60748E-07	0	0.000119998	0
Isobutane		23.1821	23.1820	0	0	0.00747038	0	23.1822			0	0.000148247	0.00471691	5.61549E-09	0	1.58271E-05	0
n-Butane		46.8372	46.8368	0	0	0.0137356	0	46.8375			0	0.000526921	0.00852357	3.00382E-08	0	2.72576E-05	0
Isopentane		12.3007	12.3006	0	0	0.00432353	0	12.3008			0	0.000105760	0.00254482	1.51099E-09	0	7.98126E-06	0
n-Pentane		12.7738	12.7737	0	0	0.00337547	0	12.7739			0	7.89143E-05	0.00196408	8.22270E-10	0	6.11206E-06	0
2-Methylpentane		2.83863	2.83862	0	0	0.000945900	0	2.83864			0	1.02670E-05	0.000536353	2.04260E-11	0	1.68318E-06	0
3-Methylpentane		1.41931	1.41930	0	0	0.000615884	0	1.41932			0	1.75367E-05	0.000348436	8.45874E-11	0	1.09319E-06	0
n-Hexane		3.31174	3.31173	0	0	0.00154195	0	3.31174			0	1.32807E-05	5.93097E-05	1.02328E-12	0	2.73912E-06	0
Methylcyclopentane		0.473103	0.473086	0	0	0.000309482	0	0.473106			0	2.44639E-05	0.000162914	2.53747E-10	0	5.43300E-07	0
Benzene		0	0	0	0	3.21122E-05	0	0			0	1.20711E-05	1.05821E-06	3.84753E-10	0	5.61882E-08	0
2-Methylhexane		0	0	0	0	0.000435742	0	0			0	4.18455E-06	1.56941E-05	1.36362E-13	0	7.81371E-07	0
3-Methylhexane		0.473106	0.473104	0	0	0.000339675	0	0.473106			0	3.39987E-06	0.000184349	1.66050E-12	0	6.09213E-07	0
Heptane		0.473106	0.473104	0	0	0.000543284	0	0.473106			0	5.69903E-06	0.000271596	2.04367E-12	0	9.84207E-07	0
Methylcyclohexane		0	0	0	0	0.000398051	0	0			0	2.11372E-05	0.000201210	4.68254E-11	0	7.09775E-07	0
Toluene		0	0	0	0	7.80648E-05	0	0			0	2.79076E-05	5.42490E-06	4.27965E-10	0	1.38349E-07	0
Octane		0	0	0	0	0.000551191	0	0			0	3.44013E-06	0.000259588	2.40392E-13	0	1.01957E-06	0
Ethylbenzene		0	0	0	0	4.15209E-05	0	0			0	1.47609E-05	5.42857E-06	1.27320E-10	0	7.52801E-08	0
m-Xylene		0	0	0	0	3.23310E-05	0	0			0	1.13639E-05	5.44574E-06	1.09427E-10	0	5.86933E-08	0
o-Xylene		0	0	0	0	4.95839E-05	0	0			0	1.78180E-05	7.23535E-06	1.79388E-10	0	8.99368E-08	0
Nonane		0	0	0	0	0.000139696	0	0			0	1.35274E-06	5.94566E-05	4.45114E-14	0	2.63059E-07	0
C10+		0	0	0	0	4.44435E-05	0	0			0	5.05860E-07	1.62966E-05	2.49451E-15	0	8.70087E-08	0
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		2.06170	0.167212	0.206679	0.206679	0.188551	0.188551	0			2.67426	2.67426	9.31462E-05	91.7150	0.167212	0.196694	0.283569
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		0.903309	0.920788	1.14125	1.14125	0.0153430	0.0153430	0.922321			0.566163	0.566163	0.000621749	0.0110728	0.920788	1.17184	0.247635
Carbon Dioxide		0.360029	0.366912	0.405240	0.405240	0.303954	0.303954	0.367652			2.94909	2.94909	0.330967	3.88565	0.366912	0.400544	0.515666
Methane		61.0719	62.2534	62.8381	62.8381	6.89524	6.89524	62.3575			59.2462	59.2462	1.54977	3.21958	62.2534	63.2914	36.1608
Ethane		19.4208	19.7964	20.2941	20.2941	28.1997	28.1997	19.8296			20.9756	20.9756	35.9414	1.05191	19.7964	20.1335	31.8217
Propane		9.40144	9.58324	8.08435	8.08435	28.4615	28.4615	9.59932			9.04311	9.04311	30.8198	0.110537	9.58324	7.95733	16.2863
Isobutane		1.37068	1.39720	1.41155	1.41155	6.60232	6.60232	1.39952			0.556378	0.556378	6.61675	0.000851594	1.39720	1.38338	2.97640
n-Butane		2.76932	2.82289	2.43548	2.43548	12.1395	12.1395	2.82760			1.97756	1.97756	11.9566	0.00455531	2.82289	2.38247	5.17461
Isopentane		0.902815	0.920281	0.888923	0.888923	4.74328	4.74328	0.921815			0.492713	0.492713	4.43130	0.000284442	0.920281	0.865962	1.86539
n-Pentane		0.937538	0.955677	0.681892	0.681892	3.70318	3.70318	0.957269			0.367644	0.367644	3.42005	0.000154791	0.955677	0.663155	1.43195
2-Methylpentane		0.248846	0.253662	0.225181	0.225181	1.23948	1.23948	0.254083			0.0571305	0.0571305	1.11552	4.59270E-06	0.253662	0.218128	0.464893
3-Methylpentane		0.124423	0.126830	0.146317	0.146317	0.807038	0.807038	0.127042			0.0975831	0.0975831	0.724688	1.90192E-05	0.126830	0.141670	0.301864
n-Hexane		0.290321	0.295939	0.367105	0.367105	2.02053	2.02053	0.296430			0.0739004	0.0739004	0.123354	2.30081E-07	0.295939	0.354970	0.751943
Methylcyclopentane		0.0405040	0.0412864	0.0710842	0.0710842	0.396049	0.396049	0.0413566			0.132945	0.132945	0.330907	5.57193E-05	0.0412864	0.0687609	0.147170
Benzene		0	0	0.00682108	0.00682108	0.0381415	0.0381415	0			0.0608843	0.0608843	0.00199496	7.84154E-05	0	0.00660025	0.0142002
2-Methylhexane		0	0	0.122372	0.122372	0.663923	0.663923	0			0.0270750	0.0270750	0.0379538	3.56510E-08	0	0.117742	0.244006
3-Methylhexane		0.0482252	0.0491583	0.0953889	0.0953889	0.517548	0.517548	0.0492399			0.0219979	0.0219979	0.445822	4.34128E-07	0.0491583	0.0918001	0.190316
Heptane		0.0482252	0.0491583	0.154176	0.154176	0.827780	0.827780	0.0492399			0.0368740	0.0368740	0.656816	5.34306E-07	0.0491583	0.148307	0.304887

