



August 3, 2016

Reference No. 082715

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

Dear Ms. Beverly McKeone:

**Re: General Permit Registration G70-C Modification Application  
Corder East 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 Corder East Well Pad.

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

1. Increase in condensate production.
2. Change in storage tanks service
3. Addition of 3 Cimarron enclosed combustors.
4. Addition of 11 line heaters.

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

Enclosed are the following documents:

- Original copy of the G70-C General Permit Modification Application.
- Two CD copies of the G70-C General Permit Modification Application.
- The application fee with check no. 451863 in the amount of \$500.00.



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

Sincerely,

GHD Services Inc.

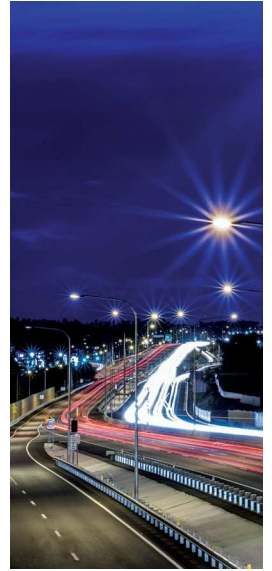
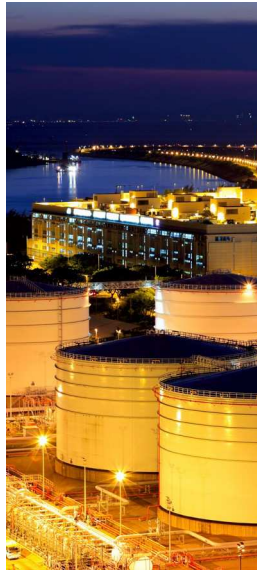
A handwritten signature in black ink, appearing to read "Manuel Bautista". The signature is fluid and cursive, with the first name "Manuel" and last name "Bautista" clearly distinguishable.

Manuel Bautista

MB/ma/262

Encl.

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



# General Permit G70-C Modification Application

Increase in condensate production, change in storage tanks service, and the addition of 3 Cimarron enclosed combustors and 11 line heaters.

Corder East Well Pad

Antero Resources Corporation

GHD  
6320 Rothway Suite 100 Houston Texas 77040  
082715 | Report No 262 | August 2016

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west virginia department of environmental protection

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

### G70-C GENERAL PERMIT REGISTRATION APPLICATION

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION, RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF NATURAL GAS PRODUCTION FACILITIES LOCATED AT THE WELL SITE

- CONSTRUCTION
- MODIFICATION
- RELOCATION
- CLASS I ADMINISTRATIVE UPDATE
- CLASS II ADMINISTRATIVE UPDATE

#### SECTION 1. GENERAL INFORMATION

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

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

Applicant's Mailing Address: 1615 Wynkoop Street

City: Denver

State: CO

ZIP Code: 80202

Facility Name: Corder East Well Pad

Operating Site Physical Address: 1734 Turtle Tree Fork Road

City: Salem

Zip Code: 26426

County: Harrison

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

Latitude: 39.22238

Longitude: -80.55340

SIC Code: 1311

DAQ Facility ID No. (For existing facilities)

NAICS Code: 211111

033-00209

#### CERTIFICATION OF INFORMATION

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

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

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

Responsible Official Signature: \_\_\_\_\_

Name and Title:

Phone:

Fax:

Email:

Date:

If applicable:

Authorized Representative Signature: Barry Schatz

Name and Title: Barry Schatz/ Senior Environmental & Regulatory Manager

Phone: 303-357-7276

Fax: 303-357-7315

Email: bschatz@anteroresources.com

Date: 8/3/2016

If applicable:

Environmental Contact

Name and Title:

Phone:

Fax:

Email:

Date:

<b>OPERATING SITE INFORMATION</b>	
Briefly describe the proposed new operation and/or any change(s) to the facility: Increase in condensate production, change in storage tanks service, and the addition of 3 Cimarron enclosed combustors and 11 line heaters.	
Directions to the facility: From Clarksburg, travel on US-50 W for 7.2 miles. Turn left onto Sycamore Rd. Go 0.5 mile. Turn left onto Shaws Run Rd, go 1.5 miles. Turn left onto Jarvisville Rd for 2.8 miles. Turn right onto Co Rte 31/Jarvisville Rd for 2.6 miles. Make a right to Turtle Tree Fork Rd for 2.4 miles. The facility is on the right.	
<b>ATTACHMENTS AND SUPPORTING DOCUMENTS</b>	
<b>I have enclosed the following required documents:</b>	
Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22).	
<input checked="" type="checkbox"/> Check attached to front of application. <input type="checkbox"/> I wish to pay by electronic transfer. Contact for payment (incl. name and email address): <input type="checkbox"/> I wish to pay by credit card. Contact for payment (incl. name and email address):	
<input checked="" type="checkbox"/> \$500 (Construction, Modification, and Relocation) <input type="checkbox"/> \$300 (Class II Administrative Update) <input type="checkbox"/> \$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO <sup>1</sup> <input type="checkbox"/> \$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH <sup>2</sup>	
<sup>1</sup> Only one NSPS fee will apply. <sup>2</sup> Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ. <i>NSPS and NESHAP fees apply to new construction or if the source is being modified.</i>	
<input checked="" type="checkbox"/> Responsible Official or Authorized Representative Signature (if applicable)	
<input checked="" type="checkbox"/> Single Source Determination Form ( <b>must be completed in its entirety</b> ) – Attachment A	
<input type="checkbox"/> Siting Criteria Waiver (if applicable) – Attachment B	<input checked="" type="checkbox"/> Current Business Certificate – Attachment C
<input checked="" type="checkbox"/> Process Flow Diagram – Attachment D	<input checked="" type="checkbox"/> Process Description – Attachment E
<input checked="" type="checkbox"/> Plot Plan – Attachment F	<input checked="" type="checkbox"/> Area Map – Attachment G
<input checked="" type="checkbox"/> G70-C Section Applicability Form – Attachment H	<input checked="" type="checkbox"/> Emission Units/ERD Table – Attachment I
<input checked="" type="checkbox"/> Fugitive Emissions Summary Sheet – Attachment J	
<input checked="" type="checkbox"/> Gas Well Affected Facility Data Sheet (if applicable) – Attachment K	
<input checked="" type="checkbox"/> Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment L	
<input checked="" type="checkbox"/> Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPU's, Heater Treaters, In-Line Heaters if applicable) – Attachment M	
<input type="checkbox"/> Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N	
<input checked="" type="checkbox"/> Tanker Truck Loading Data Sheet (if applicable) – Attachment O	
<input type="checkbox"/> Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment P	
<input type="checkbox"/> Pneumatic Controllers Data Sheet – Attachment Q	
<input checked="" type="checkbox"/> Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment R	
<input checked="" type="checkbox"/> Emission Calculations (please be specific and include all calculation methodologies used) – Attachment S	
<input checked="" type="checkbox"/> Facility-wide Emission Summary Sheet(s) – Attachment T	
<input checked="" type="checkbox"/> Class I Legal Advertisement – Attachment U	
<input checked="" type="checkbox"/> One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments	

GHD SERVICES INC.

▼ PLEASE DETACH AND RETAIN FOR YOUR RECORDS ▼

INVOICE NUMBER	DATE	VOUCHER NO.	AMOUNT
Account Number: CR71216	7/12/2016	40WVDEPAQ 401013501	451863 500.00

TOTAL : 500.00

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

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

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

7/12/2016

NO. 451863

PAY

\*\*\*\*\*500

DOLLARS AND

CENTS

\*\*\*\*\*00

\$ \*\*\*\*\*500.00

TO THE  
ORDER  
OF

**West Virginia Dept of Environmental  
 Protection - Division Air Quality**  
 601 57th Street SE  
 Charleston, WV 25304 US

*[Handwritten Signature]*  
 GHD SERVICES INC.

AUTHORIZED SIGNATURES

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

⑈ 451863 ⑈ ⑆ 221370632⑆ 61000000118910 ⑈

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

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

DATE: January 23, 2015

ATTN.: Director

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

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

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

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

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

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



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

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

\_\_\_\_\_  
Secretary

\_\_\_\_\_  
Name of Corporation or business entity



# **Attachment A**

## **Single Source Determination Form**

## ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

Classifying multiple facilities as one “stationary source” under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of Building, structure, facility, or installation as given in §45-14-2.13 and §45-19-2.12. The definition states:

*“Building, Structure, Facility, or Installation” means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same “Major Group” (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).*

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

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

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

The Corder East Well Pad calculation of potential to emit included all the emissions 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 Clarence Well Pad. This operates independently and is approximately 1.72 miles northwest of the facility.

## ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

Answer each question with a detailed explanation to determine contiguous or adjacent properties which are under a common control and any support facilities. This section must be completed in its entirety. **NOT APPLICABLE – no facility within one mile**

Provide a map of contiguous or adjacent facilities (production facilities, compressor stations, dehydration facilities, etc.) which are under common control and those facilities that are not under common control but are support facilities. Please indicate the SIC code, permit number (if applicable), and the distance between facilities in question on the map.

Are the facilities owned by the same parent company or a subsidiary of the parent company? Provide the owners identity and the percentage of ownership of each facility.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does an entity such as a corporation have decision making authority over the operation of a second entity through a contractual agreement or voting interest? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Is there a contract for service relationship between the two (2) companies or, a support/dependency relationship that exists between the two (2) companies? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do the facilities share common workforces, plant managers, security forces, corporate executive officers or board executives?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Will managers or other workers frequently shuttle back and forth to be involved actively at both facilities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do the facilities share common payroll activities, employee benefits, health plans, retirement funds, insurance coverage, or other administrative functions? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does one (1) facility operation support the operation of the other facility?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Is one (1) facility dependent on the other? If one (1) facility shuts down, what are the limitations on the other to pursue outside business? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Are there any financial arrangements between the two (2) entities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Are there any legal or lease agreements between the two (2) facilities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do the facilities share products, byproducts, equipment, or other manufacturing or air pollution control device equipment? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do all the pollutant-emitting activities at the facilities belong to the same SIC Code? Please provide the SIC Codes.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Was the location of the new facility chosen primarily because of its proximity to the existing facility to integrate the operation of the two (2) facilities? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Will materials be routinely transferred between the two (2) facilities? Please explain the amount of transfer and how often the transfers take place and what percentages go to the various entities.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does the facility influence production levels or compliance with environmental regulations at other facilities? Who accepts the responsibility for compliance with air quality requirements? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

# **Attachment B**

## **Siting Criteria Waiver**

**Attachment B**

**Siting Waiver**

**Corder East Well Pad**

**Antero Resources Corporation**

**Harrison County, West Virginia**

A Siting Waiver form is not required because there are no occupied dwelling structures within 300 feet of Corder East Well Pad.

# **Attachment C**

## **Current Business Certificate**

# State of West Virginia



## Certificate

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

### **ANTERO RESOURCES CORPORATION**

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

Therefore, I issue this

### **CERTIFICATE OF AMENDMENT TO CERTIFICATE OF AUTHORITY**



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

*Natalie E. Tennant*

*Secretary of State*

FILED

JUN 10 2013

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



IN THE OFFICE OF  
SECRETARY OF STATE

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

APPLICATION FOR  
AMENDED CERTIFICATE  
OF AUTHORITY

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

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

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

- Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachian Corporation
- Date Certificate of Authority was issued in West Virginia: 6/25/2008
- Corporate name has been changed to: Antero Resources Corporation  
(Attach one Certified Copy of Name Change as filed in home State of Incorporation.)
- Name the corporation elects to use in WV: Antero Resources Corporation  
(due to home state name not being available)
- Other amendments: \_\_\_\_\_  
(attach additional pages if necessary)
- Name and phone number of contact person. (This is optional, however, if there is a problem with the filing, listing a contact person and phone number may avoid having to return or reject the document.)  
Alvyn A. Schopp (303) 367-7310  
Contact Name Phone Number
- Signature information (See below \*Important Legal Notice Regarding Signature):  
Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person  
Signature:  Date: June 10, 2013

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



# Delaware

PAGE 1

*The First State*

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

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

4520810 8100

130754186



You may verify this certificate online  
at [corp.delaware.gov/authver.shtml](http://corp.delaware.gov/authver.shtml)

  
Jeffrey W. Bullock, Secretary of State  
AUTHENTICATION: 0496546

DATE: 06-10-13

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

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

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

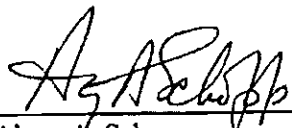
2. This Amendment to the Amended and Restated Certificate of Incorporation has been duly adopted and approved in accordance with Sections 242 of the General Corporation Law of the State of Delaware.

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

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

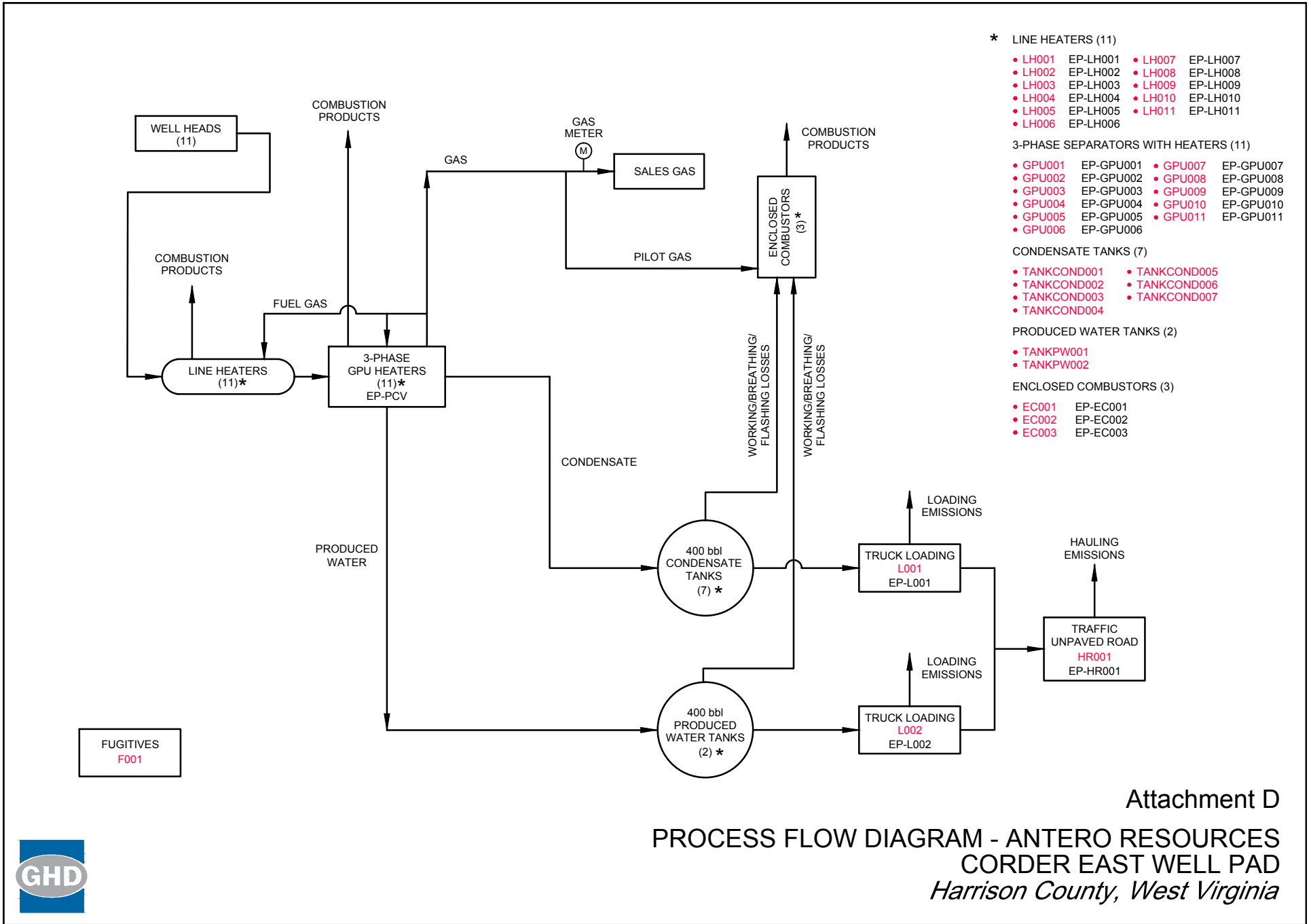
IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be executed by its duly authorized officer on the 10th day of June, 2013.

ANTERO RESOURCES APPALACHIAN CORPORATION

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

# **Attachment D**

## **Process Flow Diagram**



# **Attachment E**

## **Process Description**

## **Attachment E**

### **Process Description Corder East Well Pad Antero Resources Corporation Harrison 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 (LH001-011) and gas production units (GPU001-GPU011) which are 3 phase separators where the gas, condensate, and produced water are separated. The line heaters and GPUs are fueled by a slip stream of the separated gas. The separated gas is then metered and sent to the sales gas pipeline. The separated condensate and water from the separators flow to their respective storage tanks (TANKCOND001-007 and TANKPW001-002).

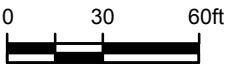
The Facility has seven (7) tanks (TANKCOND001-007) on site to store condensate and two (2) tanks (TANKPW001-002) to store produced water prior to removal from the site. The flashing, working and breathing losses from the tanks are routed to three enclosed combustors (EC001-003) to control the emissions. The enclosed combustors that will be used to control emissions are designed to achieve a VOC destruction efficiency of 98 percent.

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

Emissions from the facility's emission sources were calculated using the extended analysis of the condensate from Yoke Unit 1H, one of the wells in the Maxwell Well Pad and site specific gas analysis from Cleta Unit 1H. The extended condensate analysis is considered representative of the materials from Corder East Well Pad, being in the same Marcellus rock formation.

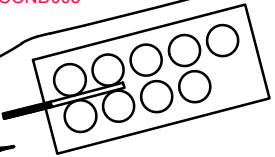
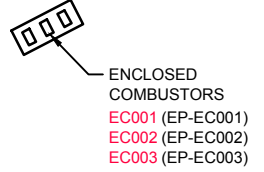
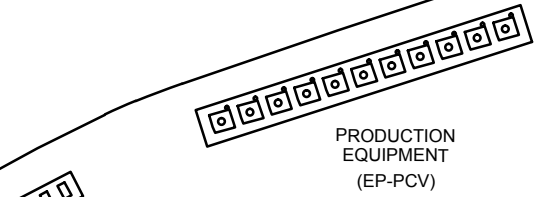
# **Attachment F**

## **Plot Plan**



GPU001 (EP-GPU001) GPU007 (EP-GPU007)  
 GPU002 (EP-GPU002) GPU008 (EP-GPU008)  
 GPU003 (EP-GPU003) GPU009 (EP-GPU009)  
 GPU004 (EP-GPU004) GPU010 (EP-GPU010)  
 GPU005 (EP-GPU005) GPU011 (EP-GPU011)  
 GPU006 (EP-GPU006)

TANKCOND001 TANKCOND006  
 TANKCOND002 TANKCOND007  
 TANKCOND003 TANKPW001  
 TANKCOND004 TANKPW002  
 TANKCOND005



HAULING ROUTE (EP-HR001)  
 HR001

L001 (EP-L001)  
 L002 (EP-L002)

- o TRUMAN UNIT 1H
- o TRUMAN UNIT 2H
- o HILDRED UNIT 1H
- o HILDRED UNIT 2H
- o CLARK UNIT 1H
- o ONEACRE UNIT 1H
- o MAUDE UNIT 1H
- o MAUDE UNIT 2H
- o CLETA UNIT 1H
- o CLETA UNIT 2H
- o OPIE UNIT 1H

FACILITY FUGITIVES  
 F001

EDGE OF GRAVEL PAD

**LEGEND**

- o EXISTING WELL LOCATION

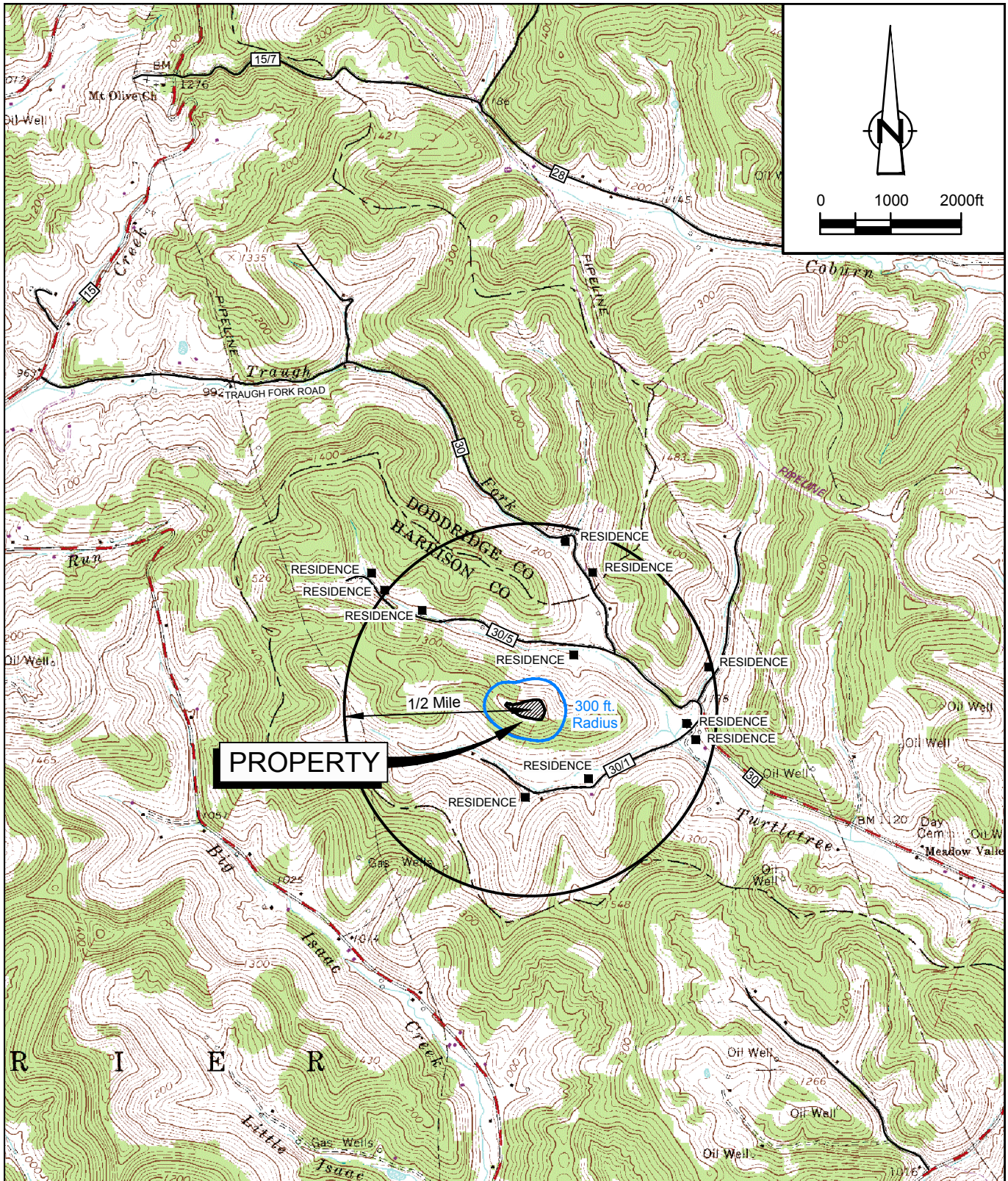


Attachment F  
 PLOT PLAN  
 CORDER EAST WELLPAD  
 ANTERO RESOURCES  
 Harrison County, West Virginia



# **Attachment G**

## **Area Map**



SOURCE: USGS QUADRANGLE MAP;  
BIG ISAAC, WEST VIRGINIA

SITE COORDINATES: LAT: 39.222389, LONG: -80.553401  
SITE ELEVATION: 1405 ft AMSL



Attachment G  
AREA MAP  
CORDER EAST WELL PAD  
ANTERO RESOURCES  
*Harrison, West Virginia*

# **Attachment H**

## **G70-C Section Applicability Form**

**ATTACHMENT H – G70-C SECTION APPLICABILITY FORM**

**General Permit G70-C Registration  
Section Applicability Form**

General Permit G70-C was developed to allow qualified applicants to seek registration for a variety of sources. These sources include gas well affected facilities, storage vessels, gas production units, in-line heaters, heater treaters, glycol dehydration units and associated reboilers, pneumatic controllers, centrifugal compressors, reciprocating compressors, reciprocating internal combustion engines (RICEs), tank truck loading, fugitive emissions, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

General Permit G70-C 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.

