July 29, 2015 Reference No. 082715

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

Dear Mr. Jay Fedczak:

Re: General Permit Registration G70-A Modification Application
Robert Williams Well Pad
Antero Resources Corporation

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

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

1. Increase in condensate production
2. Addition of 2 wells
3. Addition of 2 gas production units and 10 line heaters
4. Addition of 3 Cimarron enclosed combustors

Please refer to Table 14 in Attachment I - Emissions Calculations for the summary of changes in emissions of regulated air pollutants that will result from the above operational changes.

Enclosed are the following documents:

- Original copy of the G70-A General Permit Modification Application
- Two CD copies of the G70-A General Permit Modification Application
- The application fee with check no. 421633 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 Services Inc.

Manuel Bautista

MB/ma/210

Encl.

cc: Barry Schatz, Antero Resources Corporation

General Permit Application G70-A Modification

Increase in production, and the addition of 2 wells, 2 condensate tanks, 2 gas production unit heaters, 10 line heaters, and 3 Cimarron enclosed combustors.

Robert Williams Well Pad

Antero Resources Corporation

6320 Rothway, Suite 100 Houston Texas 77040

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Table of Contents *

G70-A General Permit Modification

Attachment A	Current Business Certificate - No changes
Attachment B	Process Description
Attachment C	Description of Fugitive Emissions
Attachment D	Process Flow Diagram
Attachment E	Plot Plan
Attachment F	Area Map - No changes
Attachment G	Emission Unit Data Sheets/G70-A Section Applicability Form
Attachment H	Air Pollution Control Device Data Sheet
Attachment I	Emission Calculations
Attachment J	Class I Legal Advertisement
Attachment K	Electronic Submittal - Not Applicable
Attachment L	General Permit Modification Application Fee
Attachment M	Siting Criteria Waiver - Not Applicable
Attachment N	Material Safety Data Sheets - No changes
Attachment O	Emissions Summary Sheet
Attachment P	Other Supporting Documentation Not Described Above - No changes

* Note: Attachments which have no changes from previous permit application or not applicable were not included in this submittal. The Attachment letter identifiers consistent with the G70-A application were maintained for easier identification/reference.

WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street, SE
Charleston, WV 25304
Phone: (304) 926-0475 • *www.dep.wv.gov/daq*

APPLICATION FOR GENERAL PERMIT REGISTRATION

CONSTRUCT, MODIFY, RELOCATE OR ADMINISTRATIVELY UPDATE

A STATIONARY SOURCE OF AIR POLLUTANTS

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

CHECK WHICH TYPE OF GENERAL PERMIT REGISTRATION YOU ARE APPLYING FOR:

☐ **G10-D –** Coal Preparation and Handling
☐ **G20-B –** Hot Mix Asphalt
☐ **G30-D –** Natural Gas Compressor Stations
☐ **G33-A –** Spark Ignition Internal Combustion Engines
☐ **G35-A –** Natural Gas Compressor Stations (Flare/Glycol Dehydration Unit)
☐ **G40-C –** Nonmetallic Minerals Processing
☐ **G50-B –** Concrete Batch
☐ **G60-C –** Class II Emergency Generator
☐ **G65-C –** Class I Emergency Generator
☒ **G70-A –** Class II Oil and Natural Gas Production Facility

SECTION I. GENERAL INFORMATION

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

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

3. Applicant's mailing address:
1615 Wynkoop Street
Denver, CO, 80202

4. Applicant's physical address:
20 Cabin Run Rd West Union, WV 26456

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

6. **WV BUSINESS REGISTRATION.** Is the applicant a resident of the State of West Virginia? ☐ **YES** ☒ **NO**

- IF **YES,** provide a copy of the Certificate of **Incorporation/ Organization / Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A**.
- IF **NO,** provide a copy of the **Certificate of Authority / Authority of LLC / Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A**.

SECTION II. FACILITY INFORMATION

7. Type of plant or facility (stationary source) to be constructed, modified, relocated or administratively updated (e.g., coal preparation plant, primary crusher, etc.):
Natural Gas and Oil Production facility

8a. Standard Industrial Classification (SIC) code: 1311

AND

8b. North American Industry System (NAICS) code: 211111

9. DAQ Plant ID No. (for existing facilities only):
017-00099

10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only):
G70-A043

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site:	12A. Address of primary operating site:
Robert Williams Well Pad	Mailing: N/A Physical: 20 Cabin Run Rd West Union, WV 26456

13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☒ **YES** ☐ **NO**

- IF **YES**, please explain: Antero is leasing the mineral rights for this site
- IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14A.
- For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;
- For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

From Clarksburg, head west on US-50 for about 28.5 miles.
Turn left onto County Road 50/30/Old U.S 50 E and continue for 1.9 miles
Turn left onto Oxford Rd. and continue for 2.0 miles
Turn right onto Co Route 21/1 – Well Pad will be on the right.

15A. Nearest city or town:	16A. County:	17A. UTM Coordinates:
Greenwood, WV	Doddridge	Northing (KM): 4343.1612 Easting (KM): 511.8528 Zone: 17N

18A. Briefly describe the proposed new operation or change (s) to the facility:	19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Increase in production, and the addition of 2 wells, 2 condensate tanks, 2 gas production unit heaters, 10 line heaters, and 3 Cimarron enclosed combustors.	Latitude: 39.237675 Longitude: -80.862658

B: 1ST ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits)

11B. Name of 1st alternate operating site:	12B. Address of 1st alternate operating site:
	Mailing: Physical:

13B. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☐ **YES** ☐ **NO**

- IF **YES**, please explain:
- IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14B.
- For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;
- For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

15B. Nearest city or town:	16B. County:	17B. UTM Coordinates: Northing (KM): _____ Easting (KM): _____ Zone: _____
18B. Briefly describe the proposed new operation or change (s) to the facility:		19B. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: _____ Longitude: _____

C: 2ND ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits):

11C. Name of 2nd alternate operating site: _____ _____	12C. Address of 2nd alternate operating site: Mailing:_____ Physical:_____ _____

13C. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☐ **YES** ☐ **NO**

- IF **YES**, please explain: _____
  _____
- IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14C.
- For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;
- For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

_____
_____
_____

15C. Nearest city or town:	16C. County:	17C. UTM Coordinates: Northing (KM): _____ Easting (KM): _____ Zone: _____
18C. Briefly describe the proposed new operation or change (s) to the facility:		19C. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: _____ Longitude: _____

20. Provide the date of anticipated installation or change: Upon issuance of the permit ☐ If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: : _____/_____/_____	21. Date of anticipated Start-up if registration is granted: Upon issuance of the permit

22. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application if other than 8760 hours/year. (Note: anything other than 24/7/52 may result in a restriction to the facility's operation).

Hours per day_____ Days per week _____ Weeks per year _____ Percentage of operation _____

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

23. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

24. Include a **Table of Contents** as the first page of your application package.

All of the required forms and additional information can be found under the Permitting Section (General Permits) of DAQ's website, or requested by phone.

25. Please check all attachments included with this permit application. Please refer to the appropriate reference document for an explanation of the attachments listed below.

- ☐ ATTACHMENT A : CURRENT BUSINESS CERTIFICATE
- ☒ ATTACHMENT B: PROCESS DESCRIPTION
- ☒ ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS
- ☒ ATTACHMENT D: PROCESS FLOW DIAGRAM
- ☒ ATTACHMENT E: PLOT PLAN
- ☐ ATTACHMENT F: AREA MAP
- ☒ ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM
- ☒ ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS
- ☒ ATTACHMENT I: EMISSIONS CALCULATIONS
- ☒ ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT
- ☐ ATTACHMENT K: ELECTRONIC SUBMITTAL
- ☒ ATTACHMENT L: GENERAL PERMIT REGISTRATION APPLICATION FEE
- ☐ ATTACHMENT M: SITING CRITERIA WAIVER
- ☐ ATTACHMENT N: MATERIAL SAFETY DATA SHEETS (MSDS)
- ☒ ATTACHMENT O: EMISSIONS SUMMARY SHEETS
- ☐ OTHER SUPPORTING DOCUMENTATION NOT DESCRIBED ABOVE (Equipment Drawings, Aggregation Discussion, etc.)

Please mail an original and two copies of the complete General Permit Registration Application with the signature(s) to the DAQ Permitting Section, at the address shown on the front page of this application. Please DO NOT fax permit applications. For questions regarding applications or West Virginia Air Pollution Rules and Regulations, please refer to the website shown on the front page of the application or call the phone number also provided on the front page of the application.

SECTION IV. CERTIFICATION OF INFORMATION

This General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of a Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, Emission Inventory, Certified Emission Statement, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. Any administratively incomplete or improperly signed or unsigned Registration Application will be returned to the applicant.

FOR A CORPORATION (domestic or foreign)

☐ I certify that I am a President, Vice President, Secretary, Treasurer or in charge of a principal business function of the corporation

FOR A PARTNERSHIP

☐ I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

☐ I certify that I am a General Partner or General Manager

FOR AN ASSOCIATION

☐ I certify that I am the President or a member of the Board of Directors

FOR A JOINT VENTURE

☐ I certify that I am the President, General Partner or General Manager

FOR A SOLE PROPRIETORSHIP

☐ I certify that I am the Owner and Proprietor

☐ *I hereby certify that* (please print or type) _____

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

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

Signature _____
(please use blue ink) Responsible Official Date

Name & Title Barry Schatz, Senior Environmental & Regulatory Manager
(please print or type)

Signature Barry Schatz 7-29-2015
(please use blue ink) Authorized Representative (if applicable) Date

Applicant's Name Antero Resources Corporation

Phone & Fax 303-357-7276 303-357-7315
Phone Fax

Email bschatz@anteroresources.com

Attachment R
AUTHORITY OF CORPORATION
OR OTHER BUSINESS ENTITY (DOMESTIC OR FOREIGN)

TO: The West Virginia Department of Environmental Protection, Division of Air Quality

DATE: January 23, 2015

ATTN.: Director

Corporation's / other business entity's Federal Employer I.D. Number 80-0162034

The undersigned hereby files with the West Virginia Department of Environmental Protection, Division of Air Quality, a permit application and hereby certifies that the said name is a trade name which is used in the conduct of an incorporated business or other business entity.

Further, the corporation or the business entity certifies as follows:

(1) Barry Schatz (is/are) the authorized representative(s) and in that capacity may represent the interest of the corporation or the business entity and may obligate and legally bind the corporation or the business entity.

(2) The corporation or the business entity is authorized to do business in the State of West Virginia.

(3) If the corporation or the business entity changes its authorized representative(s), the corporation or the business entity shall notify the Director of the West Virginia Department of Environmental Protection, Division of Air Quality, immediately upon such change.

President or Other Authorized Officer
(Vice President, Secretary, Treasurer or other official in charge of a principal business function of the corporation or the business entity)

(If not the President, then the corporation or the business entity must submit certified minutes or bylaws stating legal authority of other authorized officer to bind the corporation or the business entity).

Secretary

Name of Corporation or business entity

Attachment B
Process Description

Attachment B

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

A mixture of condensate, water, and entrained gas from the condensate and gas wells enters the facility through a series of line heaters (LH001-010) and gas production units (H001-H010) which are 3-phase separators where the gas, condensate, and produced water are separated. The line heaters and GPUs are fueled by a slip stream of the separated gas. The separated gas from the three phase separators is metered and sent to the sales gas pipeline. The separated water flow to the produced water storage tanks (TANKPW001-002). The separated condensate is then sent to two phase low pressure separators where gas is further separated from the condensate. The separated gas is routed to the compressor (ENG001), compressed, and sent to the sales gas line. The condensate from the two phase separators flow to the condensate storage tanks (TANKCOND001-010). The line heaters are only used during the first several months from start of production and will be removed once production has normalized.

The facility has ten (10) tanks (TANKCOND001-010) on site to store condensate and two (2) tanks (TANKPW001-002) to store produced water prior to removal from the site. The flashing, working and breathing losses from the tanks are routed to up to four enclosed combustors (EC001-004) to control the emissions. The enclosed combustor(s) that will be used to control emissions are designed to achieve a VOC destruction efficiency of 98 percent.

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

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

Robert Williams Well Pad calculation of potential to emit included all of the emission sources that belong to the same industrial grouping, are located on contiguous or adjacent properties, and are under the control of the same person. The nearest emission source that belongs to the same industrial grouping and under the control of the same person but not located on contiguous or adjacent property is the Primm Well Pad. This is approximately 0.6 miles northeast of the facility.

Attachment C
Description of Fugitive Emissions

Attachment C

Description of Fugitive Emissions
Robert Williams Well Pad
Antero Resources Corporation
Doddridge County, West Virginia

Sources of fugitive emissions include loading operations, haul road emissions, equipment leaks, and pneumatic control valves. Fugitive emissions were calculated using AP-42 factors. Routine equipment leaks are assumed to be occurring continuously throughout the year. Loading operations and haul road emissions only occur when tanker trucks are onsite. The fugitives emissions summary is also located in Attachment O.

Equipment Leaks

Equipment includes valves, flanges, and connectors installed in various process equipments such as gas production unit heaters, compressors, pipelines, and separators. Emissions are assumed to be occurring throughout the year. Detailed calculations are shown on Table 4.

Pneumatic Control Valves

Pneumatic control valves are part of the gas production unit heaters. These are intermittent low bleed valves and their emissions are assumed to be occurring throughout the year. Detailed calculations are shown on Table 5.

Loading Operations

Loading emissions occur when condensate and produced water are transferred out of the well site via tanker trucks. Fugitive emissions were estimated using AP-42 loading loss formula, L= 12.46*SPM/T, and Bryan & Engineering (BR&E) software known as Promax. Detailed calculations are shown in Table 8.

Haul Road Emissions

Haul road emissions are emitted when tanker trucks or service vehicles enter the Facility. The Facility is flat and unpaved. Detailed calculations are shown on Table 12.

Attachment C/O: G70-A Emissions Summary Sheet

Fugitive Emissions Data Summary Sheet

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	n/a					
Loading/Unloading Operations	VOCs	10.1380	11.5657	10.1380	11.5657	MB
	hexane (110543)	0.0237	0.0270	0.0237	0.0270	
	CO2 Equivalent CO2 (124389), CH4	3.3935	4.9429	3.3935	4.9429	
Equipment Leaks (Components)	Benzene (71432)	Does not apply	2.86E-02	Does not apply	2.86E-02	MB
	Toluene (108883)		0.0886		0.0886	
	Ethyl benzene (100414)		0.0700		0.0700	
	Hexane (110543)		1.1994		1.1994	
	o,m,p-xylenes (95476,108383,106423)		0.2154		0.2154	
	CO2 Equivalent CO2 (124389)), CH4		353.5737		353.5737	
	VOCs		16.6563		16.6563	
	TAPs (benzene)		2.86E-02		2.86E-02	
Equipment Leaks (PCVs)	hexane (110543)	1.36E-02	5.96E-02	1.36E-02	5.96E-02	MB
	CO2 Equivalent CO2 (124389)), CH4	9.0327	39.5633	9.0327	39.5633	
	VOCs	0.1145	0.5015	0.1145	0.5015	

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

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

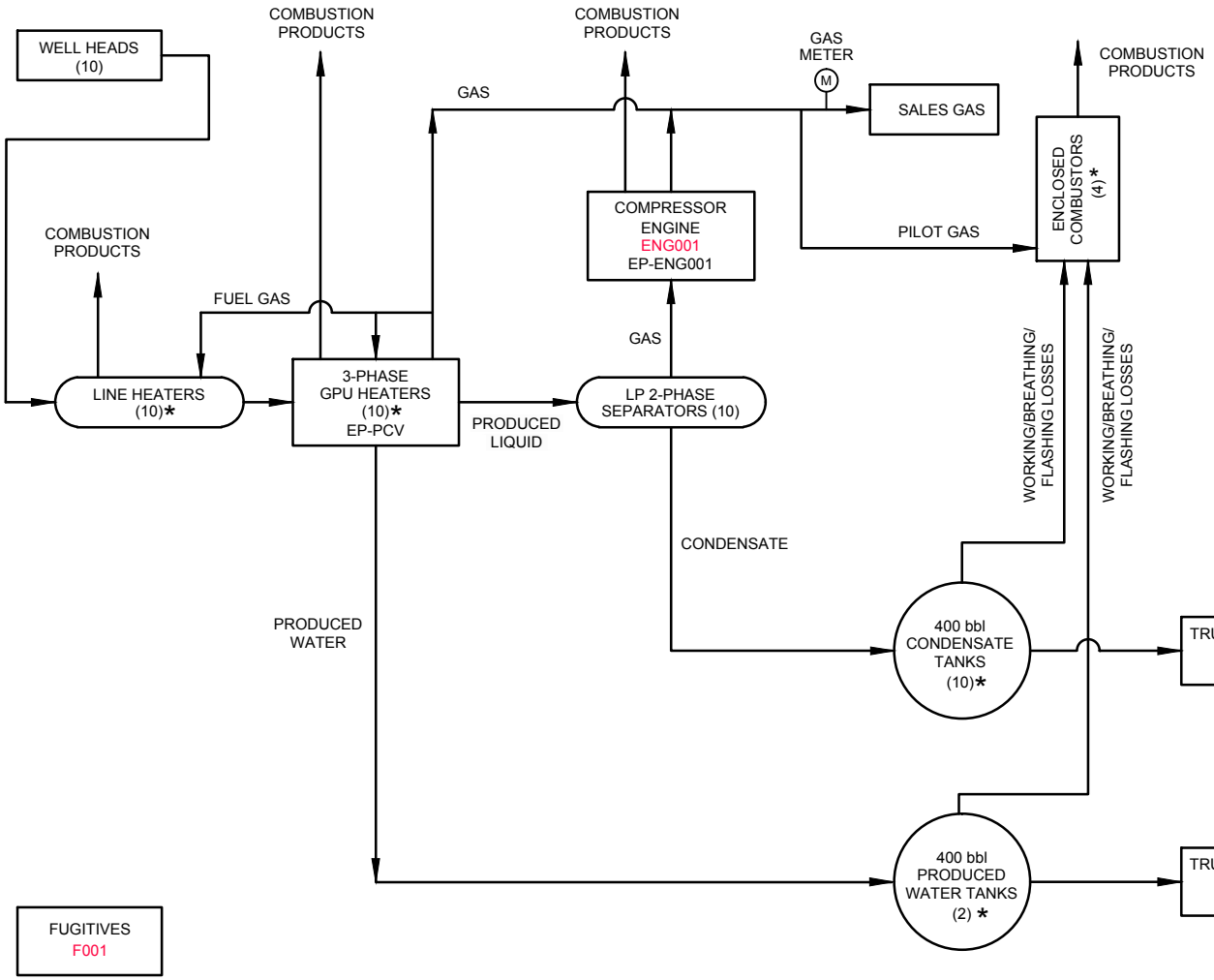
[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

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

Attachment C: Leak Source Data Sheet

Source Category	Pollutant	Number of Source Components (1)	Number of Components Monitored by Frequency (2)	Average Time to Repair (days) (3)	Estimated Annual Emission Rate (lb/yr) (4)
Pumps (5)	light liquid VOC [6,7]				
	heavy liquid VOC[8]				
	Non-VOC[9]				
Valves (10)	Gas VOC	500		First attempt within 5 days of detection and final repair within 15 days	8,280.76
	Light Liquid VOC	520		First attempt within 5 days of detection and final repair within 15 days	24,410.91
	Heavy Liquid VOC	--			--
	Non-VOC	--			--
Safety Relief Valves (11)	Gas VOC	See Valves		First attempt within 5 days of detection and final repair within 15 days	see Valves
	Non VOC	See Valves		First attempt within 5 days of detection and final repair within 15 days	see Valves
Open-ended Lines (12)	VOC				
	Non-VOC				
Sampling Connections (13)	VOC				
	Non-VOC				
Compressors	VOC				
	Non-VOC				
Flanges	VOC	130		First attempt within 5 days of detection and final repair within 15 days	186.59
	Non-VOC			First attempt within 5 days of detection and final repair within 15 days	790.50
Other	VOC	590		First attempt within 5 days of detection and final repair within 15 days	434.28
	Non-VOC				1,839.82

Attachment D
Process Flow Diagram



* LINE HEATERS (10)

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

3-PHASE GPU HEATERS (10)

• H001	EP-H001	• H006	EP-H006
• H002	EP-H002	• H007	EP-H007
• H003	EP-H003	• H008	EP-H008
• H004	EP-H004	• H009	EP-H009
• H005	EP-H005	• H010	EP-H010

CONDENSATE TANKS (10)

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

PRODUCED WATER TANKS (2)

- TANKPW001
- TANKPW002

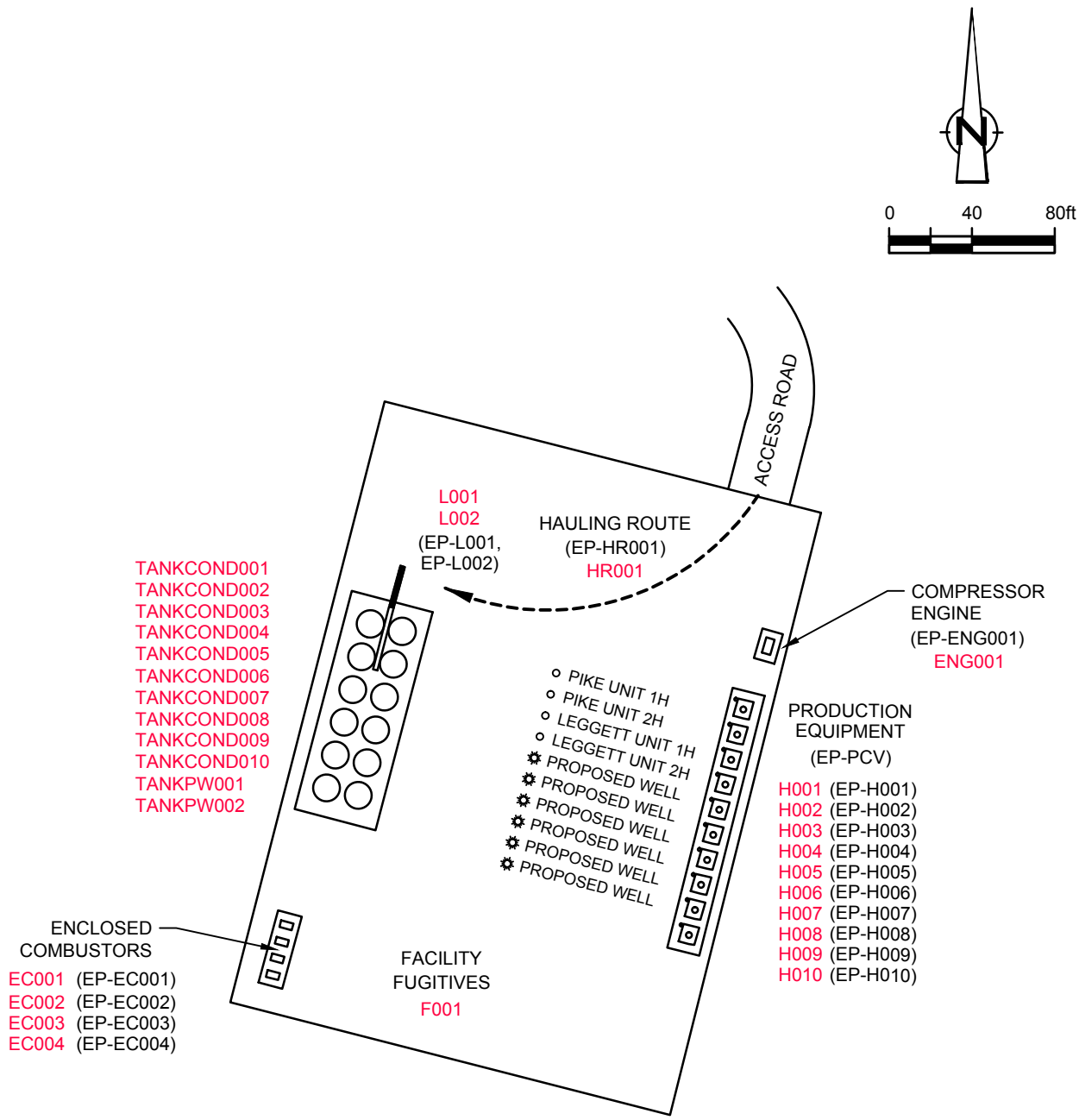
ENCLOSED COMBUSTORS (4)