Methylcyclohexane		0	0	0.108874	0.108874	0.594292	0.594292	0			0.134011	0.134011	0.476808	1.19959E-05	0	0.104802	0.218375
Toluene		0	0	0.0199269	0.0199269	0.109372	0.109372	0			0.166037	0.166037	0.0120636	0.000102885	0	0.0191697	0.0401195
Octane		0	0	0.183065	0.183065	0.957389	0.957389	0			0.0253742	0.0253742	0.715656	7.16470E-08	0	0.175143	0.349857
Ethylbenzene		0	0	0.0125590	0.0125590	0.0670284	0.0670284	0			0.101190	0.101190	0.0139095	3.52679E-05	0	0.0120188	0.0244052
m-Xylene		0	0	0.00980320	0.00980320	0.0521930	0.0521930	0			0.0779024	0.0779024	0.0139535	3.03116E-05	0	0.00937061	0.0189564
o-Xylene		0	0	0.0150254	0.0150254	0.0800449	0.0800449	0			0.122147	0.122147	0.0185390	4.96909E-05	0	0.0143588	0.0290515
Nonane		0	0	0.0533106	0.0533106	0.272440	0.272440	0			0.0112030	0.0112030	0.184043	1.48953E-08	0	0.0507372	0.0984900
C10+		0	0	0.0213778	0.0213778	0.104157	0.104157	0			0.00503437	0.00503437	0.0606194	1.00314E-09	0	0.0201666	0.0373880
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water		2026.68	161.251	0	0	0.0123999	0	0			0	0.0414153	3.85941E-06	0.0351510	0	0.000130796	0
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		887.967	887.964	0	0	0.00100902	0	887.972			0	0.00876795	2.57614E-05	4.24378E-06	0	0.000779237	0
Carbon Dioxide		353.914	353.832	0	0	0.0199893	0	353.960			0	0.0456714	0.0137132	0.00148923	0	0.000266349	0
Methane		60034.6	60034.2	0	0	0.453459	0	60035.2			0	0.917523	0.0642128	0.00123395	0	0.0420868	0
Ethane		19090.9	19090.7	0	0	1.85453	0	19091.1			0	0.324841	1.48919	0.00403159	0	0.0133882	0
Propane		9241.77	9241.62	0	0	1.87175	0	9241.82			0	0.140047	1.27698	4.23648E-05	0	0.00529138	0
Isobutane		1347.40	1347.39	0	0	0.434195	0	1347.40			0	0.00861642	0.274157	3.26385E-07	0	0.000919905	0
n-Butane		2722.28	2722.26	0	0	0.798343	0	2722.30			0	0.0306258	0.495409	1.74588E-06	0	0.00158427	0
Isopentane		887.482	887.475	0	0	0.311937	0	887.485			0	0.00763046	0.183606	1.09016E-07	0	0.000575838	0
n-Pentane		921.615	921.610	0	0	0.243536	0	921.619			0	0.00569357	0.141706	5.93258E-08	0	0.000440978	0
2-Methylpentane		244.620	244.619	0	0	0.0815133	0	244.621			0	0.000884759	0.0462204	1.76021E-09	0	0.000145049	0
3-Methylpentane		122.310	122.309	0	0	0.0530741	0	122.310			0	0.00151123	0.0300266	7.28935E-09	0	9.42064E-05	0
n-Hexane		285.390	285.390	0	0	0.132878	0	285.391			0	0.00114447	0.00511104	8.81817E-11	0	0.000236044	0
Methylcyclopentane		39.8161	39.8146	0	0	0.0260458	0	39.8164			0	0.00205887	0.0137107	2.13552E-08	0	4.57239E-05	0
Benzene		0	0	0	0	0.00250834	0	0			0	0.000942893	8.26589E-05	3.00538E-08	0	4.38897E-06	0
2-Methylhexane		0	0	0	0	0.0436622	0	0			0	0.000419300	0.00157257	1.36637E-11	0	7.82949E-05	0
3-Methylhexane		47.4061	47.4059	0	0	0.0340361	0	47.4061			0	0.000340673	0.0184721	1.66385E-10	0	6.10443E-05	0
Heptane		47.4061	47.4059	0	0	0.0544382	0	47.4061			0	0.000571054	0.0272144	2.04780E-10	0	9.86195E-05	0
Methylcyclohexane		0	0	0	0	0.0390830	0	0			0	0.00207538	0.0197560	4.59760E-09	0	6.96900E-05	0
Toluene		0	0	0	0	0.00719277	0	0			0	0.00257136	0.000499841	3.94320E-08	0	1.27472E-05	0
Octane		0	0	0	0	0.0629618	0	0			0	0.000392961	0.0296524	2.74597E-11	0	0.000116464	0
Ethylbenzene		0	0	0	0	0.00440806	0	0			0	0.00156709	0.000576324	1.35169E-08	0	7.99211E-06	0
m-Xylene		0	0	0	0	0.00343242	0	0			0	0.00120645	0.000578147	1.16173E-08	0	6.23117E-06	0
o-Xylene		0	0	0	0	0.00526408	0	0			0	0.00189165	0.000768141	1.90447E-08	0	9.54814E-06	0
Nonane		0	0	0	0	0.0179168	0	0			0	0.000173496	0.00762561	5.70881E-12	0	3.37387E-05	0
C10+		0	0	0	0	0.00684981	0	0			0	7.79653E-05	0.00251170	3.84465E-13	0	1.34102E-05	0

Process Streams		Well Stream	HP Separator Gas	HP Separator Water	HP Separator Oil	OT Flash Gas	Sales Oil	Gas	Water	Oil	Produced Water	PWT Flash Gas	Oil W/B	Water W/B	1	3	LP Separator Oil
Phase: Vapor	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	Units																
Temperature	°F	160.3	64.0	70.0	70.0	75.9	75.9	200.0			75.9	75.94	75.9425	75.9425	64	68.4377	70
Pressure	psig	200	149	149	149	0	0	300			0	0	7.60758	-14.2240	149	149	40
Mole Fraction Vapor	%	100	100	100	100	100	100	100			100	100	100	100	100	100	100
Mole Fraction Light Liquid	%	0	0	0	0	0	0	0			0	0	0	0	0	0	0
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0			0	0	0	0	0	0	0
Molecular Weight	lb/lbmol	20.3	20.3	20.2	20.2	39.0	39.0	20.4			20.4	20.4117	40.3486	18.4572	20.3473	20.1631	25.3918
Mass Density	lb/ft^3	0.7	0.6	0.6	0.6	0.1	0.1	0.9			0.1	0.0523702	0.159996	0.00151602	0.618609	0.606520	0.249706
Molar Flow	lbmol/h	4843.0	4739.5	0.0	0.0	0.2	0.0	4730.6			0.0	0.0758713	0.102690	0.00207649	0	0.00329795	0
Mass Flow	lb/h	98301.6	96435.2	0.0	0.0	6.6	0.0	96275.8			0.0	1.54866	4.14339	0.0383263	0	0.0664969	0
Vapor Volumetric Flow	MCFH	145.6	155.9	0.0	0.0	0.1	0.0	102.8			0.0	0.0295714	0.0258968	0.0252809	0	0.000109637	0
Liquid Volumetric Flow	Mbbl/d	622.2	666.4	0.0	0.0	0.3	0.0	439.5			0.0	0.126406	0.110698	0.108065	0	0.000468652	0
Std Vapor Volumetric Flow	MMSCFD	44.1	43.2	0.0	0.0	0.0	0.0	43.1			0.0	0.000691007	0.000935260	1.89119E-05	0	3.00365E-05	0
Std Liquid Volumetric Flow	Mbbl/d	19.6	19.5	0.0	0.0	0.0	0.0	19.5			0.0	0.000306217	0.000622012	2.90011E-06	0	1.35187E-05	0
Compressibility		0.970	0.958	0.960	0.960	0.987	0.987	0.966			0.997	0.996506	0.978541	0.999551	0.958093	0.960206	0.978474
Specific Gravity		0.701	0.703	0.699	0.699	1.347	1.347	0.703			0.705	0.704761	1.39313	0.637278	0.702538	0.696178	0.876709
API Gravity																	
Enthalpy	MMBtu/h	-168.2	-162.1	0.0	0.0	0.0	0.0	-154.7			0.0	-0.00283835	-0.00446622	-0.000211599	0	-0.000112216	0
Mass Enthalpy	Btu/lb	-1710.8	-1680.8	-1683.3	-1683.3	-1112.1	-1112.1	-1607.1			-1832.8	-1832.77	-1077.91	-5520.97	-1680.82	-1687.54	-1445.40
Mass Cp	Btu/(lb*°F)	0.5	0.5	0.5	0.5	0.4	0.4	0.6			0.5	0.476059	0.409892	0.441586	0.499068	0.500977	0.455195
Ideal Gas CpCv Ratio		1.233	1.257	1.257	1.257	1.141	1.141	1.221			1.258	1.25800	1.13812	1.32230	1.25691	1.25812	1.21184
Dynamic Viscosity	cP	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0107832	0.00864370	0.0102811	0.0106337	0.0107468	0.00999544
Kinematic Viscosity	cSt	1.1	1.1	1.1	1.1	5.4	5.4	0.9			12.9	12.8541	3.37264	423.365	1.07312	1.10615	2.49892
Thermal Conductivity	Btu/(h*ft*°F)	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0172620	0.0110136	0.0122241	0.0174841	0.0177355	0.0153640
Surface Tension	lbf/ft																
Net I.G. Heating Value	Btu/ft^3	1086.1	1109.8	1100.9	1100.9	2047.9	2047.9	1111.9			1060.2	1060.17	2120.21	45.2701	1109.79	1097.19	1364.29

