July 21, 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
Primm 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 Primm Well Pad.

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

1. Increase in condensate production
2. Addition of 8 line heaters
3. Addition of 3 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. 409994 in the amount of $1,500.00

GHD Services Inc. d/b/a GHD Environmental and Consulting 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/213

Encl.

cc: Barry Schatz, Antero Resources Corporation

General Permit Application G70-A Modification

Increase in production, addition of 8 line heaters, and 3 Cimarron enclosed combustors.

Primm Well Pad

Antero Resources Corporation

GHD Services Inc.
6320 Rothway, Suite 100 Houston Texas 77040
082715 | Report No 213 | July 2015

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 - No changes
Attachment D	Process Flow Diagram
Attachment E	Plot Plan
Attachment F	Area Map - No changes
Attachment G	G70-A Section Applicability Form/ Emission Unit Data Sheets
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 - No changes

* Note: Attachments which either have no changes from initial permit application or not applicable were not included in this submittal. The Attachment letter identifiers consistent with the G70-A application guidance and instructions 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 St.
Denver, CO, 80202

4. Applicant's physical address:
1313 Oxford 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):
017-00091

10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only):
G70-A028A

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site:	12A. Address of primary operating site:
Primm Well Pad	Mailing: N/A Physical: 1313 Oxford 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;

From Greenwood travel south on Old U.S. 50 W and go 3.4 mi. Turn Right on Oxford Rd and go 1.4 mi to reach destination on the left.

– 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**.

15A. Nearest city or town:	16A. County:	17A. UTM Coordinates:
Greenwood	Doddridge	Northing (KM): 4343.5939 Easting (KM): 512.7216 Zone: 17S

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 8 line heaters, and 3 Cimarron enclosed combustors.	Latitude: 39.241562 Longitude: -80.852583

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 permit issuance ☐ 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 permit issuance

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 7-21-2015
(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
Primm 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 (LH001-008) and gas production units (H001-H008) 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 low pressure 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.

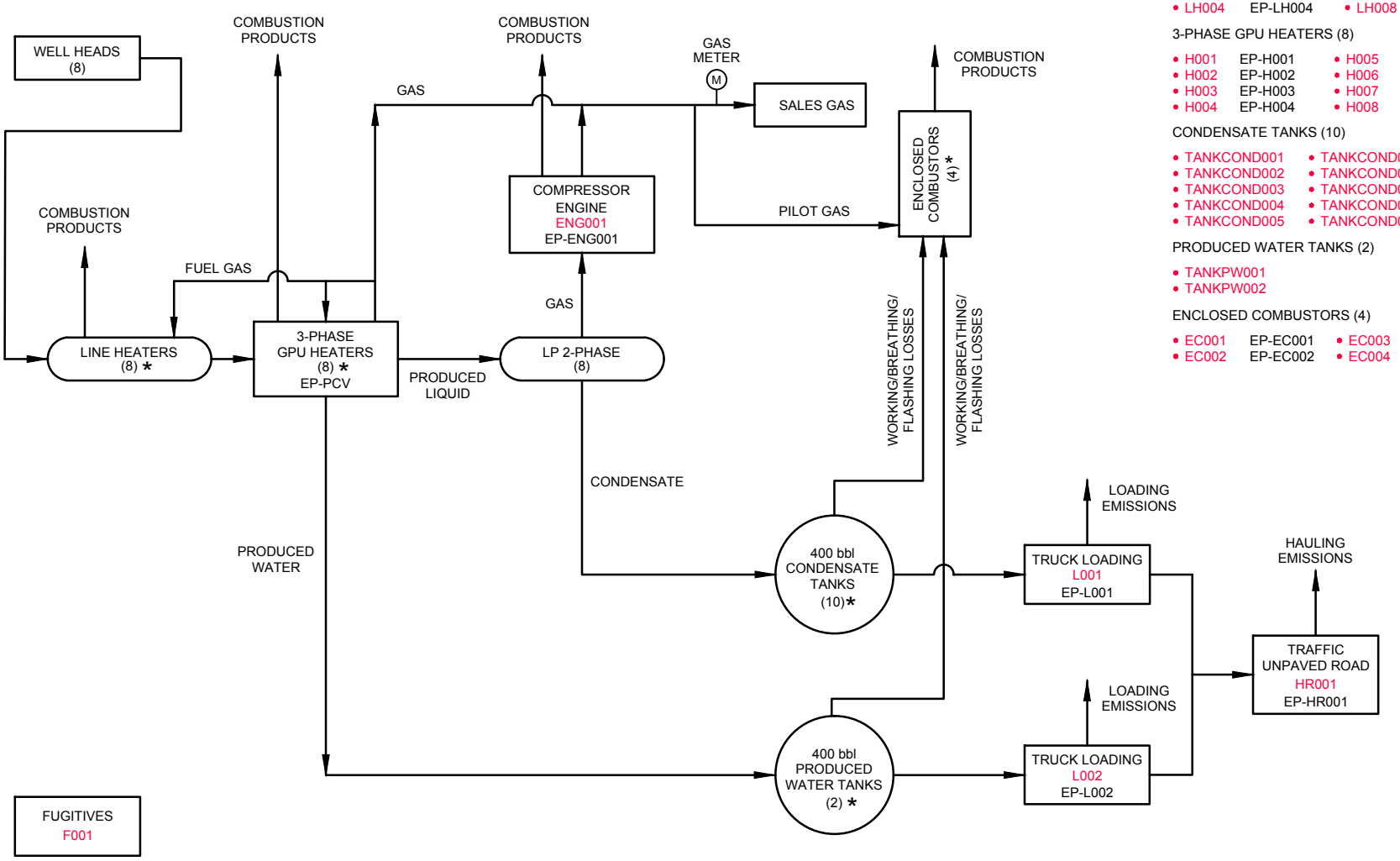
The facility has ten (10) tanks (TANKCOND001-010) on site to store condensate and two (2) tanks (TANKPW001-002) to store produced water prior to removal from the site. The flashing, working and breathing losses from the tanks are routed to up to four enclosed combustors (EC001-04) to control the emissions. 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 Primm Well Pad, being in the same Marcellus rock formation.

Primm 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 Robert Williams Well Pad. This is approximately 3,420 feet southwest of the facility.

Attachment D
Process Flow Diagram



* LINE HEATERS (8)

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

3-PHASE GPU HEATERS (8)

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

CONDENSATE TANKS (10)

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

PRODUCED WATER TANKS (2)

- TANKPW001
- TANKPW002

ENCLOSED COMBUSTORS (4)

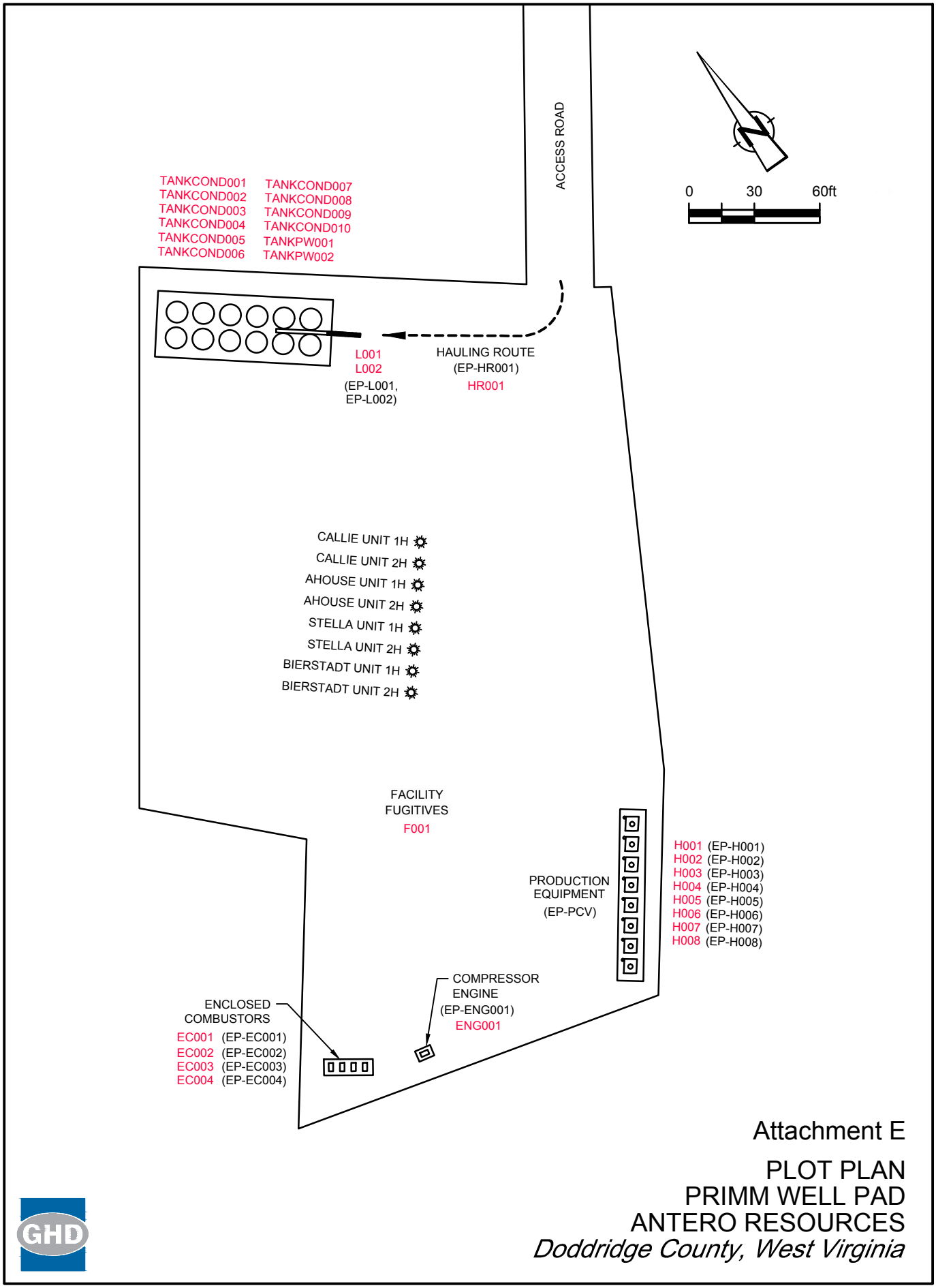
• EC001	EP-EC001	• EC003	EP-EC003
• EC002	EP-EC002	• EC004	EP-EC004

Attachment D

PROCESS FLOW DIAGRAM - ANTERO RESOURCES PRIMM WELL PAD

Doddridge County, West Virginia

Attachment E
Plot Plan



Attachment E

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

82715-00(213)GN-WA002 JUL 14/2015

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:	
47-017-06192-00	47-017-06562-00
47-017-06193-00	
47-017-06190-00	
47-017-06191-00	
47-017-06563-00	
47-017-06564-00	
47-017-06561-00	

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	EP-H001, EP-H002, EP-H003, EP-H004, EP-H005, EP-H006, EP-H007, EP-H008	Gas Production Unit Heaters	2014	1.5 MMBtu/hr (each)	New	N/A
LH001, LH002, LH003, LH004, LH005, LH006, LH007, LH008	EP-LH001, EP-LH002, EP-LH003, EP-LH004, EP-LH005, EP-LH006, EP-LH007, EP-LH008	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) 24,528,000	13B. Maximum daily throughput (gal/day) 67,200
14. Number of tank turnovers per year 146	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: Charleston, WV			
28. Daily Avg. Ambient Temperature (°F): 55.3	29. Annual Avg. Maximum Temperature (°F): 75.94		
30. Annual Avg. Minimum Temperature (°F): 65.9	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) 49,056,000	13B. Maximum daily throughput (gal/day) 134,400
14. Number of tank turnovers per year 1460	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: Charleston, WV			
28. Daily Avg. Ambient Temperature (°F): 55.3		29. Annual Avg. Maximum Temperature (°F): 75.94	
30. Annual Avg. Minimum Temperature (°F): 65.9		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
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
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)		67.2	134.4	
Max. annual throughput (1000 gal/yr)		24,528.00	49,056.00	
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)	16.65	2.84	
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 N/A	TESTING 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) 2013; (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)
97.15	2,225.86	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.