<b>GENERAL PERMIT G70-C APPLICABLE SECTIONS</b>	
<input checked="" type="checkbox"/> Section 5.0	Gas Well Affected Facility (NSPS, Subpart OOOO)
<input checked="" type="checkbox"/> Section 6.0	Storage Vessels Containing Condensate and/or Produced Water <sup>1</sup>
<input type="checkbox"/> Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO)
<input checked="" type="checkbox"/> Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO and/or NESHAP Subpart HH
<input checked="" type="checkbox"/> Section 9.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
<input type="checkbox"/> Section 10.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO)
<input type="checkbox"/> Section 11.0	Centrifugal Compressor Affected Facility (NSPS, Subpart OOOO) <sup>2</sup>
<input type="checkbox"/> Section 12.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO) <sup>2</sup>
<input type="checkbox"/> Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines, Microturbines
<input checked="" type="checkbox"/> Section 14.0	Tanker Truck Loading <sup>3</sup>
<input type="checkbox"/> Section 15.0	Glycol Dehydration Units <sup>4</sup>

- 1 Applicants that are subject to Section 6 may also be subject to Section 7 if the applicant is subject to the NSPS, Subpart OOOO control requirements or the applicable control device requirements of Section 8.
- 2 Applicants that are subject to Section 11 and 12 may also be subject to the applicable RICE requirements of Section 13.
- 3 Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 8.
- 4 Applicants that are subject to Section 15 may also be subject to the requirements of Section 9 (reboilers). Applicants that are subject to Section 15 may also be subject to control device and emission reduction device requirements of Section 8.

# **Attachment I**

## **Emission Units/ ERD Table**

**ATTACHMENT I – EMISSION UNITS / EMISSION REDUCTION DEVICES (ERD) TABLE**

Include ALL emission units and air pollution control devices /ERDs that will be part of this permit application review. This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

Emission Unit ID <sup>1</sup>	Emission Point ID <sup>2</sup>	Emission Unit Description	Year Installed/Modified	Manufac. Date <sup>3</sup>	Design Capacity	Type <sup>4</sup> and Date of Change	Control Device(s) <sup>5</sup>	ERD (s) <sup>6</sup>
GPU001, GPU002, GPU003, GPU004, GPU005, GPU006, GPU007, GPU008, GPU009, GPU010, GPU011	EP-GPU001, EP-GPU002, EP-GPU003, EP-GPU004, EP-GPU005, EP-GPU006, EP-GPU007, EP-GPU008, EP-GPU009, EP-GPU010, EP-GPU011	Gas Production Unit Heater	2014		1.0 MMBtu/hr each	Existing	N/A	
LH001, LH002, LH003, LH004, LH005, LH006, LH007, LH008, LH009, LH010, LH011	EP-LH001, EP-LH002, EP-LH003, EP-LH004, EP-LH005, EP-LH006, EP-LH007, EP-LH008, EP-LH009, EP-LH010, EP-LH011	Line Heater	2016		2.0 MMBtu/hr each	New	N/A	
F001	F001	Fugitives	2014		N/A	Existing	N/A	
TANK001-009	EP-TANK001-009	Condensate and Produced Water Tank F/W/B	2014		400 bbl each	Removal	EP-TANK001-009	
TANKCOND001-007	EP-EC001, EP-EC002, EP-EC003	Condensate Tank F/W/B	2014		400 bbl each	New	EC001, EC002, EC003	
TANKPW001-002	EP-EC001, EP-EC002, EP-EC003	PW Tank F/W/B	2014		400 bbl each	New	EC001, EC002, EC003	
L001	EP-L001	Loading (Condensate)	2014		10,080 gal/hr 766,500 gal/yr	Existing	N/A	
L002	EP-L002	Loading (Produced Water)	2014		10,080 gal/hr 9,198,000 gal/yr	Existing	N/A	
HR001	EP-HR001	Haul Truck	2014		40 ton capacity	Existing	N/A	
EC001	EP-EC001	Enclosed Combustor	2016		12 MMBtu/hr	New	N/A	
EC002	EP-EC002	Enclosed Combustor	2016		12 MMBtu/hr	New	N/A	
EC003	EP-EC003	Enclosed Combustor	2016		12 MMBtu/hr	New	N/A	
PCV	EP-PCV	Pneumatic CV	2014		6.6 scf/day/PCV	Existing	N/A	

1 For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S, ... or other appropriate designation.

2 For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.

3 When required by rule.

4 New, modification, removal, existing.

5 For Control Devices use the following numbering system: 1C, 2C, 3C, ... or other appropriate designation.

6 For ERDs use the following numbering system: 1D, 2D, 3D, ... or other appropriate designation.

# **Attachment J**

## **Fugitive Emissions Summary Sheet**

**ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET**

Sources of fugitive emissions may include loading operations, equipment leaks, blowdown emissions , etc.

Use extra pages for each associated source or equipment if necessary.

Source/Equipment:

Leak Detection Method Used		<input type="checkbox"/> Audible, visual, and	<input checked="" type="checkbox"/> Infrared (FLIR) cameras	<input type="checkbox"/> Other (please describe)	<input type="checkbox"/> None required		
Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)		
					VOC	HAP	GHG (CO2e)
Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	550	EPA	gas	1.83	0.20	452.50
Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	572	EPA	liquid	13.47	0.78	2.67
Connections (Not sampling)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	649	EPA	gas	0.10	1.06E-02	23.73
Flanges	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	143	EPA	gas	0.04	4.55E-03	10.20
Loading	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	2	EPA	gas	0.11	1.22E-03	0.85

Other equipment types may include compressor seals, relief valves, diaphragms, drains, meters, etc.

Please provide an explanation of the sources of fugitive emissions (e. g. pigging operations, equipment blowdowns, pneumatic controllers, etc.)

Please indicate if there are any closed vent bypasses (include component)

Specify all equipment used in the closed vent system (e. g. VRU, ERD, thief hatches, tanker truck loading, etc.)



# **Attachment K**

## **Gas Well Affected Facility Data Sheet**

## ATTACHMENT K – GAS WELL AFFECTED FACILITY DATA SHEET

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

API Number	Date of Flowback	Date of Well Completion	Green Completion and/or Combustion Device
47033057100000	2/3/2014	12/1/2013	Green
47033056590000	4/11/2013	2/1/2013	Green
47033056510000	4/12/2013	2/1/2013	Green
47033057110000	3/1/2017	1/1/2017	Green
47033057090000	3/1/2017	1/1/2017	Green
47033057050000	1/13/2014	11/1/2013	Green
47033057040000	1/8/2014	11/1/2013	Green
47033057080000	1/25/2014	11/1/2013	Green
47033056770000	4/25/2013	2/1/2013	Green
47033057140000	3/1/2017	1/1/2017	Green
47033057150000	3/1/2017	1/1/2017	Green

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

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

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

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

*Where,*

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

# **Attachment L**

## **Storage Vessel Data Sheet**

**ATTACHMENT L – STORAGE VESSEL DATA SHEET**

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

**The following information is REQUIRED:**

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

Additional information may be requested if necessary.

**GENERAL INFORMATION (REQUIRED)**

1. Bulk Storage Area Name: Tanks	2. Tank Name: Condensate Tank 001-007
3. Emission Unit ID number: TANKCOND001-007	4. Emission Point ID number: EP-EC001, EP-EC002, EP-EC003

5. Date Installed, Modified or Relocated (for existing tanks): 2014	6. Type of change:
Was the tank manufactured after August 23, 2011? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other <input type="checkbox"/> Relocation

7A. Description of Tank Modification (if applicable)

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

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

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

**TANK INFORMATION**

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

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

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

13A. Maximum annual throughput (gal/yr): 766500	13B. Maximum daily throughput (gal/day): 2100
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 7	15. Maximum tank fill rate (gal/min): 168

16. Tank fill method     Submerged     Splash     Bottom Loading

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

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

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

Fixed Roof     vertical     horizontal     flat roof     cone roof     dome roof     other (describe)

External Floating Roof     pontoon roof     double deck roof

Domed External (or Covered) Floating Roof

Internal Floating Roof     vertical column support     self-supporting

Variable Vapor Space     lifter roof     diaphragm

Pressurized     spherical     cylindrical

other

**ATTACHMENT L – STORAGE VESSEL DATA SHEET**

**PRESSURE/VACUUM CONTROL DATA**

19. Check as many as apply:

- Does Not Apply
- Inert Gas Blanket of
- Vent to Vapor Combustion Device (vapor combustors, flares, thermal oxidizers, enclosed combustors)
- Conservation Vent (psig)
  - Vacuum \_\_\_\_\_ Pressure \_\_\_\_\_
- Emergency relief Valve (psig)
  - Vacuum \_\_\_\_\_ Pressure \_\_\_\_\_
- Thief Hatch Weighted  Yes  No

Complete appropriate Air Pollution Control Device Sheet

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

Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emission Loss		Estimation Method
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	

*Please see Table 6 and Table 7*

**TANK CONSTRUCTION & OPERATION INFORMATION**

21. Tank Shell Construction:

- Riveted  Gunitite lined  Epoxy-coated  Other (describe): Steel

21A. Shell Color: Green      21B. Roof Color: Green      21C. Year Last Painted: 2014

22. Shell Condition (if metal and unlined):

- No Rust  Light Rust  Dense Rust  Not applicable

22A. Is the tank beated?  Yes  No      22B. If yes, operating temperature: \_\_\_\_\_      22C. If yes, how is heat provided to tank? \_\_\_\_\_

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

**Must be listed for tanks using VRUs with closed vent system**

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

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

25A. Year Internal Floaters Installed: \_\_\_\_\_

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

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

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

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

25F. Describe deck fittings \_\_\_\_\_

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

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

26C. Deck seam:  
 5 ft. wide  6 ft. wide  7 ft. wide  5 x 7.5 ft wide  5 x 12 ft wide  Other (describe) \_\_\_\_\_

26D. Deck seam length (ft) \_\_\_\_\_      26E. Area of deck (ft<sup>2</sup>) \_\_\_\_\_      26F. For column supported tanks: Number of columns: \_\_\_\_\_      26G. For column supported tanks, Diameter of each column: \_\_\_\_\_

27. Closed Vent System with VRU  Yes  No

28. Closed Vent System with Enclosed Combustor?  Yes  No

**ATTACHMENT L – STORAGE VESSEL DATA SHEET**

**SITE INFORMATION**

29. Provide the city and state on which the data in this section are based.: West Union, WV			
30. Daily Average Ambient Temperature (°F):	65.08	31. Annual Average Maximum Temperature (°F):	75.94
32. Annual Average Minimum Temperature (°F):	46.56	33. Average Wind Speed (miles/hr): 18.5mph	
34. Annual Average Solar Insulation Factor (BTU/(ft <sup>2</sup> -day))	1030.236	35. Atmospheric Pressure (psia): 14.8 (based off local conditions, could not find annual)	

**LIQUID INFORMATION**

36. Average daily temperature range of bulk liquid (F):	65.08	36A. Minimum (°F):	46.56	36B. Maximum (°F)	75.94
37. Average operating pressure range of tank (psig):	0	37A. Minimum (psig)	0	37B. Maximum (psig)	0
38A. Minimum Liquid Surface Temperature (°F)	46.56	38B. Corresponding Vapor Pressure (psia)	0.8145		
39A. Average Liquid Surface Temperature (°F)	65.08	39B. Corresponding Vapor Pressure (psia)	1.2499		
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	1.5850		

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

41A. Material Name or Composition	Condensate		
41B. CAS Number	mix of HC		
41C. Liquid Density (lb/gal)	6.0500		
41D. Liquid Molecular Weight (lb/lb-mole)	113.20		
41E. Vapor Molecular Weight (lb/lb-mole)	34.6499		
Maximum Vapor Pressure	1.5850		
41F. True (psia)			
41G. Reid (psia)	2.51		
Months Storage per Year	year round		
41H. From - To			

**ATTACHMENT L – STORAGE VESSEL DATA SHEET**

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

**The following information is REQUIRED:**

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

Additional information may be requested if necessary.

**GENERAL INFORMATION (REQUIRED)**

1. Bulk Storage Area Name Tanks	2. Tank Name: Produced Water Tank 001-002
3. Emission Unit ID number: TANKPW001-002	4. Emission Point ID number. EP-EC001, EP-EC002, EP-EC003
5. Date Installed, Modified or Relocated (for existing tanks) 2014 Was the tank manufactured after August 23, 2011? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Type of change: <input checked="" type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other  <input type="checkbox"/> Relocation
7A. Description of Tank Modification (if applicable)	
7B. Will more than one material be stored in this tank? If so, a separate form must be completed for each material. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Was USEPA Tanks simulation software utilized? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

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

**TANK INFORMATION**

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 400bbbls	
9A. Tank Internal Diameter (ft): 12	9B. Tank Internal Height (or Length) (ft): 20
10A. Maximum Liquid Height (ft): 18	10B. Average Liquid Height (ft): 10
11A. Maximum Vapor Space Height (ft): 18	11B. Average Vapor Space Height (ft): 10
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.: 400bbbls	
13A. Maximum annual throughput (gal/yr): 9198000	13B. Maximum daily throughput (gal/day): 25200
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 274	15. Maximum tank fill rate (gal/min): 168
16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Is the tank system a variable vapor space system? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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):  <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input checked="" type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical	

**ATTACHMENT L – STORAGE VESSEL DATA SHEET**

<b>PRESSURE/VACUUM CONTROL DATA</b>																	
19. Check as many as apply:																	
<input type="checkbox"/>	Does not apply		<input type="checkbox"/>	Rupture Disc (psig)													
<input type="checkbox"/>	Inert Gas Blanket		<input type="checkbox"/>	Carbon Adsorption													
<input checked="" type="checkbox"/>	Vent to Vapor Combustion Device (vapor combustors, flares, thermal oxidizers, enclosed combustors)																
<input type="checkbox"/>	Conservation Vent (psig)			Vacuum	Pressure												
<input type="checkbox"/>	Emergency relief Valve (psig)			Vacuum	Pressure												
<input type="checkbox"/>	Thief Hatch Weighted		<input type="checkbox"/>	Yes		<input type="checkbox"/>	No										
Complete appropriate Air Pollution Control Device Sheet																	
20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).																	
Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emission Loss		Estimation Method								
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy									
Please see Table 6 and Table 7																	
<b>TANK CONSTRUCTION &amp; OPERATION INFORMATION</b>																	
21. Tank Shell Construction:																	
<input type="checkbox"/>	Riveted		<input type="checkbox"/>	Gunite lined		<input type="checkbox"/>	Epoxy-coated		<input checked="" type="checkbox"/>	Other(describe): Steel							
21A.	Shell Color: Green		21B.	Roof Color: Green		21C.	Year Last Painted		2014								
22. Shell Condition (if metal and unlined):																	
<input checked="" type="checkbox"/>	No Rust		<input type="checkbox"/>	Light Rust		<input type="checkbox"/>	Dense Rus:		<input type="checkbox"/>	Not applicable							
22A	Is the tank heated?		22B.	If yes, operating temperature:		22C.	If yes, how is heat provided to tank?										
<input type="checkbox"/>	Yes		<input checked="" type="checkbox"/>	No													
23. Operating Pressure Range (psig): 0 psig, atmospheric																	
<b>Must be listed for tanks using VRUs with closed vent system</b>																	
24.	Is the tank a Vertical Fixed Roof Tank?		24A.	If yes, for dome roof provide radius (ft): NA		24B.	If yes, for cone roof, provide slop (ft/ft): NA										
<input checked="" type="checkbox"/>	Yes		<input type="checkbox"/>	No													
25. Complete the following section for <b>Floating Roof Tanks</b> Does Not Apply																	
25A. Year Internal Floaters Installed:																	
25B.	Primary Seal Type:		<input type="checkbox"/>	Metallic (mechanical) shoe seal		<input type="checkbox"/>	Liquid mounted										
			<input type="checkbox"/>	Vapor mounted resilient seal		<input type="checkbox"/>	Other (describe):										
25C.	Is the Floating Roof equipped with a Secondary Seal?									<input type="checkbox"/>	Yes	<input type="checkbox"/>	No				
25D.	If YES, how is the secondary seal mounted? (check one)																
	<input type="checkbox"/>	Shoe		<input type="checkbox"/>	Rim		<input type="checkbox"/>	Other(describe):									
25E.	Is the Floating Roof equipped with a weather shield?									<input type="checkbox"/>	Yes	<input type="checkbox"/>	No				
25F.	Describe deck fittings																
26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does not apply																	
26A.	Deck Type:		<input type="checkbox"/>	Bolted		<input type="checkbox"/>	Welded										
			26B. For bolted decks, provide deck construction														
26C. Deck seam:																	
<input type="checkbox"/>	5 ft. wide		<input type="checkbox"/>	6 ft. wide		<input type="checkbox"/>	7 ft. wide		<input type="checkbox"/>	5 x 7.5 ft. wide		<input type="checkbox"/>	5 x 12 ft. wide		<input type="checkbox"/>	Other	
26D.	Deck seam length (ft)		26E.	Area of deck (ft2)		26F.	For column supported tanks: Number of columns:		26G.	For column supported tanks, Diameter of each column:							
27. Closed Vent System with VRU										<input type="checkbox"/>	Yes		<input checked="" type="checkbox"/>	No			
28. Closed Vent System with Enclosed Combustor?										<input checked="" type="checkbox"/>	Yes		<input type="checkbox"/>	No			



**ATTACHMENT L – STORAGE VESSEL DATA SHEET**

<b>SITE INFORMATION</b>			
29. Provide the city and state on which the data in this section are based.: West Union, WV			
30. Daily Average Ambient Temperature (°F):	65.08	31. Annual Average Maximum Temperature (°F):	75.94
32. Annual Average Minimum Temperature (°F):	46.56	33. Average Wind Speed (miles/hr): 5.9mph	
34. Annual Average Solar Insulation Factor (BTU/(ft <sup>2</sup> .day))	1030.236	35. Atmospheric Pressure (psia): 14.8 (based off local conditions, could not find annual)	
<b>LIQUID INFORMATION</b>			
36. Average daily temperature range of bulk liquid (F):	65.08	36A. Minimum (°F):	46.56
		36B. Maximum (°F)	75.94
37. Average operating pressure range of tank (psig):	0	37A. Minimum (psig)	0
		37B. Maximum (psig)	0
38A. Minimum Liquid Surface Temperature (°F)	46.56	38B. Corresponding Vapor Pressure (psia)	0.2241
39A. Average Liquid Surface Temperature (°F)	65.08	39B. Corresponding Vapor Pressure (psia)	0.3712
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	0.4910
41. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
41A. Material Name or Composition	Produced Water		
41B. CAS Number	mix of HC and water		
41C. Liquid Density (lb/gal)	8.3300		
41D. Liquid Molecular Weight (lb/lb-mole)	18.02		
41E. Vapor Molecular Weight (lb/lb-mole)	18.2795		
Maximum Vapor Pressure	0.4910		
41F. True (psia)			
41G. Reid (psia)	1.0209		
Months Storage per Year	year round		
41H. From - To			