Net Liquid Heating Value	Btu/lb	20227.8	20639.6	20587.9	20587.9	19768.5	19768.5	20675.9			19626.1	19626.1	19785.5	-45.8632	20639.6	20592.8	20287.3
Gross I.G. Heating Value	Btu/ft^3	1199.3	1224.4	1214.8	1214.8	2229.5	2229.5	1226.6			1171.1	1171.11	2307.04	97.3413	1224.38	1210.79	1497.10
Gross Liquid Heating Value	Btu/lb	22344.5	22776.7	22723.3	22723.3	21534.9	21534.9	22814.9			21688.7	21688.7	21542.5	1024.7	22776.7	22730.8	22272.1

Process Streams		Well Stream	HP Separator Gas	HP Separator Water	HP Separator Oil	OT Flash Gas	Sales Oil	Gas	Water	Oil	Produced Water	PWT Flash Gas	Oil W/B	Water W/B	1	3	LP Separator Oil
Phase: Light Liquid	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		99.9768	99.9704	99.9714	0.0519321	0.00838221	0.00838221		100	0	99.9967	99.9967	5.95248E-06	100.0000	99.9704	0.0498368	0.0311818
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		8.28514E-05	9.49562E-05	0.000112166	0.0138171	3.14742E-05	3.14742E-05		0	0.0170005	4.83293E-06	4.83293E-06	2.08692E-06	2.74448E-09	9.49562E-05	0.0141568	0.00124781
Carbon Dioxide		0.000554769	0.000994854	0.00101891	0.0354217	0.00468870	0.00468870		0	0.0380011	0.000663202	0.000663202	0.00785939	2.55072E-05	0.000994854	0.0353150	0.0197821
Methane		0.0186754	0.0222401	0.0214274	4.19587	0.0795983	0.0795983		0	4.27113	0.00181455	0.00181455	0.0287804	2.87188E-06	0.0222401	4.23458	1.03099
Ethane		0.00299140	0.00425314	0.00410407	4.47369	1.11494	1.11494		0	4.48413	0.000399435	0.000399435	2.24501	5.86697E-07	0.00425314	4.48228	3.13718
Propane		0.000679741	0.00159955	0.00121885	4.47141	2.90892	2.90892		0	4.44113	0.000129744	0.000129744	4.95841	4.66665E-08	0.00159955	4.47160	4.17861
Isobutane		3.03540E-05	5.71040E-05	5.29449E-05	1.47915	1.31197	1.31197		0	1.47904	2.10721E-06	2.10721E-06	2.03870	9.52947E-11	5.71040E-05	1.47878	1.48982
n-Butane		0.000151286	0.000245696	0.000197186	3.65063	3.46668	3.46668		0	3.64611	1.64935E-05	1.64935E-05	5.28532	1.12331E-09	0.000245696	3.64951	3.73357
Isopentane		2.04845E-05	4.38971E-05	3.85365E-05	2.69131	2.82772	2.82772		0	2.69008	2.26884E-06	2.26884E-06	4.08233	3.89159E-11	4.38971E-05	2.69006	2.81273
n-Pentane		2.61671E-05	4.34250E-05	2.87378E-05	2.77233	2.96241	2.96241		0	2.77008	1.67622E-06	1.67622E-06	4.21800	2.09672E-11	4.34250E-05	2.77100	2.90768
2-Methylpentane		2.95374E-06	4.36890E-06	3.62466E-06	1.83285	2.01704	2.01704		0	1.83205	1.03846E-07	1.03846E-07	2.79584	2.48850E-13	4.36890E-06	1.83188	1.93404
3-Methylpentane		3.26337E-06	6.12892E-06	6.49498E-06	1.32954	1.46633	1.46633		0	1.32904	4.81245E-07	4.81245E-07	2.02439	2.79611E-12	6.12892E-06	1.32884	1.40356
n-Hexane		2.59018E-06	4.03975E-06	4.66113E-06	4.13676	4.57930	4.57930		0	4.13512	1.06816E-07	1.06816E-07	0.429589	9.92463E-15	4.03975E-06	4.13455	4.37038
Methylcyclopentane		1.69692E-06	6.98361E-06	1.04042E-05	0.864063	0.957068	0.957068		0	0.864026	2.01537E-06	2.01537E-06	1.22009	2.51504E-11	6.98361E-06	0.863600	0.912973
Benzene		0	0	5.37085E-05	0.0910443	0.100866	0.100866		0	0.0960029	4.95819E-05	4.95819E-05	0.00789291	1.89821E-09	0	0.0910170	0.0962015
2-Methylhexane		0	0	1.47080E-06	2.72912	3.04727	3.04727		0	2.72808	3.57988E-08	3.57988E-08	0.264636	1.41208E-15	0	2.72763	2.88828
3-Methylhexane		1.87518E-07	7.14107E-07	1.19631E-06	2.23499	2.49630	2.49630		0	2.23407	3.04016E-08	3.04016E-08	3.26237	1.79693E-14	7.14107E-07	2.23377	2.36547
Heptane		1.12049E-07	7.76049E-07	2.00560E-06	4.50398	5.03691	5.03691		0	4.50214	5.12457E-08	5.12457E-08	6.04581	2.22670E-14	7.76049E-07	4.50152	4.76813
Methylcyclohexane		0	0	8.40059E-06	3.27474	3.66209	3.66209		0	3.27410	1.15231E-06	1.15231E-06	4.43879	3.08451E-12	0	3.27296	3.46678
Toluene		0	0	0.000104305	0.793670	0.888374	0.888374		0	0.803024	9.47593E-05	9.47593E-05	0.147710	1.75370E-09	0	0.793334	0.840369
Octane		0	0	1.20013E-06	14.5298	16.3029	16.3029		0	14.5234	2.04136E-08	2.04136E-08	18.3505	1.73630E-15	0	14.5218	15.3922