• EC001	EP-EC001	• EC003	EP-EC003
• EC002	EP-EC002	• EC004	EP-EC004

Attachment D

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

Attachment E
Plot Plan



LEGEND

- EXISTING WELL LOCATION
- PROPOSED WELL LOCATION

Attachment E

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

82715-00(212)GN-WA002 JUL 23/2015

Attachment G
G70-A Section Applicability Form/ Emission Unit Data Sheets

General Permit G70-A Registration
Section Applicability Form

General Permit G70-A was developed to allow qualified applicants to seek registration for a variety of sources. These sources include natural gas well affected facilities, storage tanks, natural gas-fired compressor engines (RICE), natural gas producing units, natural gas-fired in-line heaters, pneumatic controllers, heater treaters, tank truck loading, glycol dehydration units, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

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

Section 5	Natural Gas Well Affected Facility	☑
Section 6	Storage Vessels*	☑
Section 7	Gas Producing Units, In-Line Heaters, Heater Treaters, and Glycol Dehydration Reboilers	☑
Section 8	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO)	☐
Section 9	*Reserved*	☐
Section 10	Natural gas-fired Compressor Engine(s) (RICE) **	☑
Section 11	Tank Truck Loading Facility ***	☑
Section 12	Standards of Performance for Storage Vessel Affected Facilities (NSPS, Subpart OOOO)	☐
Section 13	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (NSPS, Subpart JJJJ)	☑
Section 14	Control Devices not subject to NSPS, Subpart OOOO	☑
Section 15	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (40CFR63, Subpart ZZZZ)	☑
Section 16	Glycol Dehydration Units	☐
Section 17	Dehydration Units With Exemption from NESHAP Standard, Subpart HH § 63.764(d) (40CFR63, Subpart HH)	☐
Section 18	Dehydration Units Subject to NESHAP Standard, Subpart HH and Not Located Within an UA/UC (40CFR63, Subpart HH)	☐
Section 19	Dehydration Units Subject to NESHAP Standard, Subpart HH and Located Within an UA/UC (40CFR63, Subpart HH)	☐

***** *Applicants that are subject to Section 6 may also be subject to Section 12 if the applicant is subject to the NSPS, Subpart OOOO control requirements or the applicable control device requirements of Section 14.*

****** *Applicants that are subject to Section 10 may also be subject to the applicable RICE requirements of Section 13 and/or Section 15.*

******* *Applicants that are subject to Section 11 may also be subject to control device requirements of Section 14.*

NATURAL GAS WELL AFFECTED FACILITY DATA SHEET

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

Please provide the API number(s) for each NG well at this facility:	
47-017-06289-00	
47-017-06293-00	
47-017-06290-00	
47-017-06292-00	
6 wells not permitted	

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

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

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

Where,
047 = State code. The state code for WV is 047.
001 = County Code. County codes are odd numbers, beginning with 001 (Barbour) and continuing to 109 (Wyoming).
00001= Well number. Each well will have a unique well number.

Attachment G: Emission Units Data Sheet

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
H001, H002, H003, H004, H005, H006, H007, H008, H009, H010	EP-H001, EP-H002, EP-H003, EP-H004, EP-H005, EP-H006, EP-H007, EP-H008, EP-H009, EP-H010	Gas Production Unit Heaters	(8) 2014; (2) 2015	1.5 MMBtu/hr (each)	New	N/A
LH001, LH002, LH003, LH004, LH005, LH006, LH007, LH008, LH009, LH010	EP-LH001, EP-LH002, EP-LH003, EP-LH004, EP-LH005, EP-LH006, EP-LH007, EP-LH008, EP-LH009, EP-LH010	Line Heaters	2015	2.0 MMBtu/hr (each)	New	N/A
F001	F001	Fugitives	2014-2015	N/A	New	N/A
TANKCOND001-010	EP-EC001, EP-EC002, EP-EC003, EP-EC004	Condensate Tank F/W/B	(8) 2014; (2) 2015	400 bbl each	New	EC001, EC002, EC003, EC004
TANKPW001-002	EP-EC001, EP-EC002, EP-EC003, EP-EC004	PW Tank F/W/B	2014	400 bbl each	New	EC001, EC002, EC003, EC004
L001	EP-L001	Loading (Condensate)	2014	200 bbl capacity (each)	New	N/A
L002	EP-L002	Loading (Water)	2014	200 bbl capacity (each)	New	N/A
HR001	EP-HR001	Haul Truck	2014	40 ton capacity	New	N/A
EC001, EC002, EC003, EC004	EP-EC001, EP-EC002, EP-EC003, EP-EC004	Enclosed Combustor	(1) 2014; (3) 2015	90scf/min	New	EC001, EC002, EC003, EC004
PCV	EP-PCV	Pneumatic CV	2014-2015	6.6 scf/day/PCV	New	N/A
ENG001	EP-ENG001	Compressor Engine	2014	24 HP	New	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 New, modification, removal.
4 For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment G: Storage Vessel Emission Unit Data Sheet (Condensate)

Provide the following information for each new or modified bulk liquid storage tank.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name CONDTANK	2. Tank Name TANKCOND001-010
3. Emission Unit ID number TANKCOND001-010	4. Emission Point ID number EP-EC001, EP-EC002, EP-EC003, EP-EC004
5. Date Installed or Modified *(for existing tanks)* (8) 2014; (2) 2015	6. Type of change: New
7A. Description of Tank Modification *(if applicable) NA*	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* No	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.)	

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 400bbls	
9A. Tank Internal Diameter (ft.) 12	9B. Tank Internal Height (ft.) 20
10A. Maximum Liquid Height (ft.) 18	10B. Average Liquid Height (ft.) 10
11A. Maximum Vapor Space Height (ft.) 18	11B. Average Vapor Space Height (ft.) 10
12. Nominal Capacity *(specify barrels or gallons)* . This is also known as "working volume." 400bbls	
13A. Maximum annual throughput (gal/yr) 22,995,000	13B. Maximum daily throughput (gal/day) 63,000
14. Number of tank turnovers per year 137	15. Maximum tank fill rate (gal/min) 168
16. Tank fill method: Splash Fill	
17. Is the tank system a variable vapor space system? No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): X Fixed Roof X vertical horizontal X flat roof cone roof dome roof other (describe) External Floating Roof pontoon roof double deck roof Domed External (or Covered) Floating Roof Internal Floating Roof vertical column support self-supporting Variable Vapor Space lifter roof diaphragm Pressurized spherical cylindrical Underground Other (describe)	

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 34 – 39 in section VII

Attachment G: Storage Vessel Emission Unit Data Sheet (Condensate)

Provide the following information for each new or modified bulk liquid storage tank.

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply):

Does Not Apply — Rupture Disc (psig)

Carbon Adsorption[1] — Inert Gas Blanket of _____

X Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers) Condenser[1]

Conservation Vent (psig

Other[1] (describe) — Vacuum Setting — Pressure Setting Emergency Relief Valve (psig)

[1] Complete appropriate Air Pollution Control Device Sheet

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

Material Name and CAS No.	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
	Please see Tables 6 and 7								

1 EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

SECTION VII (required if did not provide TANKS Summary Sheets)

TANK CONSTRUCTION AND OPERATION INFORMATION		
19. Tank Shell Construction: Steel		
20A. Shell Color: Green	20B. Roof Color: Green	20C. Year Last Painted: (8) 2014; (2) 2015
21. Shell Condition (if metal and unlined): No Rust		
22A. Is the tank heated? No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?
23. Operating Pressure Range (psig): 0		
24. Is the tank a **Vertical Fixed Roof Tank**? Yes	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):
25. Complete item 25 for **Floating Roof Tanks** Does not apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type *(check one):* Metallic (mechanical) shoe seal Liquid mounted resilient seal		
25C. Is the Floating Roof equipped with a secondary seal? Yes No		
25D. If yes, how is the secondary seal mounted? *(check one)* Shoe Rim Other (describe):		
25E. Is the floating roof equipped with a weather shield? Yes No		
25F. Describe deck fittings:		
26. Complete the following section for **Internal Floating Roof Tanks** Does not apply		
26A. Deck Type: Bolted Welded	26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction:		
26D. Deck seam length (ft.):	26E. Area of deck (ft2):	26F. For column supported / 26G. For column supported

Attachment G: Storage Vessel Emission Unit Data Sheet (Condensate)

Provide the following information for each new or modified bulk liquid storage tank.

SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: West Union, WV			
28. Daily Avg. Ambient Temperature (°F): 51.7		29. Annual Avg. Maximum Temperature (°F): 63.8	
30. Annual Avg. Minimum Temperature (°F): 39.5		31. Avg. Wind Speed (mph): 5.9	
32. Annual Avg. Solar Insulation Factor (BTU/ft2-day): 1030.235999		33. Atmospheric Pressure (psia): 14.8	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.7	34A. Minimum (°F): 39.5	34B. Maximum (°F): 63.8	
35. Avg. operating pressure range of tank (psig): 0	35A. Minimum (psig): 0	35B. Maximum (psig): 0	
36A. Minimum liquid surface temperature (°F): 39.5		36B. Corresponding vapor pressure (psia):	1.0758
37A. Avg. liquid surface temperature (°F): 51.7		37B. Corresponding vapor pressure (psia):	1.4176
38A. Maximum liquid surface temperature (°F): 63.8		38B. Corresponding vapor pressure (psia):	1.8401
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	Condensate		
39B. CAS number:	mix of HC		
39C. Liquid density (lb/gal):	5.93		
39D. Liquid molecular weight (lb/lb-mole):	108.7		
39E. Vapor molecular weight (lb/lb-mole):	44.19		
39F. Maximum true vapor pressure (psia):	2.1856		
39G. Max Reid vapor pressure (psi):	3.41000		
39H. Months Storage per year. From: To:	year round		

Attachment G: Storage Vessel Emission Unit Data Sheet (Produced Water)

Provide the following information for each new or modified bulk liquid storage tank.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	PWTANK	2. Tank Name	TANKPW001-002
3. Emission Unit ID number	TANKPW001-002	4. Emission Point ID number	EP-EC001, EP-EC002, EP-EC003, EP-EC004
5. Date Installed or Modified *(for existing tanks)*	2014	6. Type of change: New	
7A. Description of Tank Modification *(if applicable)*			
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* No			
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.)			

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 400bbls			
9A. Tank Internal Diameter (ft.) 12		9B. Tank Internal Height (ft.) 20	
10A. Maximum Liquid Height (ft.) 18		10B. Average Liquid Height (ft.) 10	
11A. Maximum Vapor Space Height (ft.) 18		11B. Average Vapor Space Height (ft.) 10	
12. Nominal Capacity *(specify barrels or gallons)* . This is also known as "working volume." 400bbls			
13A. Maximum annual throughput (gal/yr)	45,990,000	13B. Maximum daily throughput (gal/day)	126,000
14. Number of tank turnovers per year	1369	15. Maximum tank fill rate (gal/min)	168
16. Tank fill method Splash Fill			
17. Is the tank system a variable vapor space system? No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?			
18. Type of tank (check all that apply): X Fixed Roof X vertical horizontal X flat roof cone roof dome roof other (describe) External Floating Roof pontoon roof double deck roof Domed External (or Covered) Floating Roof Internal Floating Roof vertical column support self-supporting Variable Vapor Space lifter roof diaphragm Pressurized spherical cylindrical Underground Other (describe)			

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 34 – 39 in section VII

Attachment G: Storage Vessel Emission Unit Data Sheet (Produced Water)

Provide the following information for each new or modified bulk liquid storage tank.

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply):

Does Not Apply — Rupture Disc (psig)

Carbon Adsorption[1] — Inert Gas Blanket of _____

X Vent to Vapor Combustion Device1 (vapor combustors, flares, thermal oxidizers) Condenser[1]

Conservation Vent (psig

Other[1] (describe) — Vacuum Setting — Pressure Setting Emergency Relief Valve (psig)

[1] Complete appropriate Air Pollution Control Device Sheet

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

Material Name and CAS No.	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
	Please see Tables 6 and 7								

1 EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

SECTION VII (required if did not provide TANKS Summary Sheets)

TANK CONSTRUCTION AND OPERATION INFORMATION		
19. Tank Shell Construction: Steel		
20A. Shell Color: Green	20B. Roof Color: Green	20C. Year Last Painted: 2014
21. Shell Condition (if metal and unlined): No Rust		
22A. Is the tank heated? No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?
23. Operating Pressure Range (psig): 0		
24. Is the tank a **Vertical Fixed Roof Tank**? Yes	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):
25. Complete item 25 for **Floating Roof Tanks** Does not apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type *(check one):* Metallic (mechanical) shoe seal Liquid mounted resilient seal		
25C. Is the Floating Roof equipped with a secondary seal? Yes No		
25D. If yes, how is the secondary seal mounted? *(check one)* Shoe Rim Other (describe):		
25E. Is the floating roof equipped with a weather shield? Yes No		
25F. Describe deck fittings:		
26. Complete the following section for **Internal Floating Roof Tanks** Does not apply		
26A. Deck Type: Bolted Welded	26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction:		
26D. Deck seam length (ft.):	26E. Area of deck (ft2):	26F. For column supported	26G. For column supported

Attachment G: Storage Vessel Emission Unit Data Sheet (Produced Water)

Provide the following information for each new or modified bulk liquid storage tank.

SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: West Union, WV			
28. Daily Avg. Ambient Temperature (°F): 51.7		29. Annual Avg. Maximum Temperature (°F): 63.8	
30. Annual Avg. Minimum Temperature (°F): 39.5		31. Avg. Wind Speed (mph): 5.9	
32. Annual Avg. Solar Insulation Factor (BTU/ft2-day): 1030.235999		33. Atmospheric Pressure (psia): 14.8	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.7	34A. Minimum (°F): 39.5	34B. Maximum (°F): 63.8	
35. Avg. operating pressure range of tank (psig): 0	35A. Minimum (psig): 0	35B. Maximum (psig): 0	
36A. Minimum liquid surface temperature (°F): 39.5		36B. Corresponding vapor pressure (psia):	0.1839
37A. Avg. liquid surface temperature (°F): 51.7		37B. Corresponding vapor pressure (psia):	0.2599
38A. Maximum liquid surface temperature (°F): 63.8		38B. Corresponding vapor pressure (psia):	0.3604
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	Produced Water		
39B. CAS number:	mix of HC and water		
39C. Liquid density (lb/gal):	8.33		
39D. Liquid molecular weight (lb/lb-mole):	18.0157		
39E. Vapor molecular weight (lb/lb-mole):	18.3919		
39F. Maximum true vapor pressure (psia):	0.4472		
39G. Max Reid vapor pressure (psi):	1.02409		
39H. Months Storage per year. From: To:	year round		

Attachment G: Natural Gas Fired Fuel Burning Units

Emission Data Sheet

Complete the information on this data for each Gas Producing Unit(s), Heater Treater(s), and in-line heater(s) at the production pad. Reboiler information should be entered on the Glycol Dehydration Emission Unit Data Sheet.

Emission Unit ID #[1]	Emission Point ID#[2]	Emission Unit Description (Manufacturer / Model #)	Year Installed/ Modified	Type[3] and Date of Change	Control Device[4]	Design Heat Input (mmBtu/hr)[5]	Fuel Heating Value (Btu/scf)[6]
H001	EP-H001	Gas Production Unit Heater	2014	New	--	1.50	1,247.06
H002	EP-H002	Gas Production Unit Heater	2014	New	--	1.50	1,247.06
H003	EP-H003	Gas Production Unit Heater	2014	New	--	1.50	1,247.06
H004	EP-H004	Gas Production Unit Heater	2014	New	--	1.50	1,247.06
H005	EP-H005	Gas Production Unit Heater	2014	New	--	1.50	1,247.06
H006	EP-H006	Gas Production Unit Heater	2014	New	--	1.50	1,247.06
H007	EP-H007	Gas Production Unit Heater	2014	New	--	1.50	1,247.06
H008	EP-H008	Gas Production Unit Heater	2014	New	--	1.50	1,247.06
H009	EP-H009	Gas Production Unit Heater	2015	New	--	1.50	1,247.06
H010	EP-H010	Gas Production Unit Heater	2015	New	--	1.50	1,247.06
LH001	EP-LH001	Line Heater	2015	New	--	2.00	1,247.06
LH002	EP-LH002	Line Heater	2015	New	--	2.00	1,247.06
LH003	EP-LH003	Line Heater	2015	New	--	2.00	1,247.06
LH004	EP-LH004	Line Heater	2015	New	--	2.00	1,247.06
LH005	EP-LH005	Line Heater	2015	New	--	2.00	1,247.06
LH006	EP-LH006	Line Heater	2015	New	--	2.00	1,247.06
LH007	EP-LH007	Line Heater	2015	New	--	2.00	1,247.06
LH008	EP-LH008	Line Heater	2015	New	--	2.00	1,247.06
LH009	EP-LH009	Line Heater	2015	New	--	2.00	1,247.06
LH010	EP-LH010	Line Heater	2015	New	--	2.00	1,247.06
ENG001	EP-ENG001	Compressor Engine (Kubota)	2014	New	--	24HP	1,247.06
EC001	EP-EC001	Enclosed Combustor (Cimarron 48")	2014	New	EC001	6.6	1,247.06
EC002	EP-EC002	Enclosed Combustor (Cimarron 48")	2015	New	EC002	6.6	1,247.06
EC003	EP-EC003	Enclosed Combustor (Cimarron 48")	2015	New	EC003	6.6	1,247.06
EC004	EP-EC004	Enclosed Combustor (Cimarron 48")	2015	New	EC004	6.6	1,247.06

1 Enter the appropriate Emission Unit (or Sources) identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For sources, use 1S, 2S, 3S…or other appropriate designation. Enter glycol dehydration unit Reboiler Vent data on the Glycol Dehydration Unit Data Sheet.

2 Enter the appropriate Emission Point identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For emission points, use 1E, 2E, 3E…or other appropriate designation.

3 New, modification, removal.

4 Complete appropriate air pollution control device sheet for any control device.

5 Enter design heat input capacity in mmBtu/hr.

6 Enter the fuel heating value in Btu/standard cubic foot.

Attachment G: Natural Gas-Fired Compressor Engine (RICE)

Emission Unit Data Sheet

Complete this section for any natural gas-fired reciprocating internal combustion engine.

Emission Unit (Source) ID No.		ENG001	
Emission Point ID No.		EP-ENG001	
Engine Manufacturer and Model		Engine (Kubota DG972-E2)	
Manufacturer's Rated bhp/rpm		24 HP @ 3600 rpm	
Source Status		NS	
Date Installed/Modified/Removed		2014	
Engine Manufactured/Reconstruction Date		2013	
Is this engine subject to 40CFR60, Subpart JJJJ?		Yes	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60, Subpart JJJJ? (Yes or No)		Yes	
Is this engine subject to 40CFR63, Subpart ZZZZ? (yes or no)		Yes	
Engine, Fuel and Combustion Data	Engine Type	RB4S	
	APCD Type	-	
	Fuel Type	RG	
	H2S (gr/100 scf)	0	
	Operating bhp/rpm	16.5 HP @ 2400 rpm	
	BSFC (Btu/bhp-hr)	9773	
	Fuel throughput (ft^3/hr)	193	
	Fuel throughput ($MMft^3$/yr)	1.6907	
	Operation (hrs/yr)	8760	
Reference	Potential Emissions	lbs/hr	tons/yr
MD	NO_X	0.3158	1.3831
MD	CO	5.6445	24.7228
AP	VOC	0.0071	0.0311
AP	SO_2	0.0001	0.0006
AP	PM_{10}	0.0024	0.0104
AP	Formaldehyde	0.0049	0.0215
MRR	Proposed Monitoring:	Monitor engine setting adjustments to ensure these are consistent with manufacturer's instructions.	
	Proposed Recordkeeping:	1) Maintain records of maintenance performed on engines. 2) Documentation from manufacturer that engine is certified to meet emission standards	
	Proposed Reporting:	N/A	

Attachment G: Tank Truck Loading
Emissions Unit Data Sheet

Furnish the following information for each new or modified bulk liquid transfer area or loading rack at the natural gas production pad.
This form is to be used for bulk liquid transfer operations to tank trucks.

1. Emission Unit ID: L001, L002	2. Emission Point ID: EP-L001, EP-L002	3. Year Installed/ Modified: 2014

4. Emission Unit Description: CONDENSATE AND PRODUCED WATER

5. Loading Area Data

5A. Number of pumps: 2	5B. Number of liquids loaded: 2	5C. Maximum number of tank trucks loading at one time: 2

6. Describe cleaning location, compounds and procedure for tank trucks: For hire tank trucks are used and are cleaned at the operator's dispatch terminal. These trucks are in dedicated service and cleaned only prior to repair or leak tests. Cleaning materials include water, steam, detergent, and solvents which are applied using hand held pressurized spray nozzles.

7. Are tank trucks pressure tested for leaks at this or any other location?
X Yes No
If YES, describe: Tank trucks are pressure tested for leaks at the location of the leak testing company. Trucks are tested using EPA Method 27-internal vapor valve test and issued certification that DOT requirements are met.

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

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	10	10	10	10
days/week	7	7	7	7

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

Liquid Name		Condensate	Produced Water	
Max. daily throughput (1000 gal/day)		63	126	
Max. annual throughput (1000 gal/yr)		22,995.00	45,990.00	
Loading Method [1]		BF	BF	
Max. Fill Rate (gal/min)		168	168	
Average Fill Time (min/loading)		50	50	
Max. Bulk Liquid Temperature (^{o}F)		72.1	72.1	
True Vapor Pressure [2]		2.19	0.45	
Cargo Vessel Condition [3]		U	U	
Control Equipment or Method [4]		None	None	
Minimum collection efficiency (%)		0	0	
Minimum control efficiency (%)		0	0	
Maximum Emission Rate	Loading (lb/hr)	13.69	1.17	
	Annual (ton/yr)	15.61	2.66	
Estimation Method [5]		Promax	Promax	

Notes:

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

2 At maximum bulk liquid temperature

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

4 List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets as Attachment "H"*):
CA = Carbon Adsorption
VB = Dedicated Vapor Balance (closed system) ECD = Enclosed Combustion Device
F = Flare
TO = Thermal Oxidation or Incineration

5 EPA = EPA Emission Factor as stated in AP-42

10. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**

MONITORING	RECORDKEEPING
1) Visual inspection to ensure that loading connections from storage tanks to trucks are leak-free.	1) Maintain records of condensate transferred from storage tanks. 2) Maintain records of produced water transferred from storage tanks.
REPORTING	TESTING
N/A	N/A

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

Attachment H
Air Pollution Control Device Data Sheet

Attachment H: Air Pollution Control Device

Vapor Combustion Control Device Sheet

Complete this vapor combustion control device sheet for each enclosed combustion device, flare, thermal oxidizer, or completion combustion device that is located at the natural gas production pad for the purpose of thermally destructing waste gas to control emissions of regulated pollutants to the atmosphere.