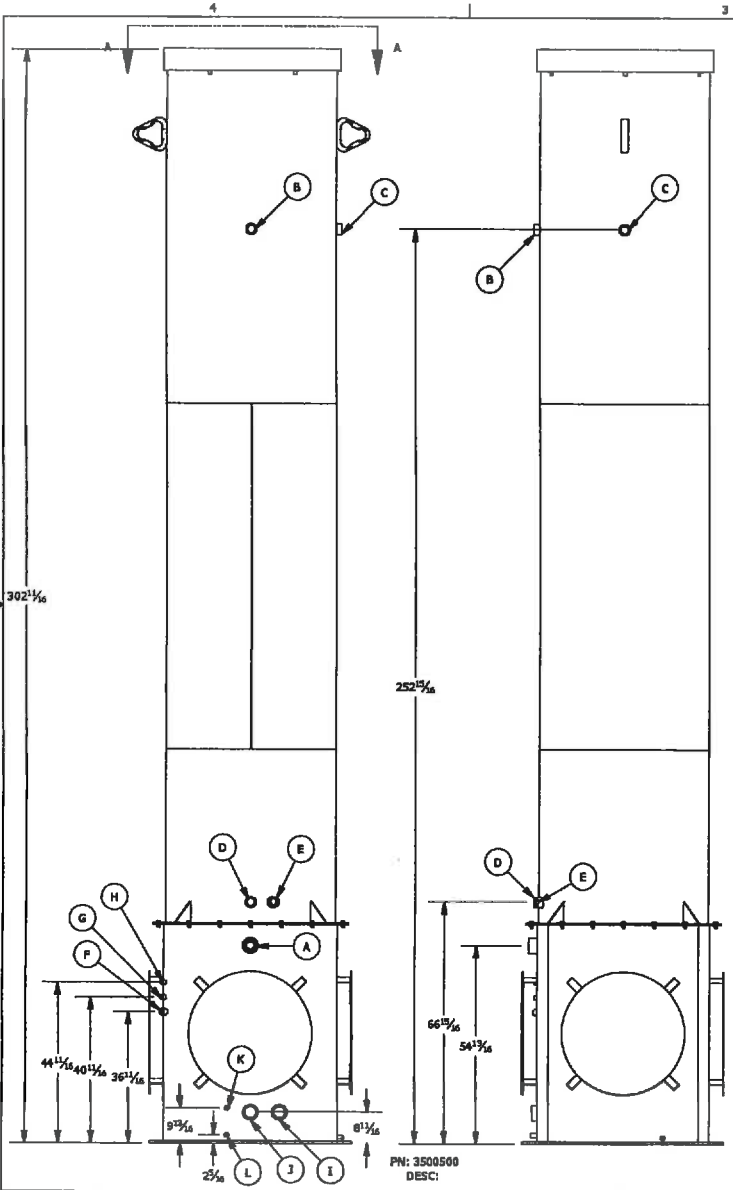
REPORTING

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

34. Additional Information Attached? **YES**

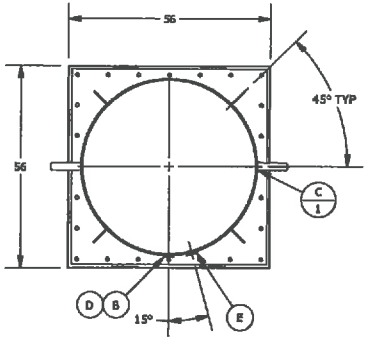
Please attach a copy of manufacturer's data sheet. Please attach a copy of manufacturer's drawing.
Please attach a copy of the manufacturer's performance testing.

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
Primm Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Oil and Gas Site General Information

Administrative Information	
Company Name	Antero Resources Corporation
Facility/Well Name	Primm Well Pad
Nearest City/Town	Greenwood
API Number/SIC Code	1311
Latitude/Longitude	39.241562, -80.852583
County	Doddridge County

Technical Information	
Max Condensate Site Throughput (bbl/day):	1,600
Max Produced Water Site Throughput (bbl/day):	3,200
Are there any sour gas streams at this site?	No
Is this site currently operational/producing?	Yes

Equipment/Processes at Site	
Equipment/Process Types	**How many for this site?**
Fugitives	8
IC Engines	1
Gas Production Unit Heaters	8
Line Heaters	8
Condensate Tanks	10
Produced Water Tanks	2
Loading Jobs	2
Enclosed Combustors	4

Table 2

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

Emission Source	VOC		NO_X		CO_{2e}		CO		SO_2		$PM_{2.5}$		PM_{10}		Lead		Total HAPs		Benzene		Xylenes		Formaldehyde	
	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)
UNCONTROLLED (Fugitives, Storage Tanks, Gas Production Unit Heaters, Line Heaters)																								
Fugitive Emissions (Component Count, PCV and Hauling)[1]	3.1338	13.7262			71.806	314.51							0.4810	0.9907			0.3035	1.3293	0.0052	0.0229	3.93E-02	1.72E-01		
Flashing, Working and Breathing (F/W/B) Losses[2]	492.68	2,157.9															19.082	83.581	0.7418	3.2491	0.4149	1.8174		
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]	0.0529	0.2318	0.9623	4.2147	1,154.72	5,057.66	0.8083	3.5404	0.0058	0.0253	0.0731	0.3203	0.0731	0.3203	4.81E-06	2.11E-05	1.81E-02	7.93E-02	2.02E-05	8.85E-05			0.0007	0.0032
Line Heater Emissions [4]	0.0706	0.3091	1.2830	5.6196	1,539.62	6,743.54	1.0777	4.7205	0.0077	0.0337	0.0975	0.4271	0.0975	0.4271	6.42E-06	2.81E-05	2.42E-02	1.06E-01	2.69E-05	1.18E-04			0.0010	0.0042
TOTALS:	**495.9453**	**2172.2403**	**2.5611**	**11.2174**	**2792.5396**	**12231.3235**	**7.5305**	**32.9836**	**0.0136**	**0.0596**	**0.1730**	**0.7578**	**0.6539**	**1.7481**	**0.0000**	**0.0000**	**19.4337**	**85.1196**	**0.7474**	**3.2738**	**0.4543**	**1.9900**	**0.0066**	**0.0289**
UNCONTROLLED (Truck Loading Emissions)																								
Truck Loading Emissions[5]	10.138	12.337			3.394	5.272											0.0289	0.0352	8.13E-04	9.93E-04	0.0022	0.0027		
CONTROLLED EMISSIONS																								
Enclosed Combustor Emissions (from F/W/B losses)[6]	9.8539	43.1601	0.5879	2.5752	2202.7807	9648.1794	0.4939	2.1632	3.02E-05	1.32E-04	0.0335	0.1468	0.0447	7.05E-05	2.94E-06	1.29E-05	0.3817	1.6720	1.48E-02	6.50E-02	0.0083	0.0363	3.78E-06	1.66E-05
Controlled Fugitive Emissions from Hauling													0.2405	0.4953										
TOTALS:	**9.8539**	**43.1601**	**0.5879**	**2.5752**	**2202.7807**	**9648.1794**	**0.4939**	**2.1632**	**3.02E-05**	**1.32E-04**	**0.0335**	**0.1468**	**0.2852**	**0.4954**	**2.94E-06**	**1.29E-05**	**0.3817**	**1.6720**	**0.0148**	**0.0650**	**0.0083**	**0.0363**	**3.78E-06**	**1.66E-05**
POTENTIAL TO EMIT[7]	**13.1183**	**69.7950**	**3.1490**	**13.7926**	**4995.3203**	**21884.7753**	**8.0244**	**35.1468**	**0.0136**	**0.0598**	**0.2065**	**0.9046**	**16.3606**	**1.2528**	**1.42E-05**	**6.20E-05**	**0.7330**	**3.2458**	**0.0205**	**0.0907**	**0.0477**	**0.2115**	**0.0066**	**0.0289**

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 1600 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 2.8166 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, engine, storage tanks, fugitives and enclosed combustor. 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

Primm Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Pollutant		Emissions			Threshold Exceeded?	
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	495.9453	13.1183	6	**Yes**	**Yes**
	tons/yr	2184.5771	69.7950	10	**Yes**	**Yes**
NO_X	lbs/hr	2.5611	3.1490	6		
	tons/yr	11.2174	13.7926	10	**Yes**	**Yes**
CO	lbs/hr	7.5305	8.0244	6	**Yes**	**Yes**
	tons/yr	32.9836	35.1468	10	**Yes**	**Yes**
SO_2	lbs/hr	0.0136	0.0136	6		
	tons/yr	0.0596	0.0598	10		
$PM_{2.5}$	lbs/hr	1.73E-01	2.07E-01	6		
	tons/yr	7.58E-01	9.05E-01	10		
PM_{10}	lbs/hr	0.6539	0.4581	6		
	tons/yr	1.7481	1.2528	10		
Lead	lbs/hr	1.12E-05	1.42E-05	6		
	tons/yr	4.92E-05	6.20E-05	10		
Total HAPs	lbs/hr	19.4337	0.7330	2	**Yes**	
	tons/yr	85.1548	3.2458	5	**Yes**	
Total TAPs	lbs/hr	0.7541	0.0271	1.14		
n-Hexane	lbs/hr	17.3885	0.6128			
	tons/yr	76.1905	2.7130			
Toluene	lbs/hr	0.6545	0.0291			
	tons/yr	2.8685	0.1292			
Ethylbenzene	lbs/hr	0.1871	0.0211			
	tons/yr	0.8203	0.0933			
Xylenes	lbs/hr	0.4543	0.0476			
	tons/yr	1.9924	0.2113			
Benzene	lbs/hr	0.7471	0.0201			
	tons/yr	3.2732	0.0891			

Enter any notes here:	1. Emissions are based on 98% Enclosed Combustor DRE operating 100% of the time.

Table 4

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

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

Gas Weight Fraction From Analysis:	VOC frac	0.191
	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
400	Valves	Gas VOC	0.004500	0.34	6,624.61
		Non VOC	0.004500	1.46	28,064.99
472	Connectors	VOC	0.000200	0.02	347.42
		Non-VOC	0.000200	0.08	1,471.85
104	Flanges	VOC	0.000390	0.01	149.27
		Non-VOC	0.000390	0.03	632.40
			Total VOCs:	0.37	7,121.30
			Total THC:	1.93	37,290.55

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
416	Valves	Light Liquid VOC	0.002500	1.01	19,528.73
		Light Liquid Non-VOC		0.03	514.15
			Total VOC:	1.01	19,528.73
			Total THC:	1.04	20,042.88

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	26,650.04	3.04	13.33
Ethylbenzene		0.01	0.06
Toluene		0.02	0.07
Xylenes		0.04	0.17
n-Hexane		0.22	0.96
TAPs (Benzene)		0.01	0.02
HAPs		0.29	1.28
CO_{2e}	565,717.91	64.58	282.86

Enter Notes Here:	Fugitive emissions based on an estimated component count Global Warming Potentials from EPA site <u>Reference to Emission factors used:</u> 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
Primm Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

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

Component	Mol%	Molecular Weight (lb/lb-mole)	Component Flow (scf/day)	Component Moles (lb-moles)	Component Emissions (lbs/day)	(lbs/hr)	(tons/year)
H2S	0	34.08	0	0.00	0.00	0.00	0.00
Nitrogen	0.4946	14.01	1.0445952	0.00	0.04	0.00	0.01
Carbon Dioxide	0.1467	44.01	0.3098304	0.00	0.04	0.00	0.01
Methane	77.6927	16.04	164.0869824	0.43	6.94	0.29	1.27
Ethane	14.1987	30.07	29.9876544	0.08	2.38	0.10	0.43
Propane	4.4938	44.1	9.4909056	0.03	1.10	0.05	0.20
Isobutane	0.5666	58.12	1.1966592	0.00	0.18	0.01	0.03
n-Butane	1.1838	58.12	2.5001856	0.01	0.38	0.02	0.07
Isopentane	0.3749	72.15	0.7917888	0.00	0.15	0.01	0.03
n-Pentane	0.2914	72.15	0.6154368	0.00	0.12	0.00	0.02
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	1.1512512	0.00	0.26	0.01	0.05
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	0.0916	0.4012
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	0.0109	0.0477
HAPs Emissions	0.0109	0.0477
TAPs Emissions	0.0000	0.0000
CO_{2e} emissions	7.2262	31.6506

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
Primm Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

# Hours Operational	8760

	Condensate Tank Flashing Losses			Produced Water Tank Flashing Losses		
	Vapor Mass Fraction	Flashing Losses		Vapor Mass Fraction	Flashing Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
Water	0.0962	0.5930	2.5974	2.5805	0.0000	0.0000
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0076	0.0471	0.2064	0.5236	0.0873	0.3825
Carbon Dioxide	0.1386	0.8541	3.7412	2.2800	0.3802	1.6654
Methane	3.2433	19.9894	87.5534	54.6475	9.1137	39.9180
Ethane	19.8016	122.0413	534.5410	22.8779	3.8154	16.7115
Propane	30.4768	187.8349	822.7169	11.5015	1.9181	8.4014
Isobutane	7.7121	47.5313	208.1872	0.6555	0.1093	0.4788
n-Butane	17.0526	105.0989	460.3330	2.7209	0.4538	1.9875
Isopentane	6.0840	37.4968	164.2361	0.5811	0.0969	0.4244
n-Pentane	6.2663	38.6203	169.1568	0.5670	0.0946	0.4142
2-Methylpentane	1.5985	9.8517	43.1503	0.0653	0.0109	0.0477
3-Methylpentane	0.9387	5.7853	25.3396	0.1012	0.0169	0.0740
n-Hexane	2.7686	17.0634	74.7378	0.0894	0.0149	0.0653
Methylcyclopentane	0.4056	2.4995	10.9479	0.1237	0.0206	0.0903
Benzene	0.1150	0.7090	3.1054	0.1886	0.0314	0.1377
2-Methylhexane	0.5439	3.3519	14.6814	0.0195	0.0033	0.0142
3-Methylhexane	0.4090	2.5210	11.0419	0.0153	0.0026	0.0112
Heptane	0.8279	5.1023	22.3480	0.0325	0.0054	0.0237
Methylcyclohexane	0.5915	3.6457	15.9683	0.1195	0.0199	0.0873
Toluene	0.0990	0.6102	2.6726	0.1528	0.0255	0.1116
Octane	0.6012	3.7055	16.2303	0.0140	0.0023	0.0102
Ethylbenzene	0.0262	0.1615	0.7072	0.0400	0.0067	0.0292
m & p-Xylene	0.0334	0.2061	0.9029	0.0505	0.0084	0.0369
o-Xylene	0.0306	0.1888	0.8268	0.0475	0.0079	0.0347
Nonane	0.1298	0.7998	3.5032	0.0046	0.0008	0.0034
C10+	0.0021	0.0129	0.0567	0.0000	0.0000	0.0000
Total VOCs	76.713	472.80	2,070.9	17.091	2.8502	12.4840
Total CO_{2e}		500.59	2,192.6		228.22	999.6
Total TAPs (Benzene)		0.7090	3.1054		0.0314	0.1377
Toluene		0.6102	2.6726		0.0255	0.1116
Ethylbenzene		0.1615	0.7072		0.0067	0.0292
Xylenes		0.3949	1.7297		0.0164	0.0716
n-Hexane		17.063	74.738		0.0149	0.0653
Total HAPs		18.939	82.953		0.0949	0.4155
Total	100.00	616.32	2,699.5	100.00	16.247	71.16