Ethylbenzene		0	0	5.03890E-05	1.27392	1.42969	1.42969		0	1.27804	4.53388E-05	4.53388E-05	0.444011	4.74393E-10	0	1.27325	1.34959
m-Xylene		0	0	4.00236E-05	1.18484	1.33000	1.33000		0	1.18804	3.61360E-05	3.61360E-05	0.531665	4.22383E-10	0	1.18423	1.25527
o-Xylene		0	0	8.26888E-05	2.03528	2.28489	2.28489		0	2.04206	7.65984E-05	7.65984E-05	0.789659	9.35920E-10	0	2.03425	2.15631
Nonane		0	0	4.76658E-07	11.2283	12.6114	12.6114		0	11.2233	1.27661E-08	1.27661E-08	12.9081	5.13966E-16	0	11.2221	11.8972
C10+		0	0	1.79083E-07	24.1215	27.1042	27.1042		0	24.1107	5.60984E-09	5.60984E-09	23.4745	3.40759E-17	0	24.1082	25.5605
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water		187.976	0	291.522	0.00162722	0	0.000233725		300.474	0	291.519	0	0	0	291.523	0.00156243	0.000922022
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.000155777	0	0.000327081	0.000432938	0	8.77611E-07		0	0.000532927	1.40894E-05	0	0	0	0.000276901	0.000443831	3.68968E-05
Carbon Dioxide		0.00104307	0	0.00297119	0.00110989	0	0.000130737		0	0.00119125	0.00193343	0	0	0	0.00290109	0.00110716	0.000584941
Methane		0.0351133	0	0.0624834	0.131472	0	0.00221948		0	0.133890	0.00528995	0	0	0	0.0648541	0.132758	0.0304857
Ethane		0.00562442	0	0.0119677	0.140177	0	0.0310883		0	0.140567	0.00116447	0	0	0	0.0124026	0.140524	0.0927639
Propane		0.00127805	0	0.00355423	0.140105	0	0.0811108		0	0.139219	0.000378243	0	0	0	0.00466443	0.140189	0.123558
Isobutane		5.70714E-05	0	0.000154390	0.0463471	0	0.0365824		0	0.0463646	6.14313E-06	0	0	0	0.000166521	0.0463613	0.0440528
n-Butane		0.000284447	0	0.000575004	0.114387	0	0.0966631		0	0.114297	4.80834E-05	0	0	0	0.000716473	0.114416	0.110399
Isopentane		3.85148E-05	0	0.000112374	0.0843284	0	0.0788466		0	0.0843278	6.61433E-06	0	0	0	0.000128008	0.0843361	0.0831701
n-Pentane		4.91993E-05	0	8.38009E-05	0.0868670	0	0.0826024		0	0.0868357	4.88666E-06	0	0	0	0.000126631	0.0868735	0.0859778
2-Methylpentane		5.55360E-06	0	1.05697E-05	0.0574297	0	0.0562421		0	0.0574307	3.02742E-07	0	0	0	1.27401E-05	0.0574314	0.0571880
3-Methylpentane		6.13577E-06	0	1.89397E-05	0.0416592	0	0.0408864		0	0.0416623	1.40297E-06	0	0	0	1.78725E-05	0.0416605	0.0415023
n-Hexane		4.87005E-06	0	1.35921E-05	0.129620	0	0.127687		0	0.129627	3.11399E-07	0	0	0	1.17803E-05	0.129622	0.129229
Methylcyclopentane		3.19053E-06	0	3.03393E-05	0.0270742	0	0.0266864		0	0.0270852	5.87538E-06	0	0	0	2.03649E-05	0.0270747	0.0269959
Benzene		0	0	0.000156617	0.00285275	0	0.00281249		0	0.00300947	0.000144546	0	0	0	0	0.00285347	0.00284460
2-Methylhexane		0	0	4.28892E-06	0.0855133	0	0.0849685		0	0.0855191	1.04364E-07	0	0	0	0	0.0855140	0.0854042
3-Methylhexane		3.52570E-07	0	3.48850E-06	0.0700303	0	0.0696055		0	0.0700329	8.86295E-08	0	0	0	2.08240E-06	0.0700309	0.0699452
Heptane		2.10674E-07	0	5.84842E-06	0.141126	0	0.140447		0	0.141132	1.49396E-07	0	0	0	2.26303E-06	0.141127	0.140990
Methylcyclohexane		0	0	2.44965E-05	0.102610	0	0.102112		0	0.102635	3.35930E-06	0	0	0	0	0.102611	0.102510
Toluene		0	0	0.000304158	0.0248685	0	0.0247710		0	0.0251730	0.000276251	0	0	0	0	0.0248718	0.0248490
Octane		0	0	3.49965E-06	0.455271	0	0.454582		0	0.455276	5.95116E-08	0	0	0	0	0.455272	0.455134
Ethylbenzene		0	0	0.000146937	0.0399165	0	0.0398647		0	0.0400636	0.000132176	0	0	0	0	0.0399176	0.0399062
m-Xylene		0	0	0.000116711	0.0371254	0	0.0370850		0	0.0372422	0.000105347	0	0	0	0	0.0371267	0.0371174
o-Xylene		0	0	0.000241125	0.0637726	0	0.0637108		0	0.0640139	0.000223307	0	0	0	0	0.0637757	0.0637604
Nonane		0	0	1.38996E-06	0.351824	0	0.351650		0	0.351826	3.72168E-08	0	0	0	0	0.351824	0.351790
C10+		0	0	5.22215E-07	0.755815	0	0.755760		0	0.755816	1.63543E-08	0	0	0	0	0.755815	0.755804
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		99.9744	99.9652	99.9654	0.00896049	0.00133205	0.00133205		100	0	99.9940	99.9940	9.89902E-07	99.9999	99.9652	0.00860270	0.00514772
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0