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.			
General Information			
1. Control Device ID#: EC001, EC002, EC003, EC004		2. Installation Date: (1) 2014; (3) 2015	
3. Maximum Rated Total Flow Capacity: 131,000 scfd	4. Maximum Design Heat Input: 6.6 MMBtu/hr	5. Design Heat Content: 2300BTU/scf	
Control Device Information			
6. Select the type of vapor combustion control device being used: Enclosed Combustor			
7. Manufacturer: Model No. Cimarron, Model No. 48" HV ECD		8. Hours of operation per year: 8760	
9. List the emission units whose emissions are controlled by this vapor combustion control device: (Emission Point ID#:)			
10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
TANKCOND001-010	Condensate Tank		
TANKPW001-002	PW Tanks		
If this vapor combustor controls emissions from more than six emission units, please attach additional pages.			
11. Assist Type		12. Flare Height (ft)	13. Tip Diameter (ft)	14. Was the design per §60.18?
Steam - Air - Pressure - X Non -		25ft	3.33	Yes
Waste Gas Information			
15. Maximum waste gas flow rate (scfm):	16. Heat value of waste gas stream (BTU/ft3)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (ft/s)
91.23	2,224.73	900	1.74E-01
19. Provide an attachment with the characteristics of the waste gas stream to be burned.			
Pilot Information			
20. Type/Grade of pilot fuel:	21. Number of pilot lights:	22. Fuel flow rate to pilot flame per pilot (scf/hr):	23. Heat input per pilot (BTU/hr):	24. Will automatic re-ignition be used?
Natural Gas	1	12.6	12800	Yes
25. If automatic re-ignition will be used, describe the method: Based on a monitoring system				
26. Describe the method of controlling flame: Flame Rectification, a thermocouple equivalent				
27. Is pilot flame equipped with a monitor to detect the presence of the flame? Yes	28. If yes, what type? Thermocouple			

29. Pollutant(s) Controlled	30. % Capture Efficiency	31. Manufacturer's Guaranteed Control Efficiency (%)
F/W/B Emissions from TANKCOND	98	98
F/W/B Emissions from TANKPW	98	98

Attachment H: Air Pollution Control Device

Vapor Combustion Control Device Sheet

Complete this vapor combustion control device sheet for each enclosed combustion device, flare, thermal oxidizer, or completion combustion device that is located at the natural gas production pad for the purpose of thermally destructing waste gas to control emissions of regulated pollutants to the atmosphere.

32. Has the control device been tested by the manufacturer and certified? Yes, see spec sheet.

33. Describe all operating ranges and maintenance procedures required by the manufacturer to maintain warranty: See spec sheet for operating ranges.

MONITORING

1) Report any period when visible emissions exceeded 5 minutes during any two-hour period.
2) Monitor the presence of pilot flame at all times with the Flame rectification system, a thermocouple equivalent.
3) Monitor visible emissions from the vapor combustor.
4) Monitor throughput to the vapor combustor.

RECORDKEEPING

1) Record the times and duration of periods when the pilot flame was not present.
2) Records of throughput to the vapor combustor.
3) Records of vapor combustor malfunction or shutdown which resulted in excess emissions.
4) Records of vapor combustor inspection and maintenance activities conducted.

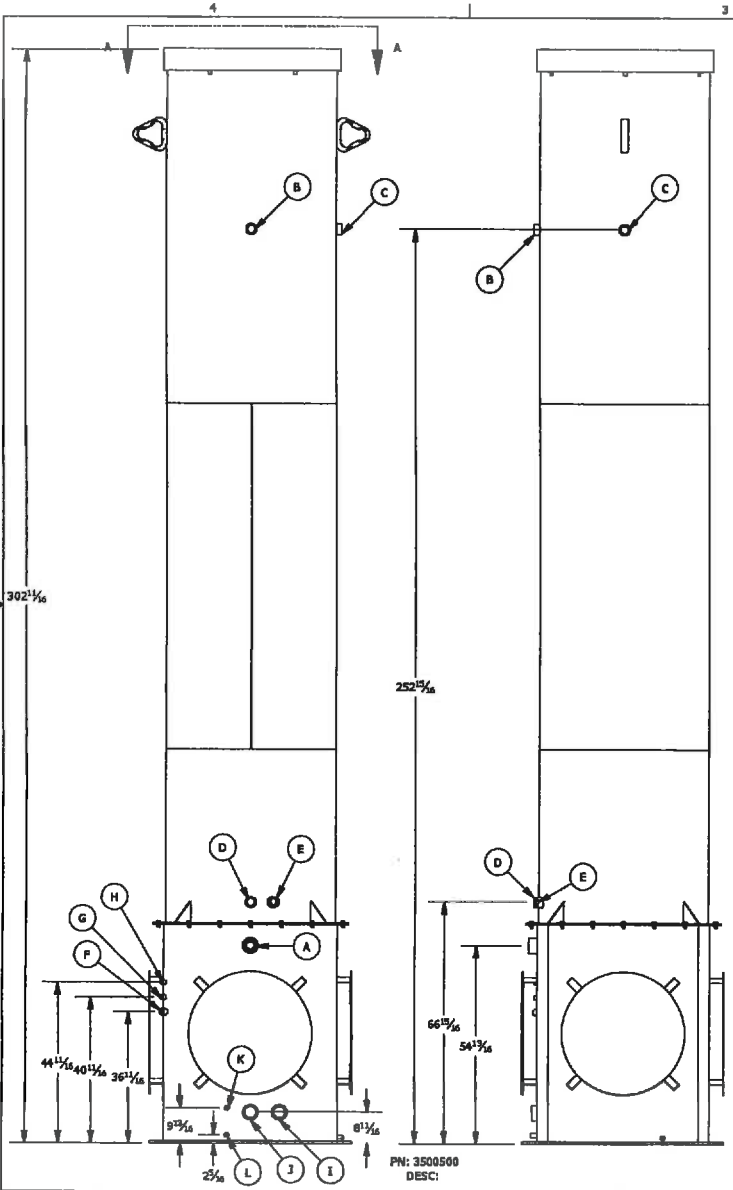
REPORTING

1) Report any period when visible emissions exceeded 5 minutes during any two-hour period.

34. Additional Information Attached? **YES**

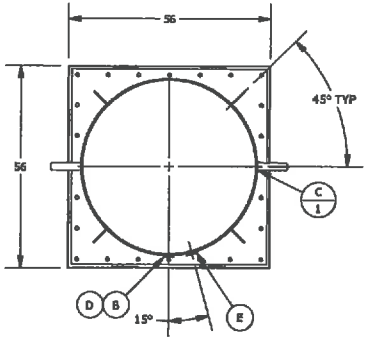
Please attach a copy of manufacturer's data sheet. Please attach a copy of manufacturer's drawing.
Please attach a copy of the manufacturer's performance testing.

If any of the requested information is not available, please contact the manufacturer.



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 I
Emission Calculations

Table 1

Facility Information
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Oil and Gas Site General Information

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

Technical Information	
Max Condensate Site Throughput (bbl/day):	1,500
Max Produced Water Site Throughput (bbl/day):	3,000
Are there any sour gas streams at this site?	No
Is this site currently operational/producing?	Yes

Equipment/Processes at Site	
Equipment/Process Types	**How many for this site?**
Fugitives	10
IC Engines	1
Gas Production Unit Heaters	10
Line Heaters	10
Condensate Tanks	10
Produced Water Tanks	2
Loading Jobs	2
Enclosed Combustors	4

Table 2

Uncontrolled/Controlled Emissions Summary
Robert Williams Well Pad
Doddridge, 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, Line Heaters)																								
Fugitive Emissions (Component Count, PCV and Hauling)[1]	3.9173	17.1577			89.757	393.14							0.5508	1.0711			0.3794	1.6617	0.0065	0.0286	4.92E-02	2.15E-01		
Flashing, Working and Breathing (F/W/B) Losses[2]	462.68	2,026.5															17.892	78.367	0.6955	3.0463	0.3892	1.7046		
Engine Emissions[3]	0.0071	0.0311	0.3158	1.3831	26.40	115.62	5.6445	24.7228	0.0001	0.0006	0.0024	0.0104	0.0023	0.0100			0.0055	0.0241	0.0004	0.0017	4.68E-05	2.05E-04	0.0049	0.0215
Gas Production Unit Heater Emissions[4]	0.0662	0.2898	1.2028	5.2684	1,443.39	6,322.07	1.0104	4.4254	0.0072	0.0316	0.0914	0.4004	0.0914	0.4004	6.01E-06	2.63E-05	2.26E-02	9.92E-02	2.53E-05	1.11E-04			0.0009	0.0040
Line Heater Emissions[4]	0.0882	0.3863	1.6038	7.0245	1,924.53	8,429.43	1.3472	5.9006	0.0096	0.0421	0.1219	0.5339	0.1219	0.5339	8.02E-06	3.51E-05	3.02E-02	1.32E-01	3.37E-05	1.48E-04			0.0012	0.0053
TOTALS:	**466.7610**	**2044.4132**	**3.1224**	**13.6760**	**3484.0754**	**15260.2500**	**8.0020**	**35.0488**	**0.0170**	**0.0744**	**0.2157**	**0.9447**	**0.7664**	**2.0153**	**0.0000**	**0.0001**	**18.3297**	**80.2843**	**0.7025**	**3.0768**	**0.4384**	**1.9202**	**0.0070**	**0.0308**
UNCONTROLLED (Truck Loading Emissions)																								
Truck Loading Emissions[5]	10.138	11.566			3.394	4.943											0.0289	0.0330	8.13E-04	9.31E-04	0.0022	0.0025		
CONTROLLED EMISSIONS																								
Enclosed Combustor Emissions (from F/W/B losses)[6]	9.2539	40.5322	0.5524	2.4197	2064.3324	9041.7759	0.4640	2.0325	3.02E-05	1.32E-04	0.0315	0.1379	0.0420	7.05E-05	2.76E-06	1.21E-05	0.3579	1.5677	1.39E-02	6.09E-02	0.0078	0.0341	3.78E-06	1.66E-05
Controlled Fugitive Emissions from Hauling													0.2754	0.5356										
TOTALS:	**9.2539**	**40.5322**	**0.5524**	**2.4197**	**2064.3324**	**9041.7759**	**0.4640**	**2.0325**	**3.02E-05**	**1.32E-04**	**0.0315**	**0.1379**	**0.3174**	**0.5356**	**2.76E-06**	**1.21E-05**	**0.3579**	**1.5677**	**0.0139**	**0.0609**	**0.0078**	**0.0341**	**3.78E-06**	**1.66E-05**
POTENTIAL TO EMIT[7]	**13.3327**	**69.9628**	**3.6748**	**16.0957**	**5548.4077**	**24306.9688**	**8.4661**	**37.0814**	**0.0170**	**0.0745**	**0.2472**	**1.0826**	**0.5330**	**1.4799**	**1.68E-05**	**7.36E-05**	**0.7956**	**3.5179**	**0.0209**	**0.0923**	**0.0570**	**0.2522**	**0.0070**	**0.0308**

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 13 for engine emissions
4 - See Table 9 for gas production unit heater and line heaters emission calculations
5 - 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 1500 barrels per day, VOC emissions would be 10.138 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 2.6406 pound per hour.
6 - See Table 10 and 11 for enclosed combustion emission calculations.
7 - The hourly potential to emit is the sum of emissions from gas production unit heaters, line heaters, engine, 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
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Pollutant		Emissions			Threshold Exceeded?	
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	466.7610	13.3327	6	**Yes**	**Yes**
	tons/yr	2055.9789	69.9628	10	**Yes**	**Yes**
NO_X	lbs/hr	3.1224	3.6748	6		
	tons/yr	13.6760	16.0957	10	**Yes**	**Yes**
CO	lbs/hr	8.0020	8.4661	6	**Yes**	**Yes**
	tons/yr	35.0488	37.0814	10	**Yes**	**Yes**
SO_2	lbs/hr	0.0170	0.0170	6		
	tons/yr	0.0744	0.0745	10		
$PM_{2.5}$	lbs/hr	2.16E-01	2.47E-01	6		
	tons/yr	9.45E-01	1.08E+00	10		
PM_{10}	lbs/hr	0.7664	0.5330	6		
	tons/yr	2.0153	1.4799	10		
Lead	lbs/hr	1.40E-05	1.68E-05	6		
	tons/yr	6.15E-05	7.36E-05	10		
Total HAPs	lbs/hr	18.3297	0.7956	2	**Yes**	
	tons/yr	80.3173	3.5179	5	**Yes**	
Total TAPs	lbs/hr	0.7095	0.0279	1.14		
n-Hexane	lbs/hr	16.3881	0.6591			
	tons/yr	71.8068	2.9138			
Toluene	lbs/hr	0.6188	0.0323			
	tons/yr	2.7120	0.1434			
Ethylbenzene	lbs/hr	0.1797	0.0241			
	tons/yr	0.7881	0.1063			
Xylenes	lbs/hr	0.4384	0.0570			
	tons/yr	1.9225	0.2520			
Benzene	lbs/hr	0.7021	0.0205			
	tons/yr	3.0761	0.0907			

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
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

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

Gas Weight Fraction From Analysis:	VOC frac	0.191
	Benzene frac	0.000
	Toluene	0.000
	Ethylbenzene	0.000
	Xylenes	0.000
	n-Hexane	0.023
	Methane	0.603

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
500	Valves	Gas VOC	0.004500	0.43	8,280.76
		Non VOC	0.004500	1.82	35,081.24
590	Connectors	VOC	0.000200	0.02	434.28
		Non-VOC	0.000200	0.10	1,839.82
130	Flanges	VOC	0.000390	0.01	186.59
		Non-VOC	0.000390	0.04	790.50
			Total VOCs:	0.46	8,901.63
			Total THC:	2.42	46,613.19

Light Liquid Weight Fraction From Analysis:	VOC frac	0.974
	Benzene frac	0.002
	Toluene	0.007
	Ethylbenzene	0.006
	Xylenes	0.017
	n-hexane	0.053
	Methane	0.008

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
520	Valves	Light Liquid VOC	0.002500	1.27	24,410.91
		Light Liquid Non-VOC		0.03	642.69
			Total VOC:	1.27	24,410.91
			Total THC:	1.30	25,053.60

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	33,312.55	3.80	16.66
Ethylbenzene		0.02	0.07
Toluene		0.02	0.09
Xylenes		0.05	0.22
n-Hexane		0.27	1.20
TAPs (Benzene)		0.01	0.03
HAPs		0.37	1.60
CO_{2e}	707,147.38	80.72	353.57

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
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

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

Component	Mol%	Molecular Weight (lb/lb-mole)	Component Flow (scf/day)	Component Moles (lb-moles)	Component Emissions (lbs/day)	(lbs/hr)	(tons/year)
H2S	0	34.08	0	0.00	0.00	0.00	0.00
Nitrogen	0.4946	14.01	1.305744	0.00	0.05	0.00	0.01
Carbon Dioxide	0.1467	44.01	0.387288	0.00	0.04	0.00	0.01
Methane	77.6927	16.04	205.108728	0.54	8.67	0.36	1.58
Ethane	14.1987	30.07	37.484568	0.10	2.97	0.12	0.54
Propane	4.4938	44.1	11.863632	0.03	1.38	0.06	0.25
Isobutane	0.5666	58.12	1.495824	0.00	0.23	0.01	0.04
n-Butane	1.1838	58.12	3.125232	0.01	0.48	0.02	0.09
Isopentane	0.3749	72.15	0.989736	0.00	0.19	0.01	0.03
n-Pentane	0.2914	72.15	0.769296	0.00	0.15	0.01	0.03
2-Methylpentane	0	86.18	0	0.00	0.00	0.00	0.00
3-Methylpentane	0	86.18	0	0.00	0.00	0.00	0.00
n-Hexane	0.5451	86.18	1.439064	0.00	0.33	0.01	0.06
Methylcyclopentane	0	84.16	0	0.00	0.00	0.00	0.00
Benzene	0	78.11	0	0.00	0.00	0.00	0.00
2-Methylhexane	0	100.2	0	0.00	0.00	0.00	0.00
3-Methylhexane	0	100.2	0	0.00	0.00	0.00	0.00
Heptane	0	100.21	0	0.00	0.00	0.00	0.00
Methylcyclohexane	0	98.186	0	0.00	0.00	0.00	0.00
Toluene	0	92.14	0	0.00	0.00	0.00	0.00
Octane	0	114.23	0	0.00	0.00	0.00	0.00
Ethylbenzene	0	106.17	0	0.00	0.00	0.00	0.00
m & p-Xylene	0	106.16	0	0.00	0.00	0.00	0.00
o-Xylene	0	106.16	0	0.00	0.00	0.00	0.00
Nonane	0	128.2	0	0.00	0.00	0.00	0.00
C10+	0	174.28	0	0.00	0.00	0.00	0.00

	lb/hr	tpy
VOC Emissions	0.1145	0.5015
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	0.0136	0.0596
HAPs Emissions	0.0136	0.0596
TAPs Emissions	0.0000	0.0000
CO_{2e} emissions	9.0327	39.5633

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

Table 6

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

# Hours Operational	8760

	Condensate Tank Flashing Losses			Produced Water Tank Flashing Losses		
	Vapor Mass Fraction	Flashing Losses		Vapor Mass Fraction	Flashing Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
Water	0.0962	0.5559	2.4350	2.5805	0.0000	0.0000
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0076	0.0442	0.1935	0.5236	0.0819	0.3585
Carbon Dioxide	0.1386	0.8008	3.5075	2.2800	0.3565	1.5614
Methane	3.2433	18.7400	82.0813	54.6474	8.5441	37.4231
Ethane	19.8016	114.4137	501.1321	22.8779	3.5770	15.6671
Propane	30.4768	176.0952	771.2971	11.5015	1.7983	7.8764
Isobutane	7.7121	44.5606	195.1755	0.6555	0.1025	0.4489
n-Butane	17.0526	98.5302	431.5622	2.7209	0.4254	1.8633
Isopentane	6.0840	35.1533	153.9713	0.5811	0.0908	0.3979
n-Pentane	6.2663	36.2065	158.5845	0.5670	0.0887	0.3883
2-Methylpentane	1.5985	9.2359	40.4534	0.0653	0.0102	0.0447
3-Methylpentane	0.9387	5.4237	23.7559	0.1012	0.0158	0.0693
n-Hexane	2.7686	15.9970	70.0667	0.0894	0.0140	0.0612
Methylcyclopentane	0.4056	2.3433	10.2637	0.1237	0.0193	0.0847
Benzene	0.1150	0.6647	2.9113	0.1886	0.0295	0.1291
2-Methylhexane	0.5439	3.1424	13.7638	0.0195	0.0030	0.0134
3-Methylhexane	0.4090	2.3634	10.3518	0.0153	0.0024	0.0105
Heptane	0.8279	4.7834	20.9512	0.0325	0.0051	0.0222
Methylcyclohexane	0.5915	3.4179	14.9703	0.1195	0.0187	0.0819
Toluene	0.0990	0.5720	2.5055	0.1528	0.0239	0.1046
Octane	0.6012	3.4740	15.2159	0.0140	0.0022	0.0096
Ethylbenzene	0.0262	0.1514	0.6630	0.0400	0.0063	0.0274
m & p-Xylene	0.0334	0.1933	0.8465	0.0505	0.0079	0.0346
o-Xylene	0.0306	0.1770	0.7751	0.0475	0.0074	0.0326
Nonane	0.1298	0.7498	3.2843	0.0046	0.0007	0.0032
C10+	0.0021	0.0121	0.0531	0.0000	0.0000	0.0000
Total VOCs	76.713	443.25	1,941.4	17.091	2.6721	11.7038
Total CO_{2e}		469.30	2,055.5		213.96	937.1
Total TAPs (Benzene)		0.6647	2.9113		0.0295	0.1291
Toluene		0.5720	2.5055		0.0239	0.1046
Ethylbenzene		0.1514	0.6630		0.0063	0.0274
Xylenes		0.3702	1.6216		0.0153	0.0672
n-Hexane		15.997	70.067		0.0140	0.0612
Total HAPs		17.755	77.768		0.0889	0.3896
Total	100.00	577.80	2,530.8	100.00	15.231	66.71

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

Table 7

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

Condensate Tank Information	
Number of Tanks	10
Maximum Working Losses (lbs/hr)	12.0553
Maximum Breathing Losses (lbs/hr)	10.5780

	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	0.0003	0.0000	0.0002	0.0000	0.0001	0.0001	0.0003
Carbon Dioxide	0.1634	0.0197	0.0863	0.0173	0.0757	0.0370	0.1620
Methane	0.7106	0.0857	0.3752	0.0752	0.3292	0.1608	0.7044
Ethane	25.0627	3.0214	13.2336	2.6511	11.6120	5.6725	24.8456
Propane	32.6007	3.9301	17.2138	3.4485	15.1045	7.3786	32.3183
Isobutane	7.8197	0.9427	4.1290	0.8272	3.6230	1.7699	7.7520
n-Butane	16.9835	2.0474	8.9677	1.7965	7.8688	3.8439	16.8364
Isopentane	5.7906	0.6981	3.0575	0.6125	2.6829	1.3106	5.7404
n-Pentane	5.8656	0.7071	3.0972	0.6205	2.7176	1.3276	5.8148
2-Methylpentane	1.4767	0.1780	0.7797	0.1562	0.6842	0.3342	1.4639
3-Methylpentane	0.8627	0.1040	0.4555	0.0913	0.3997	0.1952	0.8552
n-Hexane	0.1730	0.0209	0.0914	0.0183	0.0802	0.0392	0.1715
Methylcyclopentane	0.3412	0.0411	0.1802	0.0361	0.1581	0.0772	0.3383
Benzene	0.0059	0.0007	0.0031	0.0006	0.0027	0.0013	0.0059
2-Methylhexane	0.0322	0.0039	0.0170	0.0034	0.0149	0.0073	0.0319
3-Methylhexane	0.3636	0.0438	0.1920	0.0385	0.1685	0.0823	0.3605
Heptane	0.6786	0.0818	0.3583	0.0718	0.3144	0.1536	0.6727
Methylcyclohexane	0.4809	0.0580	0.2539	0.0509	0.2228	0.1088	0.4767
Toluene	0.0110	0.0013	0.0058	0.0012	0.0051	0.0025	0.0109
Octane	0.4644	0.0560	0.2452	0.0491	0.2152	0.1051	0.4604
Ethylbenzene	0.0054	0.0007	0.0029	0.0006	0.0025	0.0012	0.0054
m & p-Xylene	0.0089	0.0011	0.0047	0.0009	0.0041	0.0020	0.0088
o-Xylene	0.0070	0.0008	0.0037	0.0007	0.0033	0.0016	0.0070
Nonane	0.0903	0.0109	0.0477	0.0096	0.0418	0.0204	0.0895
C10+	0.0010	0.0001	0.0005	0.0001	0.0005	0.0002	0.0010
Total VOCs	74.063	8.9285	39.107	7.8344	34.3147	16.7629	73.421
Total CO_{2e}		2.1612	9.4661	1.8964	8.3062	4.0576	17.772
Total TAPs (Benzene)		0.0007	0.0031	0.0006	0.0027	0.0013	0.0059
Toluene		0.0013	0.0058	0.0012	0.0051	0.0025	0.0109
Ethylbenzene		0.0007	0.0029	0.0006	0.0025	0.0012	0.0054
Xylenes		0.0019	0.0084	0.0017	0.0074	0.0036	0.0158
n-Hexane		0.0209	0.0914	0.0183	0.0802	0.0392	0.1715
Total HAPs		0.0255	0.1115	0.0223	0.0979	0.0478	0.2094
Total	100.00	12.0553	52.8020	10.5780	46.3318	22.6333	99.134