**Attachment M**  
**Natural Gas Fired Fuel Burning Unit(s)**  
**Data Sheet**

**ATTACHMENT M – SMALL HEATERS AND REBOILERS NOT SUBJECT TO  
40CFR60 SUBPART DC  
DATA SHEET**

Complete this data sheet for each small heater and reboiler not subject to 40CFR60 Subpart Dc at the facility. *The Maximum Design Heat Input (MDHI) must be less than 10 MMBTU/hr.*

Emission Unit ID#	Emission Point ID#	Emission Unit Description (Manufacturer, model#)	Year Installed/Modified	Type and Date of Change	Maximum Design Heat Input (MMBTU/hr)	Fuel Heating Value (BTU/sef)
GPU001	EP-GPU001	Gas Production Unit Heater	2014	Existing	1	1120.44
GPU002	EP-GPU002	Gas Production Unit Heater	2014	Existing	1	1120.44
GPU003	EP-GPU003	Gas Production Unit Heater	2014	Existing	1	1120.44
GPU004	EP-GPU004	Gas Production Unit Heater	2014	Existing	1	1120.44
GPU005	EP-GPU005	Gas Production Unit Heater	2014	Existing	1	1120.44
GPU006	EP-GPU006	Gas Production Unit Heater	2014	Existing	1	1120.44
GPU007	EP-GPU007	Gas Production Unit Heater	2014	Existing	1	1120.44
GPU008	EP-GPU008	Gas Production Unit Heater	2014	Existing	1	1120.44
GPU009	EP-GPU009	Gas Production Unit Heater	2014	Existing	1	1120.44
GPU010	EP-GPU010	Gas Production Unit Heater	2014	Existing	1	1120.44
GPU011	EP-GPU011	Gas Production Unit Heater	2014	Existing	1	1120.44
LH001	EP-LH001	Line Heater	2016	New	2	1120.44
LH002	EP-LH002	Line Heater	2016	New	2	1120.44
LH003	EP-LH003	Line Heater	2016	New	2	1120.44
LH004	EP-LH004	Line Heater	2016	New	2	1120.44
LH005	EP-LH005	Line Heater	2016	New	2	1120.44
LH006	EP-LH006	Line Heater	2016	New	2	1120.44
LH007	EP-LH007	Line Heater	2016	New	2	1120.44
LH008	EP-LH008	Line Heater	2016	New	2	1120.44
LH009	EP-LH009	Line Heater	2016	New	2	1120.44
LH010	EP-LH010	Line Heater	2016	New	2	1120.44
LH011	EP-LH011	Line Heater	2016	New	2	1120.44

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

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

3. New, modification, removal.

4. Enter design heat input capacity in MMBtu/hr.

5. Enter the fuel heating value in BTU/standard cubic foot.

# **Attachment O**

## **Tanker Truck Loading Data Sheet**

## ATTACHMENT O – TANKER TRUCK LOADING DATA SHEET

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

### Truck Loadout Collection Efficiencies

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

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

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

Emission Unit ID#: L001, L002	Emission Point ID#: EP-L001, EP-L002	Year Installed/ Modified: 2014
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Emission Unit Description: **Condensate Loading, Produced Water Loading**

#### Loading Area Data

Number of Pumps: 2	Number of Liquids Loaded: 2	Max number of trucks loading at one time: 2
--------------------	-----------------------------	---

Are Tanker trucks pressure tested for leaks at this any other location?  Yes  No  Not Required

If Yes, Please Describe: Tank trucks are pressure tested for leaks at the location of the leak testing company. Trucks are tested using EPA Method 27-internal vapor valve test and issued certification that DOT requirements are met.

Provide description of closed vent system and any bypasses

Are any of the following truck loadout systems utilized? **No**

- Closed System to Tanker Truck passing a MACT level annual leak test?
- Closed System to Tanker Truck passing a NSPS level annual leak test?
- Closed System to Tanker Truck not passing an annual leak test and has vapor return?

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

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

#### Bulk Liquid Data (use extra pages as necessary)

Liquid Name	Condensate	Produced Water	
Max. Daily Throughput (1000 gal/day)	2.10	25.20	
Max. Annual Throughput (1000 gal/yr)	766.50	9198.00	
Loading Method	BF	BF	
Max. Fill Rate (gal/min)	168	168	
Average Fill Time (min/loading)	50	50	
Max. Bulk Liquid Temperature (F)	65.1	65.1	
True Vapor Pressure	1.2	0.4	
Cargo Vessel Condition	U	U	
Control Equipment or Method	None	None	
Max. Collection Efficiency (%)	0	0	
Max. Control Efficiency (%)	0	0	
Max VOC Emission Rate	Loading (lb/hr)	2.9191	0.0005
	Annual (ton/yr)	0.1110	0.0002
Max HAP Emission Rate	Loading (lb/hr)	0.0321	2.29E-07
	Annual (ton/yr)	0.0012	1.05E-07
Estimation Method	Promax	Promax	

- 1 BF Bottom Fill      SP Splash Fill      SUB Submerged Fill
- 2 At maximum bulk liquid temperature
- 3 B Ballasted Vessel      C Cleaned      U Uncleaned (dedicated servi      O Other (describe)
- 4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
- CA Carbon Adsorption      VB Dedicated Vapor Balance (closed system)
- ECD Enclosed Combustion Device      F Flare
- TO Thermal Oxidization or Incineration
- 5 EPA EPA Emission Factor in AP-42      MB Material Balance
- TM Test Measurement based upon test data submittal      O Other (describe)

**Attachment R**  
**Air Pollution Control Device – Emission**  
**Reduction Device Sheets**

## ATTACHMENT R – AIR POLLUTION CONTROL DEVICE / EMISSION REDUCTION DEVICE SHEETS

Complete the applicable air pollution control device sheet s for each flare, vapor combustor, thermal oxidizer, condenser, adsorption system, vapor recovery unit , BTEX Eliminator, Reboiler with and without Glow Plug, etc. at the facility. Use extra pages if necessary.

Emissions calculations must be performed using the most conservative control device efficiency.

*The following five (5) rows are only to be completed if registering an alternative air pollution control device.*

Emission Unit ID:	NA	Make/Model:	NA
Primary Control Device ID:	NA	Make/Model	NA
Control Efficiency (%):	NA	APCD/ERD Data Sheet Completed	<input type="checkbox"/> Yes <input type="checkbox"/> No
Secondary Control Device ID:	NA	Make/Model	NA
Control Efficiency (%):	NA	APCD/ERD Data Sheet Completed	<input type="checkbox"/> Yes <input type="checkbox"/> No

### VAPOR COMBUSTION (Including Enclosed Combustors)

#### General Information

Control Device ID#:	EC001-003	Installation Date: <input checked="" type="checkbox"/> New <input type="checkbox"/> Modified <input type="checkbox"/> Relocated	
Maximum Rated Total Flow Capacity 5458 scfh	131000 scfd	Maximum Design Heating Input (from mfg. spec sheet) 12.0 MMBTU/hr	Design Heat Content 2300 BTU/scf

#### Control Device Information

Type of Vapor Combustion Control?

- Enclosed Combustion Device     
  Elevated Flare     
  Ground Flare  
 Thermal Oxidizer

Manufacturer: Cimarron	Hours of operation per year?	8760
Model: 48" HV ECD		

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

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
TANKCOND001-007	Condensate Tanks		
TANKPW001-002	Produced Water Tanks		

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

Assist Type (Flares only) <input type="checkbox"/> Steam <input type="checkbox"/> Air <input type="checkbox"/> Pressure <input checked="" type="checkbox"/> Non	Flare height 25 feet	Tip Diameter 3.33 feet	Was the design per §60.18? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Provide determination
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#### Waste Gas Information

Maximum Waste Gas Flow Rate 4.06 (scfm)	Heat Value of Waste Gas Stream 1,350.40 BTU/ft <sup>3</sup>	Exit Velocity of the Emission Stream 0.0078 (ft/s)
--	--	---

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

#### Pilot Gas Information

Number of Pilot Lights 3	Fuel Flow Rate to Pilot Flame per Pilot 12.6 scfh	Heat Input per Pilot 12800 BTU/hr	Will automatic re-ignition be used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
-----------------------------	--	--------------------------------------	--

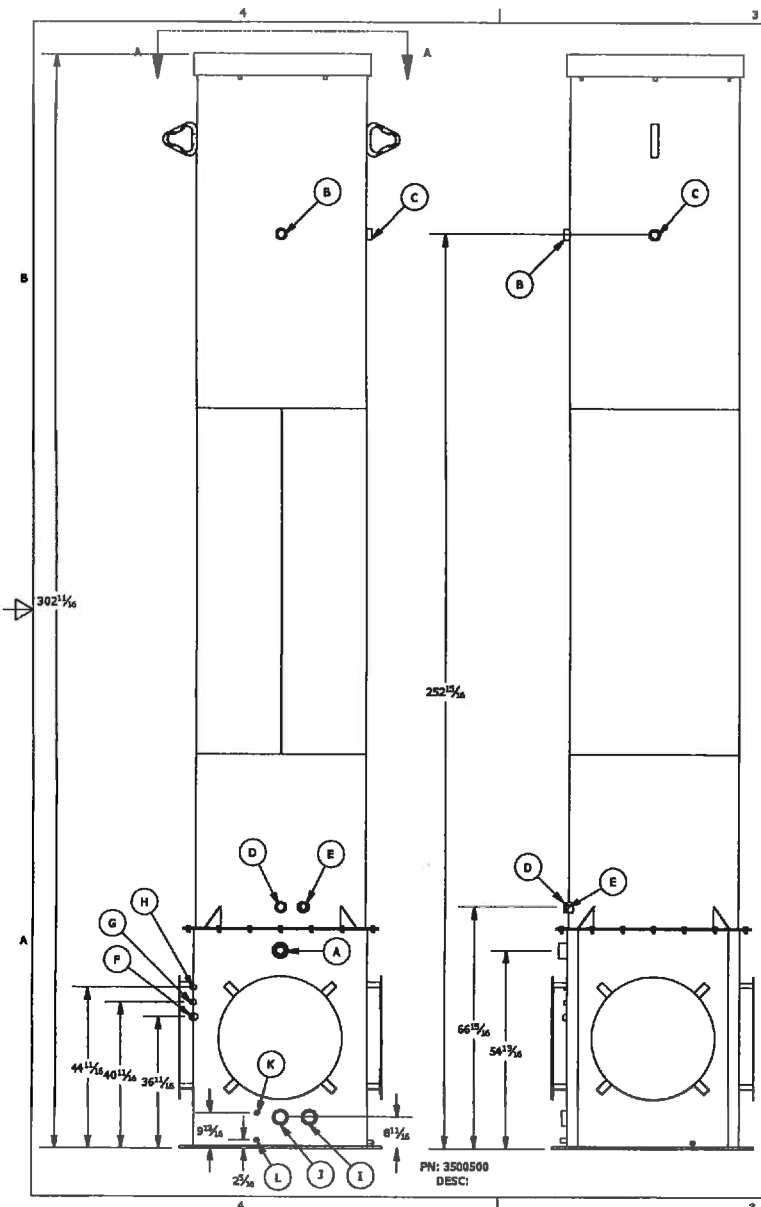
If automatic re-ignition is used, please describe the method. Flame Rectification, a thermocouple equivalent

Is pilot flame equipped with a monitor to detect the presence of the flame? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If Yes, What type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infrared <input type="checkbox"/> Ultraviolet <input type="checkbox"/> Camera <input type="checkbox"/> Other:
--	--

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

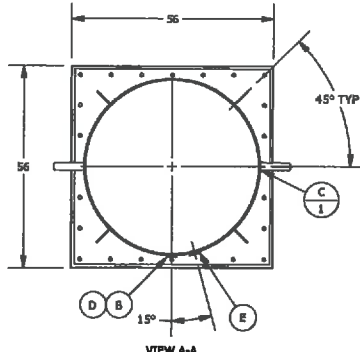
Additional information attached?  Yes  No Manufacturer's specs sheet

Please attach copies of manufacturer's data sheets, drawings, flame demonstration per §60.18 or §63.11 (b) and performance testing.



**48" DIA x 302 5/8" HEIGHT, 88 ORIFICES  
EMISSION CONTROL DEVICE**

- \* >98% TVOC DRE, CERTIFIED USEPA 40 CFR 60, APPENDIX A, SOURCE EMISSIONS 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<sup>2</sup>; 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.



PN: 3500500  
DESC:

SCHEDULE OF NOZZLES			
MARK	QTY	DESCRIPTION	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 AND SHARP CORNERS.
    - .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°
    - CONTRICTY 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 VOLLUME BCD

DATE: \_\_\_\_\_ WO No.: \_\_\_\_\_ SHEET: 1 OF 1

DRAWN BY: TDS | REV. | DRAW NO.: 3500500



# **Attachment S**

## **Emissions Calculations**

**Table 1**

**Facility Information  
Corder East Well Pad  
Harrison County, West Virginia  
Antero Resources Corporation**

**Oil and Gas Site General Information**

<b>Administrative Information</b>	
Company Name	Antero Resources Corporation
Facility/Well Name	Corder East Well Pad
Nearest City/Town	Salem
API Number/SIC Code	1311
Latitude/Longitude	39.22238, -80.5534
County	Harrison County

<b>Technical Information</b>	
Max Condensate Site Throughput (bbl/day):	50
Max Produced Water Site Throughput (bbl/day):	600
Are there any sour gas streams at this site?	No
Is this site currently operational/producing?	Yes

<b>Equipment/Processes at Site</b>	
<b>Equipment/Process Types</b>	<b>How many for this site?</b>
Fugitives	11
Gas Production Unit Heaters	11
Line Heaters	11
Condensate Tanks	7
Produced Water Tanks	2
Loading Jobs	2
Enclosed Combustors	3

Table 2

Uncontrolled/Controlled Emissions Summary  
 Corder East Well Pad  
 Harrison County, West Virginia  
 Antero Resources Corporation

Emission Source	VOC		NO <sub>x</sub>		CO <sub>2e</sub>		CO		SO <sub>2</sub>		PM <sub>2.5</sub>		PM <sub>10</sub>		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)
<b>UNCONTROLLED (Fugitives, Storage Tanks, Engine, Gas Production Unit Heaters, Line Heaters)</b>																								
Fugitive Emissions (Component Count, PCV and Hauling) <sup>1</sup>	3.5578	15.5833			119.987	525.54							5.2629	1.5645			0.2313	1.0130	0.0014	0.0062	6.64E-02	2.91E-01		
Flashing, Working and Breathing (F/W/B) Losses <sup>2</sup>	7.3690	32.2760			153.0593	670.3997											0.9870	4.3232	0.0001	0.0006	0.0054	0.0235		
Gas Production Unit Heater Emissions <sup>3</sup>	0.0540	0.2365	0.9818	4.3001	1,178.11	5,160.12	0.8247	3.6121	0.0059	0.0258	0.0746	0.3268	0.0746	0.3268	4.91E-06	2.15E-05	0.018	0.081	2.06E-05	9.03E-05			0.0007	0.0032
Line Heater Emissions <sup>4</sup>	0.1080	0.4730	1.9635	8.6002	2,356.22	10,320.23	1.6494	7.2242	0.0118	0.0516	0.1492	0.6536	0.1492	0.6536	9.82E-06	4.30E-05	0.037	0.162	4.12E-05	1.81E-04			0.0015	0.0065
<b>TOTALS:</b>	<b>11.0888</b>	<b>48.5689</b>	<b>2.9453</b>	<b>12.9003</b>	<b>3807.3718</b>	<b>16676.2886</b>	<b>2.4740</b>	<b>10.8362</b>	<b>0.0177</b>	<b>0.0774</b>	<b>0.2238</b>	<b>0.9804</b>	<b>0.2238</b>	<b>0.9804</b>	<b>1.47E-05</b>	<b>6.45E-05</b>	<b>1.2738</b>	<b>5.5791</b>	<b>0.0016</b>	<b>0.0071</b>	<b>0.0717</b>	<b>0.3142</b>	<b>0.0022</b>	<b>0.0097</b>
<b>TOTALS (Excluding Fugitives):</b>	<b>7.5309</b>	<b>32.9855</b>	<b>2.9453</b>	<b>12.9003</b>	<b>3687.3851</b>	<b>16150.7467</b>	<b>2.4740</b>	<b>10.8362</b>	<b>0.0177</b>	<b>0.0774</b>	<b>0.2238</b>	<b>0.9804</b>	<b>0.2238</b>	<b>0.9804</b>	<b>1.47E-05</b>	<b>6.45E-05</b>	<b>1.0425</b>	<b>4.5660</b>	<b>0.0002</b>	<b>0.0009</b>	<b>0.0054</b>	<b>0.0235</b>	<b>0.0022</b>	<b>0.0097</b>

**UNCONTROLLED (Truck Loading Emissions)**

Truck Loading Emissions <sup>4</sup>	2.9197	0.1112			12.5099	0.8522											0.0321	1.22E-03	0.0000	1.22E-07	0.0006	2.12E-05		
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**CONTROLLED EMISSIONS**

Enclosed Combustor Emissions (from F/W/B losses) <sup>5</sup>	0.1476	0.6464	0.0281	0.1231	58.9246	258.0899	0.0236	0.1034	2.27E-05	0.0001	0.0016	0.0070	0.0021	0.0094	1.41E-07	6.16E-07	0.0198	0.0868	0.0000	0.0000	0.0001	0.0005	2.84E-06	1.24E-05
Controlled Fugitive Emissions from Hauling													2.6315	0.7823										
<b>TOTALS:</b>	<b>0.148</b>	<b>0.646</b>	<b>0.028</b>	<b>0.123</b>	<b>58.925</b>	<b>258.090</b>	<b>0.024</b>	<b>0.103</b>	<b>2.27E-05</b>	<b>9.93E-05</b>	<b>0.002</b>	<b>0.007</b>	<b>2.634</b>	<b>0.792</b>	<b>1.41E-07</b>	<b>6.16E-07</b>	<b>0.020</b>	<b>0.087</b>	<b>2.78E-06</b>	<b>1.22E-05</b>	<b>0.000</b>	<b>0.000</b>	<b>2.84E-06</b>	<b>1.24E-05</b>

<b>POTENTIAL TO EMIT<sup>6</sup></b>	<b>3.8674</b>	<b>17.0505</b>	<b>2.9734</b>	<b>13.0234</b>	<b>3713.2372</b>	<b>16264.8311</b>	<b>2.4976</b>	<b>10.9397</b>	<b>0.0177</b>	<b>0.0775</b>	<b>0.2254</b>	<b>0.9874</b>	<b>2.8574</b>	<b>1.7721</b>	<b>1.49E-05</b>	<b>6.51E-05</b>	<b>0.3065</b>	<b>1.3438</b>	<b>0.0015</b>	<b>0.0065</b>	<b>0.0665</b>	<b>0.2912</b>	<b>0.0022</b>	<b>0.0097</b>
<b>POTENTIAL TO EMIT (Excluding Fugitives)</b>	<b>0.3096</b>	<b>1.3559</b>	<b>2.9734</b>	<b>13.0234</b>	<b>3593.2504</b>	<b>15738.4369</b>	<b>2.4976</b>	<b>10.9397</b>	<b>0.0177</b>	<b>0.0775</b>	<b>0.2254</b>	<b>0.9874</b>	<b>0.2260</b>	<b>0.9898</b>	<b>1.49E-05</b>	<b>6.51E-05</b>	<b>0.0752</b>	<b>0.3296</b>	<b>0.0001</b>	<b>0.0003</b>	<b>0.0001</b>	<b>0.0005</b>	<b>0.0022</b>	<b>0.0097</b>

<b>Enter any notes here:</b>	1 - See Tables 4 and 5 for fugitive emission calculations; Table 12 for PM emissions from hauling.
	2 - See Tables 6 and 7 for tanks emission calculations
	3 - See Table 9 for gas production unit heater and line heater emission calculations
	4 - The maximum emission was calculated based on tank truck capacity of 200 barrels and actual fill rate of 50 minutes per tank truck. At a production rate of 50 barrels per day, VOC emissions would be 2.9197 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 0.0254 pound per hour.
	5 - See Table 10 and 11 for enclosed combustion emission calculations.
	6 - The hourly potential to emit is the sum of emissions from gas production unit heaters, line heaters, engine, storage tanks, enclosed combustors, and fugitives. Does not include emissions from loading (see footnote 5). The total TPY PTE is the sum of all emissions. PM 10 TPY is the sum of uncontrolled hauling and other PM10 sources.