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

Table 7

Uncontrolled Working and Breathing Losses

Primm Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Condensate Tank Information	
Number of Tanks	10
Maximum Working Losses (lbs/hr)	12.4207
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	0.0203	0.0889	0.0173	0.0757	0.0376	0.1646
Methane	0.7106	0.0883	0.3866	0.0752	0.3292	0.1634	0.7158
Ethane	25.0627	3.1130	13.6348	2.6511	11.6120	5.7641	25.2468
Propane	32.6007	4.0492	17.7356	3.4485	15.1045	7.4977	32.8401
Isobutane	7.8197	0.9713	4.2541	0.8272	3.6230	1.7984	7.8771
n-Butane	16.9835	2.1095	9.2395	1.7965	7.8688	3.9060	17.1083
Isopentane	5.7906	0.7192	3.1502	0.6125	2.6829	1.3318	5.8331
n-Pentane	5.8656	0.7285	3.1910	0.6205	2.7176	1.3490	5.9087
2-Methylpentane	1.4767	0.1834	0.8034	0.1562	0.6842	0.3396	1.4875
3-Methylpentane	0.8627	0.1071	0.4693	0.0913	0.3997	0.1984	0.8690
n-Hexane	0.1730	0.0215	0.0941	0.0183	0.0802	0.0398	0.1743
Methylcyclopentane	0.3412	0.0424	0.1856	0.0361	0.1581	0.0785	0.3437
Benzene	0.0059	0.0007	0.0032	0.0006	0.0027	0.0014	0.0060
2-Methylhexane	0.0322	0.0040	0.0175	0.0034	0.0149	0.0074	0.0324
3-Methylhexane	0.3636	0.0452	0.1978	0.0385	0.1685	0.0836	0.3663
Heptane	0.6786	0.0843	0.3692	0.0718	0.3144	0.1561	0.6835
Methylcyclohexane	0.4809	0.0597	0.2616	0.0509	0.2228	0.1106	0.4844
Toluene	0.0110	0.0014	0.0060	0.0012	0.0051	0.0025	0.0110
Octane	0.4644	0.0577	0.2526	0.0491	0.2152	0.1068	0.4678
Ethylbenzene	0.0054	0.0007	0.0029	0.0006	0.0025	0.0012	0.0055
m & p-Xylene	0.0089	0.0011	0.0048	0.0009	0.0041	0.0020	0.0090
o-Xylene	0.0070	0.0009	0.0038	0.0007	0.0033	0.0016	0.0071
Nonane	0.0903	0.0112	0.0491	0.0096	0.0418	0.0208	0.0910
C10+	0.0010	0.0001	0.0005	0.0001	0.0005	0.0002	0.0010
Total VOCs	74.063	9.1991	40.292	7.8344	34.3147	17.0335	74.607
Total CO_{2e}		2.2267	9.7531	1.8964	8.3062	4.1231	18.059
Total TAPs (Benzene)		0.0007	0.0032	0.0006	0.0027	0.0014	0.0060
Toluene		0.0014	0.0060	0.0012	0.0051	0.0025	0.0110
Ethylbenzene		0.0007	0.0029	0.0006	0.0025	0.0012	0.0055
Xylenes		0.0020	0.0087	0.0017	0.0074	0.0037	0.0160
n-Hexane		0.0215	0.0941	0.0183	0.0802	0.0398	0.1743
Total HAPs		0.0262	0.1149	0.0223	0.0979	0.0486	0.2128
Total	100.00	12.4207	54.4026	10.5780	46.3318	22.9987	100.734

Table 7

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

Produced Water Tank Information	
Number of Tanks	2
Maximum Working Losses (lbs/hr)	0.1478
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	3.1362	0.0046	0.0203	0.0003	0.0011	0.0049	0.0214
Methane	3.1005	0.0046	0.0201	0.0003	0.0011	0.0048	0.0212
Ethane	1.1976	0.0018	0.0078	0.0001	0.0004	0.0019	0.0082
Propane	0.1467	0.0002	0.0009	0.0000	0.0001	0.0002	0.0010
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	0.0010	0.0000	0.0001	0.0002	0.0011
Total CO_{2e}		0.1192	0.5220	0.0066	0.0291	0.1258	0.5511
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	0.1478	0.6472	0.0082	0.0361	0.1560	0.6834

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

Table 8

Loading Emissions
Primm Well Pad
Doddridge County, 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)	24,528,000	49,056,000
Loading Emissions (lbs/hr)	13.69	1.17
Loading Emissions (tpy)	16.65	2.84

	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	3.03E-04
Carbon Dioxide	0.1634	0.02	0.03	3.1362	3.66E-02	8.89E-02
Methane	0.7106	0.10	0.12	3.1005	3.61E-02	8.79E-02
Ethane	25.0627	3.43	4.17	1.1976	1.40E-02	3.40E-02
Propane	32.6007	4.46	5.43	0.1467	1.71E-03	4.16E-03
Isobutane	7.8197	1.07	1.30	0.0010	1.22E-05	2.97E-05
n-Butane	16.9835	2.32	2.83	0.0065	7.62E-05	1.85E-04
Isopentane	5.7906	0.79	0.96	0.0003	4.08E-06	9.93E-06
n-Pentane	5.8656	0.80	0.98	0.0002	2.90E-06	7.06E-06
2-Methylpentane	1.4767	0.20	0.25	0.0000	6.39E-08	1.55E-07
3-Methylpentane	0.8627	0.12	0.14	0.0000	2.40E-07	5.84E-07
n-Hexane	0.1730	0.02	0.03	0.0000	3.38E-09	8.23E-09
Methylcyclopentane	0.3412	0.05	0.06	0.0001	6.30E-07	1.53E-06
Benzene	0.0059	0.00	0.00	0.0003	2.95E-06	7.19E-06
2-Methylhexane	0.0322	0.00	0.01	0.0000	3.12E-10	7.60E-10
3-Methylhexane	0.3636	0.05	0.06	0.0000	3.67E-09	8.93E-09
Heptane	0.6786	0.09	0.11	0.0000	5.72E-09	1.39E-08
Methylcyclohexane	0.4809	0.07	0.08	0.0000	1.30E-07	3.17E-07
Toluene	0.0110	0.00	0.00	0.0001	1.15E-06	2.80E-06
Octane	0.4644	0.06	0.08	0.0000	4.80E-10	1.17E-09
Ethylbenzene	0.0054	0.00	0.00	0.0000	1.70E-07	4.13E-07
m & p-Xylene	0.0089	0.00	0.00	0.0000	2.39E-07	5.82E-07
o-Xylene	0.0070	0.00	0.00	0.0000	2.35E-07	5.72E-07
Nonane	0.0903	0.01	0.02	0.0000	7.51E-11	1.83E-10
C10+	0.0010	0.00	0.00	0.0000	3.70E-17	9.01E-17
Total VOCs	74.0629	10.136	12.332	0.1554	1.81E-03	4.41E-03
Total CO_{2e}		2.454	2.9851		0.9400	2.2872
Total TAPs (Benzene)		0.0008	0.0010		0.0000	0.0000
Toluene		0.0015	0.0018		0.0000	0.0000
Ethylbenzene		0.0007	0.0009		0.0000	0.0000
Xylenes		0.0022	0.0027		0.0000	0.0000
n-Hexane		0.0237	0.0288		0.0000	0.0000
Total HAPs		0.0289	0.0352		0.0000	0.0000
Total	100.0000	13.6859	16.6512	100.0000	1.1655	2.8360

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
Primm Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Gas Production Unit Heater Emissions

Number of Units	8
GPU Heater Rating (MMBtu/hr)	1.50
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,247

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	0.962	4.215
CO	84	0.808	3.540
CO_2	120,000	1154.716	5057.656
Lead	0.0005	4.81E-06	2.11E-05
N_2O	2.2	0.021	0.093
PM (Total)	7.6	0.073	0.320
SO_2	0.6	0.006	0.025
TOC	11	0.106	0.464
Methane	2.3	0.022	0.097
VOC	5.5	0.053	0.232
HAPS			
2-Methylnaphthalene	2.40E-05	2.31E-07	1.01E-06
Benzene	2.10E-03	2.02E-05	8.85E-05
Dichlorobenzene	1.20E-03	1.15E-05	5.06E-05
Fluoranthene	3.00E-06	2.89E-08	1.26E-07
Fluorene	2.80E-06	2.69E-08	1.18E-07
Formaldehyde	7.50E-02	7.22E-04	3.16E-03
Hexane	1.80E+00	1.73E-02	7.59E-02
Naphthalene	6.10E-04	5.87E-06	2.57E-05
Phenanathrene	1.70E-05	1.64E-07	7.17E-07
Toluene	3.40E-03	3.27E-05	1.43E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.123	0.541
TOTAL Uncontrolled HAPs	0.042	0.185
TOTAL Uncontrolled TAPs (Benzene)	4.72E-05	2.07E-04
TOTAL Uncontrolled TAPs (Formaldehyde)	0.002	0.007
TOTAL CO_{2e} Emissions	2,710.35	11,871.33

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

Line Heater Emissions

Number of Units	8
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	1.283	5.620
CO	84	1.078	4.720
CO_2	120,000	1539.621	6743.541
Lead	0.0005	6.42E-06	2.81E-05
N_2O	2.2	0.028	0.124
PM (Total)	7.6	0.098	0.427
SO_2	0.6	0.008	0.034
TOC	11	0.141	0.618
Methane	2.3	0.030	0.129
VOC	5.5	0.071	0.309
HAPS			
2-Methylnaphthalene	2.40E-05	3.08E-07	1.35E-06
Benzene	2.10E-03	2.69E-05	1.18E-04
Dichlorobenzene	1.20E-03	1.54E-05	6.74E-05
Fluoranthene	3.00E-06	3.85E-08	1.69E-07
Fluorene	2.80E-06	3.59E-08	1.57E-07
Formaldehyde	7.50E-02	9.62E-04	4.21E-03
Hexane	1.80E+00	2.31E-02	1.01E-01
Naphthalene	6.10E-04	7.83E-06	3.43E-05
Phenanathrene	1.70E-05	2.18E-07	9.55E-07
Toluene	3.40E-03	4.36E-05	1.91E-04

Table 10

Enclosed Combustor Emissions
Primm Well Pad
Doddridge County, 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	--	5,293.11	335.22	197.52	3.22	5,879.47
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	441,504.00	--	46,367,645.65	2,936,559.84	1,730,259.50	28,199.36	51,504,168.35
Heating Content (Btu/ft3)	1,247		2,315.45	1,103.89	2,315.45	1,103.89	2,225.86

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	-	-	472.797	2.850	17.034	0.000	492.68
Benzene	-	-	0.709	0.031	0.001	0.000	0.742
Toluene	-	-	0.610	0.025	0.003	0.000	0.638
Ethylbenzene	-	-	0.161	0.007	0.001	0.000	0.169
Xylenes	-	-	0.395	0.016	0.004	0.000	0.415
n-Hexane	-	-	17.063	0.015	0.040	0.000	17.118
HAPs	-	-	18.939	0.095	0.049	0.000	19.082
Total Mass Flow	-	-	616.322	16.247	22.999	0.156	655.723
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	-	-	2070.850	12.484	74.607	0.001	2157.942
Benzene	-	-	3.105	0.138	0.006	0.000	3.249
Toluene	-	-	2.673	0.112	0.011	0.000	2.795
Ethylbenzene	-	-	0.707	0.029	0.005	0.000	0.742
Xylenes	-	-	1.730	0.072	0.016	0.000	1.817
n-Hexane	-	-	74.738	0.065	0.174	0.000	74.977
HAP	-	-	82.953	0.416	0.213	0.000	83.581
Total Mass Flow	-	-	2699.490	71.161	100.734	0.683	2872.069

Table 10

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

Controlled Emissions							
Hourly (lb/hr)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.005	-	0.529	0.034	0.020	0.000	0.59
CO	0.004	-	0.445	0.028	0.017	0.000	0.49
PM2.5	0.000	-	0.030	0.002	0.001	0.000	0.03
PM10	0.000	-	0.040	0.003	0.002	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	-	9.456	0.057	0.341	0.000	9.85
Benzene	0.000	-	0.014	0.001	0.000	0.000	0.01
Toluene	0.000	-	0.012	0.001	0.000	0.000	0.01
Ethylbenzene	0.000	-	0.003	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.008	0.000	0.000	0.000	0.01
n-Hexane	0.000	-	0.341	0.000	0.001	0.000	0.34
HAP	0.000	-	0.379	0.002	0.001	0.000	0.38
N_2O	0.000	-	0.012	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	-	2.318	0.147	0.087	0.001	2.58
CO	0.019	-	1.947	0.123	0.073	0.001	2.16
PM2.5	0.001	-	0.132	0.008	0.005	0.000	0.15
PM10	0.002	-	0.176	0.011	0.007	0.000	0.20
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	-	41.417	0.250	1.492	0.000	43.16
Benzene	0.000	-	0.062	0.003	0.000	0.000	0.06
Toluene	0.000	-	0.053	0.002	0.000	0.000	0.06
Ethylbenzene	0.000	-	0.014	0.001	0.000	0.000	0.01
Xylenes	0.000	-	0.035	0.001	0.000	0.000	0.04
n-Hexane	0.000	-	1.495	0.001	0.003	0.000	1.50
HAP	0.000	-	1.659	0.008	0.004	0.000	1.67
N_2O	0.000	-	0.051	0.003	0.002	0.000	0.06
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	9.85	43.16
NOx	5.88E-01	2.58E+00
CO	4.94E-01	2.16E+00
PM2.5	3.35E-02	1.47E-01
PM10	4.47E-02	1.96E-01
H_2S	1.61E-05	7.05E-05
SO_2	3.02E-05	1.32E-04
Benzene (TAPs)	1.48E-02	6.50E-02
Formaldehyde (TAPs)	3.78E-06	1.66E-05
HAPs	0.38	1.67
CO_2e	2202.78	9648.18
N_2O	1.29E-02	5.67E-02
Lead	2.94E-06	1.29E-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
Primm Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Enclosed Combustor CO_2 and CH_4 Emissions