Table 7

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

Produced Water Tank Information	
Number of Tanks	2
Maximum Working Losses (lbs/hr)	0.1395
Maximum Breathing Losses (lbs/hr)	0.0082

	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	0.0107	0.0000	0.0001	0.0000	0.0000	0.0000	0.0001
Carbon Dioxide	3.1363	0.0044	0.0192	0.0003	0.0011	0.0046	0.0203
Methane	3.1005	0.0043	0.0189	0.0003	0.0011	0.0046	0.0201
Ethane	1.1976	0.0017	0.0073	0.0001	0.0004	0.0018	0.0077
Propane	0.1467	0.0002	0.0009	0.0000	0.0001	0.0002	0.0009
Isobutane	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Butane	0.0065	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	0.0003	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	0.1554	0.0002	0.0009	0.0000	0.0001	0.0002	0.0010
Total CO_{2e}		0.1125	0.4926	0.0066	0.0291	0.1191	0.5218
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	0.1395	0.6108	0.0082	0.0361	0.1477	0.6470

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

Table 8

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

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	3.41	1.0241
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)	44.19	18.39
Collection Efficiency (%)	0	0
Loading Loss (lb/10^3 gal)*	1.36	0.12
Maximum Throughput (gallons/hr)	10,080	10,080
Average Throughput (gallons/yr)	22,995,000	45,990,000
Loading Emissions (lbs/hr)	13.69	1.17
Loading Emissions (tpy)	15.61	2.66

	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	0.0003	0.00	0.00	0.0107	1.25E-04	2.84E-04
Carbon Dioxide	0.1634	0.02	0.03	3.1363	3.66E-02	8.34E-02
Methane	0.7106	0.10	0.11	3.1005	3.61E-02	8.24E-02
Ethane	25.0627	3.43	3.91	1.1976	1.40E-02	3.18E-02
Propane	32.6007	4.46	5.09	0.1467	1.71E-03	3.90E-03
Isobutane	7.8197	1.07	1.22	0.0010	1.22E-05	2.78E-05
n-Butane	16.9835	2.32	2.65	0.0065	7.62E-05	1.74E-04
Isopentane	5.7906	0.79	0.90	0.0003	4.08E-06	9.31E-06
n-Pentane	5.8656	0.80	0.92	0.0002	2.90E-06	6.62E-06
2-Methylpentane	1.4767	0.20	0.23	0.0000	6.39E-08	1.46E-07
3-Methylpentane	0.8627	0.12	0.13	0.0000	2.40E-07	5.47E-07
n-Hexane	0.1730	0.02	0.03	0.0000	3.38E-09	7.72E-09
Methylcyclopentane	0.3412	0.05	0.05	0.0001	6.30E-07	1.44E-06
Benzene	0.0059	0.00	0.00	0.0003	2.95E-06	6.74E-06
2-Methylhexane	0.0322	0.00	0.01	0.0000	3.12E-10	7.12E-10
3-Methylhexane	0.3636	0.05	0.06	0.0000	3.67E-09	8.37E-09
Heptane	0.6786	0.09	0.11	0.0000	5.72E-09	1.30E-08
Methylcyclohexane	0.4809	0.07	0.08	0.0000	1.30E-07	2.97E-07
Toluene	0.0110	0.00	0.00	0.0001	1.15E-06	2.63E-06
Octane	0.4644	0.06	0.07	0.0000	4.80E-10	1.09E-09
Ethylbenzene	0.0054	0.00	0.00	0.0000	1.70E-07	3.87E-07
m & p-Xylene	0.0089	0.00	0.00	0.0000	2.39E-07	5.45E-07
o-Xylene	0.0070	0.00	0.00	0.0000	2.35E-07	5.36E-07
Nonane	0.0903	0.01	0.01	0.0000	7.51E-11	1.71E-10
C10+	0.0010	0.00	0.00	0.0000	3.70E-17	8.45E-17
Total VOCs	74.0629	10.136	11.562	0.1554	1.81E-03	4.13E-03
Total CO_{2e}		2.454	2.7986		0.9400	2.1443
Total TAPs (Benzene)		0.0008	0.0009		0.0000	0.0000
Toluene		0.0015	0.0017		0.0000	0.0000
Ethylbenzene		0.0007	0.0008		0.0000	0.0000
Xylenes		0.0022	0.0025		0.0000	0.0000
n-Hexane		0.0237	0.0270		0.0000	0.0000
Total HAPs		0.0289	0.0330		0.0000	0.0000
Total	100.0000	13.6859	15.6105	100.0000	1.1655	2.6588

Enter any notes here

Vapor mass fractions and loading losses from Promax output
Using equation L_L = 12.46 SPM/T from AP-42, Chapter 5, Section 5.2-4
MW was obtained by Promax; RVP was taken from laboratory reports
Annual Average Temp (F) obtained from Charleston, WV (preset in Promax)
S (saturation factor) is based on submerged loading, dedicated service as it was most representative
True vapor pressure (TVP) equation from AP-42, Chapter 7, Figure 7.1-13b
Loading emissions are vented to the atmosphere.

Table 9

Gas Production Unit Heater Emissions
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Gas Production Unit Heater Emissions

Number of Units	10
GPU Heater Rating (MMBtu/hr)	1.50
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,247

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.203	5.268
CO	84	1.010	4.425
CO_2	120,000	1443.395	6322.070
Lead	0.0005	6.01E-06	2.63E-05
N_2O	2.2	0.026	0.116
PM (Total)	7.6	0.091	0.400
SO_2	0.6	0.007	0.032
TOC	11	0.132	0.580
Methane	2.3	0.028	0.121
VOC	5.5	0.066	0.290
HAPS			
2-Methylnaphthalene	2.40E-05	2.89E-07	1.26E-06
Benzene	2.10E-03	2.53E-05	1.11E-04
Dichlorobenzene	1.20E-03	1.44E-05	6.32E-05
Fluoranthene	3.00E-06	3.61E-08	1.58E-07
Fluorene	2.80E-06	3.37E-08	1.48E-07
Formaldehyde	7.50E-02	9.02E-04	3.95E-03
Hexane	1.80E+00	2.17E-02	9.48E-02
Naphthalene	6.10E-04	7.34E-06	3.21E-05
Phenanathrene	1.70E-05	2.04E-07	8.96E-07
Toluene	3.40E-03	4.09E-05	1.79E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.154	0.676
TOTAL Uncontrolled HAPs	0.053	0.231
TOTAL Uncontrolled TAPs (Benzene)	5.89E-05	2.58E-04
TOTAL Uncontrolled TAPs (Formaldehyde)	0.002	0.009
TOTAL CO_{2e} Emissions	3,387.94	14,839.16

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

Line Heater Emissions

Number of Units	10
Line Heater Rating (MMBtu/hr)	2.00
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,247

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.604	7.025
CO	84	1.347	5.901
CO_2	120,000	1924.526	8429.426
Lead	0.0005	8.02E-06	3.51E-05
N_2O	2.2	0.035	0.155
PM (Total)	7.6	0.122	0.534
SO_2	0.6	0.010	0.042
TOC	11	0.176	0.773
Methane	2.3	0.037	0.162
VOC	5.5	0.088	0.386
HAPS			
2-Methylnaphthalene	2.40E-05	3.85E-07	1.69E-06
Benzene	2.10E-03	3.37E-05	1.48E-04
Dichlorobenzene	1.20E-03	1.92E-05	8.43E-05
Fluoranthene	3.00E-06	4.81E-08	2.11E-07
Fluorene	2.80E-06	4.49E-08	1.97E-07
Formaldehyde	7.50E-02	1.20E-03	5.27E-03
Hexane	1.80E+00	2.89E-02	1.26E-01
Naphthalene	6.10E-04	9.78E-06	4.28E-05
Phenanathrene	1.70E-05	2.73E-07	1.19E-06
Toluene	3.40E-03	5.45E-05	2.39E-04

Table 10

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

General Information	
Unit Name:	EC001, EC002, EC003, EC004

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	4

Stream Information							
	1	2	3	4	5	6	Total
Stream Sent to Flare/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)	50.4	--	4,962.29	314.27	194.38	3.05	5,524.39
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	441,504.00	--	43,469,669.96	2,753,025.31	1,702,766.23	26,697.77	48,393,663.28
Heating Content (Btu/ft3)	1,247		2,315.45	1,103.89	2,315.45	1,103.89	2,224.73

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	-	-	443.247	2.672	16.763	0.000	462.68
Benzene	-	-	0.665	0.029	0.001	0.000	0.696
Toluene	-	-	0.572	0.024	0.002	0.000	0.598
Ethylbenzene	-	-	0.151	0.006	0.001	0.000	0.159
Xylenes	-	-	0.370	0.015	0.004	0.000	0.389
n-Hexane	-	-	15.997	0.014	0.039	0.000	16.050
HAPs	-	-	17.755	0.089	0.048	0.000	17.892
Total Mass Flow	-	-	577.802	15.231	22.633	0.148	615.814
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	-	-	1941.422	11.704	73.421	0.001	2026.548
Benzene	-	-	2.911	0.129	0.006	0.000	3.046
Toluene	-	-	2.506	0.105	0.011	0.000	2.621
Ethylbenzene	-	-	0.663	0.027	0.005	0.000	0.696
Xylenes	-	-	1.622	0.067	0.016	0.000	1.705
n-Hexane	-	-	70.067	0.061	0.172	0.000	70.299
HAP	-	-	77.768	0.390	0.209	0.000	78.367
Total Mass Flow	-	-	2530.772	66.714	99.134	0.647	2697.266

Table 10

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

Controlled Emissions							
Hourly (lb/hr)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.005	-	0.496	0.031	0.019	0.000	0.55
CO	0.004	-	0.417	0.026	0.016	0.000	0.46
PM2.5	0.000	-	0.028	0.002	0.001	0.000	0.03
PM10	0.000	-	0.038	0.002	0.001	0.000	0.04
H2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	6.048	-	-	-	-	-	6.05
Total VOC	0.000	-	8.865	0.053	0.335	0.000	9.25
Benzene	0.000	-	0.013	0.001	0.000	0.000	0.01
Toluene	0.000	-	0.011	0.000	0.000	0.000	0.01
Ethylbenzene	0.000	-	0.003	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.007	0.000	0.000	0.000	0.01
n-Hexane	0.000	-	0.320	0.000	0.001	0.000	0.32
HAP	0.000	-	0.355	0.002	0.001	0.000	0.36
N_2O	0.000	-	0.011	0.001	0.000	0.000	0.01
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00
Annual (tpy)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.022	-	2.173	0.138	0.085	0.001	2.42
CO	0.019	-	1.826	0.116	0.072	0.001	2.03
PM2.5	0.001	-	0.124	0.008	0.005	0.000	0.14
PM10	0.002	-	0.165	0.010	0.006	0.000	0.18
H_2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	26.490	-	-	-	-	-	26.49
Total VOC	0.001	-	38.828	0.234	1.468	0.000	40.53
Benzene	0.000	-	0.058	0.003	0.000	0.000	0.06
Toluene	0.000	-	0.050	0.002	0.000	0.000	0.05
Ethylbenzene	0.000	-	0.013	0.001	0.000	0.000	0.01
Xylenes	0.000	-	0.032	0.001	0.000	0.000	0.03
n-Hexane	0.000	-	1.401	0.001	0.003	0.000	1.41
HAP	0.000	-	1.555	0.008	0.004	0.000	1.57
N_2O	0.000	-	0.048	0.003	0.002	0.000	0.05
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00

Enclosed Combustor/Vapor Combustor Total Emissions		
	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Total VOC	9.25	40.53
NOx	5.52E-01	2.42E+00
CO	4.64E-01	2.03E+00
PM2.5	3.15E-02	1.38E-01
PM10	4.20E-02	1.84E-01
H_2S	1.61E-05	7.05E-05
SO_2	3.02E-05	1.32E-04
Benzene (TAPs)	1.39E-02	6.09E-02
Formaldehyde (TAPs)	3.78E-06	1.66E-05
HAPs	0.36	1.57
CO_2e	2064.33	9041.78
N_2O	1.22E-02	5.32E-02
Lead	2.76E-06	1.21E-05

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
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

Enclosed Combustor CO_2 and CH_4 Emissions

Components	Mole fraction of oil flash gas constituents[a]	Volume of oil flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of water flash gas constituents[a]	Volume of water flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of oil tank vapors constituents[a]	Volume of oil tank vapor sent to Enclosed Combustor *scf/year*	Mole fraction of water tank vapors constituents[a]	Volume of water tank vapors sent to Enclosed Combustor *scf/year*	Component volume of gas sent to Enclosed Combustor *scf/year*	Number of carbon atoms	Combustion Efficiency	Combusted CO_2 Volume[b] *scf/year*	Uncombusted CO_2 and CH_4 Volume[b] *scf/year*	Volume GHGs Emitted *scf/year*
CO_2	0.001	43,469,670	0.0514	2,753,025	0.0016	1,702,766	0.013	26,698	205,161	1	0	--	205,161	149,895,768
Methane	0.090	43,469,670	3.3774	2,753,025	0.0196	1,702,766	0.036	26,698	13,225,178	1	0.98	12,960,674	264,504	264,504
Ethane	0.292	43,469,670	0.7542	2,753,025	0.3683	1,702,766	0.007	26,698	15,381,221	2	0.98	30,147,193	--	
Propane	0.306	43,469,670	0.2585	2,753,025	0.3267	1,702,766	0.001	26,698	14,572,538	3	0.98	42,843,262	--	
i-Butane	0.059	43,469,670	0.0112	2,753,025	0.0594	1,702,766	0.000	26,698	2,686,557	4	0.98	10,531,303	--	
n-Butane	0.130	43,469,670	0.0464	2,753,025	0.1291	1,702,766	0.000	26,698	5,996,114	4	0.98	23,504,767	--	
Pentane	0.076	43,469,670	0.0158	2,753,025	0.0714	1,702,766	0.000	26,698	3,460,368	5	0.98	16,955,802	--	
Hexane	0.027	43,469,670	0.0029	2,753,025	0.0129	1,702,766	0.000	26,698	1,215,282	6	0.98	7,145,856	--	
Benzene	0.001	43,469,670	0.0024	2,753,025	0.0000	1,702,766	0.000	26,698	34,998	6	0.98	205,789	--	
Heptanes	0.010	43,469,670	0.0021	2,753,025	0.0065	1,702,766	0.000	26,698	451,855	7	0.98	3,099,729	--	
Toluene	0.000	43,469,670	0.0016	2,753,025	0.0001	1,702,766	0.000	26,698	25,301	7	0.98	173,562	--	
Octane	0.005	43,469,670	0.0013	2,753,025	0.0040	1,702,766	0.000	26,698	227,712	8	0.98	1,785,263	--	
Ethyl benzene	0.000	43,469,670	0.0004	2,753,025	0.0000	1,702,766	0.000	26,698	5,817	8	0.98	45,608	--	
Xylenes	0.000	43,469,670	0.0009	2,753,025	0.0001	1,702,766	0.000	26,698	14,254	8	0.98	111,754	--	
Nonane	0.000	43,469,670	0.0000	2,753,025	0.0003	1,702,766	0.000	26,698	20,117	9	0.98	177,428	--	
Decane plus	0.000	43,469,670	0.0000	2,753,025	0.0000	1,702,766	0.000	26,698	267	10	0.98	2,618	--	
											Subtotal	**149,690,607**	--	

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	149,895,768	0.12	2000	1	1984.29	8,691.18
CH_4	264,504	0.09	2000	25	2.81	12.30
				CO_2e Emissions	**2,054.5**	**8998.78**

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
Robert Williams Well Pad
Doddridge, West Virginia
Antero Resources Corporation

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

Tanker Truck Trip Calculation	
Condensate Production (bbl/day)	1,500
PW Production (bbl/day)	3,000
Truck Capacity (bbl)	200

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

	# of Wheels	Mean Vehicle Weight (W) (tons)	Mean Vehicle Speed (S) (mph)	Miles Per Trip (miles)	Maximum Trips per Hour	Maximum Trips per Year	Vehicle Miles Travelled (miles/hr)	Vehicle Miles Travelled (miles/year)	PM (lbs/VMT)	PM10 (lbs/VMT)
Tanker Trucks Condensate	10	40	10	0.1500	1	2738	0.1500	410.7000	3.8175	1.7179
Tanker Trucks PW	10	40	10	0.1500	1	5475	0.1500	821.2500	3.8175	1.7179
Pick Up Truck	4	3	10	0.2270	1	730	0.2270	165.7100	0.3467	0.1560

	Uncontrolled Emissions						Controlled Emissions					
	PM			PM10			PM			PM10		
	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)
Tanker Trucks Condensate	0.5726	1567.8593	0.7839	0.2577	705.5367	0.3528	0.2863	783.9297	0.3920	0.1288	352.7683	0.1764
Tanker Trucks PW	0.5726	3135.1460	1.5676	0.2577	1410.8157	0.7054	0.2863	1567.5730	0.7838	0.1288	705.4079	0.3527
Pick Up Truck	0.0787	57.4483	0.0287	0.0354	25.8517	0.0129	0.0393	28.7241	0.0144	0.0177	12.9259	0.0065
Total Emissions	1.2240	4,760.4536	2.3802	0.5508	2,142.2041	1.0711	0.6120	2,380.2268	1.1901	0.2754	1,071.1021	0.5356

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

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

Kubota DG972-E2

Power (hp)	24
Fuel consumption (lbs/BHP-hr) [1]	0.449
Heat Content of Fuel (Btu/scf)	1247.06
Density of NG (lb/scf)	0.056
Operating Hours/year	8760

Pollutant	Emission Factors (g/hp-hr)	Emission Factors (lb/MMBtu)	lb/hr	tpy
NOx[1]	5.97		0.3158	1.3831
CO[2]	106.7		5.6445	24.7228
CO_2		110.000	26.3967	115.62
$PM_{2.5}$		9.910E-03	0.0024	0.0104
PM_{10}		9.500E-03	0.0023	0.0100
PM (Total)		9.910E-03	0.0024	0.0104
SO_2		5.880E-04	0.0001	0.0006
TOC		0.358	0.0859	0.3763
Methane		0.230	0.0552	0.2417
VOC[3]		0.0296	0.0071	0.0311
HAPS				
Benzene		1.58E-03	3.79E-04	1.66E-03
Ethylbenzene		2.48E-05	5.95E-06	2.61E-05
Formaldehyde		2.05E-02	4.92E-03	2.15E-02
Naphthalene		9.71E-05	2.33E-05	1.02E-04
Toluene		5.58E-04	1.34E-04	5.86E-04
Xylene		1.95E-04	4.68E-05	2.05E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.007	0.031
TOTAL Uncontrolled NOx	0.316	1.383
TOTAL Uncontrolled HAPs	0.006	0.024
TOTAL Uncontrolled TAPs (Benzene)	0.000	0.002
TOTAL Uncontrolled TAPs (Formaldehyde)	0.005	0.022
TOTAL CO_{2e} Emissions	27.78	121.7

Enter Any Notes Here:

1. Emission factor used for the 24 HP engine's NOx is the 40 CFR 1054 standard indicated on the EPA's Certificate of Conformity. See Appendix P.

2. Emission factor for CO was the Certification CO level taken from EPA's Non-Road Small SI 2013 Certification issued by Office of Transportation and Air Quality, March 2014.

3. Emission factors for all other contaminants including VOCs were obtained from AP-42, Section 3.2 "Natural Gas-fired Reciprocating Engines", Table 3.2-3.

Table 14

Change in Regulated Air Pollutants Emissions
Robert Williams Well Pad
Doddridge, 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	0.8695	2.1344	1.9178	8.4000	-1.05E+00	-6.2656
PM10	0.5330	1.4799	0.6621	2.9000	-0.1291	-1.4201
VOC (uncontrolled)	466.7610	2055.9789	101.4475	444.3401	365.3135	1611.6388
CO	8.4661	37.0814	10.2968	45.1000	-1.8307	-8.0186
NOx	3.6748	16.0957	1.7808	7.8000	1.8940	8.2957
SO2	0.0170	0.0745	0.0062	0.0270	1.08E-02	4.75E-02
Pb	1.68E-05	7.36E-05	0.0000	2.20E-05	1.18E-05	5.16E-05
HAPs	0.7956	3.5179	0.3881	1.7000	0.4075	1.8179
TAPs	0.0279	0.1231	0.0180	0.0790	0.0099	0.0441

Notes: 1.) Change in emissions due to the increase in throughput and addition of 2 wells, 2 condensate tanks, 2 gas production unit heaters, 10 line heaters, and 3 Cimarron enclosed combustors.

Bryan Research & Engineering, Inc.