Nitrogen		0.000128829	0.000147647	0.000174405	0.00370711	7.77756E-06	7.77756E-06		0	0.00456213	7.51491E-06	7.51491E-06	5.39665E-07	4.26761E-09	0.000147647	0.00379993	0.000320322
Carbon Dioxide		0.00135521	0.00243020	0.00248894	0.0149303	0.00182021	0.00182021		0	0.0160208	0.0016009	0.0016009	0.0031929	6.23115E-05	0.00243020	0.0148918	0.00797794
Methane		0.0166299	0.0198036	0.0190798	0.644685	0.0112641	0.0112641		0	0.656377	0.00161580	0.00161580	0.00426208	2.55739E-06	0.0198036	0.650916	0.151565
Ethane		0.00499278	0.00709848	0.00684962	1.28837	0.295728	0.295728		0	1.29163	0.000666674	0.000666674	0.623147	9.79247E-07	0.00709848	1.29140	0.864432
Propane		0.00166375	0.00391497	0.00298318	1.88840	1.13149	1.13149		0	1.87598	0.000317564	0.000317564	2.01833	1.14225E-07	0.00391497	1.88930	1.68849
Isobutane		9.79279E-05	0.000184223	0.000170804	0.823395	0.672651	0.672651		0	0.823499	6.79825E-06	6.79825E-06	1.09383	3.07446E-10	0.000184223	0.823550	0.793502
n-Butane		0.000488077	0.000792641	0.000636137	2.03219	1.77737	1.77737		0	2.03007	5.32112E-05	5.32112E-05	2.83574	3.62410E-09	0.000792641	2.03245	1.98856
Isopentane		8.20356E-05	0.000175793	0.000154324	1.85972	1.79964	1.79964		0	1.85923	9.08616E-06	9.08616E-06	2.71888	1.55853E-10	0.000175793	1.85966	1.85964
n-Pentane		0.000104793	0.000173902	0.000115084	1.91570	1.88537	1.88537		0	1.91453	6.71285E-06	6.71285E-06	2.80924	8.39706E-11	0.000173902	1.91562	1.92242
2-Methylpentane		1.41287E-05	2.08974E-05	1.73374E-05	1.51274	1.53327	1.53327		0	1.51238	4.96731E-07	4.96731E-07	2.22407	1.19036E-12	2.08974E-05	1.51260	1.52729
3-Methylpentane		1.56098E-05	2.93159E-05	3.10666E-05	1.09733	1.11465	1.11465		0	1.09714	2.30196E-06	2.30196E-06	1.61039	1.33751E-11	2.93159E-05	1.09723	1.10838
n-Hexane		1.23897E-05	1.93230E-05	2.22950E-05	3.41427	3.48100	3.48100		0	3.41359	5.10936E-07	5.10936E-07	0.341735	4.74741E-14	1.93230E-05	3.41393	3.45123
Methylcyclopentane		7.92706E-06	3.26227E-05	4.86011E-05	0.696471	0.710506	0.710506		0	0.696578	9.41466E-06	9.41466E-06	0.947871	1.17492E-10	3.26227E-05	0.696400	0.704098
Benzene		0	0	0.000232859	0.0681121	0.0694997	0.0694997		0	0.0718358	0.000214975	0.000214975	0.00569124	8.23038E-09	0	0.0681212	0.0688606
2-Methylhexane		0	0	8.18016E-06	2.61911	2.69345	2.69345		0	2.61863	1.99110E-07	1.99110E-07	0.244781	7.85406E-15	0	2.61882	2.65209
3-Methylhexane		1.04296E-06	3.97169E-06	6.65354E-06	2.14490	2.20645	2.20645		0	2.14443	1.69091E-07	1.69091E-07	3.01761	9.99460E-14	3.97169E-06	2.14466	2.17203
Heptane		6.23208E-07	4.31620E-06	1.11546E-05	4.32243	4.45207	4.45207		0	4.32150	2.85024E-07	2.85024E-07	5.59222	1.23850E-13	4.31620E-06	4.32193	4.37821
Methylcyclohexane		0	0	4.57817E-05	3.07951	3.17177	3.17177		0	3.07951	6.28008E-06	6.28008E-06	4.02317	1.68110E-11	0	3.07917	3.11924
Toluene		0	0	0.000533431	0.700382	0.722036	0.722036		0	0.708776	0.000484630	0.000484630	0.125633	8.96925E-09	0	0.700390	0.709549
Octane		0	0	7.60915E-06	15.8960	16.4272	16.4272		0	15.8922	1.29432E-07	1.29432E-07	19.3498	1.10092E-14	0	15.8942	16.1119
Ethylbenzene		0	0	0.000296927	1.29532	1.33889	1.33889		0	1.29977	0.000267177	0.000267177	0.435139	2.79562E-09	0	1.29520	1.31297
m-Xylene		0	0	0.000235847	1.20475	1.24553	1.24553		0	1.20823	0.000212946	0.000212946	0.521042	2.48913E-09	0	1.20465	1.22121
o-Xylene		0	0	0.000487260	2.06947	2.13978	2.13978		0	2.07678	0.000451387	0.000451387	0.773881	5.51543E-09	0	2.06932	2.09780
Nonane		0	0	3.39324E-06	13.7925	14.2679	14.2679		0	13.7891	9.08823E-08	9.08823E-08	15.2824	3.65904E-15	0	13.7909	13.9827
C10+		0	0	1.53200E-06	35.6066	36.8494	36.8494		0	35.5976	4.79921E-08	4.79921E-08	33.3980	2.91526E-16	0	35.6023	36.1005
Mass Flow		**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**
Water		3386.44	0	5251.84	0.0293149	0	0.00421063		5413.12	0	5251.80	0	0	0	5251.87	0.0281477	0.0166105
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.00436384	0	0.00916264	0.0121281	0	2.45849E-05		0	0.0149291	0.000394692	0	0	0	0.00775695	0.0124332	0.00103361
Carbon Dioxide		0.0459051	0	0.130761	0.0488457	0	0.00575369		0	0.0524262	0.0850892	0	0	0	0.127675	0.0487255	0.0257429
Methane		0.563304	0	1.00239	2.10913	0	0.0356059		0	2.14793	0.0848639	0	0	0	1.04042	2.12977	0.489065
Ethane		0.169121	0	0.359856	4.21499	0	0.934797		0	4.22672	0.0350145	0	0	0	0.372933	4.22542	2.78932
Propane		0.0563563	0	0.156726	6.17803	0	3.57663		0	6.13896	0.0166788	0	0	0	0.205681	6.18172	5.44838
Isobutane		0.00331712	0	0.00897348	2.69379	0	2.12625		0	2.69482	0.000357052	0	0	0	0.00967854	2.69462	2.56045
n-Butane		0.0165327	0	0.0334205	6.64845	0	5.61827		0	6.64320	0.00279471	0	0	0	0.0416430	6.65010	6.41662
Isopentane		0.00277880	0	0.00810768	6.08419	0	5.68868		0	6.08415	0.000477216	0	0	0	0.00923562	6.08475	6.00062
n-Pentane		0.00354967	0	0.00604614	6.26735	0	5.95966		0	6.26509	0.000352567	0	0	0	0.00913630	6.26782	6.20320
2-Methylpentane		0.000478584	0	0.000910847	4.94902	0	4.84668		0	4.94911	2.60889E-05	0	0	0	0.00109789	4.94917	4.92820
3-Methylpentane		0.000528752	0	0.00163213	3.59000	0	3.52340		0	3.59027	0.000120901	0	0	0	0.00154017	3.59010	3.57647
n-Hexane		0.000419678	0	0.00117130	11.1700	0	11.0035		0	11.1706	2.68349E-05	0	0	0	0.00101517	11.1703	11.1363
Methylcyclopentane		0.000268514	0	0.00255334	2.27855	0	2.24591		0	2.27948	0.000494469	0	0	0	0.00171390	2.27859	2.27196
Benzene		0	0	0.0122336	0.222833	0	0.219689		0	0.235075	0.0112907	0	0	0	0	0.222890	0.222197
2-Methylhexane		0	0	0.000429758	8.56860	0	8.51401		0	8.56918	1.04575E-05	0	0	0	0	8.56867	8.55767
3-Methylhexane		3.53282E-05	0	0.000349554	7.01717	0	6.97461		0	7.01743	8.88085E-06	0	0	0	0.000208661	7.01723	7.00865
Heptane		2.11100E-05	0	0.000586023	14.1411	0	14.0730		0	14.1417	1.49698E-05	0	0	0	0.000226760	14.1412	14.1275
Methylcyclohexane		0	0	0.00240522	10.0748	0	10.0260		0	10.0774	0.000329837	0	0	0	0	10.0749	10.0650
Toluene		0	0	0.0280247	2.29135	0	2.28236		0	2.31940	0.0254533	0	0	0	0	2.29165	2.28955
Octane		0	0	0.000399759	52.0049	0	51.9263		0	52.0055	6.79792E-06	0	0	0	0	52.0050	51.9892
Ethylbenzene		0	0	0.0155995	4.23773	0	4.23223		0	4.25335	0.0140324	0	0	0	0	4.23785	4.23664
m-Xylene		0	0	0.0123906	3.94141	0	3.93713		0	3.95382	0.0111841	0	0	0	0	3.94155	3.94056
o-Xylene		0	0	0.0255990	6.77042	0	6.76386		0	6.79604	0.0237074	0	0	0	0	6.77075	6.76912
Nonane		0	0	0.000178269	45.1232	0	45.1009		0	45.1235	4.77324E-06	0	0	0	0	45.1232	45.1188
C10+		0	0	8.04859E-05	116.489	0	116.481		0	116.490	2.52060E-06	0	0	0	0	116.489	116.488