Components	Mole fraction of oil flash gas constituents[a]	Volume of oil flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of water flash gas constituents[a]	Volume of water flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of oil tank vapors constituents[a]	Volume of oil tank vapor sent to Enclosed Combustor *scf/year*	Mole fraction of water tank vapors constituents[a]	Volume of water tank vapors sent to Enclosed Combustor *scf/year*	Component volume of gas sent to Enclosed Combustor *scf/year*	Number of carbon atoms	Combustion Efficiency	Combusted CO_2 Volume[b] *scf/year*	Uncombusted CO_2 and CH_4 Volume[b] *scf/year*	Volume GHGs Emitted *scf/year*
CO_2	0.001	46,367,646	0.0522	2,936,560	0.0016	1,730,260	0.013	28,199	221,122	1	0	--	221,122	159,918,804
Methane	0.090	46,367,646	3.4320	2,936,560	0.0196	1,730,260	0.036	28,199	14,265,308	1	0.98	13,980,002	285,306	285,306
Ethane	0.292	46,367,646	0.7664	2,936,560	0.3683	1,730,260	0.007	28,199	16,410,715	2	0.98	32,165,001	--	
Propane	0.306	46,367,646	0.2627	2,936,560	0.3267	1,730,260	0.001	28,199	15,528,197	3	0.98	45,652,899	--	
i-Butane	0.059	46,367,646	0.0114	2,936,560	0.0594	1,730,260	0.000	28,199	2,861,077	4	0.98	11,215,420	--	
n-Butane	0.130	46,367,646	0.0472	2,936,560	0.1291	1,730,260	0.000	28,199	6,386,948	4	0.98	25,036,837	--	
Pentane	0.076	46,367,646	0.0160	2,936,560	0.0714	1,730,260	0.000	28,199	3,685,666	5	0.98	18,059,762	--	
Hexane	0.027	46,367,646	0.0030	2,936,560	0.0129	1,730,260	0.000	28,199	1,295,332	6	0.98	7,616,551	--	
Benzene	0.001	46,367,646	0.0024	2,936,560	0.0000	1,730,260	0.000	28,199	37,442	6	0.98	220,158	--	
Heptanes	0.010	46,367,646	0.0022	2,936,560	0.0065	1,730,260	0.000	28,199	481,518	7	0.98	3,303,214	--	
Toluene	0.000	46,367,646	0.0017	2,936,560	0.0001	1,730,260	0.000	28,199	27,061	7	0.98	185,636	--	
Octane	0.005	46,367,646	0.0013	2,936,560	0.0040	1,730,260	0.000	28,199	242,615	8	0.98	1,902,103	--	
Ethyl benzene	0.000	46,367,646	0.0004	2,936,560	0.0000	1,730,260	0.000	28,199	6,221	8	0.98	48,773	--	
Xylenes	0.000	46,367,646	0.0009	2,936,560	0.0001	1,730,260	0.000	28,199	15,242	8	0.98	119,500	--	
Nonane	0.000	46,367,646	0.0000	2,936,560	0.0003	1,730,260	0.000	28,199	21,433	9	0.98	189,035	--	
Decane plus	0.000	46,367,646	0.0000	2,936,560	0.0000	1,730,260	0.000	28,199	285	10	0.98	2,790	--	
											Subtotal	**159,697,682**	--	

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	159,918,804	0.12	2000	1	2116.97	9,272.33
CH_4	285,306	0.09	2000	25	3.03	13.27
				CO_2e Emissions	**2,192.7**	**9604.13**

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
Primm Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

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

Tanker Truck Trip Calculation	
Condensate Production (bbl/day)	1,600
PW Production (bbl/day)	3,200
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	0.1300	1	2920	0.1300	379.6000	3.8175	1.7179
Tanker Trucks PW	10	40	10	0.1300	1	5840	0.1300	759.2000	3.8175	1.7179
Pick Up Truck	4	3	10	0.2200	1	730	0.2200	160.6000	0.3467	0.1560

	Uncontrolled Emissions						Controlled Emissions					
	PM			PM10			PM			PM10		
	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)
Tanker Trucks Condensate	0.4963	1449.1342	0.7246	0.2233	652.1104	0.3261	0.2481	724.5671	0.3623	0.1117	326.0552	0.1630
Tanker Trucks PW	0.4963	2898.2683	1.4491	0.2233	1304.2207	0.6521	0.2481	1449.1342	0.7246	0.1117	652.1104	0.3261
Pick Up Truck	0.0763	55.6768	0.0278	0.0343	25.0545	0.0125	0.0381	27.8384	0.0139	0.0172	12.5273	0.0063
Total Emissions	1.0688	4,403.0792	2.2015	0.4810	1,981.3857	0.9907	0.5344	2,201.5396	1.1008	0.2405	990.6928	0.4953

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
Primm Well Pad
Doddridge County, 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
Primm Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

	Potential Emissions		Initial Permit Application Emissions		Change in Emissions	
Pollutant	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**
PM	0.6545	1.4311	0.5344	1.1913	1.20E-01	0.2398
PM10	16.3606	1.2528	0.3659	1.0853	15.9947	0.1675
VOC (uncontrolled)	495.9453	2184.5771	437.7556	1921.3128	58.1897	263.2643
CO	8.0244	35.1468	7.0057	30.6850	1.0187	4.4618
NOx	3.1490	13.7926	1.9363	8.4810	1.2127	5.3116
SO2	0.0136	0.0598	0.0061	0.0265	7.59E-03	3.32E-02
Pb	1.42E-05	6.20E-05	8.10E-06	3.55E-05	6.06E-06	2.66E-05
HAPs	0.7330	3.2458	0.8348	3.6742	-0.1018	-0.4284
TAPs	0.0271	0.1196	0.0315	0.1100	-0.0044	0.0097

Notes: 1.) Change in emissions due to the increase in production, the addition of 8 line heaters, and 3 Cimarron enclosed combustors

Bryan Research & Engineering, Inc.

ProMax® 3.2

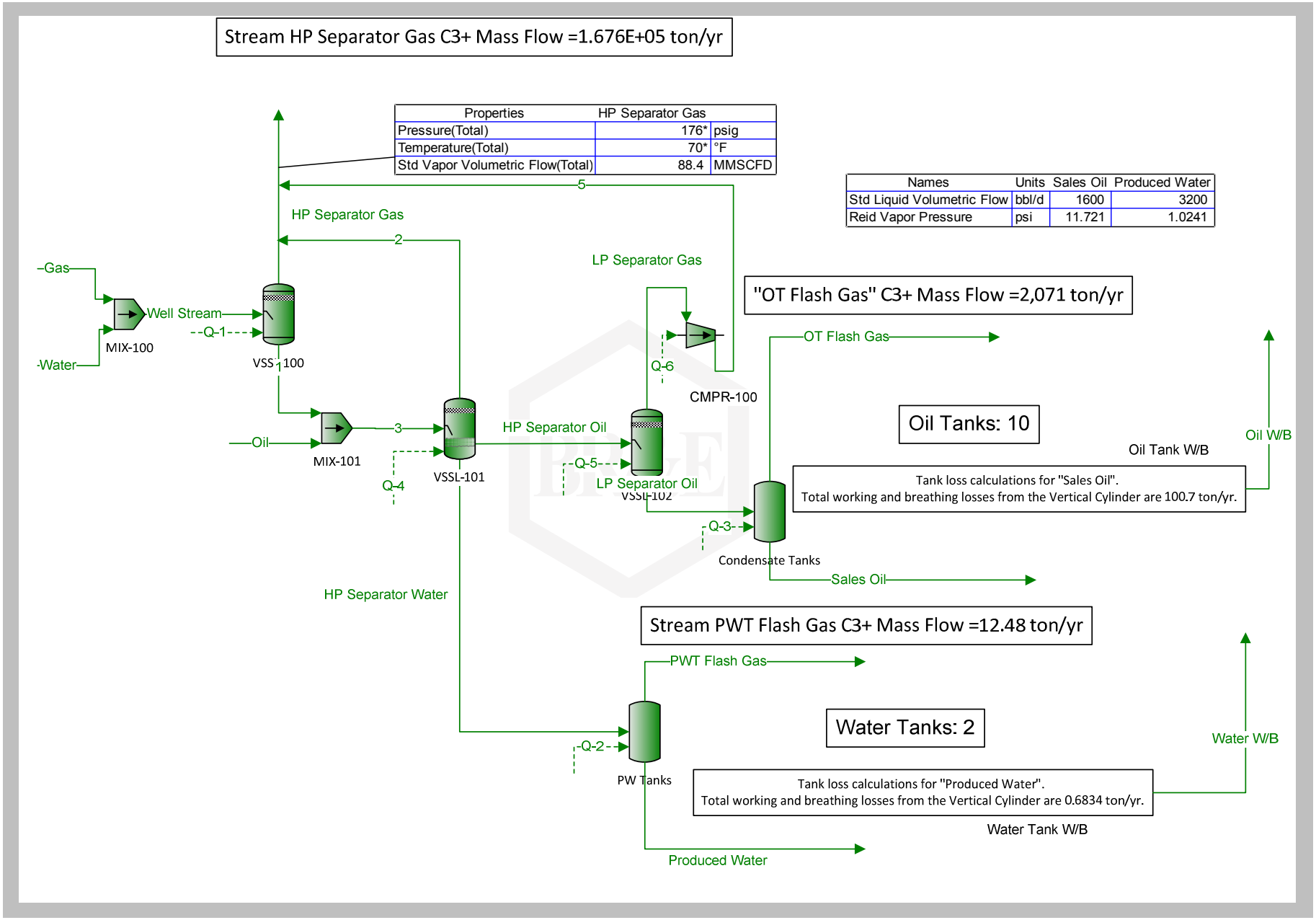
with

TSWEET® & PROSIM®

Simulation Report	
Client Name:	Antero Resources Corporation
Location:	West Virginia
Job:	Primm 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:	7/10/2015 14:36


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 | 1600 | 3200
Reid Vapor Pressure | psi | 11.721 | 1.0241
"OT Flash Gas" C3+ Mass Flow =2,071 ton/yr
Oil Tanks: 10
Water Tanks: 2
Stream PWT Flash Gas C3+ Mass Flow =12.48 ton/yr
Gas
Water
Well Stream
Oil
MIX-100
MIX-101
VSS 100
VSSL-101
VSSL-102
CMPR-100
Condensate Tanks
PW Tanks
HP Separator Gas
HP Separator Oil
HP Separator Water
LP Separator Gas
LP Separator Oil
OT Flash Gas
Sales Oil
PWT Flash Gas
Produced Water
Q-1
Q-2
Q-3
Q-4
Q-5
Q-6
2
3
5
Oil Tank W/B
Oil W/B
Water W/B
Water Tank W/B
Tank loss calculations for "Sales Oil".
Total working and breathing losses from the Vertical Cylinder are 100.7 ton/yr.
Tank loss calculations for "Produced Water".
Total working and breathing losses from the Vertical Cylinder are 0.6834 ton/yr.