**Table 3**

**Permits Summary  
Corder East Well Pad  
Harrison County, West Virginia  
Antero Resources Corporation**

Pollutant		Emissions		Threshold Exceeded?		
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	11.0888	3.8674	6	<b>Yes</b>	
	tons/yr	48.6801	17.0505	10	<b>Yes</b>	<b>Yes</b>
NO <sub>x</sub>	lbs/hr	2.9453	2.9734	6		
	tons/yr	12.9003	13.0234	10	<b>Yes</b>	<b>Yes</b>
CO	lbs/hr	2.4740	2.4976	6		
	tons/yr	10.8362	10.9397	10	<b>Yes</b>	<b>Yes</b>
SO <sub>2</sub>	lbs/hr	0.0177	0.0177	6		
	tons/yr	0.0774	0.0775	10		
PM <sub>2.5</sub>	lbs/hr	0.2238	0.2254	6		
	tons/yr	0.9804	0.9874	10		
PM <sub>10</sub>	lbs/hr	5.4868	2.8574	6		
	tons/yr	2.5450	1.7721	10		
Lead	lbs/hr	1.47E-05	1.49E-05	6		
	tons/yr	6.45E-05	6.51E-05	10		
Total HAPs	lbs/hr	1.2738	0.3065	2		
	tons/yr	5.5803	1.3438	5	<b>Yes</b>	
Total TAPs	lbs/hr	0.0038	0.0037	1.14		
n-Hexane	lbs/hr	1.1554	0.1969			
	tons/yr	5.0619	0.8635			
Toluene	lbs/hr	0.0142	0.0130			
	tons/yr	0.0621	0.0571			
Ethylbenzene	lbs/hr	0.0286	0.0264			
	tons/yr	0.1251	0.1157			
Xylenes	lbs/hr	0.0717	0.0665			
	tons/yr	0.3143	0.2912			
Benzene	lbs/hr	0.0016	0.0015			
	tons/yr	0.0071	0.0065			

<b>Enter any notes here:</b>	<p>1. Emissions are based on 98% Enclosed Combustor DRE operating 100% of the time.</p> <p>2. Please see Attachment J - Fugitive Emissions Data Summary Sheet and Attachment T - Emission Points Summary Sheet for sitewide sources and breakdown of emission quantities.</p>
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Table 4

Fugitive Emissions  
 Corder East Well Pad  
 Harrison County, West Virginia  
 Antero Resources Corporation

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

Gas Weight Fraction From Analysis:	VOC frac	0.077
	Benzene frac	0.000
	Toluene	0.000
	Ethylbenzene	0.000
	Xylenes	0.000
	n-Hexane	0.008
	HAPs	0.008
	Methane	0.759

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
550	Valves	Gas VOC	0.004500	0.19	3,662.76
		Non VOC	0.004500	2.28	44,035.44
		HAPs	0.004500	0.02	403.96
		CO2e	0.004500	46.96	905,004.69
649	Connectors	VOC	0.000200	0.01	192.09
		Non-VOC	0.000200	0.12	2,309.41
		HAPs	0.000200	0.00	21.19
		CO2e	0.000200	2.46	47,462.47
143	Flanges	VOC	0.000390	0.00	82.53
		Non-VOC	0.000390	0.05	992.27
		HAPs	0.000390	0.00	9.10
		CO2e	0.000390	1.058155	20392.772458
<b>Total VOCs:</b>				0.20	3937.39
<b>Total THC:</b>				2.66	51274.51

Light Liquid Weight Fraction From Analysis:	VOC frac	0.977
	Benzene frac	0.000
	Toluene	0.004
	Ethylbenzene	0.008
	Xylenes	0.021
	n-hexane	0.023
	HAPs	0.057
	Methane	0.008

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
572	Valves	Light Liquid VOC	0.002500	1.40	26,934.32
		Light Liquid Non-VOC	0.002500	0.03	624.64
		Light Liquid HAPs	0.002500	0.08	1,559.29
		CO2e	0.002500	0.28	5338.28
<b>Total VOC:</b>				1.40	26,934.32
<b>Total THC:</b>				1.43	27,558.96

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	30,871.71	3.52	15.44
Ethylbenzene		0.03	0.12
Toluene		0.01	0.06
Xylenes		0.07	0.29
n-Hexane		0.12	0.53
TAPs (Benzene)		0.00	0.01
HAPs		0.23	1.00
CO <sub>2e</sub>	978,198.22	111.67	489.10

<b>Enter Notes Here:</b>	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  
Corder East Well Pad  
Harrison County, West Virginia  
Antero Resources Corporation**

Number of PCVs	33
Bleed Rate (scf/day/PCV)	6.6
Total Bleed Rate (scf/day)	217.8

Component	Mol%	Molecular Weight (lb/lb-mole)	Component Flow (scf/day)	Component Moles (lb-moles)	Component Emissions		
					(lbs/day)	(lbs/hr)	(tons/year)
H2S	0.00E+00	34.08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.3975	14.01	0.865755	2.28E-03	0.03	1.33E-03	0.01
Carbon Dioxide	0.107	44.01	0.233046	6.14E-04	0.03	1.13E-03	4.93E-03
Methane	86.7515	16.04	188.944767	0.50	7.99	0.33	1.46
Ethane	10.0159	30.07	21.8146302	0.06	1.73	0.07	0.32
Propane	1.7799	44.1	3.8766222	0.01	0.45	0.02	0.08
Isobutane	0.2315	58.12	0.504207	1.33E-03	0.08	0.00	0.01
n-Butane	0.3278	58.12	0.7139484	1.88E-03	0.11	0.00	0.02
Isopentane	0.1218	72.15	0.2652804	6.99E-04	0.05	2.10E-03	0.01
n-Pentane	0.076	72.15	0.165528	4.36E-04	0.03	1.31E-03	0.01
2-Methylpentane	0.00E+00	86.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3-Methylpentane	0.00E+00	86.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
n-Hexane	0.1802	86.18	0.3924756	1.03E-03	0.09	0.00	0.02
Methylcyclopentane	0.00E+00	84.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	0.00E+00	78.11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylhexane	0.00E+00	100.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3-Methylhexane	0.00E+00	100.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptane	0.00E+00	100.21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methylcyclohexane	0.00E+00	98.186	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	0.00E+00	92.14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Octane	0.00E+00	114.23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	0.00E+00	106.17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
m & p-Xylene	0.00E+00	106.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
o-Xylene	0.00E+00	106.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nonane	0.00E+00	128.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C10+	0.00E+00	174.28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	lb/hr	tpy
VOC Emissions	0.0337	0.1475
Benzene Emissions	0.00E+00	0.00E+00
Toluene Emissions	0.00E+00	0.00E+00
Ethylbenzene Emissions	0.00E+00	0.00E+00
Xylene Emissions	0.00E+00	0.00E+00
n-Hexane Emissions	0.0037	0.0163
HAPs Emissions	0.0037	0.0163
TAPs Emissions	0.00E+00	0.00E+00
CO <sub>2e</sub> emissions	8.3203	36.4428

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

Table 6

**Uncontrolled Flashing Emissions**  
**Corder East Well Pad**  
**Harrison County, West Virginia**  
**Antero Resources Corporation**

# Hours Operational	8760
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	Condensate Tank Flashing Losses			Produced Water Tank Flashing Losses		
	Vapor Mass Fraction wt%	Flashing Losses		Vapor Mass Fraction wt%	Flashing Losses	
		lbs/hr	tpy		lbs/hr	tpy
Water	0.3078	0.0444	0.1943	2.9293	0.0897	0.3928
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0776	0.0112	0.0490	0.3002	0.0092	0.0403
Carbon Dioxide	0.3800	0.0548	0.2399	2.1390	0.0655	0.2868
Methane	26.2640	3.7854	16.5799	71.4498	2.1875	9.5814
Ethane	29.4398	4.2431	18.5847	16.7602	0.5131	2.2475
Propane	18.6203	2.6837	11.7546	4.6849	0.1434	0.6282
Isobutane	4.5590	0.6571	2.8780	0.2760	0.0084	0.0370
n-Butane	7.0723	1.0193	4.4646	0.8127	0.0249	0.1090
Isopentane	3.6221	0.5220	2.2865	0.2509	0.0077	0.0336
n-Pentane	2.3334	0.3363	1.4731	0.1531	0.0047	0.0205
2-Methylpentane	0.0181	0.0026	0.0114	0.0005	0.0000	0.0001
3-Methylpentane	0.0128	0.0018	0.0081	0.0010	0.0000	0.0001
n-Hexane	6.6867	0.9637	4.2212	0.1575	0.0048	0.0211
Methylcyclopentane	0.0028	0.0004	0.0018	0.0006	0.0000	0.0001
Benzene	0.0007	0.0001	0.0005	0.0009	0.0000	0.0001
2-Methylhexane	0.0234	0.0034	0.0148	0.0006	0.0000	0.0001
3-Methylhexane	0.0196	0.0028	0.0124	0.0005	0.0000	0.0001
Heptane	0.0392	0.0057	0.0247	0.0011	0.0000	0.0001
Methylcyclohexane	0.0242	0.0035	0.0153	0.0036	0.0001	0.0005
Toluene	0.0063	0.0009	0.0040	0.0077	0.0002	0.0010
Octane	0.1204	0.0174	0.0760	0.0020	0.0001	0.0003
Ethylbenzene	0.0117	0.0017	0.0074	0.0141	0.0004	0.0019
m & p-Xylene	0.0096	0.0014	0.0061	0.0114	0.0004	0.0015
o-Xylene	0.0191	0.0028	0.0121	0.0234	0.0007	0.0031
Nonane	0.1033	0.0149	0.0652	0.0027	0.0001	0.0004
C10+	0.2256	0.0325	0.1424	0.0161	0.0005	0.0022
Total VOCs	43.531	6.27	27.5	6.422	0.1966	0.8611
Total CO <sub>2e</sub>		94.69	414.7		54.75	239.8
Total TAPs (Benzene)		0.0001	0.0005		0.0000	0.0001
Toluene		0.0009	0.0040		0.0002	0.0010
Ethylbenzene		0.0017	0.0074		0.0004	0.0019
Xylenes		0.0041	0.0181		0.0011	0.0047
n-Hexane		0.964	4.221		0.0048	0.0211
Total HAPs		0.971	4.251		0.0066	0.0288
Total	100.00	14.41	63.1	100.00	3.062	13.41

Enter any notes here:	Vapor mass fractions and Flashing losses from Promax output
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Table 7

**Uncontrolled Working and Breathing Losses**  
**Corder East Well Pad**  
**Harrison County, West Virginia**  
**Antero Resources Corporation**

Condensate Tank Information	
Number of Tanks	7
Maximum Working Losses (lbs/hr)	0.5977
Maximum Breathing Losses (lbs/hr)	1.3163
# Hours Operational	8760

	Condensate Tank W/B Losses						
	Vapor Mass Fraction wt%	Working Losses		Breathing Losses		Max W/B Losses	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
H2S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0052	3.09E-05	1.35E-04	0.0001	0.0003	0.0001	0.0004
Carbon Dioxide	0.6786	0.0041	0.0178	0.0089	0.0391	0.0130	0.0569
Methane	7.4393	0.0445	0.1948	0.0979	0.4289	0.1424	0.6237
Ethane	44.9416	0.2686	1.1765	0.5916	2.5912	0.8602	3.7677
Propane	24.6583	0.1474	0.6455	0.3246	1.4217	0.4720	2.0672
Isobutane	5.6782	0.0339	0.1486	0.0747	0.3274	0.1087	0.4760
n-Butane	8.6859	0.0519	0.2274	0.1143	0.5008	0.1663	0.7282
Isopentane	4.2264	0.0253	0.1106	0.0556	0.2437	0.0809	0.3543
n-Pentane	2.6823	0.0160	0.0702	0.0353	0.1547	0.0513	0.2249
2-Methylpentane	0.0200	0.0001	0.0005	0.0003	0.0012	0.0004	0.0017
3-Methylpentane	0.0142	0.0001	0.0004	0.0002	0.0008	0.0003	0.0012
n-Hexane	0.5024	0.0030	0.0132	0.0066	0.0290	0.0096	0.0421
Methylcyclopentane	0.0030	0.0000	0.0001	0.0000	0.0002	0.0001	0.0002
Benzene	0.0000	2.96E-07	0.0000	0.0000	0.0000	0.0000	0.0000
2-Methylhexane	0.0017	1.01E-05	0.0000	0.0000	0.0001	0.0000	0.0001
3-Methylhexane	0.0214	0.0001	0.0006	0.0003	0.0012	0.0004	0.0018
Heptane	0.0396	0.0002	0.0010	0.0005	0.0023	0.0008	0.0033
Methylcyclohexane	0.0246	0.0001	0.0006	0.0003	0.0014	0.0005	0.0021
Toluene	0.0009	5.53E-06	2.42E-05	0.0000	0.0001	0.0000	0.0001
Octane	0.1139	0.0007	0.0030	0.0015	0.0066	0.0022	0.0096
Ethylbenzene	0.0031	1.86E-05	8.14E-05	0.0000	0.0002	0.0001	0.0003
m & p-Xylene	0.0033	1.96E-05	8.60E-05	0.0000	0.0002	0.0001	0.0003
o-Xylene	0.0057	3.39E-05	0.0001	0.0001	0.0003	0.0001	0.0005
Nonane	0.0869	0.0005	0.0023	0.0011	0.0050	0.0017	0.0073
C10+	0.1632	9.76E-04	0.0043	0.0021	0.0094	0.0031	0.0137
Total VOCs	46.935	0.2805	1.229	0.6178	2.7061	0.8984	3.935
Total CO <sub>2e</sub>		1.1156	4.8865	2.4571	10.7622	3.5728	15.649
Total TAPs (Benzene)		2.96E-07	1.30E-06	0.0000	0.0000	0.0000	0.0000
Toluene		5.53E-06	2.42E-05	0.0000	0.0001	0.0000	0.0001
Ethylbenzene		1.86E-05	8.14E-05	0.0000	0.0002	0.0001	0.0003
Xylenes		5.35E-05	0.0002	0.0001	0.0005	0.0002	0.0008
n-Hexane		0.0030	0.0132	0.0066	0.0290	0.0096	0.0421
Total HAPs		0.0031	0.0135	0.0068	0.0297	0.0099	0.0432
Total	100.00	0.5977	2.6178	1.3163	5.7656	1.9140	8.383



Table 7

## Uncontrolled Working and Breathing Losses

Corder East Well Pad  
Harrison County, West Virginia  
Antero Resources Corporation

Produced Water Tank Information	
Number of Tanks	2
Maximum Working Losses (lbs/hr)	0.0395
Maximum Breathing Losses (lbs/hr)	0.0082

	Produced Water Tank W/B Losses						
	Vapor Mass Fraction wt%	Working Losses		Breathing Losses		Max W/B Losses	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
H2S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0054	2.15E-06	9.40E-06	4.45E-07	1.95E-06	2.59E-06	1.14E-05
Carbon Dioxide	2.6078	0.0010	0.0045	0.0002	0.0009	0.0012	0.0055
Methane	3.5920	0.0014	0.0062	0.0003	0.0013	0.0017	0.0075
Ethane	0.7779	0.0003	0.0013	0.0001	0.0003	0.0004	0.0016
Propane	0.0530	2.10E-05	0.0001	4.34E-06	1.90E-05	2.53E-05	0.0001
Isobutane	0.0004	1.55E-07	6.77E-07	3.20E-08	1.40E-07	1.87E-07	8.18E-07
n-Butane	0.0017	6.85E-07	3.00E-06	1.42E-07	6.22E-07	8.27E-07	3.62E-06
Isopentane	0.0001	5.30E-08	2.32E-07	1.10E-08	4.81E-08	6.40E-08	2.80E-07
n-Pentane	0.0001	2.36E-08	1.03E-07	4.89E-09	2.14E-08	2.85E-08	1.25E-07
2-Methylpentane	4.02E-08	1.59E-11	6.97E-11	3.30E-12	1.44E-11	1.92E-11	8.41E-11
3-Methylpentane	1.82E-07	7.21E-11	3.16E-10	1.49E-11	6.55E-11	8.71E-11	3.81E-10
n-Hexane	4.54E-07	1.80E-10	7.87E-10	3.72E-11	1.63E-10	2.17E-10	9.50E-10
Methylcyclopentane	2.45E-07	9.70E-11	4.25E-10	2.01E-11	8.81E-11	1.17E-10	5.13E-10
Benzene	1.12E-06	4.44E-10	1.94E-09	9.20E-11	4.03E-10	5.36E-10	2.35E-09
2-Methylhexane	7.46E-10	2.95E-13	1.29E-12	6.11E-14	2.68E-13	3.56E-13	1.56E-12
3-Methylhexane	9.76E-09	3.86E-12	1.69E-11	7.99E-13	3.50E-12	4.66E-12	2.04E-11
Heptane	1.50E-08	5.93E-12	2.60E-11	1.23E-12	5.38E-12	7.16E-12	3.14E-11
Methylcyclohexane	2.96E-07	1.17E-10	5.13E-10	2.43E-11	1.06E-10	1.41E-10	6.20E-10
Toluene	4.42E-06	1.75E-09	7.66E-09	3.63E-10	1.59E-09	2.11E-09	9.25E-09
Octane	5.33E-09	2.11E-12	9.23E-12	4.37E-13	1.91E-12	2.54E-12	1.11E-11
Ethylbenzene	4.56E-06	1.80E-09	7.90E-09	3.74E-10	1.64E-09	2.18E-09	9.53E-09
m & p-Xylene	4.13E-06	1.63E-09	7.14E-09	3.38E-10	1.48E-09	1.97E-09	8.62E-09
o-Xylene	8.82E-06	3.49E-09	1.53E-08	7.23E-10	3.17E-09	4.21E-09	1.84E-08
Nonane	3.36E-09	1.33E-12	5.82E-12	2.76E-13	1.21E-12	1.60E-12	7.03E-12
C10+	3.94E-09	1.56E-12	6.82E-12	3.23E-13	1.41E-12	1.88E-12	8.24E-12
Total VOCs	0.0554	2.19E-05	0.0001	4.54E-06	1.99E-05	2.64E-05	0.0001
Total CO <sub>2e</sub>		0.0365	0.1600	0.0076	0.0332	0.0441	0.1932
Total TAPs (Benzene)		4.44E-10	1.94E-09	9.20E-11	4.03E-10	5.36E-10	2.35E-09
Toluene		1.75E-09	7.66E-09	3.63E-10	1.59E-09	2.11E-09	9.25E-09
Ethylbenzene		1.80E-09	7.90E-09	3.74E-10	1.64E-09	2.18E-09	9.53E-09
Xylenes		5.12E-09	2.24E-08	1.06E-09	4.65E-09	6.18E-09	2.71E-08
n-Hexane		1.80E-10	7.87E-10	3.72E-11	1.63E-10	2.17E-10	9.50E-10
Total HAPs		9.30E-09	4.07E-08	1.93E-09	8.44E-09	1.12E-08	4.92E-08
Total	100.00	0.0395	0.1731	0.0082	0.0359	0.0477	0.2090

Enter any notes here:	Vapor mass fractions, working losses and breathing losses from Promax output
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Table 8

**Loading Emissions**  
**Corder East Well Pad**  
**Harrison County, West Virginia**  
**Antero Resources Corporation**

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	2.51	1.0209
Annual Average Temp (F)	65.076213	65.076213
S (saturation factor)	0.6	0.6
P (true vapor pressure)	1.25	0.37
M (MW of vapor)	34.65	18.28
Collection Efficiency (%)	0.00	0.00
Loading Loss (lb/10 <sup>3</sup> gal)*	0.62	0.10
Maximum Throughput (gallons/hr)**	10,080	10,080
Average Throughput (gallons/yr)	766,500	9,198,000
Loading Emissions (lbs/hr)	6.22	0.97
Loading Emissions (tpy)	0.24	0.44

	Condensate Tank Loading Losses			Produced Water Tank Loading Losses		
	Vapor Mass Fraction wt%	Loading Losses lbs/hr	Loading Losses tpy	Vapor Mass Fraction wt%	Loading Losses lbs/hr	Loading Losses tpy
H2S	0.0000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0052	3.22E-04	1.22E-05	0.0054	5.29E-05	2.41E-05
Carbon Dioxide	0.6786	0.0422	1.60E-03	2.6078	2.54E-02	1.16E-02
Methane	7.4393	0.4627	1.76E-02	3.5920	3.50E-02	1.60E-02
Ethane	44.9416	2.7952	0.1063	0.7779	7.58E-03	3.46E-03
Propane	24.6583	1.5336	5.83E-02	0.0530	5.17E-04	2.36E-04
Isobutane	5.6782	0.3532	1.34E-02	0.0004	3.81E-06	1.74E-06
n-Butane	8.6859	0.5402	2.05E-02	0.0017	1.69E-05	7.71E-06
Isopentane	4.2264	0.2629	9.99E-03	0.0001	1.31E-06	5.96E-07
n-Pentane	2.6823	0.1668	6.34E-03	0.0001	5.82E-07	2.65E-07
2-Methylpentane	0.0200	0.0012	4.74E-05	4.02E-08	3.92E-10	1.79E-10
3-Methylpentane	0.0142	0.0009	3.35E-05	1.82E-07	1.78E-09	8.11E-10
n-Hexane	0.5024	0.0312	1.19E-03	4.54E-07	4.43E-09	2.02E-09
Methylcyclopentane	0.0030	0.0002	7.04E-06	2.45E-07	2.39E-09	1.09E-09
Benzene	0.0000	0.0000	1.17E-07	0.0000	1.09E-08	4.99E-09
2-Methylhexane	0.0017	0.0001	4.01E-06	7.46E-10	7.27E-12	3.32E-12
3-Methylhexane	0.0214	0.0013	5.07E-05	9.76E-09	9.51E-11	4.34E-11
Heptane	0.0396	0.0025	9.36E-05	1.50E-08	1.46E-10	6.67E-11
Methylcyclohexane	0.0246	0.0015	5.82E-05	2.96E-07	2.89E-09	1.32E-09
Toluene	0.0009	0.0001	2.19E-06	0.0000	4.31E-08	1.97E-08
Octane	0.1139	0.0071	2.69E-04	5.33E-09	5.19E-11	2.37E-11
Ethylbenzene	0.0031	0.0002	7.36E-06	4.56E-06	4.44E-08	2.03E-08
m & p-Xylene	0.0033	0.0002	7.77E-06	4.13E-06	4.02E-08	1.83E-08
o-Xylene	0.0057	0.0004	1.34E-05	8.82E-06	8.60E-08	3.92E-08
Nonane	0.0869	0.0054	2.06E-04	3.36E-09	3.28E-11	1.50E-11
C10+	0.1632	0.0102	3.86E-04	3.94E-09	3.84E-11	1.75E-11
Total VOCs	46.9350	2.9191	0.1110	0.0554	5.39E-04	2.46E-04
Total CO <sub>2e</sub>		11.6095	0.4414		0.9004	0.4108
Total TAPs (Benzene)		0.0000	1.17E-07		1.09E-08	4.99E-09
Toluene		0.0001	2.19E-06		4.31E-08	1.97E-08
Ethylbenzene		0.0002	7.36E-06		4.44E-08	2.03E-08
Xylenes		0.0006	2.12E-05		1.26E-07	5.76E-08
n-Hexane		0.0312	1.19E-03		4.43E-09	2.02E-09
Total HAPs		0.0321	1.22E-03		2.29E-07	1.05E-07
Total	100.0000	6.2195	0.2365	100.0000	0.9744	0.4445

**Enter any notes here**

Vapor mass fractions and loading losses from Promax output

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

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

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

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

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

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

Loading emissions are vented to the atmosphere.