Process Streams		Well Stream	HP Separator Gas	HP Separator Water	HP Separator Oil	OT Flash Gas	Sales Oil	Gas	Water	Oil	Produced Water	PWT Flash Gas	Oil W/B	Water W/B	1	3	LP Separator Oil
Phase: Light Liquid	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	Units																
Temperature	°F	160.3	64.0	70.0	70.0	75.9	75.9		200.0	200.0	75.9	75.94	75.9425	75.9425	64	68.4377	70
Pressure	psig	200	149	149	149	0	0		200	300	0	0	7.60758	-14.2240	149	149	40
Mole Fraction Vapor	%	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Mole Fraction Light Liquid	%	100	100	100	100	100	100		100	100	100	100	100	100	100	100	100
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Molecular Weight	lb/lbmol	18.0	18.0	18.0	104.4	113.4	113.4		18.0	104.4	18.0	18.0158	108.330	18.0153	18.0162	104.365	109.126
Mass Density	lb/ft^3	61.0	62.3	62.3	44.5	44.9	44.9		60.2	40.4	62.2	62.2171	44.2007	62.2179	62.3166	44.5610	44.8221
Molar Flow	lbmol/h	188.0	0.0	291.6	3.1	0.0	2.8		300.5	3.1	291.5	0	0	0	291.609	3.13510	2.95692

Mass Flow	lb/h	3387.3	0.0	5253.7	327.2	0.0	316.1		5413.1	327.2	5252.1	0	0	0	5253.70	327.196	322.677
Vapor Volumetric Flow	MCFH	0.1	0.0	0.1	0.0	0.0	0.0		0.1	0.0	0.1	0	0	0	0.0843066	0.00734265	0.00719905
Liquid Volumetric Flow	Mbbl/d	0.2	0.0	0.4	0.0	0.0	0.0		0.4	0.0	0.4	0	0	0	0.360376	0.0313868	0.0307729
Std Vapor Volumetric Flow	MMSCFD	1.7	0.0	2.7	0.0	0.0	0.0		2.7	0.0	2.7	0	0	0	2.65587	0.0285533	0.0269305
Std Liquid Volumetric Flow	Mbbl/d	0.2	0.0	0.4	0.0	0.0	0.0		0.4	0.0	0.4	0	0	0	0.360319	0.0318088	0.0309803
Compressibility		0.010	0.008	0.008	0.068	0.006	0.006		0.009	0.115	0.001	0.000740333	0.00950991	2.37721E-05	0.00842125	0.0676477	0.0234273
Specific Gravity		0.978	0.999	0.998	0.714	0.720	0.720		0.964	0.648	0.998	0.997565	0.708696	0.997577	0.999159	0.714474	0.718660
API Gravity		10.0	10.0	10.0	65.4	62.9	62.9		10.0	65.1	10.0	10.0152	66.0342	10.0135	10.0425	65.4107	64.0944
Enthalpy	MMBtu/h	-22.8	0.0	-35.9	-0.3	0.0	-0.3		-36.3	-0.3	-35.8	0	0	0	-35.8947	-0.282303	-0.274971
Mass Enthalpy	Btu/lb	-6737.9	-6832.3	-6826.4	-862.0	-840.7	-840.7		-6699.9	-792.0	-6822.3	-6822.34	-883.788	-6822.66	-6832.27	-862.794	-852.157
Mass Cp	Btu/(lb*°F)	1.0	1.0	1.0	0.5	0.5	0.5		1.0	0.6	1.0	0.982731	0.493596	0.982746	0.983601	0.488020	0.486245
Ideal Gas CpCv Ratio		1.322	1.326	1.326	1.053	1.049	1.049		1.320	1.044	1.326	1.32555	1.05039	1.32556	1.32610	1.05341	1.05097
Dynamic Viscosity	cP	0.4	1.1	1.0	0.5	0.5	0.5		0.3	0.2	0.9	0.924430	0.486891	0.924434	1.07544	0.481069	0.518712
Kinematic Viscosity	cSt	0.4	1.1	1.0	0.7	0.7	0.7		0.3	0.4	0.9	0.927563	0.687673	0.927556	1.07736	0.673955	0.722458
Thermal Conductivity	Btu/(h*ft*°F)	0.4	0.3	0.3	0.1	0.1	0.1		0.4	0.1	0.3	0.349778	0.0687294	0.349835	0.343789	0.0690670	0.0693035
Surface Tension	lbf/ft	0.004	0.005	0.005	0.001	0.002	0.002		0.004	0.001	0.005	0.00499710	0.00144272	0.00499737	0.00508642	0.00140062	0.00147900
Net I.G. Heating Value	Btu/ft^3	0.2	0.3	0.3	5258.5	5699.0	5699.0		0.0	5257.8	0.0	0.0405299	5468.27	3.69701E-05	0.321492	5256.30	5490.88
Net Liquid Heating Value	Btu/lb	-1054.4	-1052.6	-1052.8	18937.5	18901.0	18901.0		-1059.8	18938.7	-1058.8	-1058.85	18986.2	-1059.76	-1052.64	18937.7	18918.7
Gross I.G. Heating Value	Btu/ft^3	50.6	50.6	50.6	5650.3	6119.9	6119.9		50.3	5649.5	50.4	50.3523	5879.94	50.3100	50.6497	5647.94	5898.12
Gross Liquid Heating Value	Btu/lb	5.6	7.4	7.3	20359.9	20308.4	20308.4		0.0	20361.1	0.9	0.920040	20427.2	0.000812204	7.44791	20360.3	20333.4