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		21.2294	0.200665	99.9673	0.0518649	0.236556	0.00493103	0	100	0	99.9967	3.02980	0.000120063	94.3314	99.9676	93.9312	0.0260665
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.389645	0.493687	0.000124878	0.0166715	0.0120889	1.92682E-05	0.494658	0	0.0179998	4.63224E-06	0.395332	0.000471190	0.00701983	7.84664E-05	0.00116064	0.00112061
Carbon Dioxide		0.115570	0.146189	0.000864470	0.0317955	0.139478	0.00259287	0.146717	0	0.0309997	0.000531324	1.09580	0.164098	1.31065	0.000921796	0.00273803	0.0150834
Methane		61.2061	77.5461	0.0236500	4.71884	8.95458	0.0431145	77.7018	0	4.76595	0.00173450	72.0524	1.95714	3.55458	0.0243017	0.310624	0.856272
Ethane		11.1857	14.1718	0.00534633	5.70817	29.1679	0.866275	14.2004	0	5.72594	0.000451387	16.0934	36.8296	0.732519	0.00486664	0.350331	3.44875
Propane		3.54021	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		0.446366	0.565560	7.51268E-05	2.06705	5.87699	1.70539	0.566666	0	2.06698	2.57126E-06	0.238541	5.94479	0.000331272	6.81076E-05	0.124877	2.08604
n-Butane		0.932595	1.18158	0.000324683	5.90958	12.9949	5.41362	1.18394	0	5.90894	2.35040E-05	0.990199	12.9114	0.00206948	0.000306607	0.357096	6.10540
Isopentane		0.295345	0.374207	5.45846E-05	3.77106	3.73493	4.05972	0.374944	0	3.76996	2.77093E-06	0.170349	3.54633	8.92162E-05	6.37944E-05	0.227707	4.03009
n-Pentane		0.229564	0.290862	5.32408E-05	5.04724	3.84684	5.58155	0.291434	0	5.04595	2.67722E-06	0.166239	3.59230	6.34931E-05	4.81853E-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	4.39260E-06	0	0.0993314	1.78627
n-Hexane		0.429429	0.544108	6.80831E-06	6.01817	1.42299	7.05525	0.545164	0	6.01594	1.33782E-07	0.0219437	0.0887230	6.19607E-08	3.20538E-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	5.96558E-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	5.77875E-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	0.00685095	0.299226	9.00180E-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	0.0257526	0.216407	2.09057E-06	0	0.205426	3.71051
Toluene		0	0	0.000100916	0.742657	0.0475918	0.886575	0	0	0.743993	9.02755E-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	6.62449E-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	2.52039E-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	3.49358E-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	9.23455E-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		2610.88	19.4768	2591.32	0.0863744	0.0329168	0.00683346	0	2610.88	0	2591.29	0.0238885	6.24922E-07	0.00800203	2591.40	2591.40	0.0397502
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		47.9200	47.9180	0.00323704	0.0277642	0.00168218	2.67020E-05	47.9200	0	0.0299860	0.000120039	0.00311701	2.45252E-06	5.95485E-07	0.00203404	0.0320200	0.00170888
Carbon Dioxide		14.2132	14.1893	0.0224085	0.0529513	0.0194083	0.00359322	14.2132	0	0.0516426	0.0137686	0.00863988	0.000854120	0.000111181	0.0238952	0.0755378	0.0230015
Methane		7527.37	7526.74	0.613046	7.85863	1.24603	0.0597483	7527.37	0	7.93963	0.0449473	0.568099	0.0101868	0.000301531	0.629958	8.56959	1.30578
Ethane		1375.66	1375.54	0.138586	9.50623	4.05870	1.20049	1375.66	0	9.53888	0.0116971	0.126889	0.191696	6.21388E-05	0.126155	9.66504	5.25919
Propane		435.388	435.345	0.0479292	10.8920	4.25972	4.70203	435.388	0	10.9032	0.00442973	0.0434995	0.170034	5.19123E-06	0.0431390	10.9464	8.96174
Isobutane		54.8959	54.8941	0.00194741	3.44240	0.817783	2.36334	54.8959	0	3.44339	6.66310E-05	0.00188078	0.0309423	2.81014E-08	0.00176551	3.44516	3.18112
n-Butane		114.694	114.686	0.00841632	9.84164	1.80824	7.50223	114.694	0	9.84374	0.000609077	0.00780724	0.0672032	1.75552E-07	0.00794799	9.85169	9.31047
Isopentane		36.3227	36.3211	0.00141492	6.28022	0.519715	5.62599	36.3227	0	6.28040	7.18053E-05	0.00134312	0.0184584	7.56811E-09	0.00165371	6.28206	6.14571
n-Pentane		28.2327	28.2315	0.00138009	8.40553	0.535287	7.73495	28.2327	0	8.40608	6.93767E-05	0.00131071	0.0186977	5.38605E-09	0.00124908	8.40733	8.27024
2-Methylpentane		0	0	0.000129646	4.20615	0.114321	4.06425	0	0	4.20637	3.18671E-06	0.000126460	0.00394105	9.91988E-11	0	4.20637	4.17857
3-Methylpentane		0	0	0.000209322	2.74013	0.0671340	2.65686	0	0	2.74039	1.33953E-05	0.000195927	0.00230229	3.72619E-10	0	2.74039	2.72399
n-Hexane		52.8128	52.8120	0.000176483	10.0225	0.198008	9.77721	52.8128	0	10.0220	3.46679E-06	0.000173016	0.000461798	5.25606E-12	0.000830911	10.0228	9.97522
Methylcyclopentane		0	0	0.000295369	1.53896	0.0296998	1.50218	0	0	1.53928	5.03017E-05	0.000245068	0.000932496	1.00231E-09	0	1.53928	1.53188
Benzene		0	0	0.00452322	0.466917	0.00907666	0.455665	0	0	0.471447	0.00412064	0.000402579	1.74334E-05	5.06053E-09	0	0.471447	0.464742
2-Methylhexane		0	0	3.31585E-05	3.97309	0.0334517	3.93177	0	0	3.97315	6.91874E-07	3.24666E-05	4.17084E-13	0	0	3.97315	3.96522
3-Methylhexane		0	0	2.60269E-05	3.13016	0.0251590	3.09908	0	0	3.13021	5.67104E-07	2.54598E-05	0.000834659	4.90205E-12	0	3.13021	3.12424
Heptane		0	0	5.52263E-05	7.98285	0.0509199	7.91992	0	0	7.98294	1.20990E-06	5.40164E-05	0.00155745	7.63613E-12	0	7.98294	7.97084
Methylcyclohexane		0	0	0.000230622	5.66710	0.0371308	5.62124	0	0	5.66736	2.75754E-05	0.000203047	0.00112638	1.77340E-10	0	5.66736	5.65837
Toluene		0	0	0.00261592	1.23680	0.00662239	1.22862	0	0	1.23942	0.00233938	0.000276544	2.73622E-05	1.67209E-09	0	1.23942	1.23524
Octane		0	0	2.07048E-05	16.1408	0.0324398	16.1007	0	0	16.1408	3.01525E-07	2.04032E-05	0.000934994	5.61948E-13	0	16.1408	16.1332
Ethylbenzene		0	0	0.000543952	0.849058	0.00152077	0.847183	0	0	0.849604	0.000481076	6.28756E-05	1.17318E-05	2.13802E-10	0	0.849604	0.848704
m-Xylene		0	0	0.000708375	1.29369	0.00194175	1.29129	0	0	1.29440	0.000628970	7.94056E-05	1.92830E-05	3.01431E-10	0	1.29440	1.29323
o-Xylene		0	0	0.000874261	1.32017	0.00177808	1.31798	0	0	1.32105	0.000799592	7.46688E-05	1.52212E-05	2.96356E-10	0	1.32105	1.31976
Nonane		0	0	6.18354E-06	9.42392	0.00623620	9.41625	0	0	9.42394	1.41962E-07	6.04158E-06	0.000161905	7.83357E-14	0	9.42394	9.42249
C10+		0	0	8.30815E-09	40.1513	6.32261E-05	40.1512	0	0	40.1513	2.68372E-11	8.28132E-09	1.12918E-06	2.42215E-20	0	40.1513	40.1512
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		18.8603	0.173114	99.9595	0.00856208	0.0962168	0.000717497	0	100	0	99.9943	2.58051	4.89512E-05	92.3996	99.9620	71.9570	0.00402896
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.538274	0.662273	0.000194168	0.00427961	0.00764592	4.35962E-06	0.663391	0	0.00462148	7.20286E-06	0.523574	0.000298727	0.0106922	0.000122007	0.00138256	0.000269333
Carbon Dioxide		0.250819	0.308093	0.00211165	0.0128226	0.138588	0.000921656	0.309119	0	0.0125041	0.00129794	2.27997	0.163441	3.13622	0.00225173	0.00512398	0.00569528
Methane		48.4211	59.5731	0.0210585	0.693699	3.24333	0.00558645	59.6762	0	0.700758	0.00154452	54.6475	0.710565	3.10050	0.0216392	0.211899	0.117856
Ethane		16.5864	20.4063	0.00892279	1.57283	19.8016	0.210386	20.4417	0	1.57803	0.000753385	22.8779	25.0627	1.19760	0.00812238	0.447940	0.889715
Propane		7.69826	9.47112	0.00452541	2.64275	30.4768	1.20842	9.48766	0	2.64514	0.000418398	11.5015	32.6007	0.146722	0.00407310	0.743984	2.22331
Isobutane		1.27939	1.57413	0.000242361	1.10092	7.71210	0.800583	1.57677	0	1.10110	8.29537E-06	0.655474	7.81971	0.00104689	0.000219721	0.308637	1.04024
n-Butane		2.67303	3.28871	0.00104743	3.14748	17.0526	2.54139	3.29435	0	3.14774	7.58284E-05	2.72091	16.9835	0.00653997	0.000989141	0.882571	3.04457
Isopentane		1.05082	1.29289	0.000218587	2.49320	6.08397	2.36574	1.29507	0	2.49295	1.10969E-05	0.581056	5.79056	0.000349982	0.000255474	0.698599	2.49467
n-Pentane		0.816774	1.00493	0.000213206	3.33693	6.26625	3.25256	1.00663	0	3.33672	1.07216E-05	0.567037	5.86561	0.000249074	0.000192965	0.934941	3.35706
2-Methylpentane		0	0	2.39225E-05	1.99444	1.59846	2.04128	0	0	1.99429	5.88225E-07	0.0653447	1.47670	5.47922E-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		1.82491	2.24537	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	5.40671E-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	3.14835E-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	0.0324547	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	9.87480E-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	4.11434E-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	6.43966E-09	0	1.86296	6.79912
C10+		0	0	3.63976E-09	45.2021	0.00209891	47.8788	0	0	45.1962	1.17615E-11	1.01597E-05	0.00100453	3.17641E-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		47035.7	350.880	46683.3	1.55606	0.593005	0.123107	0	47035.7	0	46682.9	0.430359	1.12582E-05	0.144159	46684.9	46684.9	0.716112
H2S		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		1342.40	1342.35	0.0906806	0.777770	0.0471235	0.000748015	1342.40	0	0.840010	0.00336269	0.0873179	6.87033E-05	1.66816E-05	0.0569804	0.896990	0.0478715
Carbon Dioxide		625.518	624.466	0.986186	2.33036	0.854149	0.158136	625.518	0	2.27276	0.605950	0.380237	0.0375894	0.00489303	1.05162	3.32438	1.01229
Methane		120758	120747	9.83477	126.072	19.9894	0.958510	120758	0	127.371	0.721066	9.11370	0.163421	0.00483730	10.1061	137.477	20.9479
Ethane		41364.8	41361.0	4.16714	285.843	122.041	36.0976	41364.8	0	286.825	0.351722	3.81542	5.76411	0.00186845	3.79336	290.618	158.139
Propane		19198.7	19196.8	2.11347	480.289	187.835	207.339	19198.7	0	480.785	0.195331	1.91814	7.49775	0.000228910	1.90224	482.688	395.174
Isobutane		3190.67	3190.57	0.113188	200.080	47.5313	137.362	3190.67	0	200.138	0.00387274	0.109315	1.79843	1.63332E-06	0.102615	200.240	184.894
n-Butane		6666.28	6665.82	0.489175	572.018	105.099	436.046	6666.28	0	572.140	0.0354009	0.453774	3.90600	1.02035E-05	0.461955	572.602	541.145
Isopentane		2620.64	2620.52	0.102085	453.111	37.4968	405.908	2620.64	0	453.123	0.00518067	0.0969043	1.33175	5.46030E-07	0.119313	453.243	443.405
n-Pentane		2036.96	2036.87	0.0995717	606.449	38.6203	558.067	2036.96	0	606.488	0.00500545	0.0945662	1.34902	3.88597E-07	0.0901195	606.578	596.687
2-Methylpentane		0	0	0.0111723	362.467	9.85166	350.238	0	0	362.485	0.000274616	0.0108977	0.339622	8.54850E-09	0	362.485	360.090
3-Methylpentane		0	0	0.0180384	236.131	5.78530	228.956	0	0	236.154	0.00115435	0.0168840	0.198401	3.21106E-08	0	236.154	234.741
n-Hexane		4551.16	4551.09	0.0152085	863.692	17.0634	842.555	4551.16	0	863.649	0.000298752	0.0149097	0.0397956	4.52943E-10	0.0716041	863.720	859.618
Methylcyclopentane		0	0	0.0248581	129.518	2.49952	126.423	0	0	129.545	0.00423336	0.0206248	0.0784784	8.43537E-08	0	129.545	128.922
Benzene		0	0	0.353317	36.4717	0.708995	35.5928	0	0	36.8256	0.321871	0.0314462	0.00136176	3.95288E-07	0	36.8256	36.3018
2-Methylhexane		0	0	0.00332255	398.111	3.35193	393.971	0	0	398.117	6.93271E-05	0.00325322	0.00739980	4.17927E-11	0	398.117	397.323
3-Methylhexane		0	0	0.00260794	313.648	2.52098	310.534	0	0	313.653	5.68249E-05	0.00255112	0.0836345	4.91195E-10	0	313.653	313.055
Heptane		0	0	0.00553379	799.897	5.10227	793.591	0	0	799.906	0.000121234	0.00541255	0.156060	7.65155E-10	0	799.906	798.693
Methylcyclohexane		0	0	0.0226439	556.430	3.64573	551.927	0	0	556.455	0.00270752	0.0199363	0.110595	1.74124E-08	0	556.455	555.573
Toluene		0	0	0.241027	113.957	0.610177	113.203	0	0	114.198	0.215546	0.0254803	0.00252111	1.54063E-07	0	114.198	113.813
Octane		0	0	0.00236508	1843.73	3.70555	1839.16	0	0	1843.74	3.44427E-05	0.00233063	0.106803	6.41905E-11	0	1843.74	1842.87
Ethylbenzene		0	0	0.0577486	90.1403	0.161453	89.9412	0	0	90.1982	0.0510734	0.00667518	0.00124551	2.26983E-08	0	90.1982	90.1026
m-Xylene		0	0	0.0752047	137.344	0.206146	137.090	0	0	137.420	0.0667746	0.00843009	0.00204718	3.20014E-08	0	137.420	137.296
o-Xylene		0	0	0.0928159	140.156	0.188770	139.924	0	0	140.249	0.0848887	0.00792722	0.00161596	3.14627E-08	0	140.249	140.112
Nonane		0	0	0.000793071	1208.67	0.799825	1207.68	0	0	1208.67	1.82074E-05	0.000774863	0.0207652	1.00470E-11	0	1208.67	1208.48
C10+		0	0	1.69985E-06	8214.95	0.0129361	8214.93	0	0	8214.95	5.49090E-09	1.69436E-06	0.000231030	4.95573E-18	0	8214.95	8214.95