Table 9

**Gas Production Unit Heater and Line Heater Emissions  
Corder East Well Pad  
Harrison County, West Virginia  
Antero Resources Corporation**

**Gas Production Unit Heater Emissions**

Number of Units	11
GPU Heater Rating (MMBtu/hr)	1.00
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,120

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	0.982	4.300
CO	84	0.825	3.612
CO <sub>2</sub>	120,000	1178.109	5160.116
Lead	0.0005	4.91E-06	2.15E-05
N <sub>2</sub> O	2.2	0.022	0.095
PM (Total)	7.6	0.075	0.327
SO <sub>2</sub>	0.6	0.006	0.026
TOC	11	0.108	0.473
Methane	2.3	0.023	0.099
VOC	5.5	0.054	0.237
<b>HAPS</b>			
2-Methylnaphthalene	2.40E-05	2.36E-07	1.03E-06
Benzene	2.10E-03	2.06E-05	9.03E-05
Dichlorobenzene	1.20E-03	1.18E-05	5.16E-05
Fluoranthene	3.00E-06	2.95E-08	1.29E-07
Fluorene	2.80E-06	2.75E-08	1.20E-07
Formaldehyde	7.50E-02	7.36E-04	3.23E-03
Hexane	1.80E+00	1.77E-02	7.74E-02
Naphthalene	6.10E-04	5.99E-06	2.62E-05
Phenanathrene	1.70E-05	1.67E-07	7.31E-07
Toluene	3.40E-03	3.34E-05	1.46E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.162	0.710
TOTAL Uncontrolled HAPS	0.055	0.243
TOTAL Uncontrolled TAPs (Benzene)	6.19E-05	2.71E-04
TOTAL Uncontrolled Toluene	1.00E-04	4.39E-04
TOTAL Uncontrolled Hexane	5.30E-02	2.32E-01
TOTAL Uncontrolled TAPs (Formaldehyde)	2.21E-03	9.68E-03
TOTAL CO <sub>2e</sub> Emissions	3,555.33	15,572.34

**Enter any notes here:**

All Emission Factors based off AP-42 Sec 1.4 Natural Gas Combustion

**Line Heater Emissions**

Number of Units	11
Line Heater Rating (MMBtu/hr)	2.00
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,120

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.964	8.600
CO	84	1.649	7.224
CO <sub>2</sub>	120,000	2356.217	10320.231
Lead	0.0005	9.82E-06	4.30E-05
N <sub>2</sub> O	2.2	0.043	0.189
PM (Total)	7.6	0.149	0.654
SO <sub>2</sub>	0.6	0.012	0.052
TOC	11	0.216	0.946
Methane	2.3	0.045	0.198
VOC	5.5	0.108	0.473
<b>HAPS</b>			
2-Methylnaphthalene	2.40E-05	4.71E-07	2.06E-06
Benzene	2.10E-03	4.12E-05	1.81E-04
Dichlorobenzene	1.20E-03	2.36E-05	1.03E-04
Fluoranthene	3.00E-06	5.89E-08	2.58E-07
Fluorene	2.80E-06	5.50E-08	2.41E-07
Formaldehyde	7.50E-02	1.47E-03	6.45E-03
Hexane	1.80E+00	3.53E-02	1.55E-01
Naphthalene	6.10E-04	1.20E-05	5.25E-05
Phenanathrene	1.70E-05	3.34E-07	1.46E-06
Toluene	3.40E-03	6.68E-05	2.92E-04

Table 10

**Enclosed Combustor Emissions  
Corder East Well Pad  
Harrison County, West Virginia  
Antero Resources Corporation**

General Information	
Unit Name:	EC001, EC002, EC003

Pollutant	Emission Factor (lb/MMscf)
NOx	100
CO	84
PM10	7.6
PM2.5	5.7
SO <sub>2</sub>	0.6
CO <sub>2</sub>	120,000
VOC	5.5
benzene	2.10E-03
Hexane	1.80E+00
Toluene	3.40E-03
Formaldehyde	7.50E-02
N <sub>2</sub> O	2.20
Lead	5.00E-04

Constants	
Btu/MMBtu	1,000,000
scf/MMscf	1,000,000
lb/ton	2,000
H <sub>2</sub> S molecular weight	34.08
SO <sub>2</sub> molecular weight	64.06
seconds/hour	3,600
inches/ft	12

Destruction Efficiency	
VOC percent destruction efficiency (%)	98
H <sub>2</sub> S percent destruction efficiency (%)	98

Enclosed Combustor operating hours	8760
No. of Enclosed Combustors	3

Stream Information							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed/Vapor Combustor (Enter Name of Each Stream Here)	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
Maximum Expected Hourly Volumetric Flow Rate of Stream (scf/hr)	37.8	--	157.85	63.56	20.96	0.99	281.16
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	331,128.00	--	1,382,735.89	556,782.20	183,629.38	8,678.66	2,462,954.13
Heating Content (Btu/ft3)	1,120		1,700.04	1,091.40	1,997.16	97.74	1,350.40

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	-	-	6.274	0.197	0.898	0.000	7.37
Benzene	-	-	0.000	0.000	0.000	0.000	0.000
Toluene	-	-	0.001	0.000	0.000	0.000	0.001
Ethylbenzene	-	-	0.002	0.000	0.000	0.000	0.002
Xylenes	-	-	0.004	0.001	0.000	0.000	0.005
n-Hexane	-	-	0.964	0.005	0.010	0.000	0.978
HAPs	-	-	0.971	0.007	0.010	0.000	0.987
Total Mass Flow	-	-	14.413	3.062	1.914	0.048	19.436
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	-	-	27.480	0.861	3.935	0.000	32.276
Benzene	-	-	0.000	0.000	0.000	0.000	0.001
Toluene	-	-	0.004	0.001	0.000	0.000	0.005
Ethylbenzene	-	-	0.007	0.002	0.000	0.000	0.010
Xylenes	-	-	0.018	0.005	0.001	0.000	0.024
n-Hexane	-	-	4.221	0.021	0.042	0.000	4.284
HAP	-	-	4.251	0.029	0.043	0.000	4.323
Total Mass Flow	-	-	63.128	13.410	8.383	0.209	85.130

Table 10

**Enclosed Combustor Emissions  
Corder East Well Pad  
Harrison 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	0.004	-	0.016	0.006	0.002	0.000	0.03
CO	0.003	-	0.013	0.005	0.002	0.000	0.02
PM2.5	0.000	-	0.001	0.000	0.000	0.000	0.00
PM10	0.000	-	0.001	0.000	0.000	0.000	0.00
H2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO <sub>2</sub>	0.000	-	0.000	0.000	0.000	0.000	0.00
CO <sub>2</sub>	4.536	-	-	-	-	-	4.54
Total VOC	0.000	-	0.125	0.004	0.018	0.000	0.15
Benzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.000	0.000	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.000	0.000	0.000	0.000	0.00
n-Hexane	0.000	-	0.019	0.000	0.000	0.000	0.02
HAP	0.000	-	0.019	0.000	0.000	0.000	0.02
N <sub>2</sub> O	0.000	-	0.000	0.000	0.000	0.000	0.00
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00
Annual (tpy)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.017	-	0.069	0.028	0.009	0.000	0.12
CO	0.014	-	0.058	0.023	0.008	0.000	0.10
PM2.5	0.001	-	0.004	0.002	0.001	0.000	0.01
PM10	0.001	-	0.005	0.002	0.001	0.000	0.01
H <sub>2</sub> S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO <sub>2</sub>	0.000	-	0.000	0.000	0.000	0.000	0.00
CO <sub>2</sub>	19.868	-	-	-	-	-	19.87
Total VOC	0.001	-	0.550	0.017	0.079	0.000	0.65
Benzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.000	0.000	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.000	0.000	0.000	0.000	0.00
n-Hexane	0.000	-	0.084	0.000	0.001	0.000	0.09
HAP	0.000	-	0.085	0.001	0.001	0.000	0.09
N <sub>2</sub> O	0.000	-	0.002	0.001	0.000	0.000	0.00
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00

Enclosed Combustor/Vapor Combustor Total Emissions		
	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Total VOC	0.15	0.65
NOx	0.028	0.123
CO	0.024	0.103
PM2.5	0.002	0.007
PM10	0.002	0.009
H <sub>2</sub> S	1.21E-05	5.28E-05
SO <sub>2</sub>	2.27E-05	9.93E-05
Benzene (TAPs)	2.78E-06	1.22E-05
Toluene	2.35E-05	0.000
Ethylbenzene	4.36E-05	0.000
Xylenes	0.000	0.000
Hexanes	0.020	0.086
Formaldehyde (TAPs)	2.84E-06	1.24E-05
HAPs	0.02	0.09
CO <sub>2</sub> e	58.92	258.09
N <sub>2</sub> O	0.001	0.003
Lead	1.41E-07	6.16E-07

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

Table 11

**Enclosed Combustor GHG Emissions  
Corder East Well Pad  
Harrison County, West Virginia  
Antero Resources Corporation**

**Enclosed Combustor CO<sub>2</sub> and CH<sub>4</sub> Emissions**

Components	Mole fraction of oil flash gas constituents <sup>a</sup>	Volume of oil flash gas sent to Enclosed Combustor scf/year	Mole fraction of water flash gas constituents <sup>a</sup>	Volume of water flash gas sent to Enclosed Combustor scf/year	Mole fraction of oil tank vapors constituents <sup>a</sup>	Volume of oil tank vapor sent to Enclosed Combustor scf/year	Mole fraction of water tank vapors constituents <sup>a</sup>	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 <sub>2</sub> Volume <sup>b</sup> scf/year	Uncombusted CO <sub>2</sub> and CH <sub>4</sub> Volume <sup>b</sup> scf/year	Volume GHGs Emitted scf/year
CO <sub>2</sub>	0.003	1,382,736	0.0090	556,782	0.0053	183,629	0.011	8,679	9,582	1	0	--	9,582	3,632,749
Methane	0.477	1,382,736	0.8283	556,782	0.1607	183,629	0.041	8,679	1,150,111	1	0.98	1,127,109	23,002	23,002
Ethane	0.285	1,382,736	0.1036	556,782	0.5179	183,629	0.005	8,679	546,901	2	0.98	1,071,926	--	
Propane	0.123	1,382,736	0.0198	556,782	0.1938	183,629	0.000	8,679	216,525	3	0.98	636,585	--	
i-Butane	0.023	1,382,736	0.0009	556,782	0.0339	183,629	0.000	8,679	38,280	4	0.98	150,056	--	
n-Butane	0.035	1,382,736	0.0026	556,782	0.0518	183,629	0.000	8,679	59,933	4	0.98	234,939	--	
Pentane	0.024	1,382,736	0.0010	556,782	0.0332	183,629	0.000	8,679	39,895	5	0.98	195,488	--	
Hexane	0.023	1,382,736	0.0003	556,782	0.0022	183,629	0.000	8,679	31,961	6	0.98	187,931	--	
Benzene	0.000	1,382,736	0.0000	556,782	0.0000	183,629	0.000	8,679	5	6	0.98	30	--	
Heptanes	0.000	1,382,736	0.0000	556,782	0.0002	183,629	0.000	8,679	389	7	0.98	2,667	--	
Toluene	0.000	1,382,736	0.0000	556,782	0.0000	183,629	0.000	8,679	37	7	0.98	254	--	
Octane	0.000	1,382,736	0.0000	556,782	0.0004	183,629	0.000	8,679	608	8	0.98	4,770	--	
Ethyl benzene	0.000	1,382,736	0.0000	556,782	0.0000	183,629	0.000	8,679	60	8	0.98	471	--	
Xylenes	0.000	1,382,736	0.0001	556,782	0.0000	183,629	0.000	8,679	148	8	0.98	1,161	--	
Nonane	0.000	1,382,736	0.0000	556,782	0.0002	183,629	0.000	8,679	370	9	0.98	3,260	--	
Decane plus	0.000	1,382,736	0.0000	556,782	0.0004	183,629	0.000	8,679	665	10	0.98	6,519	--	
<b>Subtotal</b>												<b>3,623,166</b>	--	

Pollutant	Volume Emitted scf/year	Density of GHG <sup>c</sup> lb/scf	Conversion Factor lb/ton	GWF	Emissions <sup>c</sup>	
					lbs/hr	(tons/yr)
CO <sub>2</sub>	3,632,749	0.12	2000	1	48.09	210.63
CH <sub>4</sub>	23,002	0.09	2000	25	0.24	1.07
<b>CO<sub>2</sub>e Emissions</b>					<b>54.2</b>	<b>237.38</b>

**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  
Corder East Well Pad  
Harrison 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 <sup>1</sup> (%)	50	50

Tanker Truck Trip Calculation	
Condensate Production (bbl/day)	50
PW Production (bbl/day)	600
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		PM (lbs/VMT)	PM10 (lbs/VMT)
							(miles/hr)	(miles/year)		
Tanker Trucks Condensate	10	40	10	1.5200	1	92	1.5200	139.8400	3.8175	1.7179
Tanker Trucks PW	10	40	10	1.5200	1	1095	1.5200	1664.4000	3.8175	1.7179
Pick Up Truck	4	3	10	0.2600	1	730	0.2600	189.8000	0.3467	0.1560

	Uncontrolled Emissions						Controlled Emissions					
	PM			PM10			PM			PM10		
	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)
Tanker Trucks Condensate	5.8026	533.8433	0.2669	2.6112	240.2295	0.1201	2.9013	266.9217	0.1335	1.3056	120.1147	0.0601
Tanker Trucks PW	5.8026	6353.8959	3.1769	2.6112	2859.2532	1.4296	2.9013	3176.9480	1.5885	1.3056	1429.6266	0.7148
Pick Up Truck	0.0901	65.7998	0.0329	0.0406	29.6099	0.0148	0.0451	32.8999	0.0164	0.0203	14.8050	0.0074
<b>Total Emissions</b>	<b>11.6954</b>	<b>6,953.5390</b>	<b>3.4768</b>	<b>5.2629</b>	<b>3,129.0926</b>	<b>1.5645</b>	<b>5.8477</b>	<b>3,476.7695</b>	<b>1.7384</b>	<b>2.6315</b>	<b>1,564.5463</b>	<b>0.7823</b>

<b>Enter any notes here:</b>	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
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**Table 13**

**Change in Regulated Air Pollutants Emissions  
Corder East Well Pad  
Harrison County, West Virginia  
Antero Resources Corporation**

Pollutant	Potential Emissions		Previous Permit Application Emissions		Change in Emissions	
	Hourly PTE	Yearly PTE	Hourly PTE	Yearly PTE	Hourly PTE	Yearly PTE
<b>PM</b>	6.0737	2.7282	0.8849	0.0878	5.19E+00	2.6404
<b>PM10</b>	2.8574	1.7721	0.4728	0.3663	2.3846	1.4058
<b>VOC (uncontrolled)</b>	11.0888	48.6801	5.6846	24.9377	5.4042	23.7424
<b>CO</b>	2.4976	10.9397	0.8247	3.6121	1.6729	7.3276
<b>NOx</b>	2.9734	13.0234	0.9818	4.3001	1.9916	8.7233
<b>SO2</b>	0.0177	0.0775	0.0059	0.0258	1.18E-02	5.17E-02
<b>Pb</b>	1.49E-05	6.51E-05	4.91E-06	2.15E-05	9.96E-06	4.36E-05
<b>HAPs</b>	0.3065	1.3438	0.3415	1.4960	-0.0350	-0.1522
<b>TAPs</b>	0.0037	0.0162	0.0032	0.0141	4.91E-04	0.0021

Notes:

1. Change in emissions due to the increase in condensate production, change in storage tanks service, and the addition of 11 line heaters, and 3 Cimarron enclosed combustors.
2. Change in permit from G70A to G70C.





Bryan Research & Engineering, Inc.

# ProMax<sup>®</sup> 3.2

with  
TSWEET<sup>®</sup> & PROSIM<sup>®</sup>

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## Simulation Report

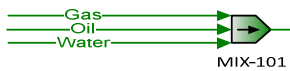
Client Name:	Antero Resources Corporation
Location:	West Virginia
Job:	Corder East Well Pad
Project Name:	PROMAX SCENARIO 3
File Name:	ProMax@C:\Users\lychen1\Documents\Drafts\082715- ANTERO\ProMax Report\1 HP\PROMAX SCENARIO 3.pmx
ProMax Version:	
Report Created:	7/18/2016 10:03

Names	Units	Oil	Water
Std Liquid Volumetric Flow	bbl/d	105#	665.91#

Names	Units	Gas
Std Vapor Volumetric Flow	MMSCFD	267.88#

Properties	HP Separator Gas
Pressure(Total)	198* psig
Temperature(Total)	70* °F

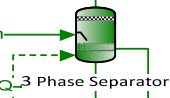
Properties	Total gas to sale
Pressure(Total)	198 psig
Temperature(Total)	70 °F
Std Vapor Volumetric Flow(Total)	268 MMSCFD



Stream Total gas to sale C3+ Mass Flow =1.837E+05 ton/yr

Names	Units	Sales Oil	Produced Water
Std Liquid Volumetric Flow	bbl/d	50	600
Reid Vapor Pressure	psi	5.3397	1.0209

HP Separator Gas



HP Separator Oil

HP Separator Water

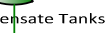
"OT Flash Gas" C3+ Mass Flow =27.48 ton/yr



Oil Tanks: 7

Oil Tank W/B  
Tank loss calculations for "Sales Oil".  
Total working and breathing losses from the Vertical Cylinder are 8.383 ton/yr.

Stream Oil W/B C3+ Mass Flow =3.935 ton/yr



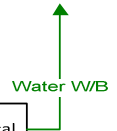
Stream PWT Flash Gas C3+ Mass Flow =0.8611 ton/yr



Water Tanks: 2

Water Tank W/B  
Tank loss calculations for "Produced Water".  
Total working and breathing losses from the Vertical Cylinder are 0.209 ton/yr.