ProMax® 3.2

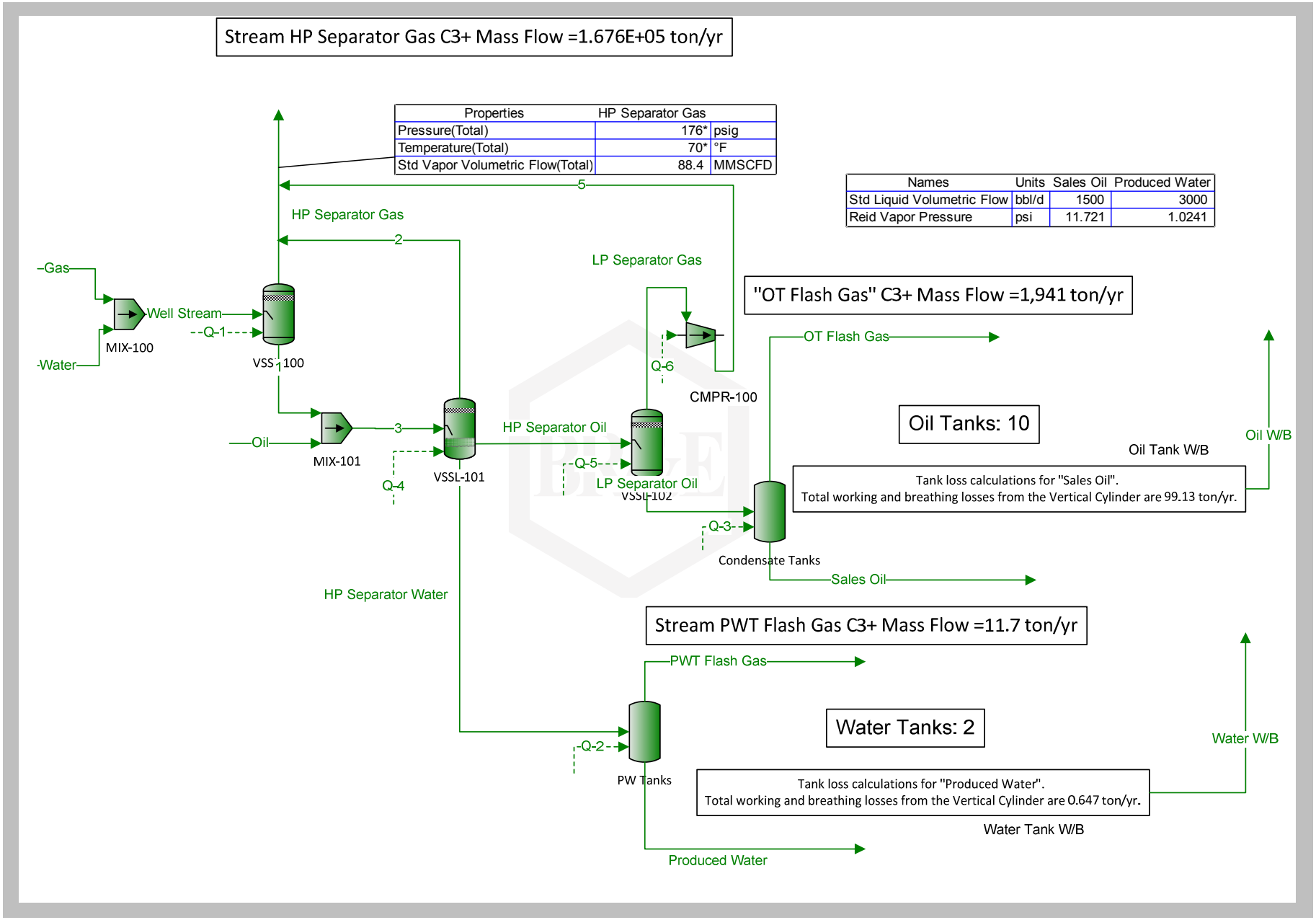
with

TSWEET® & PROSIM®

Simulation Report	
Client Name:	Antero Resources Corporation
Location:	West Virginia
Job:	Robert Williams Well Pad

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

Report Created:	7/14/2015 15:11


Stream HP Separator Gas C3+ Mass Flow =1.676E+05 ton/yr
Properties | HP Separator Gas
Pressure(Total) | 176* | psig
Temperature(Total) | 70* | °F
Std Vapor Volumetric Flow(Total) | 88.4 | MMSCFD
Names | Units | Sales Oil | Produced Water
Std Liquid Volumetric Flow | bbl/d | 1500 | 3000
Reid Vapor Pressure | psi | 11.721 | 1.0241
"OT Flash Gas" C3+ Mass Flow =1,941 ton/yr
Oil Tanks: 10
Stream PWT Flash Gas C3+ Mass Flow =11.7 ton/yr
Water Tanks: 2
Tank loss calculations for "Sales Oil".
Total working and breathing losses from the Vertical Cylinder are 99.13 ton/yr.
Tank loss calculations for "Produced Water".
Total working and breathing losses from the Vertical Cylinder are 0.647 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
Oil W/B
Oil Tank W/B
Q-3
Condensate Tanks
Sales Oil
HP Separator Water
PWT Flash Gas
Q-2
PW Tanks
Water W/B
Water Tank 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		20.1783	0.200665	99.9673	0.0518649	0.236556	0.00493103	0	100	0	99.9967	3.02980	0.000120063	94.3313	99.9676	93.9312	0.0260665
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.394844	0.493686	0.000124878	0.0166715	0.0120889	1.92682E-05	0.494658	0	0.0179998	4.63224E-06	0.395332	0.000471190	0.00701982	7.84662E-05	0.00116064	0.00112061
Carbon Dioxide		0.117112	0.146204	0.000864497	0.0317965	0.139482	0.00259295	0.146717	0	0.0309997	0.000531341	1.09584	0.164103	1.31069	0.000921888	0.00273812	0.0150839
Methane		62.0229	77.5461	0.0236500	4.71884	8.95458	0.0431145	77.7018	0	4.76595	0.00173450	72.0524	1.95713	3.55457	0.0243017	0.310624	0.856272
Ethane		11.3350	14.1718	0.00534633	5.70817	29.1679	0.866275	14.2004	0	5.72594	0.000451387	16.0934	36.8296	0.732518	0.00486664	0.350331	3.44875
Propane		3.58745	4.48525	0.00184900	6.54027	30.6125	3.39299	4.49433	0	6.54493	0.000170941	5.51707	32.6678	0.0611964	0.00166416	0.396776	5.87672
Isobutane		0.452323	0.565558	7.51268E-05	2.06705	5.87699	1.70539	0.566666	0	2.06698	2.57126E-06	0.238541	5.94479	0.000331272	6.81073E-05	0.124877	2.08604
n-Butane		0.945040	1.18158	0.000324683	5.90958	12.9949	5.41362	1.18394	0	5.90894	2.35040E-05	0.990198	12.9114	0.00206948	0.000306607	0.357096	6.10540
Isopentane		0.299286	0.374206	5.45846E-05	3.77106	3.73493	4.05972	0.374944	0	3.76996	2.77093E-06	0.170349	3.54633	8.92161E-05	6.37943E-05	0.227707	4.03009
n-Pentane		0.232628	0.290861	5.32408E-05	5.04724	3.84684	5.58155	0.291434	0	5.04595	2.67721E-06	0.166238	3.59230	6.34930E-05	4.81851E-05	0.304742	5.42326
2-Methylpentane		0	0	5.00147E-06	2.52565	0.821568	2.93277	0	0	2.52497	1.22974E-07	0.0160390	0.757175	1.16940E-06	0	0.152469	2.74013
3-Methylpentane		0	0	8.07517E-06	1.64535	0.482458	1.91719	0	0	1.64498	5.16919E-07	0.0248495	0.442328	4.39259E-06	0	0.0993314	1.78627
n-Hexane		0.435159	0.544106	6.80831E-06	6.01817	1.42299	7.05525	0.545164	0	6.01594	1.33782E-07	0.0219437	0.0887230	6.19607E-08	3.20536E-05	0.363299	6.54132
Methylcyclopentane		0	0	1.13947E-05	0.924096	0.213438	1.08398	0	0	0.923991	1.94112E-06	0.0310821	0.179156	1.18156E-05	0	0.0557947	1.00454
Benzene		0	0	0.000174496	0.280368	0.0652294	0.328809	0	0	0.282997	0.000159014	0.0510594	0.00334940	5.96557E-05	0	0.0170886	0.304757
2-Methylhexane		0	0	1.27918E-06	2.38570	0.240401	2.83717	0	0	2.38498	2.66991E-08	0.00411777	0.0141882	4.91677E-09	0	0.144015	2.60022
3-Methylhexane		0	0	1.00406E-06	1.87956	0.180805	2.23630	0	0	1.87898	2.18843E-08	0.00322908	0.160359	5.77874E-08	0	0.113461	2.04874
Heptane		0	0	2.13051E-06	4.79343	0.365936	5.71503	0	0	4.79195	4.66893E-08	0.00685094	0.299226	9.00179E-08	0	0.289359	5.22693
Methylcyclohexane		0	0	8.89689E-06	3.40290	0.266840	4.05629	0	0	3.40197	1.06412E-06	0.0257525	0.216407	2.09056E-06	0	0.205426	3.71051
Toluene		0	0	0.000100916	0.742657	0.0475918	0.886575	0	0	0.743993	9.02754E-05	0.0350743	0.00525696	1.97113E-05	0	0.0449256	0.810019
Octane		0	0	7.98744E-07	9.69198	0.233128	11.6183	0	0	9.68890	1.16357E-08	0.00258776	0.179636	6.62448E-09	0	0.585059	10.5794
Ethylbenzene		0	0	2.09845E-05	0.509831	0.0109290	0.611328	0	0	0.509995	1.85645E-05	0.00797455	0.00225398	2.52038E-06	0	0.0307958	0.556543
m-Xylene		0	0	2.73276E-05	0.776815	0.0139544	0.931799	0	0	0.776992	2.42716E-05	0.0100711	0.00370475	3.55339E-06	0	0.0469183	0.848047
o-Xylene		0	0	3.37271E-05	0.792720	0.0127782	0.951058	0	0	0.792992	3.08559E-05	0.00947031	0.00292437	3.49357E-06	0	0.0478844	0.865442
Nonane		0	0	2.38547E-07	5.65875	0.0448164	6.79478	0	0	5.65694	5.47825E-09	0.000766258	0.0311061	9.23454E-10	0	0.341591	6.17886
C10+		0	0	3.20510E-10	24.1095	0.000454374	28.9732	0	0	24.1018	1.03564E-12	1.05033E-06	0.000216943	2.85534E-16	0	1.45537	26.3294
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		2448.92	19.4768	2429.36	0.0809760	0.0308595	0.00640636	0	2448.92	0	2429.34	0.0223955	6.14993E-07	0.00757593	2429.44	2429.44	0.0372658
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		47.9198	47.9179	0.00303473	0.0260289	0.00157704	2.50332E-05	47.9198	0	0.0281119	0.000112536	0.00292219	2.41354E-06	5.63775E-07	0.00190691	0.0300188	0.00160207
Carbon Dioxide		14.2132	14.1908	0.0210086	0.0496434	0.0181958	0.00336875	14.2132	0	0.0484149	0.0129085	0.00810014	0.000840574	0.000105264	0.0224040	0.0708189	0.0215646
Methane		7527.33	7526.74	0.574731	7.36747	1.16815	0.0560140	7527.33	0	7.44340	0.0421381	0.532593	0.0100249	0.000285475	0.590586	8.03399	1.22417
Ethane		1375.65	1375.54	0.129924	8.91209	3.80503	1.12546	1375.65	0	8.94270	0.0109661	0.118958	0.188650	5.88299E-05	0.118270	9.06097	4.93049
Propane		435.386	435.346	0.0449336	10.2112	3.99349	4.40815	435.386	0	10.2218	0.00415287	0.0407808	0.167332	4.91479E-06	0.0404429	10.2622	8.40163
Isobutane		54.8956	54.8939	0.00182570	3.22725	0.766671	2.21563	54.8956	0	3.22818	6.24665E-05	0.00176323	0.0304506	2.66051E-08	0.00165516	3.22984	2.98230
n-Butane		114.694	114.686	0.00789030	9.22654	1.69522	7.03334	114.694	0	9.22851	0.000571010	0.00731929	0.0661354	1.66204E-07	0.00745123	9.23596	8.72857
Isopentane		36.3225	36.3210	0.00132649	5.88771	0.487233	5.27437	36.3225	0	5.88788	6.73175E-05	0.00125917	0.0181651	7.16511E-09	0.00155034	5.88943	5.76160
n-Pentane		28.2326	28.2314	0.00129383	7.88018	0.501831	7.25151	28.2326	0	7.88070	6.50407E-05	0.00122879	0.0184006	5.09924E-09	0.00117101	7.88187	7.75335
2-Methylpentane		0	0	0.000121543	3.94327	0.107176	3.81024	0	0	3.94347	2.98754E-06	0.000118556	0.00387843	9.39165E-11	0	3.94347	3.91741
3-Methylpentane		0	0	0.000196239	2.56887	0.0629381	2.49080	0	0	2.56911	1.25581E-05	0.000183681	0.00226571	3.52777E-10	0	2.56911	2.55374
n-Hexane		52.8125	52.8117	0.000165452	9.39609	0.185633	9.16614	52.8125	0	9.39562	3.25012E-06	0.000162202	0.000454460	4.97618E-12	0.000778976	9.39639	9.35177
Methylcyclopentane		0	0	0.000276909	1.44278	0.0278436	1.40829	0	0	1.44308	4.71578E-05	0.000229751	0.000917679	9.48935E-10	0	1.44308	1.43614
Benzene		0	0	0.00424052	0.437734	0.00850937	0.427186	0	0	0.441981	0.00386310	0.000377418	1.71564E-05	4.79106E-09	0	0.441981	0.435695
2-Methylhexane		0	0	3.10861E-05	3.72477	0.0313610	3.68603	0	0	3.72482	6.48632E-07	3.04375E-05	7.26755E-05	3.94875E-13	0	3.72482	3.71739
3-Methylhexane		0	0	2.44002E-05	2.93453	0.0235866	2.90539	0	0	2.93457	5.31660E-07	2.38685E-05	0.000821397	4.64102E-12	0	2.93457	2.92897
Heptane		0	0	5.17747E-05	7.48392	0.0477374	7.42492	0	0	7.48401	1.13428E-06	5.06404E-05	0.00153271	7.22951E-12	0	7.48401	7.47266
Methylcyclohexane		0	0	0.000216208	5.31290	0.0348101	5.26991	0	0	5.31315	2.58519E-05	0.000190356	0.00110849	1.67897E-10	0	5.31315	5.30472
Toluene		0	0	0.00245243	1.15950	0.00620850	1.15183	0	0	1.16196	0.00219317	0.000259260	2.69274E-05	1.58305E-09	0	1.16196	1.15804
Octane		0	0	1.94107E-05	15.1320	0.0304123	15.0944	0	0	15.1320	2.82679E-07	1.91280E-05	0.000920137	5.32025E-13	0	15.1320	15.1248
Ethylbenzene		0	0	0.000509955	0.795992	0.00142573	0.794234	0	0	0.796503	0.000451009	5.89458E-05	1.15454E-05	2.02417E-10	0	0.796503	0.795660
m-Xylene		0	0	0.000664102	1.21283	0.00182039	1.21059	0	0	1.21350	0.000589659	7.44427E-05	1.89766E-05	2.85380E-10	0	1.21350	1.21241
o-Xylene		0	0	0.000819620	1.23766	0.00166695	1.23561	0	0	1.23848	0.000749618	7.00021E-05	1.49793E-05	2.80575E-10	0	1.23848	1.23728
Nonane		0	0	5.79707E-06	8.83493	0.00584644	8.82773	0	0	8.83494	1.33090E-07	5.66398E-06	0.000159333	7.41643E-14	0	8.83494	8.83358
C10+		0	0	7.78889E-09	37.6418	5.92744E-05	37.6417	0	0	37.6418	2.51599E-11	7.76373E-09	1.11123E-06	2.29317E-20	0	37.6418	37.6418
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		17.8998	0.173114	99.9595	0.00856208	0.0962168	0.000717497	0	100	0	99.9943	2.58051	4.89512E-05	92.3995	99.9620	71.9570	0.00402896
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.544645	0.662271	0.000194168	0.00427961	0.00764591	4.35962E-06	0.663391	0	0.00462148	7.20285E-06	0.523574	0.000298726	0.0106921	0.000122006	0.00138256	0.000269333
Carbon Dioxide		0.253788	0.308123	0.00211171	0.0128230	0.138593	0.000921685	0.309119	0	0.0125041	0.00129798	2.28004	0.163446	3.13631	0.00225195	0.00512414	0.00569546
Methane		48.9942	59.5731	0.0210585	0.693699	3.24333	0.00558644	59.6762	0	0.700758	0.00154452	54.6474	0.710565	3.10050	0.0216392	0.211899	0.117856
Ethane		16.7827	20.4063	0.00892279	1.57283	19.8016	0.210386	20.4417	0	1.57803	0.000753384	22.8779	25.0627	1.19760	0.00812238	0.447940	0.889715
Propane		7.78938	9.47113	0.00452541	2.64275	30.4768	1.20842	9.48766	0	2.64514	0.000418398	11.5015	32.6007	0.146721	0.00407310	0.743984	2.22331
Isobutane		1.29453	1.57412	0.000242361	1.10092	7.71210	0.800583	1.57677	0	1.10110	8.29537E-06	0.655473	7.81971	0.00104689	0.000219720	0.308637	1.04024
n-Butane		2.70467	3.28871	0.00104743	3.14748	17.0526	2.54139	3.29435	0	3.14774	7.58284E-05	2.72091	16.9835	0.00653996	0.000989140	0.882571	3.04457
Isopentane		1.06326	1.29288	0.000218587	2.49320	6.08397	2.36574	1.29507	0	2.49295	1.10969E-05	0.581056	5.79056	0.000349981	0.000255473	0.698599	2.49467
n-Pentane		0.826442	1.00492	0.000213206	3.33693	6.26625	3.25256	1.00663	0	3.33672	1.07216E-05	0.567036	5.86561	0.000249074	0.000192964	0.934941	3.35706
2-Methylpentane		0	0	2.39225E-05	1.99444	1.59846	2.04128	0	0	1.99429	5.88224E-07	0.0653446	1.47670	5.47921E-06	0	0.558712	2.02593
3-Methylpentane		0	0	3.86243E-05	1.29929	0.938681	1.33441	0	0	1.29925	2.47260E-06	0.101240	0.862661	2.05815E-05	0	0.363992	1.32069
n-Hexane		1.84652	2.24536	3.25647E-05	4.75239	2.76859	4.91063	2.24910	0	4.75154	6.39924E-07	0.0894013	0.173034	2.90317E-07	0.000153319	1.33128	4.83635
Methylcyclopentane		0	0	5.32269E-05	0.712664	0.405554	0.736824	0	0	0.712719	9.06783E-06	0.123670	0.341229	5.40670E-05	0	0.199673	0.725337
Benzene		0	0	0.000756532	0.200683	0.115036	0.207444	0	0	0.202603	0.000689445	0.188557	0.00592102	0.000253362	0	0.0567606	0.204240
2-Methylhexane		0	0	7.11432E-06	2.19057	0.543860	2.29616	0	0	2.19032	1.48498E-07	0.0195069	0.0321748	2.67873E-08	0	0.613632	2.23540
3-Methylhexane		0	0	5.58419E-06	1.72582	0.409037	1.80987	0	0	1.72562	1.21718E-07	0.0152970	0.363648	3.14834E-07	0	0.483444	1.76130
Heptane		0	0	1.18491E-05	4.40136	0.827859	4.62525	0	0	4.40085	2.59682E-07	0.0324546	0.678559	4.90431E-07	0	1.23292	4.49358
Methylcyclohexane		0	0	4.84856E-05	3.06171	0.591530	3.21677	0	0	3.06145	5.79948E-06	0.119542	0.480875	1.11606E-05	0	0.857684	3.12574

Toluene		0	0	0.000516093	0.627038	0.0990030	0.659778	0	0	0.628285	0.000461699	0.152785	0.0109620	9.87479E-05	0	0.176018	0.640333
Octane		0	0	5.06416E-06	10.1450	0.601236	10.7191	0	0	10.1437	7.37760E-08	0.0139749	0.464387	4.11433E-08	0	2.84182	10.3683
Ethylbenzene		0	0	0.000123653	0.495989	0.0261962	0.524200	0	0	0.496243	0.000109399	0.0400256	0.00541556	1.45486E-05	0	0.139026	0.506932
m-Xylene		0	0	0.000161030	0.755725	0.0334478	0.798996	0	0	0.756041	0.000143031	0.0505484	0.00890127	2.05115E-05	0	0.211810	0.772451
o-Xylene		0	0	0.000198740	0.771198	0.0306285	0.815511	0	0	0.771610	0.000181831	0.0475331	0.00702629	2.01662E-05	0	0.216171	0.788295
Nonane		0	0	1.69814E-06	6.65058	0.129774	7.03868	0	0	6.64973	3.90000E-08	0.00464622	0.0902884	6.43965E-09	0	1.86296	6.79912
C10+		0	0	3.63976E-09	45.2021	0.00209891	47.8788	0	0	45.1962	1.17614E-11	1.01597E-05	0.00100453	3.17640E-15	0	12.6620	46.2186
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		44117.9	350.880	43765.6	1.45881	0.555942	0.115412	0	44117.9	0	43765.2	0.403462	1.10793E-05	0.136482	43767.0	43767.0	0.671355
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		1342.40	1342.34	0.0850130	0.729159	0.0441782	0.000701264	1342.40	0	0.787509	0.00315252	0.0818605	6.76116E-05	1.57933E-05	0.0534190	0.840928	0.0448795
Carbon Dioxide		625.514	624.528	0.924579	2.18478	0.800790	0.148257	625.514	0	2.13072	0.568096	0.356483	0.0369933	0.00463262	0.985988	3.11670	0.949047
Methane		120757	120747	9.22010	118.192	18.7400	0.898603	120757	0	119.410	0.675999	8.54410	0.160824	0.00457971	9.47445	128.885	19.6386
Ethane		41364.6	41361.0	3.90669	267.978	114.414	33.8415	41364.6	0	268.898	0.329739	3.57695	5.67252	0.00176896	3.55628	272.455	148.255
Propane		19198.6	19196.8	1.98138	450.271	176.095	194.380	19198.6	0	450.736	0.183123	1.79825	7.37861	0.000216721	1.78335	452.520	370.475
Isobutane		3190.65	3190.55	0.106114	187.575	44.5606	128.777	3190.65	0	187.629	0.00363069	0.102483	1.76986	1.54634E-06	0.0962017	187.725	173.338
n-Butane		6666.24	6665.81	0.458602	536.267	98.5302	408.793	6666.24	0	536.381	0.0331883	0.425413	3.84393	9.66012E-06	0.433082	536.814	507.323
Isopentane		2620.63	2620.51	0.0957047	424.791	35.1533	380.539	2620.63	0	424.803	0.00485687	0.0908478	1.31059	5.16954E-07	0.111855	424.915	415.692
n-Pentane		2036.94	2036.86	0.0933485	568.546	36.2065	523.188	2036.94	0	568.583	0.00469261	0.0886559	1.32758	3.67904E-07	0.0844868	568.667	559.394
2-Methylpentane		0	0	0.0104740	339.813	9.23593	328.349	0	0	339.830	0.000257452	0.0102166	0.334225	8.09329E-09	0	339.830	337.584
3-Methylpentane		0	0	0.0169110	221.373	5.42371	214.646	0	0	221.394	0.00108220	0.0158288	0.195248	3.04007E-08	0	221.394	220.070
n-Hexane		4551.14	4551.07	0.0142579	809.711	15.9970	789.895	4551.14	0	809.671	0.000280080	0.0139778	0.0391633	4.28824E-10	0.0671285	809.738	805.892
Methylcyclopentane		0	0	0.0233045	121.424	2.34330	118.521	0	0	121.449	0.00396878	0.0193357	0.0772314	7.98619E-08	0	121.449	120.865
Benzene		0	0	0.331235	34.1922	0.664683	33.3683	0	0	34.5240	0.301754	0.0294808	0.00134012	3.74239E-07	0	34.5240	34.0330
2-Methylhexane		0	0	0.00311489	373.229	3.14243	369.347	0	0	373.235	6.49942E-05	0.00304989	0.00728222	3.95672E-11	0	373.235	372.490
3-Methylhexane		0	0	0.00244495	294.045	2.36342	291.125	0	0	294.049	5.32733E-05	0.00239167	0.0823055	4.65039E-10	0	294.049	293.489
Heptane		0	0	0.00518792	749.903	4.78338	743.992	0	0	749.912	0.000113657	0.00507427	0.153580	7.24411E-10	0	749.912	748.775
Methylcyclohexane		0	0	0.0212286	521.653	3.41787	517.432	0	0	521.677	0.00253830	0.0186903	0.108838	1.64852E-08	0	521.677	520.849
Toluene		0	0	0.225963	106.835	0.572041	106.128	0	0	107.061	0.202075	0.0238878	0.00248105	1.45860E-07	0	107.061	106.700
Octane		0	0	0.00221726	1728.50	3.47395	1724.21	0	0	1728.51	3.22901E-05	0.00218497	0.105106	6.07724E-11	0	1728.51	1727.69
Ethylbenzene		0	0	0.0541393	84.5065	0.151362	84.3198	0	0	84.5608	0.0478814	0.00625799	0.00122572	2.14896E-08	0	84.5608	84.4712
m-Xylene		0	0	0.0705044	128.760	0.193262	128.522	0	0	128.831	0.0626012	0.00790321	0.00201465	3.02973E-08	0	128.831	128.715
o-Xylene		0	0	0.0870149	131.397	0.176972	131.178	0	0	131.484	0.0795831	0.00743177	0.00159028	2.97873E-08	0	131.484	131.355
Nonane		0	0	0.000743504	1133.12	0.749836	1132.20	0	0	1133.13	1.70694E-05	0.000726434	0.0204352	9.51195E-12	0	1133.13	1132.95
C10+		0	0	1.59361E-06	7701.51	0.0121275	7701.50	0	0	7701.51	5.14771E-09	1.58846E-06	0.000227359	4.69184E-18	0	7701.51	7701.51