Process Streams		Well Stream	HP Separator Gas	HP Separator Water	HP Separator Oil	OT Flash Gas	Sales Oil	Gas	Water	Oil	Produced Water	PWT Flash Gas	Oil W/B	Water W/B	1	3	LP Separator Oil
Phase: Heavy Liquid	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water					99.9714											99.9711	
H2S					0											0	
Nitrogen					0.000112166											0.000115972	
Carbon Dioxide					0.00101891											0.00102163	
Methane					0.0214274											0.0217288	
Ethane					0.00410407											0.00411542	
Propane					0.00121885											0.00122590	
Isobutane					5.29449E-05											5.28171E-05	
n-Butane					0.000197186											0.000195680	
Isopentane					3.85365E-05											3.83183E-05	
n-Pentane					2.87378E-05											2.83807E-05	
2-Methylpentane					3.62466E-06											3.55964E-06	
3-Methylpentane					6.49498E-06											6.40406E-06	
n-Hexane					4.66113E-06											4.57509E-06	
Methylcyclopentane					1.04042E-05											1.04068E-05	
Benzene					5.37085E-05											5.34768E-05	
2-Methylhexane					1.47080E-06											1.46617E-06	
3-Methylhexane					1.19631E-06											1.19151E-06	
Heptane					2.00560E-06											2.02075E-06	
Methylcyclohexane					8.40059E-06											8.30449E-06	
Toluene					0.000104305											0.000103229	
Octane					1.20013E-06											1.17408E-06	
Ethylbenzene					5.03890E-05											5.00434E-05	
m-Xylene					4.00236E-05											3.95942E-05	
o-Xylene					8.26888E-05											8.16688E-05	
Nonane					4.76658E-07											4.66219E-07	
C10+					1.79083E-07											1.75045E-07	
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water					0											291.522	
H2S					0											0	
Nitrogen					0											0.000338181	
Carbon Dioxide					0											0.00297913	
Methane					0											0.0633623	
Ethane					0											0.0120008	
Propane					0											0.00357479	
Isobutane					0											0.000154018	
n-Butane					0											0.000570614	
Isopentane					0											0.000111738	
n-Pentane					0											8.27597E-05	
2-Methylpentane					0											1.03801E-05	
3-Methylpentane					0											1.86746E-05	

n-Hexane					0											1.33412E-05	
Methylcyclopentane					0											3.03470E-05	
Benzene					0											0.000155942	
2-Methylhexane					0											4.27544E-06	
3-Methylhexane					0											3.47451E-06	
Heptane					0											5.89263E-06	
Methylcyclohexane					0											2.42164E-05	
Toluene					0											0.000301022	
Octane					0											3.42368E-06	
Ethylbenzene					0											0.000145929	
m-Xylene					0											0.000115459	
o-Xylene					0											0.000238151	
Nonane					0											1.35952E-06	
C10+					0											5.10442E-07	
Mass Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water					99.9654											99.9651	
H2S					0											0	
Nitrogen					0.000174405											0.000180323	
Carbon Dioxide					0.00248894											0.00249558	
Methane					0.0190798											0.0193481	
Ethane					0.00684962											0.00686857	
Propane					0.00298318											0.00300043	
Isobutane					0.000170804											0.000170392	
n-Butane					0.000636137											0.000631279	
Isopentane					0.000154324											0.000153450	
n-Pentane					0.000115084											0.000113654	
2-Methylpentane					1.73374E-05											1.70264E-05	
3-Methylpentane					3.10666E-05											3.06317E-05	
n-Hexane					2.22950E-05											2.18835E-05	
Methylcyclopentane					4.86011E-05											4.86133E-05	
Benzene					0.000232859											0.000231854	
2-Methylhexane					8.18016E-06											8.15443E-06	
3-Methylhexane					6.65354E-06											6.62684E-06	
Heptane					1.11546E-05											1.12388E-05	
Methylcyclohexane					4.57817E-05											4.52580E-05	
Toluene					0.000533431											0.000527929	
Octane					7.60915E-06											7.44397E-06	
Ethylbenzene					0.000296927											0.000294891	
m-Xylene					0.000235847											0.000233317	
o-Xylene					0.000487260											0.000481249	
Nonane					3.39324E-06											3.31893E-06	
C10+					1.53200E-06											1.49745E-06	
Mass Flow		**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**
Water					0											5251.84	
H2S					0											0	
Nitrogen					0											0.00947360	
Carbon Dioxide					0											0.131110	
Methane					0											1.01649	
Ethane					0											0.360853	
Propane					0											0.157633	
Isobutane					0											0.00895185	
n-Butane					0											0.0331654	
Isopentane					0											0.00806178	
n-Pentane					0											0.00597101	
2-Methylpentane					0											0.000894510	
3-Methylpentane					0											0.00160929	
n-Hexane					0											0.00114969	
Methylcyclopentane					0											0.00255399	
Benzene					0											0.0121809	
2-Methylhexane					0											0.000428408	
3-Methylhexane					0											0.000348153	
Heptane					0											0.000590453	
Methylcyclohexane					0											0.00237771	
Toluene					0											0.0277357	
Octane					0											0.000391082	

Ethylbenzene					0											0.0154926	
m-Xylene					0											0.0122577	
o-Xylene					0											0.0252833	
Nonane					0											0.000174366	
C10+					0											7.86714E-05	

Process Streams		Well Stream	HP Separator Gas	HP Separator Water	HP Separator Oil	OT Flash Gas	Sales Oil	Gas	Water	Oil	Produced Water	PWT Flash Gas	Oil W/B	Water W/B	1	3	LP Separator Oil
Phase: Heavy Liquid	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	Units																
Temperature	°F				70.0											68.4377	
Pressure	psig				149											149	
Mole Fraction Vapor	%				0											0	
Mole Fraction Light Liquid	%				0											0	
Mole Fraction Heavy Liquid	%				100											100	
Molecular Weight	lb/lbmol				18.0											18.0164	
Mass Density	lb/ft^3				62.3											62.2779	
Molar Flow	lbmol/h				0.0											291.606	
Mass Flow	lb/h				0.0											5253.68	
Vapor Volumetric Flow	MCFH				0.0											0.0843586	
Liquid Volumetric Flow	Mbbl/d				0.0											0.360598	
Std Vapor Volumetric Flow	MMSCFD				0.0											2.65584	
Std Liquid Volumetric Flow	Mbbl/d				0.0											0.360309	
Compressibility					0.008											0.00835573	
Specific Gravity					0.998											0.998539	
API Gravity					10.0											10.0405	
Enthalpy	MMBtu/h				0.0											-35.8715	
Mass Enthalpy	Btu/lb				-6826.4											-6827.87	
Mass Cp	Btu/(lb*°F)				1.0											0.983201	
Ideal Gas CpCv Ratio					1.326											1.32589	
Dynamic Viscosity	cP				1.0											1.01548	
Kinematic Viscosity	cSt				1.0											1.01793	
Thermal Conductivity	Btu/(h*ft*°F)				0.3											0.345907	
Surface Tension	lbf/ft				0.005											0.00505245	
Net I.G. Heating Value	Btu/ft^3				0.3											0.319217	
Net Liquid Heating Value	Btu/lb				-1052.8											-1052.69	
Gross I.G. Heating Value	Btu/ft^3				50.6											50.6469	
Gross Liquid Heating Value	Btu/lb				7.3											7.4	