Stream Water W/B C3+ Mass Flow =0.0001157 ton/yr



Process Streams	Phase Total	Status	HP Separator Gas		HP Separator Water		HP Separator Oil		OT Flash Gas		Sales Oil		Gas		Water		Oil		Produced Water		PWT Flash Gas		Oil WB		Water WB		Well Stream		Total Gas to sale								
			Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		
			%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Water			0.181235	99.9644	0.0673830	0.497793	0.0132420	0	100	0	99.9972	3.03000	0.000484254	94.32482749	1.79995	0.181235																					
H2S			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Nitrogen			0.396755	6.98456E-05	0.00913142	0.0807211	0.000216193	0.397543	0	0.013	2.33872E-06	0.199716	0.006396265	0.00354391	0.390263	0.396755																					
Carbon Dioxide			0.106786	0.000745128	0.0330795	0.251551	0.0059805	0.107012	0	0.014	0.000439125	0.905726	0.534283392	1.083136892	0.105055	0.106786																					
Methane			86.5890	0.0300507	5.51788	47.8965	0.212252	86.7610	0	5.372	0.001991347	82.9958	16.06813447	4.092925775	85.1728	86.5890																					
Ethane			9.99826	0.00380226	3.91780	28.5242	0.822578	10.0170	0	5.517	0.000291409	10.3869	51.78821783	0.47288852	9.83523	9.99826																					
Propane			1.77775	0.000730593	2.60537	12.3024	1.38559	1.78009	0	4.82	6.13897E-05	1.97985	19.37621694	0.021975726	1.74904	1.77775																					
Isobutane			0.231415	3.08637E-05	0.851942	2.28520	0.671683	0.231525	0	1.445	9.54859E-07	0.0884841	3.385105446	0.000123012	0.227753	0.231415																					
n-Butane			0.328008	4.42598E-05	1.73112	3.54501	1.50295	0.327836	0	3.282	6.19196E-06	0.260548	5.178131977	0.00054515	0.322896	0.328008																					
Isopentane			0.122026	2.29604E-05	1.59392	1.46260	1.61044	0.121813	0	2.1	1.05556E-06	0.0648047	2.029731309	0.39863E-05	0.122026	0.122026																					
n-Pentane			0.0763582	1.40025E-05	1.33775	0.942249	1.38751	0.0760083	0	2.123	6.37806E-07	0.0395390	1.288193564	1.51252E-05	0.0763582	0.0763582																					
2-Methylpentane			0.000485818	4.03950E-08	0.0199098	0.00612319	0.0216440	0	1.478	8.97874E-10	0.000116850	0.008058186	8.53757E-09	0.000485818	0.000485818																						
3-Methylpentane			0.000341928	7.83963E-08	0.0156746	0.00432493	0.0171023	0	1.041	4.54446E-09	0.000218460	0.005689902	3.86993E-08	0.000341928	0.000341928																						
n-Hexane			0.179299	1.17217E-05	10.1483	2.26061	11.1405	0.180220	0	2.91	2.08136E-07	0.0340623	0.020215117	0.179299	0.179299																						
Methylcyclopentane			7.56937E-05	5.60522E-08	0.00467664	0.000974303	0.00514236	0	0.231	8.75713E-09	0.000139928	0.00122539	5.3301E-08	7.56937E-05	7.56937E-05																						
Benzene			2.09494E-05	7.75971E-07	0.00135860	0.00149522	0.0261	0.00022484	0	0.064	7.00328E-07	0.00022484	2.19826E-05	2.09494E-05	2.09494E-05																						
2-Methylhexane			0.000549936	3.91757E-08	0.0730298	0.00680496	0.0813602	0	1.696	7.39219E-10	0.000113712	0.000586635	1.36121E-10	0.000549936	0.000549936																						
3-Methylhexane			0.000459965	3.42076E-08	0.0643159	0.00566959	0.0716896	0	1.42	6.74009E-09	9.92071E-05	0.007411913	1.77987E-09	0.000459965	0.000459965																						
Heptane			0.000932394	7.16547E-08	0.162347	0.0113983	0.181334	0	2.893	1.41981E-09	0.00027786	0.013688854	2.73222E-09	0.000932394	0.000932394																						
Methylcyclohexane			0.000571845	2.57372E-07	0.101083	0.00716834	0.112896	0	1.775	2.80973E-08	0.000678319	0.006841155	5.51956E-08	0.000571845	0.000571845																						
Toluene			0.000158164	4.54617E-06	0.0364078	0.00200555	0.0407352	0	0.945	4.02073E-06	0.00155848	0.00034825	8.77846E-07	0.000158164	0.000158164																						
Oxane			0.00260542	1.13806E-07	1.38043	0.0307155	1.55201	0	8.505	1.49856E-09	0.000322554	0.034556616	8.53166E-10	0.00260542	0.00260542																						
Ethylbenzene			0.000264726	6.62072E-06	0.170011	0.00321851	0.190992	0	0.878	5.78495E-06	0.00247829	0.001015262	7.85331E-07	0.000264726	0.000264726																						
m-Xylene			0.000217664	5.53028E-06	0.166384	0.00263548	0.186982	0	0.734	4.85313E-06	0.00200817	0.001071827	7.1045E-07	0.000217664	0.000217664																						
o-Xylene			0.000432080	1.48050E-05	0.371593	0.00523850	0.417676	0	1.476	1.34210E-05	0.00410787	0.001851623	1.51944E-06	0.000432080	0.000432080																						
Nonane			0.00207038	1.36797E-07	3.16316	0.0224663	3.55810	0	7.697	2.84370E-09	0.000396269	0.023484016	4.79319E-10	0.00207038	0.00207038																						
C10+			0.00391363	6.71485E-07	66.4559	0.0411297	74.8102	0	42.021	3.73023E-08	0.00187622	0.035394697	4.50712E-10	0.00391363	0.00391363																						
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	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	lbmol/h	lbmol/h	
Water			53.4126	485.885	0.00298340	0.00246261	0.000520784	0	539.300	0	485.880	0.00497817	2.67497E-07	0.002462541	539.300	53.4126																					
H2S			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Nitrogen			116.930	0.000339490	0.000404296	0.000399333	4.96295E-06	116.929	0	0.00126710	1.13637E-05	0.000328126	5.3324E-06	9.2521E-08	116.930	116.930																					
Carbon Dioxide			31.4716	0.00362175	0.0146460	0.00124444	0.000220161	31.4753	0	0.00136457	0.00213368	0.00148807	0.000295133	2.82775E-05	31.4716	31.4716																					
Methane			25519.1	0.146064	0.244306	0.00934750	25519.0	0	0.523606	0.00979459	0.136359	0.008875894	0.000106854	25519.1	25519.1																						
Ethane			2946.64	0.0184812	0.173462	0.0141111	0.0323505	2946.30	0	0.537739	0.00141594	0.0170652	0.02860735	1.23452E-05	2946.64	2946.64																					
Propane			523.930	0.00355111	0.115353	0.00680608	0.0544927	523.579	0	0.469803	0.000298288	0.00325822	0.010703249	5.73721E-07	523.930	523.930																					
Isobutane			66.2014	0.000150015	0.0377199	0.00113051	0.0264149	66.6985	0	0.140843	4.63900E-06	0.000145376	0.001869902	3.21147E-09	66.2014	66.2014																					
n-Butane			96.6690	0.000458157	0.0766458	0.00157374	0.319895	96.4262	0	0.319																											

Ethylbenzene	0.00151825	3.90154E-05	0.140293	0.0117284	0.143630	0	0	0.820478	3.40908E-05	0.0141191	0.00310696	4.56111E-06	0.00163737	0.00151825					
m-Xylene	0.00124834	3.25896E-05	0.137300	0.00960382	0.140615	0	0	0.685912	2.85995E-05	0.0114408	0.003284005	4.12621E-06	0.00136882	0.00124834					
o-Xylene	0.00247806	8.72447E-05	0.306638	0.0190893	0.314102	0	0	1.37930	7.90988E-05	0.0234030	0.005673251	8.82474E-06	0.00275257	0.00247806					
Nonane	0.0143446	9.73813E-07	3.15335	0.103305	3.23253	0	0	8.68935	2.04448E-08	0.00272734	0.08625058	3.36307E-09	0.0173407	0.0143446					
C10+	0.0337849	5.95612E-06	82.5443	0.225598	84.6813	0	0	59.1064	3.30877E-07	0.0160892	0.163234677	3.94014E-09	0.0337849	0.0337849					
<b>Mass Flow</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>
Water	962.244	8753.35	0.0537468	0.0443647	0.00938207	0	0	9715.65	0	8753.26	0.0896831	4.81904E-06	0.04496361	9715.65	962.244				
H2S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Nitrogen	3275.60	0.00951026	0.0113257	0.0111867	0.000139029	3275.59	0	0.0354959	0.000318336	0.00919193	9.89781E-05	2.59183E-06	3275.62	3275.60					
Carbon Dioxide	1385.05	0.159391	0.0644564	0.0547673	0.00968918	1385.21	0	0.0060541	0.0390201	0.0654894	0.012988673	0.001244478	1385.27	1385.05					
Methane	409389	2.34322	3.91926	3.78535	0.133914	409387	0	8.99903	0.155691	2.18753	0.142391177	0.001714203	409396	409389					
Ethane	88602.7	0.555711	5.21582	4.24307	0.972749	88592.3	0	16.1693	0.0425758	0.513136	0.860195541	0.000371208	88608.4	88602.7					
Propane	23103.0	0.156588	5.08658	2.68369	2.40289	23087.5	0	20.7162	0.0131532	0.143435	0.47196642	2.52986E-05	23108.2	23103.0					
Isobutane	3964.02	0.00871923	2.19237	0.657075	1.53529	3958.03	0	8.18612	0.000269664	0.00844957	0.10682821	1.86658E-07	3966.22	3964.02					
n-Butane	5618.62	0.0266291	4.45482	1.01931	3.43551	5604.51	0	18.9300	0.00174868	0.0248804	0.166250063	8.27209E-07	5623.10	5618.62					
Isopentane	2594.68	0.00805187	5.09163	0.522037	4.56959	2585.01	0	14.7678	0.000370074	0.00768180	0.008083607	6.40163E-08	2599.78	2594.68					
n-Pentane	1623.63	0.00491045	4.27333	0.336312	3.93702	1612.98	0	14.9296	0.000223593	0.00468686	0.051340108	2.84896E-08	1627.91	1623.63					
2-Methylpentane	12.3384	1.69199E-05	0.0759645	0.00261041	0.0733541	0	0	12.4144	3.75958E-07	1.65440E-05	0.00038359	1.92077E-11	12.4144	12.3384					
3-Methylpentane	8.68400	3.28372E-05	0.0598054	0.00184378	0.0579616	0	0	8.74384	1.90705E-06	3.09302E-05	0.000270854	8.7065E-11	8.74384	8.68400					
n-Hexane	4553.70	0.00490979	38.7204	0.963733	37.7566	4567.98	0	24.4424	8.71500E-05	0.00482264	0.009616425	2.16857E-10	4592.42	4553.70					
Methylcyclopentane	1.87744	2.29289E-05	0.0174260	0.00404564	0.0170204	0	0	1.89489	3.58101E-06	1.93479E-05	5.6974E-05	1.1711E-10	1.89489	1.87744					
Benzene	0.482272	0.000294612	0.00468861	0.000105297	0.00459331	0	0	0.487265	0.000265803	2.88091E-05	4.9765E-07	5.3675E-10	0.487265	0.482272					
2-Methylhexane	16.2402	1.90801E-05	0.323994	0.00337326	0.320621	0	0	16.5642	3.59907E-07	1.87202E-05	3.24706E-05	3.56089E-13	16.2402	16.2402					
3-Methylhexane	13.5833	1.66604E-05	0.285335	0.00282383	0.282511	0	0	13.8686	3.28198E-07	1.63322E-05	0.000410254	4.65609E-12	13.5833	13.5833					
Heptane	27.5346	3.48986E-05	0.720246	0.00656200	0.714596	0	0	28.2549	6.91267E-07	3.42074E-05	0.000757687	7.16049E-12	28.2549	27.5346					
Methylcyclohexane	16.5474	0.000122828	0.439429	0.000348190	0.435947	0	0	16.9870	1.34046E-05	0.000109424	0.000471003	1.41486E-10	16.9870	16.5474					
Toluene	4.29488	0.00203598	0.148524	0.000941159	0.147610	0	0	4.44544	0.00180006	0.000235922	1.77247E-05	2.11162E-09	4.44544	4.29488					
Octane	87.7113	6.31869E-05	6.98154	0.0173572	6.96418	0	0	94.6929	8.31795E-07	6.23551E-05	0.002180482	2.54425E-12	94.6929	87.7113					
Ethylbenzene	8.28286	0.00341644	0.799133	0.00169038	0.797443	0	0	9.08541	0.000432276	5.95396E-05	2.17666E-09	9.08541	8.28286	8.28286					
m-Xylene	6.81038	0.00285375	0.782086	0.00138417	0.780702	0	0	7.59532	0.00250348	0.000350274	6.28568E-05	1.96912E-09	7.59532	6.81038					
o-Xylene	13.5191	0.00763970	1.74697	0.00275129	1.74391	0	0	15.2734	0.00692319	0.000716515	0.000108588	4.21138E-09	13.5191	13.5191					
Nonane	78.2577	8.52733E-05	17.9621	0.0148891	17.9472	0	0	86.2198	1.77215E-06	8.35012E-05	0.001663771	1.60493E-12	86.2198	78.2577					
C10+	184.315	0.000521556	470.188	0.0325147	470.155	0	0	654.503	2.89636E-05	0.000492592	0.003124364	1.88032E-12	654.503	184.315					

Process Streams	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	Well Stream	Total gas to sale				
Phase: Total	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved				
Property	Units																	
Temperature	°F	70.0	70.0	70.0	75.9	75.9	85.0	85.0	75.9	75.9	75.942503	75.942503	83.6907	70				
Pressure	psig	198	198	198	0	0	1000	1000	0	0	3.622707026	-14.22584205	1000	198				
Mole Fraction Vapor	%	100	0	0	100	0	100	0	0	100	100	100	86.2695	100				
Mole Fraction Light Liquid	%	0	100	100	0	0	100	100	100	0	0	0	0.00123976	0				
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0	0	0	0	0	1.72300	0				
Molecular Weight	lb/lbmol	18.5	18.0	128.7	29.1	141.2	18.5	18.0	18.6	18.6	34.64990297	18.27946925	18.5194	18.5112				
Mass Density	lb/ft³	0.7	62.3	47.0	0.1	47.3	3.8	62.2	0.2	45.8	0.0111894828	0.001495684	3.93666	0.723833				
Molar Flow	lbmol/h	29471.5	486.1	4.4	0.5	3.9	29413.0	539.3	9.7	485.9	0.005239108	0.002610703	29962.0	29471.5				
Mass Flow	lb/h	545553.1	8756.6	569.6	14.4	555.2	544056.3	9715.6	1107.3	8753.6	1.914029739	0.047722258	554879	545553				
Vapor Volumetric Flow	MCFH	753.7	0.1	0.0	0.0	0.0	141.4	0.2	0.0	0.1	17.10561403	31.90664204	140.952	753.700				
Liquid Volumetric Flow	Mbb/d	3221.8	0.6	0.1	0.8	0.1	604.3	0.7	0.1	0.6	2.132647983	3.977970956	602.510	3221.75				
Sid Vapor Volumetric Flow	MMSCFD	268.4	4.4	0.0	0.0	0.0	267.9	4.9	0.1	4.4	0.000503097	2.37773E-05	272.883	268.416				
Sid Liquid Volumetric Flow	Mbb/d	116.3	0.6	0.1	0.0	0.0	116.2	0.7	0.1	0.6	0.0009099434	0.000105351	116.972	116.319				
Compressibility		0.957	0.011	0.102	0.993	0.008	0.834	0.050	0.431	0.997	0.986894813	0.99952054	0.818621	0.956942				
Specific Gravity		0.639	0.998	0.753	1.006	0.758	0.639	0.997	0.734	0.998	1.196367141	0.631140479	0.639141	0.639141				
API Gravity		10.0	10.0	55.2	53.4	53.4	9.9	58.4	10.0	10.0								
Enthalpy	MMBtu/h	-982.9	-59.8	-0.5	0.0	-0.4	-989.5	-66.2	-0.9	-59.7	-2248.726254	-264.7309326	-1056.56	-982.862				
Mass Enthalpy	Btu/lb	-1801.6	-6826.1	-802.4	-1326.8	-782.6	-1818.7	-6810.9	-818.4	-6822.5	-1945.3	-1174.864846	-547.326204	-1801.12	-1801.59			
Mass Cp	Btu/(lb*°F)	0.5	1.0	0.5	0.4	0.5	0.7	1.0	0.5	1.0	0.418108026	0.445185415	0.661707	0.523032				
Ideal Gas Cp/Cv Ratio		1.275	1.326	1.044	1.185	1.039	1.271	1.325	1.048	1.326	1.160238465	1.32296399	1.27223	1.27528				
Dynamic Viscosity	cP	0.9	1.0	0.7	0.0	0.9	0.0	0.8	0.9	0.9	0.009102744	0.010237817	0.0109881	0.947683				
Kinematic Viscosity	cSt	0.0	1.0	1.0	8.0	1.2	0.2	0.8	0.9	14.3	5.078570375	427.3135093	9.47683	0.947683				
Thermal Conductivity	Btu/(h*ft²*F)	0.0	0.3	0.1	0.0	0.0	0.4	0.1	0.3	0.0	0.012207473	0.01230396	0.01					

n-Pentane	0.0763582	0.0763582	0.0763582	0.942249	0.942249	0.0760083				0.0395390	0.0395390	1.288193564	1.51252E-05	0.0766138	0.0763582			
2-Methylpentane	0.000485818	0.000485818	0.000485818	0.00612319	0.00612319	0				0.000116850	0.000116850	0.008058166	8.53757E-09	0.000489052	0.000485818			
3-Methylpentane	0.000341928	0.000341928	0.000341928	0.00432493	0.00432493	0				0.000218460	0.000218460	0.005689902	3.86993E-08	0.000344437	0.000341928			
n-Hexane	0.179299	0.179299	0.179299	2.26061	2.26061	0.180220				0.0340623	0.0340623	0.202015117	9.63904E-08	0.180891	0.179299			
Methylcyclopentane	7.56937E-05	7.56937E-05	7.56937E-05	0.000974303	0.000974303	0				0.000139928	0.000139928	0.001225539	5.3301E-08	7.64173E-05	7.56937E-05			
Benzene	2.09494E-05	2.09494E-05	2.09494E-05	0.000272491	0.000272491	0				0.000224484	0.000224484	2.19626E-05	2.62717E-07	2.11566E-05	2.09494E-05			
2-Methylhexane	0.000549936	0.000549936	0.000549936	0.00680496	0.00680496	0				0.000113712	0.000113712	0.000586635	1.36121E-10	0.000560843	0.000549936			
3-Methylhexane	0.000459965	0.000459965	0.000459965	0.00569659	0.00569659	0				9.92071E-05	9.92071E-05	0.007411913	1.77987E-09	0.000469546	0.000459965			
Heptane	0.000932394	0.000932394	0.000932394	0.0113983	0.0113983	0				0.000207786	0.000207786	0.013688854	2.73722E-09	0.000956442	0.000932394			
Methylcyclohexane	0.000571845	0.000571845	0.000571845	0.00716834	0.00716834	0				0.000678319	0.000678319	0.008684155	5.51956E-08	0.000586730	0.000571845			
Toluene	0.000158164	0.000158164	0.000158164	0.00200555	0.00200555	0				0.00155848	0.00155848	0.00034825	8.77848E-07	0.000163482	0.000158164			
Octane	0.00260542	0.00260542	0.00260542	0.0307155	0.0307155	0				0.000332254	0.000332254	0.034556616	8.53156E-10	0.00280710	0.00260542			
Ethylbenzene	0.000264726	0.000264726	0.000264726	0.00321851	0.00321851	0				0.00247829	0.00247829	0.001015262	7.85331E-07	0.000289427	0.000264726			
m-Xylene	0.000217664	0.000217664	0.000217664	0.00263548	0.00263548	0				0.00200817	0.00200817	0.001071827	7.1045E-07	0.000241826	0.000217664			
o-Xylene	0.000432080	0.000432080	0.000432080	0.00523850	0.00523850	0				0.00410787	0.00410787	0.001851623	1.51944E-06	0.000485994	0.000432080			
Nonane	0.00207038	0.00207038	0.00207038	0.0234663	0.0234663	0				0.000396269	0.000396269	0.023840416	4.79319E-10	0.00253156	0.00207038			
C10+	0.00391363	0.00391363	0.00391363	0.0411297	0.0411297	0				0.00187622	0.00187622	0.035394697	4.50712E-10	0.0133664	0.00391363			
<b>Molar Flow</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>	<b>lbmol/h</b>
Water	53.4126	0	0	0.00246261	0	0				0	0.00497817	2.67497E-07	0.002462541	21.8263	53.4126			
H2S	0	0	0	0	0	0				0	0	0	0	0	0			
Nitrogen	116.930	0	0	0.000399333	0	116.929				0.000328126	3.53324E-06	9.2521E-08	116.929	116.930				
Carbon Dioxide	31.4716	0	0	0.00124444	0	31.4753				0.00148807	0.000295133	2.82775E-05	31.4716	31.4716				
Methane	25519.1	0	0	0.235958	0	25519.0				0.136359	0.008875694	0.000106854	25518.8	25519.1				
Ethane	2946.64	0	0	0.141111	0	2946.30				0.0170652	0.02860735	1.23452E-05	2946.74	2946.64				
Propane	523.930	0	0	0.0606808	0	523.579				0.00325282	0.010703249	5.73721E-07	524.022	523.930				
Isobutane	68.2014	0	0	0.0113051	0	68.0985				0.000145376	0.001869902	3.21147E-09	68.2341	68.2014				
n-Butane	96.6690	0	0	0.0175374	0	96.4262				0.000428071	0.002860354	1.42322E-08	96.7360	96.6690				
Isopentane	35.9629	0	0	0.00723557	0	35.8289				0.000106472	0.001121205	8.87281E-10	36.0269	35.9629				
n-Pentane	22.5039	0	0	0.00466137	0	22.3563				6.49610E-05	0.000711587	3.94873E-10	22.5578	22.5039				
2-Methylpentane	0.143178	0	0	3.02919E-05	0	0				1.91980E-07	4.45127E-06	2.22891E-13	0.143994	0.143178				
3-Methylpentane	0.100771	0	0	2.13957E-05	0	0				3.58922E-07	3.14305E-06	1.01032E-12	0.101414	0.100771				
n-Hexane	52.8422	0	0	0.0111834	0	53.0080				5.59631E-05	0.000111591	2.51647E-12	53.2607	52.8422				
Methylcyclopentane	0.0223081	0	0	4.81995E-06	0	0				2.29896E-07	6.76977E-07	1.39153E-12	0.0225000	0.0223081				
Benzene	0.00617412	0	0	1.34803E-06	0	0				3.68818E-07	1.2132E-08	6.85875E-12	0.00622924	0.00617412				
2-Methylhexane	0.162075	0	0	3.36646E-05	0	0				1.86825E-07	3.24052E-07	3.55371E-15	0.165132	0.162075				
3-Methylhexane	0.135559	0	0	2.81814E-05	0	0				1.62993E-07	4.09427E-06	4.64671E-14	0.138251	0.135559				
Heptane	0.274791	0	0	5.63881E-05	0	0				3.41384E-07	7.5616E-06	7.14606E-14	0.281610	0.274791				
Methylcyclohexane	0.168532	0	0	3.54623E-05	0	0				1.1445E-06	4.79705E-06	1.44099E-12	0.172754	0.168532				
Toluene	0.0466133	0	0	9.92158E-06	0	0				2.56052E-06	1.9237E-07	2.2918E-11	0.0481347	0.0466133				
Octane	0.767858	0	0	0.000151952	0	0				5.45881E-07	1.90888E-05	2.22734E-14	0.826508	0.767858				
Ethylbenzene	0.0780187	0	0	1.59222E-05	0	0				4.07174E-06	5.60822E-07	2.05026E-11	0.0852176	0.0780187				
m-Xylene	0.0641490	0	0	1.30379E-05	0	0				3.29934E-06	5.92067E-07	1.85477E-11	0.0712022	0.0641490				
o-Xylene	0.127341	0	0	2.59152E-05	0	0				6.74907E-06	1.02282E-06	3.96681E-11	0.143091	0.127341				
Nonane	0.610172	0	0	0.000116090	0	0				6.51055E-07	1.29724E-05	1.25136E-14	0.745382	0.610172				
C10+	1.15341	0	0	0.000203471	0	0				3.08255E-06	1.95517E-05	1.17667E-14	3.93553	1.15341				
<b>Mass Fraction</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>
Water	0.176380	0.176380	0.176380	0.307817	0.307817	0				2.92925	2.92925	0.000251775	92.96157099	0.0720804	0.176380			
H2S	0	0	0	0	0	0				0	0	0	0	0	0			
Nitrogen	0.600419	0.600419	0.600419	0.0776168	0.0776168	0.602068				0.300229	0.300229	0.005171187	0.005431064	0.600460	0.600419			
Carbon Dioxide	0.253880	0.253880	0.253880	0.379993	0.379993	0.254608				2.13903	2.13903	0.678603486	2.607751485	0.253841	0.253880			
Methane	75.0412	75.0412	75.0412	26.2840	26.2840	75.2472				71.4498	71.4498	7.439339863	3.592040728	75.0462	75.0412			
Ethane	16.2409	16.2409	16.2409	29.4398	29.4398	16.2837				16.7602	16.7602	44.94159752	0.777850946	16.2427	16.2409			
Propane	4.23478	4.23478	4.23478	18.6203	18.6203	4.24359				4.68491	4.68491	24.65829551	0.053012111	4.23586	4.23478			
Isobutane	0.726605	0.726605	0.726605	4.55900	4.55900	0.727504				0.275982	0.275982	5.678220107	0.000391133	0.727010	0.726605			
n-Butane	1.02989	1.02989	1.02989	7.07233	7.07233	1.03013				0.812651	0.812651	8.685866239	0.001733381	1.03069	1.02989			
Isopentane	0.475606	0.475606	0.475606	3.62207	3.62207	0.475137				0.250905	0.250905	4.226350584	0.000134143	0.476489	0.475606			
n-Pentane	0.297612	0.297612	0.297612	2.33344	2.33344	0.296473				0.153083	0.153083	2.682304598	5.96987E-05	0.298348	0.297612			
2-Methylpentane	0.00226164	0.00226164	0.00226164	0.0181119	0.0181119	0				0.000540364	0.000540364	0.020040952	4.02489E-08	0.00227470	0.00226164			
3-Methylpentane	0.00159178	0.00159178	0.00159178	0.0127928	0.0127928	0				0.00101025	0.00101025	0.014150959	1.82441E-07	0.00160206	0.00159178			
n-Hexane	0.834694	0.834694	0.834694	6.68669	6.68669	0.839615				0.157518	0.157518	5.02417726	4.54416E-07	0.841369	0.834694			
Methylcyclopentane	0.000344135	0.000344135	0.000344135	0.00281449	0.00281449	0				0.000631946	0.000631946	0.002976654	2.454E-07	0.000347122	0.000344135			
Benzene	8.84005E-05	8.84005E-05	8.84005E-05	0.000730586	0.000730586	0				0.000940970	0.000940970	4.95107E-05	1.12264E-06	8.91968E-05	8.84005E-05			
2-Methylhexane	0.00297683	0.00297683	0.00297683	0.0234048	0.0234048	0				0.000611445	0.000611445	0.001696453	7.46169E-10	0.00303222	0.00297683			
3-Methylhexane	0.00248981	0.00248981	0.00248981	0.0195927	0.0195927	0				0.000533448	0.000533448	0.021434058	9.75664E-09	0.00253946	0.00248981			
Heptane	0.00504709	0.00504709	0.00504709	0.0392029	0.0392029	0				0.00111729	0.00111729	0.039585962	1.50045E-08	0.00517275	0.00504709			