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	59.3	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	%	78.8600	100	0	0	100	0	100	0	0	0	100	100	100	0	0.00359170	0
Mole Fraction Light Liquid	%	21.1400	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	1.1	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	12298.4	9706.1	2592.2	166.5	13.9	138.6	9687.5	2610.9	166.6	2591.4	0.788452	0.520494	0.00848289	2592.24	2758.83	152.496
Mass Flow	lb/h	249390.4	202687.8	46702.2	18173.8	616.3	17157.8	202354.7	47035.7	18176.2	46685.5	16.6773	22.9987	0.156017	46702.6	64878.8	17774.1
Vapor Volumetric Flow	MCFH	237.3	274.9	0.8	0.4	5.4	0.4	159.5	0.8	0.4	0.8	0.307215	0.123621	0.103681	0.750100	1.15652	0.390821
Liquid Volumetric Flow	Mbbl/d	1014.2	1175.2	3.2	1.7	22.9	1.6	681.6	3.2	1.7	3.2	1.31322	0.528430	0.443191	3.20636	4.94366	1.67060
Std Vapor Volumetric Flow	MMSCFD	112.0	88.4	23.6	1.5	0.1	1.3	88.2	23.8	1.5	23.6	0.00718093	0.00474047	7.72590E-05	23.6092	25.1264	1.38887
Std Liquid Volumetric Flow	Mbbl/d	43.7	40.5	3.2	1.8	0.1	1.6	40.5	3.2	1.8	3.2	0.00324828	0.00324665	1.17900E-05	3.20325	4.95862	1.68557
Compressibility		0.744	0.950	0.010	0.081	0.983	0.007	0.916	0.011	0.135	0.001	0.996213	0.973139	0.999551	0.00907068	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	0.635023	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	-655.5	-334.8	-318.8	-15.8	-0.6	-14.4	-334.2	-321.3	-15.8	-318.5	-0.0294765	-0.0238311	-0.000862996	-318.798	-334.630	-15.2315
Mass Enthalpy	Btu/lb	-2628.4	-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	0.443278	0.983065	0.844943	0.486495
Ideal Gas CpCv Ratio		1.265	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	425.024	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	899.5	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	16583.2	20646.6	-1051.4	18902.9	19681.2	18845.5	20684.2	-1059.8	18904.8	-1058.8	19713.8	19714.5	-40.9989	-1051.90	4539.09	18874.5
Gross I.G. Heating Value	Btu/ft^3	1002.3	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	18506.9	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		0.123966	0.200665	0.200643	0.200643	0.236556	0.236556	0			3.02980	3.02980	0.000120063	94.3314	0.200665	0.198062	0.332043
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		0.494071	0.493687	0.784865	0.784865	0.0120889	0.0120889	0.494658			0.395332	0.395332	0.000471190	0.00701983	0.493687	0.790213	0.185558
Carbon Dioxide		0.146238	0.146189	0.137072	0.137072	0.139478	0.139478	0.146717			1.09580	1.09580	0.164098	1.31065	0.146189	0.136667	0.213293
Methane		77.6058	77.5461	75.4278	75.4278	8.95458	8.95458	77.7018			72.0524	72.0524	1.95714	3.55458	77.5461	75.5135	46.6674
Ethane		14.1827	14.1718	15.5745	15.5745	29.1679	29.1679	14.2004			16.0934	16.0934	36.8296	0.732519	14.1718	15.5296	30.2461
Propane		4.48865	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		0.566001	0.565560	0.624984	0.624984	5.87699	5.87699	0.566666			0.238541	0.238541	5.94479	0.000331272	0.565560	0.621370	1.86077
n-Butane		1.18249	1.18158	1.25360	1.25360	12.9949	12.9949	1.18394			0.990199	0.990199	12.9114	0.00206948	1.18158	1.24579	3.78285
Isopentane		0.374497	0.374207	0.320870	0.320870	3.73493	3.73493	0.374944			0.170349	0.170349	3.54633	8.92162E-05	0.374207	0.318550	0.958004
n-Pentane		0.291088	0.290862	0.322212	0.322212	3.84684	3.84684	0.291434			0.166239	0.166239	3.59230	6.34931E-05	0.290862	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	4.39260E-06	0	0.0389036	0.114924
n-Hexane		0.544535	0.544108	0.116010	0.116010	1.42299	1.42299	0.545164			0.0219437	0.0219437	0.0887230	6.19607E-08	0.544108	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	5.96558E-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	5.77875E-08	0	0.0148843	0.0421687
Heptane		0	0	0.0308542	0.0308542	0.365936	0.365936	0			0.00685095	0.00685095	0.299226	9.00180E-08	0	0.0305361	0.0855190
Methylcyclohexane		0	0	0.0220095	0.0220095	0.266840	0.266840	0			0.0257526	0.0257526	0.216407	2.09057E-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	6.62449E-09	0	0.0201481	0.0540506
Ethylbenzene		0	0	0.000932061	0.000932061	0.0109290	0.0109290	0			0.00797455	0.00797455	0.00225398	2.52039E-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	3.49358E-06	0	0.00108056	0.00294575
Nonane		0	0	0.00403281	0.00403281	0.0448164	0.0448164	0			0.000766258	0.000766258	0.0311061	9.23455E-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		12.0228	19.4768	0	0	0.0329168	0	0			0	0.0238885	6.24922E-07	0.00800203	0	0.000196257	0
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		47.9176	47.9180	0	0	0.00168218	0	47.9200			0	0.00311701	2.45252E-06	5.95485E-07	0	0.000783014	0
Carbon Dioxide		14.1829	14.1893	0	0	0.0194083	0	14.2132			0	0.00863988	0.000854120	0.000111181	0	0.000135422	0
Methane		7526.61	7526.74	0	0	1.24603	0	7527.37			0	0.568099	0.0101868	0.000301531	0	0.0748256	0
Ethane		1375.51	1375.54	0	0	4.05870	0	1375.66			0	0.126889	0.191696	6.21388E-05	0	0.0153881	0
Propane		435.332	435.345	0	0	4.25972	0	435.388			0	0.0434995	0.170034	5.19123E-06	0	0.00492061	0
Isobutane		54.8936	54.8941	0	0	0.817783	0	54.8959			0	0.00188078	0.0309423	2.81014E-08	0	0.000615709	0
n-Butane		114.684	114.686	0	0	1.80824	0	114.694			0	0.00780724	0.0672032	1.75552E-07	0	0.00123445	0
Isopentane		36.3206	36.3211	0	0	0.519715	0	36.3227			0	0.00134312	0.0184584	7.56811E-09	0	0.000315648	0
n-Pentane		28.2312	28.2315	0	0	0.535287	0	28.2327			0	0.00131071	0.0186977	5.38605E-09	0	0.000316839	0
2-Methylpentane		0	0	0	0	0.114321	0	0			0	0.000126460	0.00394105	9.91988E-11	0	6.58419E-05	0
3-Methylpentane		0	0	0	0	0.0671340	0	0			0	0.000195927	0.00230229	3.72619E-10	0	3.85492E-05	0
n-Hexane		52.8118	52.8120	0	0	0.198008	0	52.8128			0	0.000173016	0.000461798	5.25606E-12	0	0.000113913	0
Methylcyclopentane		0	0	0	0	0.0296998	0	0			0	0.000245068	0.000932496	1.00231E-09	0	1.68354E-05	0
Benzene		0	0	0	0	0.00907666	0	0			0	0.000402579	1.74334E-05	5.06053E-09	0	5.13417E-06	0
2-Methylhexane		0	0	0	0	0.0334517	0	0			0	3.24666E-05	7.38489E-05	4.17084E-13	0	1.96160E-05	0
3-Methylhexane		0	0	0	0	0.0251590	0	0			0	2.54598E-05	0.000834659	4.90205E-12	0	1.47487E-05	0
Heptane		0	0	0	0	0.0509199	0	0			0	5.40164E-05	0.00155745	7.63613E-12	0	3.02580E-05	0
Methylcyclohexane		0	0	0	0	0.0371308	0	0			0	0.000203047	0.00112638	1.77340E-10	0	2.15884E-05	0
Toluene		0	0	0	0	0.00662239	0	0			0	0.000276544	2.73622E-05	1.67209E-09	0	3.83243E-06	0
Octane		0	0	0	0	0.0324398	0	0			0	2.04032E-05	0.000934994	5.61948E-13	0	1.99646E-05	0
Ethylbenzene		0	0	0	0	0.00152077	0	0			0	6.28756E-05	1.17318E-05	2.13802E-10	0	9.12945E-07	0
m-Xylene		0	0	0	0	0.00194175	0	0			0	7.94056E-05	1.92830E-05	3.01431E-10	0	1.17005E-06	0
o-Xylene		0	0	0	0	0.00177808	0	0			0	7.46688E-05	1.52212E-05	2.96356E-10	0	1.07071E-06	0
Nonane		0	0	0	0	0.00623620	0	0			0	6.04158E-06	0.000161905	7.83357E-14	0	3.94453E-06	0
C10+		0	0	0	0	6.32261E-05	0	0			0	8.28132E-09	1.12918E-06	0	0	5.02551E-08	0
Mass Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water		0.106934	0.173114	0.170589	0.170589	0.0962168	0.0962168	0			2.58051	2.58051	4.89512E-05	92.3996	0.173114	0.168574	0.210127
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		0.662719	0.662273	1.03764	1.03764	0.00764592	0.00764592	0.663391			0.523574	0.523574	0.000298727	0.0106922	0.662273	1.04583	0.182596
Carbon Dioxide		0.308163	0.308093	0.284697	0.284697	0.138588	0.138588	0.309119			2.27997	2.27997	0.163441	3.13622	0.308093	0.284157	0.329739
Methane		59.6127	59.5731	57.1071	57.1071	3.24333	3.24333	59.6762			54.6475	54.6475	0.710565	3.10050	59.5731	57.2327	26.2985
Ethane		20.4198	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		9.47730	9.47112	10.3829	10.3829	30.4768	30.4768	9.48766			11.5015	11.5015	32.6007	0.146722	9.47112	10.3452	21.2929
Isobutane		1.57519	1.57413	1.71435	1.71435	7.71210	7.71210	1.57677			0.655474	0.655474	7.81971	0.00104689	1.57413	1.70624	3.79910
n-Butane		3.29090	3.28871	3.43866	3.43866	17.0526	17.0526	3.29435			2.72091	2.72091	16.9835	0.00653997	3.28871	3.42088	7.72339
Isopentane		1.29375	1.29289	1.09256	1.09256	6.08397	6.08397	1.29507			0.581056	0.581056	5.79056	0.000349982	1.29289	1.08581	2.42797
n-Pentane		1.00560	1.00493	1.09713	1.09713	6.26625	6.26625	1.00663			0.567037	0.567037	5.86561	0.000249074	1.00493	1.08991	2.44191
2-Methylpentane		0	0	0.272588	0.272588	1.59846	1.59846	0			0.0653447	0.0653447	1.47670	5.47922E-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	2.24537	0.471810	0.471810	2.76859	2.76859	2.24910			0.0894013	0.0894013	0.173034	2.90317E-07	2.24537	0.468038	1.01908
Methylcyclopentane		0	0	0.0680902	0.0680902	0.405554	0.405554	0			0.123670	0.123670	0.341229	5.40671E-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	3.14835E-07	0	0.0704616	0.148427
Heptane		0	0	0.145908	0.145908	0.827859	0.827859	0			0.0324547	0.0324547	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	9.87480E-05	0	0.0168360	0.0358851
Octane		0	0	0.109894	0.109894	0.601236	0.601236	0			0.0139749	0.0139749	0.464387	4.11434E-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	6.43966E-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		216.595	350.880	0	0	0.593005	0	0			0	0.430359	1.12582E-05	0.144159	0	0.00353563	0
H2S		0	0	0	0	0	0	0			0	0	0	0	0	0	0
Nitrogen		1342.33	1342.35	0	0	0.0471235	0	1342.40			0	0.0873179	6.87033E-05	1.66816E-05	0	0.0219349	0
Carbon Dioxide		624.183	624.466	0	0	0.854149	0	625.518			0	0.380237	0.0375894	0.00489303	0	0.00595984	0
Methane		120745	120747	0	0	19.9894	0	120758			0	9.11370	0.163421	0.00483730	0	1.20039	0
Ethane		41360.2	41361.0	0	0	122.041	0	41364.8			0	3.81542	5.76411	0.00186845	0	0.462705	0
Propane		19196.2	19196.8	0	0	187.835	0	19198.7			0	1.91814	7.49775	0.000228910	0	0.216977	0
Isobutane		3190.54	3190.57	0	0	47.5313	0	3190.67			0	0.109315	1.79843	1.63332E-06	0	0.0357864	0
n-Butane		6665.71	6665.82	0	0	105.099	0	6666.28			0	0.453774	3.90600	1.02035E-05	0	0.0717487	0
Isopentane		2620.49	2620.52	0	0	37.4968	0	2620.64			0	0.0969043	1.33175	5.46030E-07	0	0.0227736	0
n-Pentane		2036.85	2036.87	0	0	38.6203	0	2036.96			0	0.0945662	1.34902	3.88597E-07	0	0.0228596	0
2-Methylpentane		0	0	0	0	9.85166	0	0			0	0.0108977	0.339622	8.54850E-09	0	0.00567395	0
3-Methylpentane		0	0	0	0	5.78530	0	0			0	0.0168840	0.198401	3.21106E-08	0	0.00332199	0
n-Hexane		4551.08	4551.09	0	0	17.0634	0	4551.16			0	0.0149097	0.0397956	4.52943E-10	0	0.00981653	0
Methylcyclopentane		0	0	0	0	2.49952	0	0			0	0.0206248	0.0784784	8.43537E-08	0	0.00141686	0
Benzene		0	0	0	0	0.708995	0	0			0	0.0314462	0.00136176	3.95288E-07	0	0.000401039	0
2-Methylhexane		0	0	0	0	3.35193	0	0			0	0.00325322	0.00739980	4.17927E-11	0	0.00196556	0
3-Methylhexane		0	0	0	0	2.52098	0	0			0	0.00255112	0.0836345	4.91195E-10	0	0.00147785	0
Heptane		0	0	0	0	5.10227	0	0			0	0.00541255	0.156060	7.65155E-10	0	0.00303191	0
Methylcyclohexane		0	0	0	0	3.64573	0	0			0	0.0199363	0.110595	1.74124E-08	0	0.00211968	0
Toluene		0	0	0	0	0.610177	0	0			0	0.0254803	0.00252111	1.54063E-07	0	0.000353114	0
Octane		0	0	0	0	3.70555	0	0			0	0.00233063	0.106803	6.41905E-11	0	0.00228053	0
Ethylbenzene		0	0	0	0	0.161453	0	0			0	0.00667518	0.00124551	2.26983E-08	0	9.69228E-05	0
m-Xylene		0	0	0	0	0.206146	0	0			0	0.00843009	0.00204718	3.20014E-08	0	0.000124219	0
o-Xylene		0	0	0	0	0.188770	0	0			0	0.00792722	0.00161596	3.14627E-08	0	0.000113672	0
Nonane		0	0	0	0	0.799825	0	0			0	0.000774863	0.0207652	1.00470E-11	0	0.000505906	0
C10+		0	0	0	0	0.0129361	0	0			0	1.69436E-06	0.000231030	0	0	1.02822E-05	0