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	59.2	70.0	70.0	70.0	75.9	75.9	67.0	67.0	67.0	75.9	75.94	75.9425	75.9425	70	69.6176	70
Pressure	psig	200	176	176	176	0	0	300	200	300	0	0	8.85520	-14.2259	176	176	40
Mole Fraction Vapor	%	79.9123	100	0	0	100	0	100	0	0	0	100	100	100	0	0.00359171	0
Mole Fraction Light Liquid	%	20.0877	0	100	100	0	100	0	100	100	100	0	0	0	100	6.03750	100
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93.9589	0
Molecular Weight	lb/lbmol	20.3	20.9	18.0	109.1	44.3	123.8	20.9	18.0	109.1	18.0	21.1519	44.1863	18.3919	18.0163	23.5168	116.555
Mass Density	lb/ft^3	1.0	0.7	62.3	45.0	0.1	45.8	1.3	62.3	45.2	62.2	0.0542853	0.186042	0.00150478	62.2619	56.0981	45.4789
Molar Flow	lbmol/h	12136.4	9706.1	2430.2	156.1	13.0	129.9	9687.5	2448.9	156.2	2429.4	0.739174	0.512224	0.00803119	2430.23	2586.41	142.965
Mass Flow	lb/h	246471.5	202687.8	43783.3	17038.0	577.8	16085.4	202353.6	44117.9	17040.2	43767.7	15.6349	22.6333	0.147709	43783.7	60823.9	16663.2
Vapor Volumetric Flow	MCFH	237.1	274.9	0.7	0.4	5.0	0.4	159.5	0.7	0.4	0.7	0.288014	0.121657	0.0981596	0.703218	1.08424	0.366395
Liquid Volumetric Flow	Mbbl/d	1013.7	1175.2	3.0	1.6	21.4	1.5	681.6	3.0	1.6	3.0	1.23114	0.520033	0.419591	3.00597	4.63468	1.56619
Std Vapor Volumetric Flow	MMSCFD	110.5	88.4	22.1	1.4	0.1	1.2	88.2	22.3	1.4	22.1	0.00673212	0.00466514	7.31451E-05	22.1336	23.5560	1.30207
Std Liquid Volumetric Flow	Mbbl/d	43.5	40.5	3.0	1.6	0.1	1.5	40.5	3.0	1.6	3.0	0.00304527	0.00319506	1.11622E-05	3.00305	4.64870	1.58022
Compressibility		0.753	0.950	0.010	0.081	0.983	0.007	0.916	0.011	0.135	0.001	0.996213	0.973139	0.999551	0.00970768	0.0140739	0.0246608
Specific Gravity			0.721	0.998	0.722	1.529	0.734	0.721	0.999	0.724	0.998	0.730318	1.52563	0.635024	0.998282		0.729190
API Gravity				10.0	63.2		59.4		10.0	63.0	10.0				10.0441		61.2866
Enthalpy	MMBtu/h	-635.6	-334.8	-298.9	-14.8	-0.6	-13.5	-334.2	-301.4	-14.8	-298.6	-0.0276343	-0.0234524	-0.000817042	-298.873	-313.716	-14.2796
Mass Enthalpy	Btu/lb	-2578.7	-1651.7	-6826.0	-870.3	-1042.5	-841.8	-1651.6	-6830.9	-871.0	-6822.3	-1767.47	-1036.19	-5531.43	-6826.13	-5157.77	-856.952
Mass Cp	Btu/(lb*°F)	0.6	0.5	1.0	0.5	0.4	0.5	0.5	1.0	0.5	1.0	0.471760	0.407944	0.443277	0.983065	0.844943	0.486495
Ideal Gas CpCv Ratio		1.264	1.249	1.326	1.051	1.125	1.044	1.250	1.326	1.051	1.326	1.24959	1.12552	1.32218	1.32581	1.24534	1.04740
Dynamic Viscosity	cP		0.0	1.0	0.5	0.0	0.7	0.0	1.0	0.5	0.9	0.0106605	0.00837436	0.0102449	0.995521		0.602248
Kinematic Viscosity	cSt		0.9	1.0	0.7	4.5	0.9	0.5	1.0	0.8	0.9	12.2595	2.81009	425.023	0.998177		0.826695
Thermal Conductivity	Btu/(h*ft*°F)		0.0	0.3	0.1	0.0	0.1	0.0	0.3	0.1	0.3	0.0169405	0.0105211	0.0122167	0.346580		0.0691505
Surface Tension	lbf/ft			0.005	0.001		0.002		0.005	0.001	0.005				0.00504013		0.00155106
Net I.G. Heating Value	Btu/ft^3	911.5	1139.6	0.4	5484.8	2315.5	6204.6	1141.9	0.0	5484.2	0.0	1103.89	2313.86	45.6837	0.355148	331.497	5849.70
Net Liquid Heating Value	Btu/lb	16792.1	20646.6	-1051.4	18902.9	19681.2	18845.5	20684.2	-1059.8	18904.8	-1058.8	19713.8	19714.5	-40.9993	-1051.90	4539.09	18874.5
Gross I.G. Heating Value	Btu/ft^3	1015.0	1256.4	50.7	5889.3	2516.4	6655.9	1258.8	50.3	5888.7	50.4	1218.05	2514.75	97.9514	50.6854	403.213	6278.22
Gross Liquid Heating Value	Btu/lb	18725.9	22769.3	8.7	20308.4	21402.3	20227.7	22808.7	0.0	20310.4	0.9	21761.9	21439.6	1037.5	8.2	5696.0	20268.4

Process Streams		**Well Stream**	**HP Separator Gas**	**HP Separator Water**	**HP Separator Oil**	**OT Flash Gas**	**Sales Oil**	**Gas**	**Water**	**Oil**	**Produced Water**	**PWT Flash Gas**	**Oil W/B**	**Water W/B**	**1**	**3**	**LP Separator Oil**
Phase: Vapor	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water		0.123328	0.200665	0.200643	0.200643	0.236556	0.236556	0			3.02980	3.02980	0.000120063	94.3313	0.200665	0.198062	0.332043
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		0.494073	0.493686	0.784865	0.784865	0.0120889	0.0120889	0.494658			0.395332	0.395332	0.000471190	0.00701982	0.493686	0.790213	0.185558
Carbon Dioxide		0.146257	0.146204	0.137077	0.137077	0.139482	0.139482	0.146717			1.09584	1.09584	0.164103	1.31069	0.146204	0.136671	0.213300
Methane		77.6063	77.5461	75.4278	75.4278	8.95458	8.95458	77.7018			72.0524	72.0524	1.95713	3.55457	77.5461	75.5135	46.6674
Ethane		14.1828	14.1718	15.5745	15.5745	29.1679	29.1679	14.2004			16.0934	16.0934	36.8296	0.732518	14.1718	15.5296	30.2461
Propane		4.48868	4.48525	4.98927	4.98927	30.6125	30.6125	4.49433			5.51707	5.51707	32.6678	0.0611964	4.48525	4.96585	13.7465

Isobutane		0.566002	0.565558	0.624984	0.624984	5.87699	5.87699	0.566666			0.238541	0.238541	5.94479	0.000331272	0.565558	0.621370	1.86077
n-Butane		1.18250	1.18158	1.25360	1.25360	12.9949	12.9949	1.18394			0.990198	0.990198	12.9114	0.00206948	1.18158	1.24579	3.78285
Isopentane		0.374498	0.374206	0.320870	0.320870	3.73493	3.73493	0.374944			0.170349	0.170349	3.54633	8.92161E-05	0.374206	0.318550	0.958004
n-Pentane		0.291089	0.290861	0.322212	0.322212	3.84684	3.84684	0.291434			0.166238	0.166238	3.59230	6.34930E-05	0.290861	0.319752	0.963507
2-Methylpentane		0	0	0.0670249	0.0670249	0.821568	0.821568	0			0.0160390	0.0160390	0.757175	1.16940E-06	0	0.0664472	0.196416
3-Methylpentane		0	0	0.0392460	0.0392460	0.482458	0.482458	0			0.0248495	0.0248495	0.442328	4.39259E-06	0	0.0389036	0.114924
n-Hexane		0.544536	0.544106	0.116010	0.116010	1.42299	1.42299	0.545164			0.0219437	0.0219437	0.0887230	6.19607E-08	0.544106	0.114961	0.336650
Methylcyclopentane		0	0	0.0171433	0.0171433	0.213438	0.213438	0			0.0310821	0.0310821	0.179156	1.18156E-05	0	0.0169902	0.0504509
Benzene		0	0	0.00522765	0.00522765	0.0652294	0.0652294	0			0.0510594	0.0510594	0.00334940	5.96557E-05	0	0.00518137	0.0154891
2-Methylhexane		0	0	0.0200013	0.0200013	0.240401	0.240401	0			0.00411777	0.00411777	0.0141882	4.91677E-09	0	0.0197963	0.0560408
3-Methylhexane		0	0	0.0150376	0.0150376	0.180805	0.180805	0			0.00322908	0.00322908	0.160359	5.77874E-08	0	0.0148843	0.0421687
Heptane		0	0	0.0308542	0.0308542	0.365936	0.365936	0			0.00685094	0.00685094	0.299226	9.00179E-08	0	0.0305361	0.0855190
Methylcyclohexane		0	0	0.0220095	0.0220095	0.266840	0.266840	0			0.0257525	0.0257525	0.216407	2.09056E-06	0	0.0217868	0.0621705
Toluene		0	0	0.00390780	0.00390780	0.0475918	0.0475918	0			0.0350743	0.0350743	0.00525696	1.97113E-05	0	0.00386767	0.0110873
Octane		0	0	0.0203851	0.0203851	0.233128	0.233128	0			0.00258776	0.00258776	0.179636	6.62448E-09	0	0.0201481	0.0540506
Ethylbenzene		0	0	0.000932061	0.000932061	0.0109290	0.0109290	0			0.00797455	0.00797455	0.00225398	2.52038E-06	0	0.000921338	0.00252691
m-Xylene		0	0	0.00119489	0.00119489	0.0139544	0.0139544	0			0.0100711	0.0100711	0.00370475	3.55339E-06	0	0.00118081	0.00321890
o-Xylene		0	0	0.00109350	0.00109350	0.0127782	0.0127782	0			0.00947031	0.00947031	0.00292437	3.49357E-06	0	0.00108056	0.00294575
Nonane		0	0	0.00403281	0.00403281	0.0448164	0.0448164	0			0.000766258	0.000766258	0.0311061	9.23454E-10	0	0.00398079	0.0102469
C10+		0	0	5.17376E-05	5.17376E-05	0.000454374	0.000454374	0			1.05033E-06	1.05033E-06	0.000216943	0	0	5.07171E-05	0.000102952
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		11.9609	19.4768	0	0	0.0308595	0	0			0	0.0223955	6.14993E-07	0.00757593	0	0.000183992	0
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		47.9174	47.9179	0	0	0.00157704	0	47.9198			0	0.00292219	2.41354E-06	5.63775E-07	0	0.000734079	0
Carbon Dioxide		14.1847	14.1908	0	0	0.0181958	0	14.2132			0	0.00810014	0.000840574	0.000105264	0	0.000126962	0
Methane		7526.61	7526.74	0	0	1.16815	0	7527.33			0	0.532593	0.0100249	0.000285475	0	0.0701492	0
Ethane		1375.51	1375.54	0	0	3.80503	0	1375.65			0	0.118958	0.188650	5.88299E-05	0	0.0144264	0
Propane		435.333	435.346	0	0	3.99349	0	435.386			0	0.0407808	0.167332	4.91479E-06	0	0.00461309	0
Isobutane		54.8935	54.8939	0	0	0.766671	0	54.8956			0	0.00176323	0.0304506	2.66051E-08	0	0.000577229	0
n-Butane		114.684	114.686	0	0	1.69522	0	114.694			0	0.00731929	0.0661354	1.66204E-07	0	0.00115730	0
Isopentane		36.3206	36.3210	0	0	0.487233	0	36.3225			0	0.00125917	0.0181651	7.16511E-09	0	0.000295921	0
n-Pentane		28.2311	28.2314	0	0	0.501831	0	28.2326			0	0.00122879	0.0184006	5.09924E-09	0	0.000297038	0
2-Methylpentane		0	0	0	0	0.107176	0	0			0	0.000118556	0.00387843	9.39165E-11	0	6.17270E-05	0
3-Methylpentane		0	0	0	0	0.0629381	0	0			0	0.000183681	0.00226571	3.52777E-10	0	3.61400E-05	0
n-Hexane		52.8116	52.8117	0	0	0.185633	0	52.8125			0	0.000162202	0.000454460	4.97618E-12	0	0.000106794	0
Methylcyclopentane		0	0	0	0	0.0278436	0	0			0	0.000229751	0.000917679	9.48935E-10	0	1.57833E-05	0
Benzene		0	0	0	0	0.00850937	0	0			0	0.000377418	1.71564E-05	4.79106E-09	0	4.81330E-06	0
2-Methylhexane		0	0	0	0	0.0313610	0	0			0	3.04375E-05	7.26755E-05	3.94875E-13	0	1.83900E-05	0
3-Methylhexane		0	0	0	0	0.0235866	0	0			0	2.38685E-05	0.000821397	4.64102E-12	0	1.38269E-05	0
Heptane		0	0	0	0	0.0477374	0	0			0	5.06404E-05	0.00153271	7.22951E-12	0	2.83669E-05	0
Methylcyclohexane		0	0	0	0	0.0348101	0	0			0	0.000190356	0.00110849	1.67897E-10	0	2.02392E-05	0
Toluene		0	0	0	0	0.00620850	0	0			0	0.000259260	2.69274E-05	1.58305E-09	0	3.59292E-06	0
Octane		0	0	0	0	0.0304123	0	0			0	1.91280E-05	0.000920137	5.32025E-13	0	1.87169E-05	0
Ethylbenzene		0	0	0	0	0.00142573	0	0			0	5.89458E-05	1.15454E-05	2.02417E-10	0	8.55889E-07	0
m-Xylene		0	0	0	0	0.00182039	0	0			0	7.44427E-05	1.89766E-05	2.85380E-10	0	1.09693E-06	0
o-Xylene		0	0	0	0	0.00166695	0	0			0	7.00021E-05	1.49793E-05	2.80575E-10	0	1.00380E-06	0
Nonane		0	0	0	0	0.00584644	0	0			0	5.66398E-06	0.000159333	7.41643E-14	0	3.69801E-06	0
C10+		0	0	0	0	5.92744E-05	0	0			0	7.76373E-09	1.11123E-06	0	0	4.71143E-08	0
Mass Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water		0.106384	0.173114	0.170589	0.170589	0.0962168	0.0962168	0			2.58051	2.58051	4.89512E-05	92.3995	0.173114	0.168574	0.210127
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		0.662720	0.662271	1.03764	1.03764	0.00764591	0.00764591	0.663391			0.523574	0.523574	0.000298726	0.0106921	0.662271	1.04582	0.182596
Carbon Dioxide		0.308203	0.308123	0.284706	0.284706	0.138593	0.138593	0.309119			2.28004	2.28004	0.163446	3.13631	0.308123	0.284166	0.329749
Methane		59.6131	59.5731	57.1071	57.1071	3.24333	3.24333	59.6762			54.6474	54.6474	0.710565	3.10050	59.5731	57.2327	26.2985
Ethane		20.4199	20.4063	22.1015	22.1015	19.8016	19.8016	20.4417			22.8779	22.8779	25.0627	1.19760	20.4063	22.0611	31.9474
Propane		9.47737	9.47113	10.3829	10.3829	30.4768	30.4768	9.48766			11.5015	11.5015	32.6007	0.146721	9.47113	10.3452	21.2929
Isobutane		1.57519	1.57412	1.71435	1.71435	7.71210	7.71210	1.57677			0.655473	0.655473	7.81971	0.00104689	1.57412	1.70624	3.79910
n-Butane		3.29092	3.28871	3.43866	3.43866	17.0526	17.0526	3.29435			2.72091	2.72091	16.9835	0.00653996	3.28871	3.42088	7.72339
Isopentane		1.29376	1.29288	1.09256	1.09256	6.08397	6.08397	1.29507			0.581056	0.581056	5.79056	0.000349981	1.29288	1.08581	2.42797
n-Pentane		1.00561	1.00492	1.09713	1.09713	6.26625	6.26625	1.00663			0.567036	0.567036	5.86561	0.000249074	1.00492	1.08991	2.44191
2-Methylpentane		0	0	0.272588	0.272588	1.59846	1.59846	0			0.0653446	0.0653446	1.47670	5.47921E-06	0	0.270526	0.594575
3-Methylpentane		0	0	0.159612	0.159612	0.938681	0.938681	0			0.101240	0.101240	0.862661	2.05815E-05	0	0.158388	0.347888
n-Hexane		2.24690	2.24536	0.471810	0.471810	2.76859	2.76859	2.24910			0.0894013	0.0894013	0.173034	2.90317E-07	2.24536	0.468038	1.01908
Methylcyclopentane		0	0	0.0680902	0.0680902	0.405554	0.405554	0			0.123670	0.123670	0.341229	5.40670E-05	0	0.0675540	0.149148

Benzene		0	0	0.0192713	0.0192713	0.115036	0.115036	0			0.188557	0.188557	0.00592102	0.000253362	0	0.0191210	0.0425002
2-Methylhexane		0	0	0.0945851	0.0945851	0.543860	0.543860	0			0.0195069	0.0195069	0.0321748	2.67873E-08	0	0.0937150	0.197254
3-Methylhexane		0	0	0.0711119	0.0711119	0.409037	0.409037	0			0.0152970	0.0152970	0.363648	3.14834E-07	0	0.0704616	0.148427
Heptane		0	0	0.145908	0.145908	0.827859	0.827859	0			0.0324546	0.0324546	0.678559	4.90431E-07	0	0.144557	0.301013
Methylcyclohexane		0	0	0.101987	0.101987	0.591530	0.591530	0			0.119542	0.119542	0.480875	1.11606E-05	0	0.101063	0.214428
Toluene		0	0	0.0169926	0.0169926	0.0990030	0.0990030	0			0.152785	0.152785	0.0109620	9.87479E-05	0	0.0168360	0.0358851
Octane		0	0	0.109894	0.109894	0.601236	0.601236	0			0.0139749	0.0139749	0.464387	4.11433E-08	0	0.108732	0.216881
Ethylbenzene		0	0	0.00466996	0.00466996	0.0261962	0.0261962	0			0.0400256	0.0400256	0.00541556	1.45486E-05	0	0.00462114	0.00942362
m-Xylene		0	0	0.00598683	0.00598683	0.0334478	0.0334478	0			0.0505484	0.0505484	0.00890127	2.05115E-05	0	0.00592257	0.0120043
o-Xylene		0	0	0.00547885	0.00547885	0.0306285	0.0306285	0			0.0475331	0.0475331	0.00702629	2.01662E-05	0	0.00541973	0.0109856
Nonane		0	0	0.0244101	0.0244101	0.129774	0.129774	0			0.00464622	0.00464622	0.0902884	6.43965E-09	0	0.0241209	0.0461651
C10+		0	0	0.000499574	0.000499574	0.00209891	0.00209891	0			1.01597E-05	1.01597E-05	0.00100453	0	0	0.000490240	0.000739921
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		215.479	350.880	0	0	0.555942	0	0			0	0.403462	1.10793E-05	0.136482	0	0.00331466	0
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		1342.33	1342.34	0	0	0.0441782	0	1342.40			0	0.0818605	6.76116E-05	1.57933E-05	0	0.0205640	0
Carbon Dioxide		624.260	624.528	0	0	0.800790	0	625.514			0	0.356483	0.0369933	0.00463262	0	0.00558755	0
Methane		120745	120747	0	0	18.7400	0	120757			0	8.54410	0.160824	0.00457971	0	1.12537	0
Ethane		41360.2	41361.0	0	0	114.414	0	41364.6			0	3.57695	5.67252	0.00176896	0	0.433788	0
Propane		19196.3	19196.8	0	0	176.095	0	19198.6			0	1.79825	7.37861	0.000216721	0	0.203417	0
Isobutane		3190.53	3190.55	0	0	44.5606	0	3190.65			0	0.102483	1.76986	1.54634E-06	0	0.0335498	0
n-Butane		6665.71	6665.81	0	0	98.5302	0	6666.24			0	0.425413	3.84393	9.66012E-06	0	0.0672646	0
Isopentane		2620.48	2620.51	0	0	35.1533	0	2620.63			0	0.0908478	1.31059	5.16954E-07	0	0.0213504	0
n-Pentane		2036.84	2036.86	0	0	36.2065	0	2036.94			0	0.0886559	1.32758	3.67904E-07	0	0.0214309	0
2-Methylpentane		0	0	0	0	9.23593	0	0			0	0.0102166	0.334225	8.09329E-09	0	0.00531934	0
3-Methylpentane		0	0	0	0	5.42371	0	0			0	0.0158288	0.195248	3.04007E-08	0	0.00311437	0
n-Hexane		4551.06	4551.07	0	0	15.9970	0	4551.14			0	0.0139778	0.0391633	4.28824E-10	0	0.00920303	0
Methylcyclopentane		0	0	0	0	2.34330	0	0			0	0.0193357	0.0772314	7.98619E-08	0	0.00132831	0
Benzene		0	0	0	0	0.664683	0	0			0	0.0294808	0.00134012	3.74239E-07	0	0.000375976	0
2-Methylhexane		0	0	0	0	3.14243	0	0			0	0.00304989	0.00728222	3.95672E-11	0	0.00184272	0
3-Methylhexane		0	0	0	0	2.36342	0	0			0	0.00239167	0.0823055	4.65039E-10	0	0.00138549	0
Heptane		0	0	0	0	4.78338	0	0			0	0.00507427	0.153580	7.24411E-10	0	0.00284242	0
Methylcyclohexane		0	0	0	0	3.41787	0	0			0	0.0186903	0.108838	1.64852E-08	0	0.00198720	0
Toluene		0	0	0	0	0.572041	0	0			0	0.0238878	0.00248105	1.45860E-07	0	0.000331046	0
Octane		0	0	0	0	3.47395	0	0			0	0.00218497	0.105106	6.07724E-11	0	0.00213800	0
Ethylbenzene		0	0	0	0	0.151362	0	0			0	0.00625799	0.00122572	2.14896E-08	0	9.08654E-05	0
m-Xylene		0	0	0	0	0.193262	0	0			0	0.00790321	0.00201465	3.02973E-08	0	0.000116455	0
o-Xylene		0	0	0	0	0.176972	0	0			0	0.00743177	0.00159028	2.97873E-08	0	0.000106568	0
Nonane		0	0	0	0	0.749836	0	0			0	0.000726434	0.0204352	9.51195E-12	0	0.000474288	0
C10+		0	0	0	0	0.0121275	0	0			0	1.58846E-06	0.000227359	0	0	9.63959E-06	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	59.2	70.0	70.0	70.0	75.9	75.9	67.0			75.9	75.94	75.9425	75.9425	70	69.6176	70
Pressure	psig	200	176	176	176	0	0	300			0	0	8.85520	-14.2259	176	176	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	20.9	20.9	21.2	21.2	44.3	44.3	20.9			21.2	21.1519	44.1863	18.3919	20.8824	21.1666	28.4678
Mass Density	lb/ft^3	0.9	0.7	0.7	0.7	0.1	0.1	1.3			0.1	0.0542853	0.186042	0.00150478	0.737260	0.748904	0.281578
Molar Flow	lbmol/h	9698.5	9706.1	0.0	0.0	13.0	0.0	9687.5			0.0	0.739174	0.512224	0.00803119	0	0.0928963	0
Mass Flow	lb/h	202548.6	202687.8	0.0	0.0	577.8	0.0	202353.6			0.0	15.6349	22.6333	0.147709	0	1.96630	0
Vapor Volumetric Flow	MCFH	236.4	274.9	0.0	0.0	5.0	0.0	159.5			0.0	0.288014	0.121657	0.0981596	0	0.00262557	0
Liquid Volumetric Flow	Mbbl/d	1010.6	1175.2	0.0	0.0	21.4	0.0	681.6			0.0	1.23114	0.520033	0.419591	0	0.0112232	0
Std Vapor Volumetric Flow	MMSCFD	88.3	88.4	0.0	0.0	0.1	0.0	88.2			0.0	0.00673212	0.00466514	7.31451E-05	0	0.000846065	0
Std Liquid Volumetric Flow	Mbbl/d	40.5	40.5	0.0	0.0	0.1	0.0	40.5			0.0	0.00304527	0.00319506	1.11622E-05	0	0.000390306	0
Compressibility		0.940	0.950	0.949	0.949	0.983	0.983	0.916			0.996	0.996213	0.973139	0.999551	0.950238	0.948878	0.972836
Specific Gravity		0.721	0.721	0.732	0.732	1.529	1.529	0.721			0.730	0.730318	1.52563	0.635024	0.721013	0.730825	0.982915
API Gravity																	
Enthalpy	MMBtu/h	-335.3	-334.8	0.0	0.0	-0.6	0.0	-334.2			0.0	-0.0276343	-0.0234524	-0.000817042	0	-0.00320014	0
Mass Enthalpy	Btu/lb	-1655.4	-1651.7	-1626.3	-1626.3	-1042.5	-1042.5	-1651.6			-1767.5	-1767.47	-1036.19	-5531.43	-1651.67	-1627.50	-1336.70
Mass Cp	Btu/(lb**F)	0.5	0.5	0.5	0.5	0.4	0.4	0.5			0.5	0.471760	0.407944	0.443277	0.502368	0.498947	0.443288
Ideal Gas CpCv Ratio		1.252	1.249	1.247	1.247	1.125	1.125	1.250			1.250	1.24959	1.12552	1.32218	1.24909	1.24730	1.19113