	0.00303315	0.00303315	0.00303315	0.0241586	0.0241586	0				0.00357403	0.00357403	0.024607946	2.96477E-07	0.00310939	0.00303315	
Methylcyclohexane																
Toluene	0.000787252	0.000787252	0.000787252	0.00634273	0.00634273	0				0.00770575	0.00770575	0.000926041	4.42482E-06	0.000813011	0.000787252	
Octane	0.0160775	0.0160775	0.0160775	0.120430	0.120430	0				0.00203666	0.00203666	0.113920986	5.33138E-09	0.0173069	0.0160775	
Ethylbenzene	0.00151825	0.00151825	0.00151825	0.0117284	0.0117284	0				0.0141191	0.0141191	0.000311096	4.56111E-06	0.00165847	0.00151825	
m-Xylene	0.00124834	0.00124834	0.00124834	0.00960382	0.00960382	0				0.0114408	0.0114408	0.003284005	4.12621E-06	0.00138571	0.00124834	
o-Xylene	0.00247806	0.00247806	0.00247806	0.0190893	0.0190893	0				0.0234030	0.0234030	0.005673251	8.82474E-06	0.00278477	0.00247806	
Nonane	0.0143446	0.0143446	0.0143446	0.103305	0.103305	0				0.00272734	0.00272734	0.086925058	3.36307E-09	0.0175247	0.0143446	
C10+	0.0337849	0.0337849	0.0337849	0.225598	0.225598	0				0.0160892	0.0160892	0.16323477	3.94014E-09	0.015286	0.0337849	
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	962.244	0	0	0.0443647	0	0				0.0896831	4.81904E-06	0.044363361	393.206	962.244		
H2S	0	0	0	0	0	0				0	0	0	0	0		
Nitrogen	3275.60	0	0	0.0111867	0	3275.59				0.00919193	9.89781E-05	2.59183E-06	3275.57	3275.60		
Carbon Dioxide	1385.05	0	0	0.0547673	0	1385.21				0.0654894	0.012988673	0.001244478	1384.73	1385.05		
Methane	409389	0	0	3.78535	0	409387				2.18753	0.142391177	0.001714203	409385	409389		
Ethane	88602.7	0	0	4.24307	0	88592.3				0.513136	0.860195541	0.000371208	88605.7	88602.7		
Propane	23103.0	0	0	2.68369	0	23087.5				0.143435	0.47196642	2.52986E-05	23107.1	23103.0		
isobutane	3964.02	0	0	0.657075	0	3958.03				0.00844957	0.106682821	1.86658E-07	3965.92	3964.02		
n-Butane	5618.62	0	0	1.01931	0	5604.51				0.0248804	0.166250063	8.27209E-07	5622.51	5618.62		
Isopentane	2594.68	0	0	0.522037	0	2585.01				0.00768180	0.080893607	6.40163E-08	2599.30	2594.68		
n-Pentane	1623.63	0	0	0.336312	0	1612.98				0.00468686	0.051340108	2.84896E-08	1627.52	1623.63		
2-Methylpentane	12.3384	0	0	0.00261041	0	0				1.65440E-05	0.00038359	1.92077E-11	12.4087	12.3384		
3-Methylpentane	8.68400	0	0	0.00184378	0	0				3.09302E-05	0.000270854	8.7065E-11	8.73942	8.68400		
n-Hexane	4553.70	0	0	0.963733	0	4567.98				0.00482264	0.009616425	2.16857E-10	4589.76	4553.70		
Methylcyclopentane	1.87744	0	0	0.000405644	0	0				1.93479E-05	5.6974E-05	1.1711E-10	1.89368	1.87744		
Benzene	0.482272	0	0	0.000105297	0	0				2.88091E-05	9.4765E-07	5.3575E-10	0.486578	0.482272		
2-Methylhexane	16.2402	0	0	0.00337326	0	0				1.87202E-05	3.24709E-05	3.56089E-13	16.5465	16.2402		
3-Methylhexane	13.5833	0	0	0.00282383	0	0				1.63322E-05	0.000410254	4.65609E-12	13.8530	13.5833		
Heptane	27.5346	0	0	0.00565020	0	0				3.42074E-05	0.000757687	7.16049E-12	28.2179	27.5346		
Methylcyclohexane	16.5474	0	0	0.00348190	0	0				0.000109424	0.000471003	1.41486E-10	16.9620	16.5474		
Toluene	4.29488	0	0	0.000914159	0	0				0.000235922	1.77247E-05	2.11162E-09	4.43506	4.29488		
Octane	87.7113	0	0	0.0173572	0	0				6.23551E-05	0.002180482	2.54425E-12	94.4108	87.7113		
Ethylbenzene	8.28286	0	0	0.00169038	0	0				0.000432276	5.95396E-05	2.17668E-09	9.04712	8.28286		
m-Xylene	6.81038	0	0	0.00138417	0	0				0.000350274	6.28568E-05	1.96912E-09	7.55918	6.81038		
o-Xylene	13.5191	0	0	0.00275129	0	0				0.000716515	0.000108588	4.21136E-09	15.1912	13.5191		
Nonane	78.2577	0	0	0.0148891	0	0				8.35012E-05	0.001663771	1.60493E-12	95.5990	78.2577		
C10+	184.315	0	0	0.0325147	0	0				0.000492592	0.003124364	1.88032E-12	628.897	184.315		
Process Streams	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	Well Stream	Total gas to sale		
Phase: Vapor	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved		
Property	Units															
Temperature	°F	70.0	70.0	70.0	75.9	75.9	85.0			75.9	75.9	75.942503	75.942503	83.6907	70	
Pressure	psig	198	198	198	0	0	1000			0	0	3.622707026	-14.22584205	1000	198	
Mole Fraction Vapor	%	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	
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0			0	0	0	0	0	0	
Molecular Weight	lb/lbmol	18.5	18.5	18.5	29.1	29.1	18.5			18.6	18.6	34.64990297	18.27946925	18.5273	18.5112	
Mass Density	lb/ft³	0.7	0.7	0.7	0.1	0.1	3.8			0.0	0.0	0.111894828	0.001495684	3.87435	0.723833	
Molar Flow	lbmol/h	29471.5	0.0	0.0	0.5	0.0	29413.0			0.0	0.2	0.055239108	0.002610703	29443.5	29471.5	
Mass Flow	lb/h	545553.1	0.0	0.0	14.4	0.0	544056.3			0.0	3.1	1.914029739	0.047722258	545510	545553	
Vapor Volumetric Flow	MCFH	753.7	0.0	0.0	0.2	0.0	141.4			0.0	0.1	17.10561403	31.90664204	140.801	753.700	
Liquid Volumetric Flow	Mbb/d	3221.8	0.0	0.0	0.8	0.0	504.3			0.0	0.3	2.132647983	3.977970956	601.864	3221.75	
Sid Vapor Volumetric Flow	MMSCFD	268.4	0.0	0.0	0.0	0.0	267.9			0.0	0.0	0.000503097	2.37773E-05	268.161	268.416	
Sid Liquid Volumetric Flow	Mbb/d	116.3	0.0	0.0	0.0	0.0	116.2			0.0	0.0	0.0009099434	0.000105351	116.327	116.319	
Compressibility		0.957	0.957	0.957	0.993	0.993	0.834			0.997	0.997	0.968894813	0.999520254	0.832144	0.96642	
Specific Gravity		0.639	0.639	0.639	1.006	1.006	0.639			0.643	0.643	1.196367141	0.631140479	0.639699	0.639141	
API Gravity																
Enthalpy	MMBtu/h	-982.9	0.0	0.0	0.0	0.0	-989.5			0.0	0.0	-2248.726254	-264.7309326	-992.997	-982.862	
Mass Enthalpy	Btu/lb	-1801.6	-1801.6	-1801.6	-1326.8	-1326.8	-1818.7			-1945.3	-1945.3	-1174.864846	-5547.326204	-1820.31	-1801.59	
Mass Cp	Btu/(lb*°F)	0.5	0.5	0.5	0.4	0.4	0.7			0.5	0.5	0.418108026	0.445185415	0.656245	0.523032	
Ideal Gas Cp/Cv Ratio		1.275	1.275	1.275	1.185	1.185	1.271			1.276	1.276	1.160238465	1.32296399	1.27147	1.27528	
Dynamic Viscosity	cP	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.009102744	0.010237817	0.0129695	0.0108881	
Kinematic Viscosity	cSt	0.9	0.9	0.9	8.0	8.0	0.2			14.3	14.3	5.078570375	427.3135093	0.208979	0.947683	
Thermal Conductivity	Btu/(h*ft*°F)	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.012207473	0.01230396	0.0228270	0.0186393	
Surface Tension	lb/ft															
Net I.G. Heating Value	Btu/ft³	1023.3	1023.3	1023.3	1553.5	1553.5	1024.5			985.4	985.4	1831.068291	45.40767717	1025.21	1023.34	



Property	Units																
Temperature	°F	70.0	70.0	70.0	75.9	75.9	85.0	85.0	75.9	75.9	83.6907	70					
Pressure	psig	198	198	198	0	0	1000	1000	0	0	1000	198					
Mole Fraction Vapor	%	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					
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0	0	0	0	0					
Molecular Weight	lb/lbmol	128.7	18.0	141.2	141.2	141.2	18.0	113.6	18.0	18.0	93.0093	128.654					
Mass Density	lb/ft³	47.0	62.3	47.0	47.3	47.3	62.2	45.8	62.2	62.2	43.9373	46.9799					
Molar Flow	lbmol/h	0.0	486.1	4.4	0.0	3.9	539.3	9.7	485.9	0.0	0.371457	0					
Mass Flow	lb/h	0.0	8756.6	569.6	0.0	555.2	9715.6	1107.3	8753.6	0.0	34.5490	0					
Vapor Volumetric Flow	MCFH	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.000786325	0					
Liquid Volumetric Flow	Mbb/d	0.0	0.6	0.1	0.0	0.1	0.7	0.1	0.6	0.0	0.00336121	0					
Std Vapor Volumetric Flow	MMSCFD	0.0	4.4	0.0	0.0	0.0	4.9	0.1	4.4	0.0	0.00338310	0					
Std Liquid Volumetric Flow	Mbb/d	0.0	0.6	0.1	0.0	0.0	0.7	0.1	0.6	0.0	0.00347689	0					
Compressibility		0.102	0.011	0.102	0.008	0.008	0.050	0.431	0.001	0.001	0.368363	0.102471					
Specific Gravity		0.753	0.998	0.753	0.758	0.758	0.997	0.734	0.998	0.998	0.704474	0.753256					
API Gravity		55.2	10.0	55.2	53.4	53.4	9.9	58.4	10.0	10.0	65.7780	55.2127					
Enthalpy	MMBtu/h	0.0	-59.8	-0.5	0.0	-0.4	-66.2	-0.9	-59.7	0.0	-0.0300045	0					
Mass Enthalpy	Btu/lb	-802.4	-6826.1	-802.4	-782.6	-782.6	-6810.9	-818.4	-6822.5	-6822.5	-868.462	-802.360					
Mass Cp	Btu/(lb**F)	0.5	1.0	0.5	0.5	0.5	1.0	0.5	1.0	1.0	0.500784	0.472552					
Ideal Gas Cp/Cv Ratio		1.044	1.326	1.044	1.039	1.039	1.325	1.048	1.326	1.326	1.05866	1.04360					
Dynamic Viscosity	cP	0.7	1.0	0.7	0.9	0.9	0.8	0.6	0.9	0.9	0.372444	0.746130					
Kinematic Viscosity	cSt	1.0	1.0	1.0	1.2	1.2	0.8	0.8	0.9	0.9	0.529183	0.991475					
Thermal Conductivity	Btu/(h**ft**F)	0.1	0.3	0.1	0.1	0.1	0.4	0.1	0.3	0.3	0.0650728	0.0676679					
Surface Tension	lbf/ft	0.002	0.005	0.002	0.002	0.002	0.005	0.001	0.005	0.005	0.000877569	0.00185876					
Net I.G. Heating Value	Btu/ft³	6435.9	0.4	6435.9	7050.1	7050.1	0.0	5700.5	0.0	0.0	4688.33	6435.95					
Net Liquid Heating Value	Btu/lb	18829.4	-1051.8	18829.4	18795.9	18795.9	-1059.8	18875.8	-1059.2	-1059.2	18979.2	18829.4					
Gross I.G. Heating Value	Btu/ft³	6891.2	50.7	6891.2	7544.2	7544.2	50.3	6113.7	50.3	50.3	5032.91	6891.22					
Gross Liquid Heating Value	Btu/lb	20172.2	8.3	20172.2	20124.1	20124.1	0.0	20255.1	0.6	0.6	20385.1	20172.2					

Process Streams	Status	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	Well Stream	Total gas to sale			
Phase: Heavy Liquid		Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved			
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		99.9644		99.9644										99.8729	99.9644			
H2S		0		0										0	0			
Nitrogen		6.98456E-05		6.98456E-05										0.000310154	6.98456E-05			
Carbon Dioxide		0.000745128		0.000745128										0.00231193	0.000745128			
Methane		0.0300507		0.0300507										0.112611	0.0300507			
Ethane		0.00380226		0.00380226										0.0102054	0.00380226			
Propane		0.000730593		0.000730593										0.00140620	0.000730593			
Isobutane		3.08637E-05		3.08637E-05										4.97562E-05	3.08637E-05			
n-Butane		9.42598E-05		9.42598E-05										0.000150439	9.42598E-05			
Isopentane		2.29604E-05		2.29604E-05										2.66830E-05	2.29604E-05			
n-Pentane		1.40025E-05		1.40025E-05										1.72966E-05	1.40025E-05			
2-Methylpentane		4.03950E-08		4.03950E-08										4.33786E-08	4.03950E-08			
3-Methylpentane		7.83963E-08		7.83963E-08										8.07851E-08	7.83963E-08			
n-Hexane		1.17217E-05		1.17217E-05										1.17123E-05	1.17217E-05			
Methylcyclopentane		5.60522E-08		5.60522E-08										5.34350E-08	5.60522E-08			
Benzene		7.75971E-07		7.75971E-07										8.21217E-07	7.75971E-07			
2-Methylhexane		3.91757E-08		3.91757E-08										2.75548E-08	3.91757E-08			
3-Methylhexane		3.42076E-08		3.42076E-08										2.44831E-08	3.42076E-08			
Heptane		7.16547E-08		7.16547E-08										4.35004E-08	7.16547E-08			
Methylcyclohexane		2.57372E-07		2.57372E-07										2.10321E-07	2.57372E-07			
Toluene		4.54617E-06		4.54617E-06										3.90758E-06	4.54617E-06			
Octane		1.13806E-07		1.13806E-07										7.09899E-08	1.13806E-07			
Ethylbenzene		6.62072E-06		6.62072E-06										4.24024E-06	6.62072E-06			
m-Xylene		5.53028E-06		5.53028E-06										3.56247E-06	5.53028E-06			
o-Xylene		1.48050E-05		1.48050E-05										9.82446E-06	1.48050E-05			
Nonane		1.36789E-07		1.36789E-07										7.15019E-08	1.36789E-07			
C10+		6.71485E-07		6.71485E-07										5.91145E-07	6.71485E-07			
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		99.9624		99.9624										99.8721	99.9624			
H2S		0		0										0	0			
Nitrogen		0.000108606		0.000108606										0.000482279	0.000108606			
Carbon Dioxide		0.00182023		0.00182023										0.00564776	0.00182023			



Methane	0.0267594		0.0267594										0.100279	0.0267594				
Ethane	0.00634617		0.00634617										0.0170335	0.00634617				
Propane	0.00178822		0.00178822										0.00344189	0.00178822				
Isobutane	9.95727E-05		9.95727E-05										0.000160526	9.95727E-05				
n-Butane	0.000304102		0.000304102										0.000485353	0.000304102				
Isopentane	9.19516E-05		9.19516E-05										0.000106861	9.19516E-05				
n-Pentane	5.60769E-05		5.60769E-05										6.92700E-05	5.60769E-05				
2-Methylpentane	1.93224E-07		1.93224E-07										2.07498E-07	1.93224E-07				
3-Methylpentane	3.74998E-07		3.74998E-07										3.86429E-07	3.74998E-07				
n-Hexane	5.60693E-05		5.60693E-05										5.60251E-05	5.60693E-05				
Methylcyclopentane	2.61846E-07		2.61846E-07										2.49623E-07	2.61846E-07				
Benzene	3.36444E-06		3.36444E-06										3.56066E-06	3.36444E-06				
2-Methylhexane	2.17893E-07		2.17893E-07										1.53260E-07	2.17893E-07				
3-Methylhexane	1.90261E-07		1.90261E-07										1.36175E-07	1.90261E-07				
Heptane	3.98539E-07		3.98539E-07										2.41949E-07	3.98539E-07				
Methylcyclohexane	1.40269E-06		1.40269E-06										1.14627E-06	1.40269E-06				
Toluene	2.32507E-05		2.32507E-05										1.99850E-05	2.32507E-05				
Octane	7.21588E-07		7.21588E-07										4.50118E-07	7.21588E-07				
Ethylbenzene	3.90154E-05		3.90154E-05										2.49878E-05	3.90154E-05				
m-Xylene	3.25896E-05		3.25896E-05										2.09936E-05	3.25896E-05				
o-Xylene	8.72447E-05		8.72447E-05										5.78966E-05	8.72447E-05				
Nonane	9.73813E-07		9.73813E-07										5.09035E-07	9.73813E-07				
C10+	5.95612E-06		5.95612E-06										5.24356E-06	5.95612E-06				