Process Streams		**Well Stream**	**HP Separator Gas**	**HP Separator Water**	**HP Separator Oil**	**OT Flash Gas**	**Sales Oil**	**Gas**	**Water**	**Oil**	**Produced Water**	**PWT Flash Gas**	**Oil W/B**	**Water W/B**	**1**	**3**	**LP Separator Oil**
Phase: Vapor	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	**Units**																
Temperature	°F	59.3	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	13.9	0.0	9687.5			0.0	0.788452	0.520494	0.00848289	0	0.0990890	0
Mass Flow	lb/h	202549.4	202687.8	0.0	0.0	616.3	0.0	202354.7			0.0	16.6773	22.9987	0.156017	0	2.09738	0
Vapor Volumetric Flow	MCFH	236.5	274.9	0.0	0.0	5.4	0.0	159.5			0.0	0.307215	0.123621	0.103681	0	0.00280060	0
Liquid Volumetric Flow	Mbbl/d	1011.0	1175.2	0.0	0.0	22.9	0.0	681.6			0.0	1.31322	0.528430	0.443191	0	0.0119714	0
Std Vapor Volumetric Flow	MMSCFD	88.3	88.4	0.0	0.0	0.1	0.0	88.2			0.0	0.00718093	0.00474047	7.72590E-05	0	0.000902466	0
Std Liquid Volumetric Flow	Mbbl/d	40.5	40.5	0.0	0.0	0.1	0.0	40.5			0.0	0.00324828	0.00324665	1.17900E-05	0	0.000416325	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	0.635023	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	-0.0294765	-0.0238311	-0.000862996	0	-0.00341347	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	0.443278	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	425.024	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	20661.1	20646.6	20543.4	20543.4	19681.2	19681.2	20684.2			19713.8	19713.8	19714.5	-40.9989	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	1256.42	1267.00	1665.57
Gross Liquid Heating Value	Btu/lb	22784.4	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		9.56261E-05	7.84664E-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	7.84664E-05	0.0167921	0.00112061
Carbon Dioxide		0.00116666	0.000921796	0.000864470	0.0317955	0.00259287	0.00259287		0	0.0309997	0.000531324	0.000531324	0.00460931	2.04351E-05	0.000921796	0.0317972	0.0150834
Methane		0.0293498	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		0.00596170	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		0.00217630	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		8.58852E-05	6.81076E-05	7.51268E-05	2.06705	1.70539	1.70539		0	2.06698	2.57126E-06	2.57126E-06	2.73595	1.16280E-10	6.81076E-05	2.06682	2.08604
n-Butane		0.000376769	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		8.09682E-05	6.37944E-05	5.45846E-05	3.77106	4.05972	4.05972		0	3.76996	2.77093E-06	2.77093E-06	6.08858	4.75279E-11	6.37944E-05	3.77050	4.03009
n-Pentane		5.89724E-05	4.81853E-05	5.32408E-05	5.04724	5.58155	5.58155		0	5.04595	2.67722E-06	2.67722E-06	8.21840	3.34882E-11	4.81853E-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		3.87054E-05	3.20538E-05	6.80831E-06	6.01817	7.05525	7.05525		0	6.01594	1.33782E-07	1.33782E-07	0.692012	1.24301E-14	3.20538E-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	2.84846E-12	0	3.40235	3.71051
Toluene		0	0	0.000100916	0.742657	0.886575	0.886575		0	0.743993	9.02755E-05	9.02755E-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		2598.86	0	2591.32	0.0863744	0	0.00683346		2610.88	0	2591.29	0	0	0	2591.40	0.0855216	0.0397502
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.00248617	0	0.00323704	0.0277642	0	2.67020E-05		0	0.0299860	0.000120039	0	0	0	0.00203404	0.0279696	0.00170888
Carbon Dioxide		0.0303319	0	0.0224085	0.0529513	0	0.00359322		0	0.0516426	0.0137686	0	0	0	0.0238952	0.0529628	0.0230015
Methane		0.763060	0	0.613046	7.85863	0	0.0597483		0	7.93963	0.0449473	0	0	0	0.629958	7.87948	1.30578
Ethane		0.154997	0	0.138586	9.50623	0	1.20049		0	9.53888	0.0116971	0	0	0	0.126155	9.51098	5.25919
Propane		0.0565812	0	0.0479292	10.8920	0	4.70203		0	10.9032	0.00442973	0	0	0	0.0431390	10.8935	8.96174
Isobutane		0.00223291	0	0.00194741	3.44240	0	2.36334		0	3.44339	6.66310E-05	0	0	0	0.00176551	3.44260	3.18112
n-Butane		0.00979555	0	0.00841632	9.84164	0	7.50223		0	9.84374	0.000609077	0	0	0	0.00794799	9.84205	9.31047
Isopentane		0.00210508	0	0.00141492	6.28022	0	5.62599		0	6.28040	7.18053E-05	0	0	0	0.00165371	6.28033	6.14571
n-Pentane		0.00153321	0	0.00138009	8.40553	0	7.73495		0	8.40608	6.93767E-05	0	0	0	0.00124908	8.40563	8.27024
2-Methylpentane		0	0	0.000129646	4.20615	0	4.06425		0	4.20637	3.18671E-06	0	0	0	0	4.20618	4.17857
3-Methylpentane		0	0	0.000209322	2.74013	0	2.65686		0	2.74039	1.33953E-05	0	0	0	0	2.74014	2.72399
n-Hexane		0.00100630	0	0.000176483	10.0225	0	9.77721		0	10.0220	3.46679E-06	0	0	0	0.000830911	10.0225	9.97522
Methylcyclopentane		0	0	0.000295369	1.53896	0	1.50218		0	1.53928	5.03017E-05	0	0	0	0	1.53897	1.53188
Benzene		0	0	0.00452322	0.466917	0	0.455665		0	0.471447	0.00412064	0	0	0	0	0.466923	0.464742
2-Methylhexane		0	0	3.31585E-05	3.97309	0	3.93177		0	3.97315	6.91874E-07	0	0	0	0	3.97309	3.96522
3-Methylhexane		0	0	2.60269E-05	3.13016	0	3.09908		0	3.13021	5.67104E-07	0	0	0	0	3.13017	3.12424
Heptane		0	0	5.52263E-05	7.98285	0	7.91992		0	7.98294	1.20990E-06	0	0	0	0	7.98286	7.97084
Methylcyclohexane		0	0	0.000230622	5.66710	0	5.62124		0	5.66736	2.75754E-05	0	0	0	0	5.66710	5.65837
Toluene		0	0	0.00261592	1.23680	0	1.22862		0	1.23942	0.00233938	0	0	0	0	1.23681	1.23524
Octane		0	0	2.07048E-05	16.1408	0	16.1007		0	16.1408	3.01525E-07	0	0	0	0	16.1408	16.1332
Ethylbenzene		0	0	0.000543952	0.849058	0	0.847183		0	0.849604	0.000481076	0	0	0	0	0.849060	0.848704
m-Xylene		0	0	0.000708375	1.29369	0	1.29129		0	1.29440	0.000628970	0	0	0	0	1.29369	1.29323

o-Xylene		0	0	0.000874261	1.32017	0	1.31798		0	1.32105	0.000799592	0	0	0	0	1.32018	1.31976
Nonane		0	0	6.18354E-06	9.42392	0	9.41625		0	9.42394	1.41962E-07	0	0	0	0	9.42393	9.42249
C10+		0	0	8.30815E-09	40.1513	0	40.1512		0	40.1513	2.68372E-11	0	0	0	0	40.1513	40.1512
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		99.9534	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		0.000148686	0.000122007	0.000194168	0.00427961	4.35962E-06	4.35962E-06		0	0.00462148	7.20286E-06	7.20286E-06	3.11286E-07	4.09039E-09	0.000122007	0.00431114	0.000269333
Carbon Dioxide		0.00284983	0.00225173	0.00211165	0.0128226	0.000921656	0.000921656		0	0.0125041	0.00129794	0.00129794	0.00183838	4.99208E-05	0.00225173	0.0128250	0.00569528
Methane		0.0261339	0.0216392	0.0210585	0.693699	0.00558645	0.00558645		0	0.700758	0.00154452	0.00154452	0.00226455	2.44455E-06	0.0216392	0.695516	0.117856
Ethane		0.00994987	0.00812238	0.00892279	1.57283	0.210386	0.210386		0	1.57803	0.000753385	0.000753385	0.487091	1.10661E-06	0.00812238	1.57356	0.889715
Propane		0.00532650	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		0.000277069	0.000219721	0.000242361	1.10092	0.800583	0.800583		0	1.10110	8.29537E-06	8.29537E-06	1.44114	3.75152E-10	0.000219721	1.10095	1.04024
n-Butane		0.00121547	0.000989141	0.00104743	3.14748	2.54139	2.54139		0	3.14774	7.58284E-05	7.58284E-05	4.50793	5.16450E-09	0.000989141	3.14751	3.04457
Isopentane		0.000324243	0.000255474	0.000218587	2.49320	2.36574	2.36574		0	2.49295	1.10969E-05	1.10969E-05	3.98106	1.90343E-10	0.000255474	2.49316	2.49467
n-Pentane		0.000236159	0.000192965	0.000213206	3.33693	3.25256	3.25256		0	3.33672	1.07216E-05	1.07216E-05	5.37366	1.34116E-10	0.000192965	3.33686	3.35706
2-Methylpentane		0	0	2.39225E-05	1.99444	2.04128	2.04128		0	1.99429	5.88225E-07	5.88225E-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	1.43666E-11	0	1.29926	1.32069
n-Hexane		0.00185132	0.000153319	3.25647E-05	4.75239	4.91063	4.91063		0	4.75154	6.39924E-07	6.39924E-07	0.540444	5.94591E-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	1.17615E-11	1.17615E-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		46819.1	0	46683.3	1.55606	0	0.123107		47035.7	0	46682.9	0	0	0	46684.9	1.54070	0.716112
H2S		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.0696460	0	0.0906806	0.777770	0	0.000748015		0	0.840010	0.00336269	0	0	0	0.0569804	0.783525	0.0478715
Carbon Dioxide		1.33489	0	0.986186	2.33036	0	0.158136		0	2.27276	0.605950	0	0	0	1.05162	2.33087	1.01229
Methane		12.2414	0	9.83477	126.072	0	0.958510		0	127.371	0.721066	0	0	0	10.1061	126.406	20.9479
Ethane		4.66062	0	4.16714	285.843	0	36.0976		0	286.825	0.351722	0	0	0	3.79336	285.986	158.139
Propane		2.49498	0	2.11347	480.289	0	207.339		0	480.785	0.195331	0	0	0	1.90224	480.354	395.174
Isobutane		0.129782	0	0.113188	200.080	0	137.362		0	200.138	0.00387274	0	0	0	0.102615	200.091	184.894
n-Butane		0.569339	0	0.489175	572.018	0	436.046		0	572.140	0.0354009	0	0	0	0.461955	572.042	541.145
Isopentane		0.151879	0	0.102085	453.111	0	405.908		0	453.123	0.00518067	0	0	0	0.119313	453.118	443.405
n-Pentane		0.110619	0	0.0995717	606.449	0	558.067		0	606.488	0.00500545	0	0	0	0.0901195	606.456	596.687
2-Methylpentane		0	0	0.0111723	362.467	0	350.238		0	362.485	0.000274616	0	0	0	0	362.469	360.090
3-Methylpentane		0	0	0.0180384	236.131	0	228.956		0	236.154	0.00115435	0	0	0	0	236.133	234.741
n-Hexane		0.0867179	0	0.0152085	863.692	0	842.555		0	863.649	0.000298752	0	0	0	0.0716041	863.695	859.618
Methylcyclopentane		0	0	0.0248581	129.518	0	126.423		0	129.545	0.00423336	0	0	0	0	129.519	128.922
Benzene		0	0	0.353317	36.4717	0	35.5928		0	36.8256	0.321871	0	0	0	0	36.4722	36.3018
2-Methylhexane		0	0	0.00332255	398.111	0	393.971		0	398.117	6.93271E-05	0	0	0	0	398.112	397.323
3-Methylhexane		0	0	0.00260794	313.648	0	310.534		0	313.653	5.68249E-05	0	0	0	0	313.649	313.055
Heptane		0	0	0.00553379	799.897	0	793.591		0	799.906	0.000121234	0	0	0	0	799.898	798.693
Methylcyclohexane		0	0	0.0226439	556.430	0	551.927		0	556.455	0.00270752	0	0	0	0	556.431	555.573
Toluene		0	0	0.241027	113.957	0	113.203		0	114.198	0.215546	0	0	0	0	113.958	113.813
Octane		0	0	0.00236508	1843.73	0	1839.16		0	1843.74	3.44427E-05	0	0	0	0	1843.74	1842.87
Ethylbenzene		0	0	0.0577486	90.1403	0	89.9412		0	90.1982	0.0510734	0	0	0	0	90.1404	90.1026
m-Xylene		0	0	0.0752047	137.344	0	137.090		0	137.420	0.0667746	0	0	0	0	137.344	137.296
o-Xylene		0	0	0.0928159	140.156	0	139.924		0	140.249	0.0848887	0	0	0	0	140.157	140.112
Nonane		0	0	0.000793071	1208.67	0	1207.68		0	1208.67	1.82074E-05	0	0	0	0	1208.67	1208.48
C10+		0	0	1.69985E-06	8214.95	0	8214.93		0	8214.95	5.49090E-09	0	0	0	0	8214.95	8214.95