June 7, 2013

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

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

Date Sampled: 05/17/2013

Date Analyzed: 06/03/2013

Job Number: J33542

Sample: Tom's Fork No. 1H

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

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

Piston No. : WF-305*

Base Conditions: 14.65 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

David Dannhaus 361-661-7015

June 6, 2013

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

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

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

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

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT

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

Computed Real Characteristics Of Heptanes Plus:

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

Computed Real Characteristics Of Total Sample:

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

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

Base Conditions: 14.650 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

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

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT

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

Computed Real Characteristics Of Total Sample:

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

May 30, 2013

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

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

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

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

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

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

Characteristics of Heptanes Plus:

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

Characteristics of Total Sample:

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

Base Conditions: 14.650 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

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

David Dannhaus 361-661-7015

TOTAL EXTENDED REPORT

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

Antero Resources
Ruddy Alt Pad Hinterer Unit 1 H Well

Tag Name	Value	Units	Timestamp
Accumulated Gas Flow	56360.79	MCF	10/7/2013 09:34:34
Casing Pressure	0	PSIA	9/24/2013 08:32:54
Current Day Gas Flow	13854.17	MCF	10/7/2013 09:34:34
Differential Pressure	71.1	inH2O	10/7/2013 09:34:34
Flow Rate	14414.89	MCF Per Day	10/7/2013 09:34:34
Pressure	325.89	PSIA	10/7/2013 09:34:34
Previous Day Energy	12322.33	MBTU	10/7/2013 09:34:35
Previous Day Gas Flow	9881.1	MCF	10/7/2013 09:34:35
Temperature	48.99	F	10/7/2013 09:34:34
Tubing Pressure	0	PSIA	9/24/2013 08:32:54
Daily AP	54.98	PSIA	10/6/2013 10:00:00
Daily DP	204.1	inH2O	10/6/2013 10:00:00
Daily Energy	12322.33	MBTU	10/6/2013 10:00:00
Daily Flow	9881.11	MCF	10/6/2013 10:00:00
Daily Tf	40.3	F	10/6/2013 10:00:00
Hourly AP	316.55	PSIA	10/7/2013 09:00:00
Hourly DP	73.48	Inches	10/7/2013 09:00:00
Hourly Energy	750	MBTU	10/7/2013 09:00:00
Hourly Flow Time	3600	Seconds	10/7/2013 09:00:00
Hourly Tf	48.2	F	10/7/2013 09:00:00
Hourly Volume	601.4	MCF	10/7/2013 09:00:00
Audited Accumulated Gas Volume		MCF	
Audited Casing Pressure		PSI	
Audited Gas Volume		MCF	
Audited Oil Volume		Barrels	
Audited Tubing Pressure		PSI	
Audited Water Volume		Barrels	
Argon	0	%	10/7/2013 09:34:39
BTU	1247.06	BTU	10/7/2013 09:34:34
C02	0.1467	%	10/7/2013 09:34:39
Carbon Monoxide	0	%	10/7/2013 09:34:39
Decane	0	%	10/7/2013 09:34:39
Ethane	14.1987	%	10/7/2013 09:34:39
Helium	0	%	10/7/2013 09:34:39
Heptane	0	%	10/7/2013 09:34:39
Hexane	0.5451	%	10/7/2013 09:34:39
Hydrogen	0	%	10/7/2013 09:34:39
Hydrogen Sulfide	0	%	10/7/2013 09:34:39
Iso-Butane	0.5666	%	10/7/2013 09:34:39
Iso-Pentane	0.3749	%	10/7/2013 09:34:39
Methane	77.6927	%	10/7/2013 09:34:39
N2	0.4946	%	10/7/2013 09:34:39
N-Butane	1.1838	%	10/7/2013 09:34:39
Nonane	0	%	10/7/2013 09:34:39
N-Pentane	0.2914	%	10/7/2013 09:34:39
Octane	0	%	10/7/2013 09:34:39
Oxygen	0.0117	%	10/7/2013 09:34:39
Plate Size	3.75	Inches	10/7/2013 09:34:37
Propane	4.4938	%	10/7/2013 09:34:39
SPG	0.7248		10/7/2013 09:34:34
Water	0	%	10/7/2013 09:34:39

Attachment T
Facility-wide Emissions Summary Sheet(s)

ATTACHMENT T – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

Emission Point ID#	NOx		CO		VOC		SO2		PM10		PM2 . 5		GHG (CO2e)		Formaldehyde	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
HR001									0.0927	0.0197						
PCV					0.0268	0.1174							2.5291	11.0773		
F001					1.1085	4.8553							25.3504	111.0349		
GPU001, GPU002, GPU003	0.3208	1.4049	0.2694	1.1801	0.0176	0.0773	0.0019	0.0084	0.0244	0.1068	0.0244	0.1068	384.9053	1685.8852	0.0002	0.0011
L001					7.7704	0.1773							4.8833	0.1114		
L002					0.0014	0.0004							0.9872	0.2702		
EC001	0.0114	0.0500	0.0096	0.0420	0.1405	0.6154	0.0000	0.0000	0.0009	0.0038	0.0007	0.0029	32.7449	143.4226	0.0000	0.0000
TOTAL	0.3322	1.4549	0.2790	1.2221	0.1581	0.6927	0.0019	0.0085	0.0252	0.1106	0.0250	0.1096	417.6502	1829.3078	0.0002	0.0011

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 T – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

Emission Point ID#	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
HR001												
PCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0021	0.0005	0.0021
F001	0.0006	0.0027	0.0061	0.0266	0.0112	0.0489	0.0282	0.1235	0.0341	0.1493	0.0801	0.3510
GPU001, GPU002, GPU003	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0058	0.0253	0.0060	0.0264
L001	0.0002	0.0000	0.0015	0.0000	0.0017	0.0000	0.0041	0.0001	0.0154	0.0004	0.0230	0.0005
L002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EC001	0.0001	0.0003	0.0002	0.0009	0.0001	0.0006	0.0003	0.0012	0.0028	0.0123	0.0035	0.0152
TOTAL	0.0001	0.0003	0.0002	0.0009	0.0001	0.0006	0.0003	0.0012	0.0086	0.0376	0.0095	0.0417

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
Class I Legal Advertisement

Attachment U

Air Quality Permit Notice
Notice of Application
Ruddy Alt
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-B General Permit Modification for an Oil and Natural Gas Production facility located at 596 Brushy Fork Rd. New Milton, WV 26411, near New Milton in Doddridge County, West Virginia.

The latitude and longitude coordinates are: 39.156706 degrees N and -80.695917 degrees W

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

Pollutants	TOTALS (tpy):
NO_X	1.4549
CO	1.2221
$PM_{2.5}$	0.1096
PM_{10}	0.1106
VOC	0.6927
SO_2	0.0085
Formaldehyde	0.0011
Benzene	0.0003
Toluene	0.0009
Ethylbenzene	0.0006
Xylenes	0.0012
Hexane	0.0376
Total HAPs	0.0417

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

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.
Dated this the __ day of _____, 2016

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