Dynamic Viscosity	cP	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0106605	0.00837436	0.0102449	0.0107125	0.0106903	0.00966994
Kinematic Viscosity	cSt	0.8	0.9	0.9	0.9	4.5	4.5	0.5			12.3	12.2595	2.81009	425.023	0.907084	0.891138	2.14389
Thermal Conductivity	Btu/(h*ft*°F)	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0169405	0.0105211	0.0122167	0.0176599	0.0174964	0.0143682
Surface Tension	lbf/ft																
Net I.G. Heating Value	Btu/ft^3	1140.5	1139.6	1150.8	1150.8	2315.5	2315.5	1141.9			1103.9	1103.89	2313.86	45.6837	1139.61	1149.62	1521.48
Net Liquid Heating Value	Btu/lb	20661.2	20646.6	20543.4	20543.4	19681.2	19681.2	20684.2			19713.8	19713.8	19714.5	-40.9993	20646.6	20544.5	20164.4
Gross I.G. Heating Value	Btu/ft^3	1257.3	1256.4	1268.3	1268.3	2516.4	2516.4	1258.8			1218.1	1218.05	2514.75	97.9514	1256.41	1267.00	1665.57
Gross Liquid Heating Value	Btu/lb	22784.5	22769.3	22647.1	22647.1	21402.3	21402.3	22808.7			21761.9	21761.9	21439.6	1037.5	22769.3	22648.9	22085.1

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		99.9606	99.9676	99.9673	0.0518649	0.00493103	0.00493103		100	0	99.9967	99.9967	3.59707E-06	100.0000	99.9676	0.0513444	0.0260665
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		9.57336E-05	7.84662E-05	0.000124878	0.0166715	1.92682E-05	1.92682E-05		0	0.0179998	4.63224E-06	4.63224E-06	1.22614E-06	2.63051E-09	7.84662E-05	0.0167921	0.00112061
Carbon Dioxide		0.00116890	0.000921888	0.000864497	0.0317965	0.00259295	0.00259295		0	0.0309997	0.000531341	0.000531341	0.00460946	2.04357E-05	0.000921888	0.0317982	0.0150839
Methane		0.0293813	0.0243017	0.0236500	4.71884	0.0431145	0.0431145		0	4.76595	0.00173450	0.00173450	0.0155760	2.74517E-06	0.0243017	4.73058	0.856272
Ethane		0.00597023	0.00486664	0.00534633	5.70817	0.866275	0.866275		0	5.72594	0.000451387	0.000451387	1.78746	6.63004E-07	0.00486664	5.71009	3.44875
Propane		0.00218170	0.00166416	0.00184900	6.54027	3.39299	3.39299		0	6.54493	0.000170941	0.000170941	5.84711	6.14840E-08	0.00166416	6.54008	5.87672
Isobutane		8.60638E-05	6.81073E-05	7.51268E-05	2.06705	1.70539	1.70539		0	2.06698	2.57126E-06	2.57126E-06	2.73595	1.16280E-10	6.81073E-05	2.06682	2.08604
n-Butane		0.000377422	0.000306607	0.000324683	5.90958	5.41362	5.41362		0	5.90894	2.35040E-05	2.35040E-05	8.55818	1.60077E-09	0.000306607	5.90885	6.10540
Isopentane		8.11561E-05	6.37943E-05	5.45846E-05	3.77106	4.05972	4.05972		0	3.76996	2.77093E-06	2.77093E-06	6.08858	4.75279E-11	6.37943E-05	3.77050	4.03009
n-Pentane		5.90790E-05	4.81851E-05	5.32408E-05	5.04724	5.58155	5.58155		0	5.04595	2.67721E-06	2.67721E-06	8.21840	3.34882E-11	4.81851E-05	5.04647	5.42326
2-Methylpentane		0	0	5.00147E-06	2.52565	2.93277	2.93277		0	2.52497	1.22974E-07	1.22974E-07	4.25840	2.94685E-13	0	2.52525	2.74013
3-Methylpentane		0	0	8.07517E-06	1.64535	1.91719	1.91719		0	1.64498	5.16919E-07	5.16919E-07	2.76704	3.00338E-12	0	1.64509	1.78627
n-Hexane		3.87730E-05	3.20536E-05	6.80831E-06	6.01817	7.05525	7.05525		0	6.01594	1.33782E-07	1.33782E-07	0.692012	1.24301E-14	3.20536E-05	6.01720	6.54132
Methylcyclopentane		0	0	1.13947E-05	0.924096	1.08398	1.08398		0	0.923991	1.94112E-06	1.94112E-06	1.42375	2.42238E-11	0	0.923947	1.00454
Benzene		0	0	0.000174496	0.280368	0.328809	0.328809		0	0.282997	0.000159014	0.000159014	0.0259368	6.08774E-09	0	0.280325	0.304757
2-Methylhexane		0	0	1.27918E-06	2.38570	2.83717	2.83717		0	2.38498	2.66991E-08	2.66991E-08	0.257816	1.05314E-15	0	2.38532	2.60022
3-Methylhexane		0	0	1.00406E-06	1.87956	2.23630	2.23630		0	1.87898	2.18843E-08	2.18843E-08	3.05263	1.29350E-14	0	1.87925	2.04874
Heptane		0	0	2.13051E-06	4.79343	5.71503	5.71503		0	4.79195	4.66893E-08	4.66893E-08	7.16469	2.02871E-14	0	4.79265	5.22693
Methylcyclohexane		0	0	8.89689E-06	3.40290	4.05629	4.05629		0	3.40197	1.06412E-06	1.06412E-06	5.09254	2.84845E-12	0	3.40235	3.71051
Toluene		0	0	0.000100916	0.742657	0.886575	0.886575		0	0.743993	9.02754E-05	9.02754E-05	0.150693	1.67072E-09	0	0.742540	0.810019
Octane		0	0	7.98744E-07	9.69198	11.6183	11.6183		0	9.68890	1.16357E-08	1.16357E-08	13.6857	9.89683E-16	0	9.69039	10.5794
Ethylbenzene		0	0	2.09845E-05	0.509831	0.611328	0.611328		0	0.509995	1.85645E-05	1.85645E-05	0.193515	1.94246E-10	0	0.509748	0.556543
m-Xylene		0	0	2.73276E-05	0.776815	0.931799	0.931799		0	0.776992	2.42716E-05	2.42716E-05	0.379337	2.83705E-10	0	0.776688	0.848047
o-Xylene		0	0	3.37271E-05	0.792720	0.951058	0.951058		0	0.792992	3.08559E-05	3.08559E-05	0.333676	3.77014E-10	0	0.792592	0.865442
Nonane		0	0	2.38547E-07	5.65875	6.79478	6.79478		0	5.65694	5.47825E-09	5.47825E-09	7.27015	2.20556E-16	0	5.65782	6.17886
C10+		0	0	3.20510E-10	24.1095	28.9732	28.9732		0	24.1018	1.03564E-12	1.03564E-12	19.9962	0	0	24.1055	26.3294
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		2436.96	0	2429.36	0.0809760	0	0.00640636		2448.92	0	2429.34	0	0	0	2429.44	0.0801765	0.0372658
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.00233391	0	0.00303473	0.0260289	0	2.50332E-05		0	0.0281119	0.000112536	0	0	0	0.00190691	0.0262215	0.00160207
Carbon Dioxide		0.0284967	0	0.0210086	0.0496434	0	0.00336875		0	0.0484149	0.0129085	0	0	0	0.0224040	0.0496542	0.0215646
Methane		0.716291	0	0.574731	7.36747	0	0.0560140		0	7.44340	0.0421381	0	0	0	0.590586	7.38701	1.22417
Ethane		0.145549	0	0.129924	8.91209	0	1.12546		0	8.94270	0.0109661	0	0	0	0.118270	8.91655	4.93049
Propane		0.0531880	0	0.0449336	10.2112	0	4.40815		0	10.2218	0.00415287	0	0	0	0.0404429	10.2126	8.40163
Isobutane		0.00209816	0	0.00182570	3.22725	0	2.21563		0	3.22818	6.24665E-05	0	0	0	0.00165516	3.22743	2.98230
n-Butane		0.00920123	0	0.00789030	9.22654	0	7.03334		0	9.22851	0.000571010	0	0	0	0.00745123	9.22692	8.72857
Isopentane		0.00197852	0	0.00132649	5.88771	0	5.27437		0	5.88788	6.73175E-05	0	0	0	0.00155034	5.88781	5.76160
n-Pentane		0.00144030	0	0.00129383	7.88018	0	7.25151		0	7.88070	6.50407E-05	0	0	0	0.00117101	7.88028	7.75335
2-Methylpentane		0	0	0.000121543	3.94327	0	3.81024		0	3.94347	2.98754E-06	0	0	0	0	3.94329	3.91741
3-Methylpentane		0	0	0.000196239	2.56887	0	2.49080		0	2.56911	1.25581E-05	0	0	0	0	2.56888	2.55374
n-Hexane		0.000945254	0	0.000165452	9.39609	0	9.16614		0	9.39562	3.25012E-06	0	0	0	0.000778976	9.39612	9.35177
Methylcyclopentane		0	0	0.000276909	1.44278	0	1.40829		0	1.44308	4.71578E-05	0	0	0	0	1.44278	1.43614
Benzene		0	0	0.00424052	0.437734	0	0.427186		0	0.441981	0.00386310	0	0	0	0	0.437740	0.435695
2-Methylhexane		0	0	3.10861E-05	3.72477	0	3.68603		0	3.72482	6.48632E-07	0	0	0	0	3.72477	3.71739
3-Methylhexane		0	0	2.44002E-05	2.93453	0	2.90539		0	2.93457	5.31660E-07	0	0	0	0	2.93453	2.92897
Heptane		0	0	5.17747E-05	7.48392	0	7.42492		0	7.48401	1.13428E-06	0	0	0	0	7.48393	7.47266
Methylcyclohexane		0	0	0.000216208	5.31290	0	5.26991		0	5.31315	2.58519E-05	0	0	0	0	5.31291	5.30472
Toluene		0	0	0.00245243	1.15950	0	1.15183		0	1.16196	0.00219317	0	0	0	0	1.15951	1.15804
Octane		0	0	1.94107E-05	15.1320	0	15.0944		0	15.1320	2.82679E-07	0	0	0	0	15.1320	15.1248
Ethylbenzene		0	0	0.000509955	0.795992	0	0.794234		0	0.796503	0.000451009	0	0	0	0	0.795993	0.795660
m-Xylene		0	0	0.000664102	1.21283	0	1.21059		0	1.21350	0.000589659	0	0	0	0	1.21283	1.21241

o-Xylene		0	0	0.000819620	1.23766	0	1.23561		0	1.23848	0.000749618	0	0	0	0	1.23767	1.23728
Nonane		0	0	5.79707E-06	8.83493	0	8.82773		0	8.83494	1.33090E-07	0	0	0	0	8.83493	8.83358
C10+		0	0	7.78889E-09	37.6418	0	37.6417		0	37.6418	2.51599E-11	0	0	0	0	37.6418	37.6418
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		99.9533	99.9620	99.9595	0.00856208	0.000717497	0.000717497		100	0	99.9943	99.9943	5.87278E-07	99.9999	99.9620	0.00847727	0.00402896
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.000148853	0.000122006	0.000194168	0.00427961	4.35962E-06	4.35962E-06		0	0.00462148	7.20285E-06	7.20285E-06	3.11286E-07	4.09038E-09	0.000122006	0.00431114	0.000269333
Carbon Dioxide		0.00285529	0.00225195	0.00211171	0.0128230	0.000921685	0.000921685		0	0.0125041	0.00129798	0.00129798	0.00183844	4.99223E-05	0.00225195	0.0128254	0.00569546
Methane		0.0261619	0.0216392	0.0210585	0.693699	0.00558644	0.00558644		0	0.700758	0.00154452	0.00154452	0.00226455	2.44455E-06	0.0216392	0.695516	0.117856
Ethane		0.00996409	0.00812238	0.00892279	1.57283	0.210386	0.210386		0	1.57803	0.000753384	0.000753384	0.487091	1.10661E-06	0.00812238	1.57356	0.889715
Propane		0.00533971	0.00407310	0.00452541	2.64275	1.20842	1.20842		0	2.64514	0.000418398	0.000418398	2.33663	1.50493E-07	0.00407310	2.64302	2.22331
Isobutane		0.000277645	0.000219720	0.000242361	1.10092	0.800583	0.800583		0	1.10110	8.29537E-06	8.29537E-06	1.44114	3.75152E-10	0.000219720	1.10095	1.04024
n-Butane		0.00121758	0.000989140	0.00104743	3.14748	2.54139	2.54139		0	3.14774	7.58284E-05	7.58284E-05	4.50793	5.16450E-09	0.000989140	3.14751	3.04457
Isopentane		0.000324996	0.000255473	0.000218587	2.49320	2.36574	2.36574		0	2.49295	1.10969E-05	1.10969E-05	3.98106	1.90343E-10	0.000255473	2.49316	2.49467
n-Pentane		0.000236586	0.000192964	0.000213206	3.33693	3.25256	3.25256		0	3.33672	1.07216E-05	1.07216E-05	5.37366	1.34116E-10	0.000192964	3.33686	3.35706
2-Methylpentane		0	0	2.39225E-05	1.99444	2.04128	2.04128		0	1.99429	5.88224E-07	5.88224E-07	3.32570	1.40962E-12	0	1.99439	2.02593
3-Methylpentane		0	0	3.86243E-05	1.29929	1.33441	1.33441		0	1.29925	2.47260E-06	2.47260E-06	2.16099	1.43665E-11	0	1.29926	1.32069
n-Hexane		0.000185456	0.000153319	3.25647E-05	4.75239	4.91063	4.91063		0	4.75154	6.39924E-07	6.39924E-07	0.540444	5.94590E-14	0.000153319	4.75225	4.83635
Methylcyclopentane		0	0	5.32269E-05	0.712664	0.736824	0.736824		0	0.712719	9.06783E-06	9.06783E-06	1.08590	1.13163E-10	0	0.712643	0.725337
Benzene		0	0	0.000756532	0.200683	0.207444	0.207444		0	0.202603	0.000689445	0.000689445	0.0183606	2.63956E-08	0	0.200679	0.204240
2-Methylhexane		0	0	7.11432E-06	2.19057	2.29616	2.29616		0	2.19032	1.48498E-07	1.48498E-07	0.234121	5.85763E-15	0	2.19050	2.23540
3-Methylhexane		0	0	5.58419E-06	1.72582	1.80987	1.80987		0	1.72562	1.21718E-07	1.21718E-07	2.77207	7.19450E-14	0	1.72577	1.76130
Heptane		0	0	1.18491E-05	4.40136	4.62525	4.62525		0	4.40085	2.59682E-07	2.59682E-07	6.50620	1.12838E-13	0	4.40122	4.49358
Methylcyclohexane		0	0	4.84856E-05	3.06171	3.21677	3.21677		0	3.06145	5.79948E-06	5.79948E-06	4.53146	1.55245E-11	0	3.06161	3.12574
Toluene		0	0	0.000516093	0.627038	0.659778	0.659778		0	0.628285	0.000461699	0.000461699	0.125831	8.54483E-09	0	0.627021	0.640333
Octane		0	0	5.06416E-06	10.1450	10.7191	10.7191		0	10.1437	7.37760E-08	7.37760E-08	14.1676	6.27523E-15	0	10.1447	10.3683
Ethylbenzene		0	0	0.000123653	0.495989	0.524200	0.524200		0	0.496243	0.000109399	0.000109399	0.186187	1.14470E-09	0	0.495974	0.506932
m-Xylene		0	0	0.000161030	0.755725	0.798996	0.798996		0	0.756041	0.000143031	0.000143031	0.364973	1.67189E-09	0	0.755701	0.772451
o-Xylene		0	0	0.000198740	0.771198	0.815511	0.815511		0	0.771610	0.000181831	0.000181831	0.321040	2.22176E-09	0	0.771175	0.788295
Nonane		0	0	1.69814E-06	6.65058	7.03868	7.03868		0	6.64973	3.90000E-08	3.90000E-08	8.45029	1.57019E-15	0	6.65037	6.79912
C10+		0	0	3.63976E-09	45.2021	47.8788	47.8788		0	45.1962	1.17614E-11	1.17614E-11	37.0772	0	0	45.2006	46.2186
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		43902.4	0	43765.6	1.45881	0	0.115412		44117.9	0	43765.2	0	0	0	43767.0	1.44440	0.671355
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.0653807	0	0.0850130	0.729159	0	0.000701264		0	0.787509	0.00315252	0	0	0	0.0534190	0.734554	0.0448795
Carbon Dioxide		1.25413	0	0.924579	2.18478	0	0.148257		0	2.13072	0.568096	0	0	0	0.985988	2.18526	0.949047
Methane		11.4911	0	9.22010	118.192	0	0.898603		0	119.410	0.675999	0	0	0	9.47445	118.506	19.6386
Ethane		4.37652	0	3.90669	267.978	0	33.8415		0	268.898	0.329739	0	0	0	3.55628	268.112	148.255
Propane		2.34536	0	1.98138	450.271	0	194.380		0	450.736	0.183123	0	0	0	1.78335	450.332	370.475
Isobutane		0.121950	0	0.106114	187.575	0	128.777		0	187.629	0.00363069	0	0	0	0.0962017	187.586	173.338
n-Butane		0.534796	0	0.458602	536.267	0	408.793		0	536.381	0.0331883	0	0	0	0.433082	536.289	507.323
Isopentane		0.142748	0	0.0957047	424.791	0	380.539		0	424.803	0.00485687	0	0	0	0.111855	424.798	415.692
n-Pentane		0.103916	0	0.0933485	568.546	0	523.188		0	568.583	0.00469261	0	0	0	0.0844868	568.553	559.394
2-Methylpentane		0	0	0.0104740	339.813	0	328.349		0	339.830	0.000257452	0	0	0	0	339.814	337.584
3-Methylpentane		0	0	0.0169110	221.373	0	214.646		0	221.394	0.00108220	0	0	0	0	221.374	220.070
n-Hexane		0.0814576	0	0.0142579	809.711	0	789.895		0	809.671	0.000280080	0	0	0	0.0671285	809.714	805.892
Methylcyclopentane		0	0	0.0233045	121.424	0	118.521		0	121.449	0.00396878	0	0	0	0	121.424	120.865
Benzene		0	0	0.331235	34.1922	0	33.3683		0	34.5240	0.301754	0	0	0	0	34.1927	34.0330
2-Methylhexane		0	0	0.00311489	373.229	0	369.347		0	373.235	6.49942E-05	0	0	0	0	373.230	372.490
3-Methylhexane		0	0	0.00244495	294.045	0	291.125		0	294.049	5.32733E-05	0	0	0	0	294.046	293.489
Heptane		0	0	0.00518792	749.903	0	743.992		0	749.912	0.000113657	0	0	0	0	749.904	748.775
Methylcyclohexane		0	0	0.0212286	521.653	0	517.432		0	521.677	0.00253830	0	0	0	0	521.654	520.849
Toluene		0	0	0.225963	106.835	0	106.128		0	107.061	0.202075	0	0	0	0	106.835	106.700
Octane		0	0	0.00221726	1728.50	0	1724.21		0	1728.51	3.22901E-05	0	0	0	0	1728.50	1727.69
Ethylbenzene		0	0	0.0541393	84.5065	0	84.3198		0	84.5608	0.0478814	0	0	0	0	84.5066	84.4712
m-Xylene		0	0	0.0705044	128.760	0	128.522		0	128.831	0.0626012	0	0	0	0	128.760	128.715
o-Xylene		0	0	0.0870149	131.397	0	131.178		0	131.484	0.0795831	0	0	0	0	131.397	131.355
Nonane		0	0	0.000743504	1133.12	0	1132.20		0	1133.13	1.70694E-05	0	0	0	0	1133.12	1132.95
C10+		0	0	1.59361E-06	7701.51	0	7701.50		0	7701.51	5.14771E-09	0	0	0	0	7701.51	7701.51

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	59.2	70.0	70.0	70.0	75.9	75.9		67.0	67.0	75.9	75.94	75.9425	75.9425	70	69.6176	70