Mass Flow	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water	0		0										9322.43	0				
H2S	0		0										0	0				
Nitrogen	0		0										0.0450177	0				
Carbon Dioxide	0		0										0.527183	0				
Methane	0		0										9.36037	0				
Ethane	0		0										1.58997	0				
Propane	0		0										0.321279	0				
Isobutane	0		0										0.0149841	0				
n-Butane	0		0										0.0453047	0				
Isopentane	0		0										0.00997479	0				
n-Pentane	0		0										0.00646592	0				
2-Methylpentane	0		0										1.93686E-05	0				
3-Methylpentane	0		0										3.60707E-05	0				
n-Hexane	0		0										0.00522959	0				
Methylcyclopentane	0		0										2.33007E-05	0				
Benzene	0		0										0.000332365	0				
2-Methylhexane	0		0										1.43059E-05	0				
3-Methylhexane	0		0										1.27111E-05	0				
Heptane	0		0										2.25845E-05	0				
Methylcyclohexane	0		0										0.000106997	0				
Toluene	0		0										0.00186548	0				
Octane	0		0										4.20157E-05	0				
Ethylbenzene	0		0										0.00233245	0				
m-Xylene	0		0										0.00195962	0				
o-Xylene	0		0										0.00540419	0				
Nonane	0		0										4.75153E-05	0				
C10+	0		0										0.000489453	0				

Process Streams	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	Well Stream	Total gas to sale				
Phase: Heavy Liquid	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved				
Property	Units																	
Temperature	°F	70.0		70.0									83.6907	70				
Pressure	psig	198		198									1000	198				
Mole Fraction Vapor	%	0		0									0	0				
Mole Fraction Light Liquid	%	0		0									0	0				
Mole Fraction Heavy Liquid	%	100		100									100	100				
Molecular Weight	lb/lbmol	18.0		18.0									18.0154	18.0156				
Mass Density	lb/ft³	62.3		62.3									62.0955	62.2600				
Molar Flow	lbmol/h	0.0		0.0									518.132	0				
Mass Flow	lb/h	0.0		0.0									9334.37	0				
Vapor Volumetric Flow	MCFH	0.0		0.0									0.150323	0				



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

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

**Sample:** Yoke No. 1H (Maxwell Horizontal Pad)  
 Separator Hydrocarbon Liquid  
 Sampled @ 200 psig & 69 °F

Date Sampled: 09/25/13

Job Number: 35843.002

**CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M**

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.013	0.003	0.003
Carbon Dioxide	0.014	0.005	0.006
Methane	5.372	1.842	0.761
Ethane	5.517	2.986	1.465
Propane	4.820	2.687	1.877
Isobutane	1.445	0.957	0.742
n-Butane	3.282	2.094	1.685
2,2 Dimethylpropane	0.111	0.086	0.071
Isopentane	2.100	1.554	1.338
n-Pentane	2.012	1.476	1.282
2,2 Dimethylbutane	0.190	0.160	0.144
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.281	0.233	0.214
2 Methylpentane	1.478	1.241	1.125
3 Methylpentane	1.041	0.860	0.792
n-Hexane	1.974	1.643	1.502
Heptanes Plus	<u>70.350</u>	<u>82.174</u>	<u>86.993</u>
Totals:	100.000	100.000	100.000

**Characteristics of Heptanes Plus:**

Specific Gravity ----- 0.7687 (Water=1)  
 °API Gravity ----- 52.59 @ 60°F  
 Molecular Weight ----- 140.0  
 Vapor Volume ----- 17.42 CF/Gal  
 Weight ----- 6.40 Lbs/Gal

**Characteristics of Total Sample:**

Specific Gravity ----- 0.7261 (Water=1)  
 °API Gravity ----- 63.39 @ 60°F  
 Molecular Weight ----- 113.2  
 Vapor Volume ----- 20.35 CF/Gal  
 Weight ----- 6.05 Lbs/Gal

Base Conditions: 14.650 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: XG  
 Processor: JCdjv  
 Cylinder ID: T-943

David Dannhaus 361-661-7015

**TANKS DATA INPUT REPORT**

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.014	0.005	0.006
Nitrogen	0.013	0.003	0.003
Methane	5.372	1.842	0.761
Ethane	5.517	2.986	1.465
Propane	4.820	2.687	1.877
Isobutane	1.445	0.957	0.742
n-Butane	3.393	2.180	1.756
Isopentane	2.100	1.554	1.338
n-Pentane	2.012	1.476	1.282
Other C-6's	2.989	2.494	2.275
Heptanes	6.705	6.069	5.827
Octanes	10.280	9.819	9.895
Nonanes	7.698	8.452	8.624
Decanes Plus	42.021	55.063	59.304
Benzene	0.064	0.036	0.044
Toluene	0.495	0.336	0.403
E-Benzene	0.878	0.686	0.823
Xylenes	2.210	1.712	2.072
n-Hexane	1.974	1.643	1.502
2,2,4 Trimethylpentane	<u>0.000</u>	<u>0.000</u>	<u>0.000</u>
Totals:	100.000	100.000	100.000

**Characteristics of Total Sample:**

Specific Gravity -----	0.7261 (Water=1)
°API Gravity -----	63.39 @ 60°F
Molecular Weight-----	113.2
Vapor Volume -----	20.35 CF/Gal
Weight -----	6.05 Lbs/Gal

**Characteristics of Decanes (C10) Plus:**

Specific Gravity -----	0.7820 (Water=1)
Molecular Weight-----	159.8

**Characteristics of Atmospheric Sample:**

°API Gravity -----	56.94 @ 60°F
Reid Vapor Pressure (ASTM D-5191)-----	2.51 psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
Cylinder Number	-----	T-943*	T-966
Pressure, PSIG	200	198	209
Temperature, °F	69	70	70

\* Sample used for analysis

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.013	0.003	0.003
Carbon Dioxide	0.014	0.005	0.006
Methane	5.372	1.842	0.761
Ethane	5.517	2.986	1.465
Propane	4.820	2.687	1.877
Isobutane	1.445	0.957	0.742
n-Butane	3.282	2.094	1.685
2,2 Dimethylpropane	0.111	0.086	0.071
Isopentane	2.100	1.554	1.338
n-Pentane	2.012	1.476	1.282
2,2 Dimethylbutane	0.190	0.160	0.144
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.281	0.233	0.214
2 Methylpentane	1.478	1.241	1.125
3 Methylpentane	1.041	0.860	0.792
n-Hexane	1.974	1.643	1.502
Methylcyclopentane	0.231	0.166	0.172
Benzene	0.064	0.036	0.044
Cyclohexane	0.465	0.321	0.346
2-Methylhexane	1.696	1.596	1.501
3-Methylhexane	1.420	1.319	1.256
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	0.906	0.814	0.794
n-Heptane	1.987	1.855	1.758
Methylcyclohexane	1.775	1.444	1.539
Toluene	0.495	0.336	0.403
Other C-8's	6.320	6.110	6.152
n-Octane	2.185	2.265	2.204
E-Benzene	0.878	0.686	0.823
M & P Xylenes	0.734	0.576	0.688
O-Xylene	1.476	1.136	1.384
Other C-9's	5.324	5.750	5.936
n-Nonane	2.373	2.702	2.688
Other C-10's	8.709	10.336	10.867
n-decane	2.435	3.024	3.060
Undecanes(11)	11.327	13.792	14.705
Dodecanes(12)	8.408	11.059	11.955
Tridecanes(13)	5.532	7.802	8.550
Tetradecanes(14)	2.884	4.357	4.840
Pentadecanes(15)	1.477	2.391	2.688
Hexadecanes(16)	0.586	1.013	1.148
Heptadecanes(17)	0.267	0.487	0.558
Octadecanes(18)	0.187	0.359	0.414
Nonadecanes(19)	0.095	0.190	0.220
Eicosanes(20)	0.047	0.098	0.114
Heneicosanes(21)	0.025	0.055	0.065
Docosanes(22)	0.019	0.043	0.051
Tricosanes(23)	0.008	0.020	0.024
Tetracosanes(24)	0.005	0.013	0.015
Pentacosanes(25)	0.003	0.008	0.010
Hexacosanes(26)	0.002	0.005	0.005
Heptacosanes(27)	0.001	0.003	0.004
Octacosanes(28)	0.001	0.002	0.003
Nonacosanes(29)	0.001	0.002	0.002
Triacontanes(30)	0.000	0.001	0.001
Hentriacontanes Plus(31+)	<u>0.001</u>	<u>0.003</u>	<u>0.004</u>
Total	100.000	100.000	100.000



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

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

**Date Sampled:** 09/25/2013

**Date Analyzed:** 10/02/2013

**Sample:** Yoke No. 1H(Maxwell Horizontal Pad)

**Job Number:** J35843

FLASH LIBERATION OF HYDROCARBON LIQUID		
	Separator HC Liquid	Stock Tank
Pressure, psig	200	0
Temperature, °F	69	70
Gas Oil Ratio (1)	-----	142
Gas Specific Gravity (2)	-----	1.144
Separator Volume Factor (3)	1.0761	1.000

STOCK TANK FLUID PROPERTIES	
Shrinkage Recovery Factor (4)	0.9293
Oil API Gravity at 60 °F	56.94
Reid Vapor Pressure, psi (5)	2.51

Quality Control Check			
	Sampling Conditions	Test Samples	
Cylinder No.	-----	T-943*	T-966
Pressure, psig	200	198	209
Temperature, °F	69	70	70

(1) - Scf of flashed vapor per barrel of stock tank oil

(2) - Air = 1.000

(3) - Separator volume / Stock tank volume

(4) - Fraction of first stage separator liquid

(5) - Absolute pressure at 100 deg F

Analyst: \_\_\_\_\_ O. A. \_\_\_\_\_

\* Sample used for flash study

**Base Conditions: 14.73 PSI & 60 °F**

Certified: FESCO, Ltd. - Alice, Texas

\_\_\_\_\_  
 David Dannhaus 361-661-7015

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

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

**Sample:** Yoke No. 1H (Maxwell Horizontal Pad)  
 Gas Evolved from Hydrocarbon Liquid Flashed  
 From 200 psig & 69 °F to 0 psig & 70 °F

Date Sampled: 09/25/13

Job Number: 35843.001

**CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT**

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.250	
Carbon Dioxide	0.123	
Methane	35.935	
Ethane	30.932	8.225
Propane	18.489	5.065
Isobutane	3.361	1.094
n-Butane	5.774	1.810
2-2 Dimethylpropane	0.073	0.028
Isopentane	1.682	0.612
n-Pentane	1.243	0.448
Hexanes	1.135	0.466
Heptanes Plus	<u>1.003</u>	<u>0.440</u>
Totals	100.000	18.186

**Computed Real Characteristics Of Heptanes Plus:**

Specific Gravity ----- 3.585 (Air=1)  
 Molecular Weight ----- 102.82  
 Gross Heating Value ----- 5398 BTU/CF

**Computed Real Characteristics Of Total Sample:**

Specific Gravity ----- 1.144 (Air=1)  
 Compressibility (Z) ----- 0.9902  
 Molecular Weight ----- 32.81  
 Gross Heating Value  
     Dry Basis ----- 1914 BTU/CF  
     Saturated Basis ----- 1882 BTU/CF

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

Base Conditions: 14.650 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: MR  
 Processor: ANB  
 Cylinder ID: ST-20

David Dannhaus 361-661-7015

**CHROMATOGRAPH EXTENDED ANALYSIS  
TOTAL REPORT**

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.250		0.213
Carbon Dioxide	0.123		0.165
Methane	35.935		17.569
Ethane	30.932	8.225	28.350
Propane	18.489	5.065	24.850
Isobutane	3.361	1.094	5.954
n-Butane	5.774	1.810	10.229
2,2 Dimethylpropane	0.073	0.028	0.161
Isopentane	1.682	0.612	3.699
n-Pentane	1.243	0.448	2.734
2,2 Dimethylbutane	0.070	0.029	0.184
Cyclopentane	0.102	0.042	0.218
2,3 Dimethylbutane	0.371	0.151	0.975
2 Methylpentane	0.231	0.095	0.607
3 Methylpentane	0.000	0.000	0.000
n-Hexane	0.361	0.148	0.948
Methylcyclopentane	0.035	0.012	0.090
Benzene	0.019	0.005	0.045
Cyclohexane	0.053	0.018	0.136
2-Methylhexane	0.106	0.049	0.324
3-Methylhexane	0.105	0.048	0.321
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.117	0.051	0.354
n-Heptane	0.114	0.052	0.348
Methylcyclohexane	0.101	0.040	0.302
Toluene	0.038	0.013	0.107
Other C8's	0.159	0.074	0.534
n-Octane	0.039	0.020	0.136
Ethylbenzene	0.002	0.001	0.006
M & P Xylenes	0.018	0.007	0.058
O-Xylene	0.002	0.001	0.006
Other C9's	0.062	0.031	0.239
n-Nonane	0.012	0.007	0.047
Other C10's	0.018	0.010	0.078
n-Decane	0.003	0.002	0.013
Undecanes (11)	<u>0.000</u>	<u>0.000</u>	<u>0.000</u>
Totals	100.000	18.186	100.000

**Computed Real Characteristics Of Total Sample:**

Specific Gravity -----	1.144	(Air=1)
Compressibility (Z) -----	0.9902	
Molecular Weight -----	32.81	
Gross Heating Value		
Dry Basis -----	1914	BTU/CF
Saturated Basis -----	1882	BTU/CF



**Antero Resources**  
**Cleta Unit 1H - Corder East Pad**

Tag Name	Value	Units	Timestamp
Accumulated Gas Flow	152080		1/9/2014 13:00:05
Battery	13.7	Volts	1/9/2014 13:00:05
Casing Pressure	223	PSIA	1/9/2014 13:00:08
Current Day Gas Flow	660.058	MCF	1/9/2014 13:00:05
Differential Pressure	6	inH2O	1/9/2014 13:00:05
Flow Rate	3271	MCF Per Day	1/9/2014 13:00:05
Pressure	188	PSIA	1/9/2014 13:00:05
Previous Day Flow	3259.27	MCF	1/9/2014 13:00:05
Temperature	70	F	1/9/2014 13:00:05
Tubing Pressure	213	PSIA	1/9/2014 13:00:08
Daily AP	154	PSIA	1/6/2014 09:00:00
Daily DP	8.9	inH2O	1/6/2014 09:00:00
Daily Energy	3891	MBTU	1/6/2014 09:00:00
Daily Flow	3473	MCF	1/6/2014 09:00:00
Daily Tf	63.33	F	1/6/2014 09:00:00
Hourly AP	149.5	PSIA	1/7/2014 11:00:00
Hourly DP	9.19	Inches	1/7/2014 11:00:00
Hourly Energy	162.85	MBTU	1/7/2014 11:00:00
Hourly FlowTime	60		1/7/2014 11:00:00
Hourly Tf	63.6	F	1/7/2014 11:00:00
Hourly Volume	145.34	MCF	1/7/2014 11:00:00
Audited Accumulated Gas Volume		MCF	
Audited Casing Pressure	209	PSI	1/7/2014 09:00:00
Audited Gas Volume	3397.33	MCF	1/7/2014 09:00:00
Audited Oil Volume	0	Barrels	1/7/2014 09:00:00
Audited Tubing Pressure	199	PSI	1/7/2014 09:00:00
Audited Water Volume	0	Barrels	1/7/2014 09:00:00
Argon	0	%	1/9/2014 13:00:05
BTU	1120.44	BTU	1/9/2014 13:00:05
CO2	0.107	%	1/9/2014 13:00:05
Carbon Monoxide	0	%	1/9/2014 13:00:05
Decane	0	%	1/9/2014 13:00:05
Ethane	10.0159	%	1/9/2014 13:00:05
Helium	0	%	1/9/2014 13:00:05
Heptane	0	%	1/9/2014 13:00:05
Hexane	0.1802	%	1/9/2014 13:00:05
Hydrogen	0	%	1/9/2014 13:00:05
Hydrogen Sulfide	0	%	1/9/2014 13:00:05
Iso-Butane	0.2315	%	1/9/2014 13:00:05
Iso-Pentane	0.1218	%	1/9/2014 13:00:05
Methane	86.7515	%	1/9/2014 13:00:05
N2	0.3975	%	1/9/2014 13:00:05
N-Butane	0.3278	%	1/9/2014 13:00:05
Nonane	0	%	1/9/2014 13:00:05
N-Pentane	0.076	%	1/9/2014 13:00:05
Octane	0	%	1/9/2014 13:00:05
Oxygen	0.0109	%	1/9/2014 13:00:05
Plate Size	3.75	Inches	1/9/2014 13:00:05
Propane	1.7799	%	1/9/2014 13:00:05
SPG	0.6405		1/9/2014 13:00:05
Water	0	%	1/9/2014 13:00:05

# **Attachment T**

## **Facility-wide Emissions Summary Sheet(s)**

**ATTACHMENT T – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET**

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

Emission Point ID#	NOx		CO		VOC		SO2		PM10		PM2.5		GHG (CO2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
EP-HR001									2.6315	0.7823				
EP-PCV					0.0337	0.1475							8.3203	36.4428
F001					3.5242	15.4359							111.6665	489.0991
EP-GPU001 through EP-GPU011 (emissions per EPN)	0.0893	0.3909	0.0750	0.3284	0.0049	0.0215	0.0005	0.0023	0.0068	0.0297	0.0068	0.0297	107.1008	469.1014
EP-LH001 through EP-LH011 (emissions per EPN)	0.1785	0.7818	0.1499	0.6567	0.0098	0.0430	0.0011	0.0047	0.0136	0.0594	0.0136	0.0594	214.2016	938.2028
EP-L001					2.9191	0.1110							11.6095	0.4414
EP-L002					5.39E-04	2.46E-04							0.9004	0.4108
EP-EC001 through EP-EC003 (emissions per EPN)	0.0094	0.0410	0.0079	0.0345	0.0492	0.2155	0.0000	0.0000	0.0007	0.0031	0.0005	0.0023	19.6415	86.0300
<b>TOTAL</b>	<b>2.9734</b>	<b>13.0234</b>	<b>2.4976</b>	<b>10.9397</b>	<b>0.3096</b>	<b>1.3559</b>	<b>0.0177</b>	<b>0.0775</b>	<b>0.2260</b>	<b>0.9898</b>	<b>0.2254</b>	<b>0.9874</b>	<b>3593.2504</b>	<b>15738.4369</b>

Annual emissions shall be based on 8760 hours per year of operation for all emission units except emergency generators.

According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above

**ATTACHMENT T – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET**

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

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
EP-HR001														
EP-PCV			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0037	0.0163	0.0037	0.0163
F001			0.0014	0.0062	0.0129	0.0565	0.0264	0.1155	0.0664	0.2907	0.1205	0.5279	0.2276	0.9968
EP-GPU001 through EP-GPU011 (emissions per EPN)	0.0001	0.0003	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0016	0.0070	0.0017	0.0074
EP-LH001 through EP-LH011 (emissions per EPN)	0.0001	0.0006	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0032	0.0141	0.0034	0.0147
EP-L001			3.08E-06	1.17E-07	5.76E-05	2.19E-06	1.93E-04	7.36E-06	0.001	2.12E-05	0.031	0.001	0.032	0.001
EP-L002			1.09E-08	4.99E-09	4.31E-08	1.97E-08	4.44E-08	2.03E-08	1.26E-07	5.76E-08	4.43E-09	2.02E-09	2.29E-07	1.05E-07
EP-EC001 through EP-EC003 (emissions per EPN)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0002	0.0065	0.0287	0.0066	0.0289
<b>TOTAL</b>	0.0022	0.0097	0.0001	0.0003	0.0001	0.0005	0.0000	0.0002	0.0001	0.0005	0.0726	0.3182	0.0752	0.3296

Annual emissions shall be based on 8760 hours per year of operation for all emission units except emergency generators.

According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above

# **Attachment U**

## **Class I Legal Advertisement**

**Attachment U**

**Air Quality Permit Notice  
Notice of Application  
Corder East Well Pad  
Antero Resources Corporation  
Harrison 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-C General Permit Modification for an Oil and Natural Gas Production facility located at 1734 Turtle Tree Fork Road Salem, WV 26426, near Salem in Harrison County, West Virginia.

The latitude and longitude coordinates are: 39.22238 and -80.5534

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

Pollutants	TOTALS (tpy):
NO <sub>x</sub>	13.0234
CO	10.9397
PM <sub>2.5</sub>	0.9874
PM <sub>10</sub>	0.9898
VOC	1.3559
SO <sub>2</sub>	0.0775
Formaldehyde	0.0097
Benzene	0.0003
Toluene	0.0005
Ethylbenzene	0.0002
Xylenes	0.0005
Hexane	0.3182
Total HAPs	0.3296

Proposed new equipment will be installed on or about December 1, 2016. Startup of operation using new equipment is planned to begin on or about March 01, 2017. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV

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

Dated this the \_\_ day of \_\_\_\_\_, 2016

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

[www.ghd.com](http://www.ghd.com)