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	59.3	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	2599.9	0.0	2592.2	166.5	0.0	138.6	2610.9	166.6	2591.4	0	0	0	2592.24	166.565	152.496
Mass Flow	lb/h	46841.0	0.0	46702.2	18173.8	0.0	17157.8	47035.7	18176.2	46685.5	0	0	0	46702.6	18174.4	17774.1
Vapor Volumetric Flow	MCFH	0.8	0.0	0.8	0.4	0.0	0.4	0.8	0.4	0.8	0	0	0	0.750100	0.403672	0.390821
Liquid Volumetric Flow	Mbbl/d	3.2	0.0	3.2	1.7	0.0	1.6	3.2	1.7	3.2	0	0	0	3.20636	1.72553	1.67060
Std Vapor Volumetric Flow	MMSCFD	23.7	0.0	23.6	1.5	0.0	1.3	23.8	1.5	23.6	0	0	0	23.6092	1.51701	1.38887
Std Liquid Volumetric Flow	Mbbl/d	3.2	0.0	3.2	1.8	0.0	1.6	3.2	1.8	3.2	0	0	0	3.20325	1.75494	1.68557
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	-320.2	0.0	-318.8	-15.8	0.0	-14.4	-321.3	-15.8	-318.5	0	0	0	-318.798	-15.8217	-15.2315
Mass Enthalpy	Btu/lb	-6836.1	-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	0.000833047	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					0.000864470											0.000865666	
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											2591.32	
H2S					0											0	
Nitrogen					0											0.00326739	
Carbon Dioxide					0											0.0224395	
Methane					0											0.615284	

Ethane					0											0.138666	
Propane					0											0.0479972	
Isobutane					0											0.00194621	
n-Butane					0											0.00840037	
Isopentane					0											0.00141292	
n-Pentane					0											0.00137586	
2-Methylpentane					0											0.000129070	
3-Methylpentane					0											0.000208596	
n-Hexane					0											0.000175676	
Methylcyclopentane					0											0.000295386	
Benzene					0											0.00451843	
2-Methylhexane					0											3.31313E-05	
3-Methylhexane					0											2.60001E-05	
Heptane					0											5.53251E-05	
Methylcyclohexane					0											0.000229972	
Toluene					0											0.00260928	
Octane					0											2.05931E-05	
Ethylbenzene					0											0.000543044	
m-Xylene					0											0.000706521	
o-Xylene					0											0.000871630	
Nonane					0											6.14982E-06	
C10+					0											8.23480E-09	
Mass Fraction		**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Water					99.9595											99.9594	
H2S					0											0	
Nitrogen					0.000194168											0.000195987	
Carbon Dioxide					0.00211165											0.00211457	
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											46683.3	
H2S					0											0	
Nitrogen					0											0.0915306	
Carbon Dioxide					0											0.987552	
Methane					0											9.87068	
Ethane					0											4.16954	
Propane					0											2.11647	
Isobutane					0											0.113118	
n-Butane					0											0.488248	
Isopentane					0											0.101941	
n-Pentane					0											0.0992666	
2-Methylpentane					0											0.0111227	
3-Methylpentane					0											0.0179758	

n-Hexane					0											0.0151390	
Methylcyclopentane					0											0.0248595	
Benzene					0											0.352943	
2-Methylhexane					0											0.00331983	
3-Methylhexane					0											0.00260526	
Heptane					0											0.00554368	
Methylcyclohexane					0											0.0225801	
Toluene					0											0.240415	
Octane					0											0.00235232	
Ethylbenzene					0											0.0576523	
m-Xylene					0											0.0750078	
o-Xylene					0											0.0925366	
Nonane					0											0.000788746	
C10+					0											1.68484E-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											2592.17	
Mass Flow	lb/h				0.0											46702.3	
Vapor Volumetric Flow	MCFH				0.0											0.750051	
Liquid Volumetric Flow	Mbbl/d				0.0											3.20615	
Std Vapor Volumetric Flow	MMSCFD				0.0											23.6085	
Std Liquid Volumetric Flow	Mbbl/d				0.0											3.20326	
Compressibility					0.010											0.00971434	
Specific Gravity					0.998											0.998340	
API Gravity					10.0											10.0440	
Enthalpy	MMBtu/h				0.0											-318.805	
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
Primm Well Pad
Antero Resources Corporation
Doddridge County, West Virginia

Notice is given that Antero Resources Corporation has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-A Modification Permit Application for an Oil and Natural Gas facility located at 1313 Oxford Rd. West Union, WV 26456 in Doddridge County, West Virginia.

The latitude and longitude coordinates are: 39.241562 degrees N and -80.852583 degrees W

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

Pollutants	TOTALS (tpy):
VOC	69.7950
NO_X	13.7926
CO_{2e}	21884.8000
CO	35.1468
SO_2	0.0598
$PM_{2.5}$	0.9046
PM_{10}	1.2528
Lead	6.20E-05
Total HAPs	3.2458
Benzene	0.0907
Formaldehyde	0.0289
Xylenes	0.2115

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

Conestoga-Rovers & Associates, Inc.

▼ PLEASE DETACH AND RETAIN FOR YOUR RECORDS ▼

INVOICE NUMBER	DATE		VOUCHER NO.	AMOUNT
Account Number:		40WVDEP	409994	
CR62615	6/26/2015		400957647	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

Conestoga-Rovers & Associates, 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

6/26/2015 NO. 409994

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

TO THE ORDER OF
West Virginia Department of
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304 US

Conestoga-Rovers & Associates, Inc.

AUTHORIZED SIGNATURES

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

⑈409994⑈ ⑆221370632⑆6000000168910⑈

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	Vertical Stack	H001, H002, H003, H004, H005, H006, H007, H008	Gas Production Unit Heaters	N/A		CO (630080)	0.8083	3.5404	0.8083	3.5404	Gas/Vapor /Solid (for PM)	MB AP-42
						NOx (10102439)	0.9623	4.2147	0.9623	4.2147		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4 (74828)	1154.7159	5057.6556	1154.7159	5057.6556		
						SO2 (7446095)	5.77E-03	0.0253	5.77E-03	0.0253		
						PM, PM10, PM2.5	0.0731	0.3203	0.0731	0.3203		
						Hexane (110543)	0.0173	0.0759	0.0173	0.0759		
						Total VOCs	0.0529	0.2318	0.0529	0.2318		
EP-LH001, EP-LH002, EP-LH003, EP-LH004, EP-LH005, EP-LH006, EP-LH007, EP-LH008	Vertical Stack	LH001, LH002, LH003, LH004, LH005, LH006, LH007, LH008	Line Heaters	N/A		CO (630080)	1.0777	4.7205	1.0777	4.7205		
						NOx (10102439)	1.2830	5.6196	1.2830	5.6196		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4 (74828)	1539.6212	6743.5408	1539.6212	6743.5408		
						SO2 (7446095)	7.70E-03	0.0337	7.70E-03	0.0337		
						PM, PM10, PM2.5	0.0975	0.4271	0.0975	0.4271		
						Hexane (110543)	0.0231	0.1012	0.0231	0.1012		
						Total VOCs	0.0706	0.3091	0.0706	0.3091		
F001	N/A	F001	Fugitives	N/A		Benzene (71432)	5.22E-03	2.29E-02	5.22E-03	2.29E-02	Gas/Vapor	MB
						Toluene (108883)	1.62E-02	0.0709	1.62E-02	0.0709		
						Ethyl benzene (100414)	0.0128	0.0560	0.0128	0.0560		
						Hexane (110543)	0.2191	0.9596	0.2191	0.9596		
						o,m,p-xylenes (95476,108383,106423)	0.0393	0.1723	0.0393	0.1723		
						CO2 Equivalent CO2 (124389)), CH4	64.5797	282.8590	64.5797	282.8590		
						VOCs	3.0422	13.3250	3.0422	13.3250		
						TAPs (benzene)	5.22E-03	2.29E-02	5.22E-03	2.29E-02		
EP-L001, EP-L002	N/A	L001, L002	Loading (Condensate), Loading (Water)	N/A		VOCs	10.1380	12.3367	10.1380	12.3367	Gas/Vapor	MB
						hexane (110543)	0.0237	0.0288	0.0237	0.0288		
						CO2 Equivalent CO2 (124389), CH4	3.3935	5.2724	3.3935	5.2724		

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	1.0688	2.2015	0.5344	1.1008	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	0.4939	2.1632	Gas/Vapor/ Solid (for PM)	MB
						NOx (10102439)	0.00E+00	0.00E+00	0.5879	2.5752		
						CO2 Equivalent N2O (10024972), CO2 (124389), CH4	0.00E+00	0.00E+00	2202.7807	9648.1794		
						PM, PM10, PM2.5	0.00E+00	0.00E+00	0.0447	7.05E-05		
						Benzene (71432)	0.7418	3.2491	1.48E-02	0.0650		
						Toluene (108883)	0.6382	2.7952	1.28E-02	0.0559		
						ethyl benzene (100414)	0.1694	16.7083	3.39E-03	0.3342		
						hexane (110543)	17.1181	74.9774	0.3424	1.4995		
						o,m,p-xylenes (95476,108383,106423)	0.4149	1.8174	8.30E-03	0.0363		
						VOCs	492.6809	2157.9422	9.8539	43.1601		
EP-PCV	valve	PCV	Pneumatic CV	N/A		hexane (110543)	1.09E-02	0.0477	1.09E-02	0.0477	Gas/Vapor	MB
						CO2 Equivalent CO2 (124389)), CH4	7.2262	31.6506	7.2262	31.6506		
						VOCs	0.0916	0.4012	0.0916	0.4012		
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					
Unpaved Haul Roads	PM, PM10, PM2.5	1.0688	2.2015	0.5344	1.1008	MB
Loading/Unloading Operations	VOCs	10.1380	12.3367	10.1380	12.3367	MB
	hexane (110543)	0.0237	0.0288	0.0237	0.0288	
	CO2 Equivalent CO2 (124389), CH4	3.3935	5.2724	3.3935	5.2724	
Equipment Leaks (Components)	Benzene (71432)	Does not apply	2.29E-02	Does not apply	2.29E-02	MB
	Toluene (108883)		0.0709		0.0709	
	Ethyl benzene (100414)		0.0560		0.0560	
	Hexane (110543)		0.9596		0.9596	
	o,m,p-xylenes (95476,108383,106423)		0.1723		0.1723	
	CO2 Equivalent CO2 (124389)), CH4		282.8590		282.8590	
	VOCs		13.3250		13.3250	
	TAPs (benzene)		2.29E-02		2.29E-02	
Equipment Leaks (PCVs)	hexane (110543)	1.09E-02	4.77E-02	1.09E-02	4.77E-02	MB
	CO2 Equivalent CO2 (124389)), CH4	7.2262	31.6506	7.2262	31.6506	
	VOCs	0.0916	0.4012	0.0916	0.4012	

[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).