Pressure	psig	200	176	176	176	0	0		200	300	0	0	8.85520	-14.2259	176	176	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	109.1	123.8	123.8		18.0	109.1	18.0	18.0157	110.343	18.0153	18.0163	109.113	116.555
Mass Density	lb/ft^3	62.4	62.3	62.3	45.0	45.8	45.8		62.3	45.2	62.2	62.2171	44.4776	62.2179	62.2619	45.0227	45.4789
Molar Flow	lbmol/h	2437.9	0.0	2430.2	156.1	0.0	129.9		2448.9	156.2	2429.4	0	0	0	2430.23	156.154	142.965
Mass Flow	lb/h	43923.0	0.0	43783.3	17038.0	0.0	16085.4		44117.9	17040.2	43767.7	0	0	0	43783.7	17038.5	16663.2
Vapor Volumetric Flow	MCFH	0.7	0.0	0.7	0.4	0.0	0.4		0.7	0.4	0.7	0	0	0	0.703218	0.378443	0.366395
Liquid Volumetric Flow	Mbbl/d	3.0	0.0	3.0	1.6	0.0	1.5		3.0	1.6	3.0	0	0	0	3.00597	1.61769	1.56619
Std Vapor Volumetric Flow	MMSCFD	22.2	0.0	22.1	1.4	0.0	1.2		22.3	1.4	22.1	0	0	0	22.1336	1.42220	1.30207
Std Liquid Volumetric Flow	Mbbl/d	3.0	0.0	3.0	1.6	0.0	1.5		3.0	1.6	3.0	0	0	0	3.00305	1.64526	1.58022
Compressibility		0.011	0.010	0.010	0.081	0.007	0.007		0.011	0.135	0.001	0.000740333	0.0101649	2.36798E-05	0.00970768	0.0813640	0.0246608
Specific Gravity		1.000	0.998	0.998	0.722	0.734	0.734		0.999	0.724	0.998	0.997564	0.713137	0.997577	0.998282	0.721876	0.729190
API Gravity		10.1	10.0	10.0	63.2	59.4	59.4		10.0	63.0	10.0	10.0153	64.7888	10.0135	10.0441	63.2329	61.2866
Enthalpy	MMBtu/h	-300.3	0.0	-298.9	-14.8	0.0	-13.5		-301.4	-14.8	-298.6	0	0	0	-298.873	-14.8328	-14.2796
Mass Enthalpy	Btu/lb	-6836.3	-6826.1	-6826.0	-870.3	-841.8	-841.8		-6830.9	-871.0	-6822.3	-6822.34	-888.616	-6822.66	-6826.13	-870.546	-856.952
Mass Cp	Btu/(lb*°F)	1.0	1.0	1.0	0.5	0.5	0.5		1.0	0.5	1.0	0.982732	0.494371	0.982746	0.983065	0.489988	0.486495
Ideal Gas CpCv Ratio		1.326	1.326	1.326	1.051	1.044	1.044		1.326	1.051	1.326	1.32555	1.04938	1.32556	1.32581	1.05064	1.04740
Dynamic Viscosity	cP	1.1	1.0	1.0	0.5	0.7	0.7		1.0	0.5	0.9	0.924435	0.512336	0.924435	0.995521	0.528810	0.602248
Kinematic Viscosity	cSt	1.1	1.0	1.0	0.7	0.9	0.9		1.0	0.8	0.9	0.927568	0.719105	0.927556	0.998177	0.733242	0.826695
Thermal Conductivity	Btu/(h*ft*°F)	0.3	0.3	0.3	0.1	0.1	0.1		0.3	0.1	0.3	0.349779	0.0684419	0.349835	0.346580	0.0686456	0.0691505
Surface Tension	lbf/ft	0.005	0.005	0.005	0.001	0.002	0.002		0.005	0.001	0.005	0.00499710	0.00147168	0.00499737	0.00504013	0.00143380	0.00155106
Net I.G. Heating Value	Btu/ft^3	0.4	0.4	0.4	5484.8	6204.6	6204.6		0.0	5484.2	0.0	0.0414222	5558.72	3.75103E-05	0.355148	5484.07	5849.70
Net Liquid Heating Value	Btu/lb	-1050.1	-1051.9	-1051.4	18902.9	18845.5	18845.5		-1059.8	18904.8	-1058.8	-1058.83	18949.4	-1059.76	-1051.90	18902.9	18874.5
Gross I.G. Heating Value	Btu/ft^3	50.8	50.7	50.7	5889.3	6655.9	6655.9		50.3	5888.7	50.4	50.3533	5974.15	50.3100	50.6854	5888.55	6278.22
Gross Liquid Heating Value	Btu/lb	10.1	8.2	8.7	20308.4	20227.7	20227.7		0.0	20310.4	0.9	0.939750	20377.2	0.000833046	8.22656	20308.5	20268.4

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					99.9673											99.9672	
H2S					0											0	
Nitrogen					0.000124878											0.000126048	
Carbon Dioxide					0.000864497											0.000865693	
Methane					0.0236500											0.0237363	
Ethane					0.00534633											0.00534941	
Propane					0.00184900											0.00185162	
Isobutane					7.51268E-05											7.50802E-05	
n-Butane					0.000324683											0.000324067	
Isopentane					5.45846E-05											5.45073E-05	
n-Pentane					5.32408E-05											5.30775E-05	
2-Methylpentane					5.00147E-06											4.97923E-06	
3-Methylpentane					8.07517E-06											8.04717E-06	
n-Hexane					6.80831E-06											6.77719E-06	
Methylcyclopentane					1.13947E-05											1.13953E-05	
Benzene					0.000174496											0.000174311	
2-Methylhexane					1.27918E-06											1.27813E-06	
3-Methylhexane					1.00406E-06											1.00303E-06	
Heptane					2.13051E-06											2.13432E-06	
Methylcyclohexane					8.89689E-06											8.87180E-06	
Toluene					0.000100916											0.000100660	
Octane					7.98744E-07											7.94435E-07	
Ethylbenzene					2.09845E-05											2.09494E-05	
m-Xylene					2.73276E-05											2.72560E-05	
o-Xylene					3.37271E-05											3.36255E-05	
Nonane					2.38547E-07											2.37246E-07	
C10+					3.20510E-10											3.17680E-10	
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											2429.36	
H2S					0											0	
Nitrogen					0											0.00306317	
Carbon Dioxide					0											0.0210377	
Methane					0											0.576829	

Ethane					0											0.129999	
Propane					0											0.0449974	
Isobutane					0											0.00182457	
n-Butane					0											0.00787535	
Isopentane					0											0.00132461	
n-Pentane					0											0.00128987	
2-Methylpentane					0											0.000121003	
3-Methylpentane					0											0.000195559	
n-Hexane					0											0.000164696	
Methylcyclopentane					0											0.000276924	
Benzene					0											0.00423603	
2-Methylhexane					0											3.10606E-05	
3-Methylhexane					0											2.43751E-05	
Heptane					0											5.18672E-05	
Methylcyclohexane					0											0.000215599	
Toluene					0											0.00244620	
Octane					0											1.93060E-05	
Ethylbenzene					0											0.000509104	
m-Xylene					0											0.000662363	
o-Xylene					0											0.000817154	
Nonane					0											5.76546E-06	
C10+					0											7.72013E-09	
Mass Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water					99.9595											99.9594	
H2S					0											0	
Nitrogen					0.000194168											0.000195987	
Carbon Dioxide					0.00211171											0.00211464	
Methane					0.0210585											0.0211353	
Ethane					0.00892279											0.00892792	
Propane					0.00452541											0.00453183	
Isobutane					0.000242361											0.000242210	
n-Butane					0.00104743											0.00104545	
Isopentane					0.000218587											0.000218278	
n-Pentane					0.000213206											0.000212552	
2-Methylpentane					2.39225E-05											2.38161E-05	
3-Methylpentane					3.86243E-05											3.84903E-05	
n-Hexane					3.25647E-05											3.24159E-05	
Methylcyclopentane					5.32269E-05											5.32298E-05	
Benzene					0.000756532											0.000755730	
2-Methylhexane					7.11432E-06											7.10849E-06	
3-Methylhexane					5.58419E-06											5.57845E-06	
Heptane					1.18491E-05											1.18703E-05	
Methylcyclohexane					4.84856E-05											4.83490E-05	
Toluene					0.000516093											0.000514782	
Octane					5.06416E-06											5.03684E-06	
Ethylbenzene					0.000123653											0.000123446	
m-Xylene					0.000161030											0.000160608	
o-Xylene					0.000198740											0.000198142	
Nonane					1.69814E-06											1.68888E-06	
C10+					3.63976E-09											3.60762E-09	
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											43765.6	
H2S					0											0	
Nitrogen					0											0.0858099	
Carbon Dioxide					0											0.925859	
Methane					0											9.25376	
Ethane					0											3.90895	
Propane					0											1.98419	
Isobutane					0											0.106048	
n-Butane					0											0.457733	
Isopentane					0											0.0955693	
n-Pentane					0											0.0930624	
2-Methylpentane					0											0.0104275	
3-Methylpentane					0											0.0168524	

n-Hexane					0											0.0141928	
Methylcyclopentane					0											0.0233058	
Benzene					0											0.330884	
2-Methylhexane					0											0.00311234	
3-Methylhexane					0											0.00244243	
Heptane					0											0.00519720	
Methylcyclohexane					0											0.0211688	
Toluene					0											0.225389	
Octane					0											0.00220530	
Ethylbenzene					0											0.0540490	
m-Xylene					0											0.0703198	
o-Xylene					0											0.0867531	
Nonane					0											0.000739450	
C10+					0											1.57954E-06	

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											69.6176	
Pressure	psig				176											176	
Mole Fraction Vapor	%				0											0	
Mole Fraction Light Liquid	%				0											0	
Mole Fraction Heavy Liquid	%				100											100	
Molecular Weight	lb/lbmol				18.0											18.0167	
Mass Density	lb/ft^3				62.3											62.2655	
Molar Flow	lbmol/h				0.0											2430.16	
Mass Flow	lb/h				0.0											43783.4	
Vapor Volumetric Flow	MCFH				0.0											0.703173	
Liquid Volumetric Flow	Mbbl/d				0.0											3.00577	
Std Vapor Volumetric Flow	MMSCFD				0.0											22.1330	
Std Liquid Volumetric Flow	Mbbl/d				0.0											3.00305	
Compressibility					0.010											0.00971434	
Specific Gravity					0.998											0.998340	
API Gravity					10.0											10.0440	
Enthalpy	MMBtu/h				0.0											-298.880	
Mass Enthalpy	Btu/lb				-6826.0											-6826.33	
Mass Cp	Btu/(lb*°F)				1.0											0.983090	
Ideal Gas CpCv Ratio					1.326											1.32583	
Dynamic Viscosity	cP				1.0											1.00036	
Kinematic Viscosity	cSt				1.0											1.00297	
Thermal Conductivity	Btu/(h*ft*°F)				0.3											0.346385	
Surface Tension	lbf/ft				0.005											0.00504296	
Net I.G. Heating Value	Btu/ft^3				0.4											0.378012	
Net Liquid Heating Value	Btu/lb				-1051.4											-1051.40	
Gross I.G. Heating Value	Btu/ft^3				50.7											50.7093	
Gross Liquid Heating Value	Btu/lb				8.7											8.7	

September 26, 2013

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

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

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

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

CHROMATOGRAPH EXTENDED ANALYSIS- GPA 2186-M

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

Characteristics of Heptanes Plus:

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

Characteristics of Total Sample:

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

Base Conditions: 14.850 PSI & 60 oF

Certified: FESCO, Ltd. - Alice, Texas

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

David Dannhaus 361-661-7015

TANKS DATA INPUT REPORT

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

Characteristics of Total Sample:

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

Characteristics of Decanes (C10) Plus:

Specific Gravity	0.8007	(Water-1)
Molecular Weight	204.6	

Characteristics of Atmospheric Sample:

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

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

* Sample used for analysis

TOTAL EXTENDED REPORT

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

October 7, 2013

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

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

Date Sampled: 09/05/13

Date Analyzed: 09/13/13

Job Number: J35434

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

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

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

Piston No. : WF-133*

Base Conditions: 14.85 PSI & 60 "F

Certified: FESCO, Ltd. Alice, Texas

David Dannhaus 361-661-7015

September 18, 2013

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

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

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

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

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT

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

Computed Real Characteristics Of Heptanes Plus:

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

Computed Real Characteristics Of Total Sample:

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

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

Base Conditions: 14.850 PSI & 60 Deg F

Certified: FESCO, Ltd. Alice, Texas

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

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT

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

Computed Real Characteristics Of Total Sample:

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

Gross Heating Value

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

Antero Resources
Prunty Unit 1H - Lockhart Heirs Pad

Tag Name	Value	Units	Timestamp
Accumulated Gas Flow	560999.8	MCF	10/16/2013 16:11:13
Casing Pressure	450.96	PSIA	10/16/2013 17:05:05
Current Day Gas Flow	2287.78	MCF	10/16/2013 16:11:13
Differential Pressure	57.03	inH2O	10/16/2013 16:11:13
Flow Rate	7454.35	MCF Per Day	10/16/2013 16:11:13
Pressure	108.81	PSIA	10/16/2013 16:11:13
Previous Day Energy	9462.83	MBTU	10/16/2013 16:11:15
Previous Day Gas Flow	7588.11	MCF	10/16/2013 16:11:15
Temperature	60.11	F	10/16/2013 16:11:13
Tubing Pressure	748.58	PSIA	10/16/2013 17:05:05
Daily AP	63.93	PSIA	10/16/2013 09:00:00
Daily DP	111.06	inH2O	10/16/2013 09:00:00
Daily Energy	9462.83	MBTU	10/16/2013 09:00:00
Daily Flow	7588.11	MCF	10/16/2013 09:00:00
Daily Tf	59.56	F	10/16/2013 09:00:00
Hourly AP	110.1	PSIA	10/16/2013 10:00:00
Hourly DP	61.64	Inches	10/16/2013 10:00:00
Hourly Energy	399.7	MBTU	10/16/2013 10:00:00
Hourly Flow Time	3600	Seconds	10/16/2013 10:00:00
Hourly Tf	61.1	F	10/16/2013 10:00:00
Hourly Volume	320.5	MCF	10/16/2013 10:00:00
Argon	0	%	10/16/2013 16:11:25
BTU	1247.06	BTU	10/16/2013 16:11:13
C02	0.1467	%	10/16/2013 16:11:25
Carbon Monoxide	0	%	10/16/2013 16:11:25
Decane	0	%	10/16/2013 16:11:25
Ethane	14.1987	%	10/16/2013 16:11:25
Helium	0	%	10/16/2013 16:11:25
Heptane	0	%	10/16/2013 16:11:25
Hexane	0.5451	%	10/16/2013 16:11:25
Hydrogen	0	%	10/16/2013 16:11:25
Hydrogen Sulfide	0	%	10/16/2013 16:11:25
Iso-Butane	0.5666	%	10/16/2013 16:11:25
Iso-Pentane	0.3749	%	10/16/2013 16:11:25
Methane	77.6927	%	10/16/2013 16:11:25
N2	0.4946	%	10/16/2013 16:11:25
N-Butane	1.1838	%	10/16/2013 16:11:25
Nonane	0	%	10/16/2013 16:11:25
N-Pentane	0.2914	%	10/16/2013 16:11:25
Octane	0	%	10/16/2013 16:11:25
Oxygen	0.0117	%	10/16/2013 16:11:25
Plate Size	3.75	Inches	10/16/2013 16:11:20
Propane	4.4938	%	10/16/2013 16:11:25
SPG	0.7248		10/16/2013 16:11:13
Water	0	%	10/16/2013 16:11:25

Attachment J
Class I Legal Advertisement

Attachment J

Air Quality Permit Notice
Notice of Application
Robert Williams Well Pad
Antero Resources Corporation
Doddridge, West Virginia

Notice is given that Antero Resources Corporation has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-A Modification Permit Application for an Oil and Natural Gas facility located at 20 Cabin Run Rd West Union, WV 26456 in Doddridge, West Virginia.

The latitude and longitude coordinates are: 39.237675 degrees N and -80.862658 degrees W

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

Pollutants	TOTALS (tpy):
VOC	69.9630
NO_X	16.0957
CO_{2e}	24307.0000
CO	37.0814
SO_2	0.0745
$PM_{2.5}$	1.0826
PM_{10}	1.4799
Lead	7.36E-05
Total HAPs	3.5179
Benzene	0.0923
Formaldehyde	0.0308
Xylenes	0.2522

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

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.
Dated this the __ day of _____, 2015

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

Attachment L
General Permit Modification Application Fee

U.S. DOLLARS

GHD SERVICES INC.

▼ PLEASE DETACH AND RETAIN FOR YOUR RECORDS ▼

INVOICE NUMBER	DATE		VOUCHER NO.	AMOUNT
Account Number:		40WVDEPAQ	421633	
CR71715	7/17/2015	400960434		1,500.00

TOTAL: 1,500.00

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

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

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

NO. 421633

7/17/2015

PAY **********1,500 DOLLARS AND **********00 CENTS $ **********1,500.00 U.S. DOLLARS

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 ITED

⑈421633⑈ ⑆221370632⑆610000011891O⑈

Attachment O
Emissions Summary Sheet

Attachment O: G70-A Emissions Summary Sheet

Emission Points Data Summary Sheet

Table 1: Emissions Data												
Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]
		ID No.	Source	ID No.	Device Type		lb/hr	ton/yr	lb/hr	ton/yr		
EP-H001, EP-H002, EP-H003, EP-H004, EP-H005, EP-H006, EP-H007, EP-H008, EP-H009, EP-H010	Vertical Stack	H001, H002, H003, H004, H005, H006, H007, H008, H009, H010	Gas Production Unit Heaters	N/A		CO (630080)	1.0104	4.4254	1.0104	4.4254	Gas/Vapor /Solid (for PM)	MB AP-42
						NOx (10102439)	1.2028	5.2684	1.2028	5.2684		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4 (74828)	1443.3949	6322.0695	1443.3949	6322.0695		
						SO2 (7446095)	7.22E-03	0.0316	7.22E-03	0.0316		
						PM, PM10, PM2.5	0.0914	0.4004	0.0914	0.4004		
						Hexane (110543)	0.0217	0.0948	0.0217	0.0948		
						Total VOCs	0.0662	0.2898	0.0662	0.2898		
EP-LH001, EP-LH002, EP-LH003, EP-LH004, EP-LH005, EP-LH006, EP-LH007, EP-LH008, EP-LH009, EP-LH010	Vertical Stack	LH001, LH002, LH003, LH004, LH005, LH006, LH007, LH008, LH009, LH010	Line Heaters	N/A		CO (630080)	1.3472	5.9006	1.3472	5.9006		
						NOx (10102439)	1.6038	7.0245	1.6038	7.0245		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4 (74828)	1924.5265	8429.4260	1924.5265	8429.4260		
						SO2 (7446095)	9.62E-03	0.0421	9.62E-03	0.0421		
						PM, PM10, PM2.5	0.1219	0.5339	0.1219	0.5339		
						Hexane (110543)	0.0289	0.1264	0.0289	0.1264		
						Total VOCs	0.0882	0.3863	0.0882	0.3863		
F001	N/A	F001	Fugitives	N/A		Benzene (71432)	6.52E-03	2.86E-02	6.52E-03	2.86E-02	Gas/Vapor	MB
						Toluene (108883)	2.02E-02	0.0886	2.02E-02	0.0886		
						Ethyl benzene (100414)	0.0160	0.0700	0.0160	0.0700		
						Hexane (110543)	0.2738	1.1994	0.2738	1.1994		
						o,m,p-xylenes (95476,108383,106423)	0.0492	0.2154	0.0492	0.2154		
						CO2 Equivalent CO2 (124389)), CH4	80.7246	353.5737	80.7246	353.5737		
						VOCs	3.8028	16.6563	3.8028	16.6563		
						TAPs (benzene)	6.52E-03	2.86E-02	6.52E-03	2.86E-02		
EP-L001, EP-L002	N/A	L001, L002	Loading (Condensate), Loading (Water)	N/A		VOCs	10.1380	11.5657	10.1380	11.5657	Gas/Vapor	MB
						toluene (108883)	1.50E-03	1.71E-03	1.50E-03	1.71E-03		
						hexane (110543)	0.0237	0.0270	0.0237	0.0270		
						CO2 Equivalent CO2 (124389), CH4	3.3935	4.9429	3.3935	4.9429		

Attachment O: G70-A Emissions Summary Sheet

Emission Points Data Summary Sheet

Table 1: Emissions Data												
Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]
		ID No.	Source	ID No.	Device Type		lb/hr	ton/yr	lb/hr	ton/yr		
EP-HR001	N/A	HR001	Haul Truck	N/A		PM, PM10, PM2.5	1.22E+00	2.38E+00	6.12E-01	1.19E+00	Solid	MB
EP-EC001, EP-EC002, EP-EC003, EP-EC004	N/A	TANKCOND001-010, TANKPW001-002, EC001, EC002, EC003, EC004	Condensate Tank F/W/B, PW Tank F/W/B, Enclosed Combustor	EC001, EC002, EC003, EC004	Enclosed Combustor	CO (630080)	0.00E+00	0.00E+00	0.4640	2.0325	Gas/Vapor/ Solid (for PM)	MB
						NOx (10102439)	0.00E+00	0.00E+00	0.5524	2.4197		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4	0.00E+00	0.00E+00	2064.3324	9041.7759		
						PM, PM10, PM2.5	0.00E+00	0.00E+00	0.0420	7.05E-05		
						Benzene (71432)	0.6955	3.0463	1.39E-02	0.0609		
						Toluene (108883)	0.5984	2.6210	1.20E-02	0.0524		
						ethyl benzene (100414)	0.1588	15.6858	3.18E-03	0.3137		
						hexane (110543)	16.0501	70.2994	0.3210	1.4060		
						o,m,p-xylenes (95476,108383,106423)	0.3892	1.7046	7.78E-03	0.0341		
						VOCs	462.6823	2026.5483	9.2539	40.5322		
EP-PCV	valve	PCV	Pneumatic CV	N/A		hexane (110543)	1.36E-02	0.0596	1.36E-02	0.0596	Gas/Vapor	MB
						CO2 Equivalent CO2 (124389)), CH4	9.0327	39.5633	9.0327	39.5633		
						VOCs	0.1145	0.5015	0.1145	0.5015		
EP-ENG001	Vertical Stack	ENG001	Compressor Engine	N/A		CO (630080)	5.6445	24.7228	5.6445	24.7228	Gas/Vapor/ Solid (for PM)	MB
						NOx (10102439)	0.3158	1.3831	0.3158	1.3831		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4 (74828)	26.3967	115.6175	26.3967	115.6175		
						TAPs Formaldehyde (50000)	4.92E-03	0.0215	4.92E-03	0.0215		
						Total VOCs	7.10E-03	0.0311	7.10E-03	0.0311		

Attachment C/O: G70-A Emissions Summary Sheet

Fugitive Emissions Data Summary Sheet

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	n/a					
Loading/Unloading Operations	VOCs	10.1380	11.5657	10.1380	11.5657	MB
	hexane (110543)	0.0237	0.0270	0.0237	0.0270	
	CO2 Equivalent CO2 (124389), CH4	3.3935	4.9429	3.3935	4.9429	
Equipment Leaks (Components)	Benzene (71432)	Does not apply	2.86E-02	Does not apply	2.86E-02	MB
	Toluene (108883)		0.0886		0.0886	
	Ethyl benzene (100414)		0.0700		0.0700	
	Hexane (110543)		1.1994		1.1994	
	o,m,p-xylenes (95476,108383,106423)		0.2154		0.2154	
	CO2 Equivalent CO2 (124389)), CH4		353.5737		353.5737	
	VOCs		16.6563		16.6563	
	TAPs (benzene)		2.86E-02		2.86E-02	
Equipment Leaks (PCVs)	hexane (110543)	1.36E-02	5.96E-02	1.36E-02	5.96E-02	MB
	CO2 Equivalent CO2 (124389)), CH4	9.0327	39.5633	9.0327	39.5633	
	VOCs	0.1145	0.5015	0.1145	0.5015	

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

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

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

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