



April 6, 2016

Reference No. 082715

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

Dear Mr. Jay Fedczak:

**Re: General Permit Registration G70-B Modification Application
Cline 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 Cline Well Pad.

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

1. Removal of Kubota engine
2. Change in storage tanks service

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


Enclosed are the following documents:

- Original copy of the G70-B General Permit Modification Application.
- Two CD copies of the G70-B General Permit Modification Application.
- The application fee with check no. 440998 in the amount of \$1,500.00.

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

Sincerely,

GHD

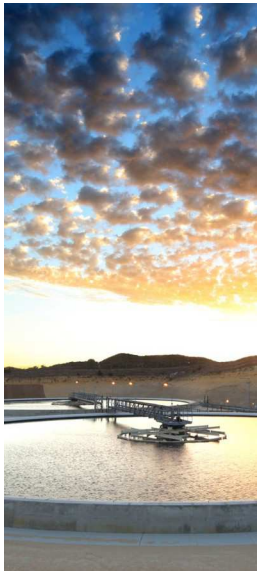
A handwritten signature in black ink, appearing to read 'Manuel Bautista', written in a cursive style.

Manuel Bautista

MB/ma/238

Encl.

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



General Permit G70-B Modification Application

Removal of Kubota engine and change in storage tanks service.

Cline Well Pad

Antero Resources Corporation

GHD Services Inc.
6320 Rothway Suite 100 Houston Texas 77040
082715 | Report No 238 | April 2016

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west virginia department of environmental protection

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

G70-B GENERAL PERMIT REGISTRATION APPLICATION

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

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

SECTION 1. GENERAL INFORMATION

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

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

Applicant's Mailing Address: 1615 Wynkoop Street

City: Denver

State: CO

ZIP Code: 80202

Facility Name: Cline Well Pad

Operating Site Physical Address: 11316 WV RT 18S

City: New Milton

Zip Code: 26411

County: Doddridge

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

Latitude: 39.185733

Longitude: -80.699803

SIC Code: 1311

DAQ Facility ID No. (For existing facilities)
017-00101

NAICS Code: 211111

CERTIFICATION OF INFORMATION

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

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

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

Responsible Official Signature: _____

Name and Title:

Phone:

Fax:

Email:

Date:

If applicable:

Authorized Representative Signature: Barry Schatz

Name and Title: Barry Schatz/ Senior Environmental & Regulatory Manager Phone: 303-357-7276 Fax: 303-357-7315

Email: bschatz@anteroresources.com

Date: April 6, 2016

If applicable:

Environmental Contact

Name and Title:

Phone:

Fax:

Email:

Date:

OPERATING SITE INFORMATION	
Briefly describe the proposed new operation and/or any change(s) to the facility: Removal of Kubota engine and change in storage tanks service.	
Directions to the facility: From the nearest city (New Milton), at the Co Rte 25/2 and Co Rte 25 head north to Co Rte 25/Meathouse Fork Rd for 1.2 miles. Turn left to WV-18S and go for 5.1 miles. Turn right to an unnamed road for 0.1 miles. Facility entrance will be on the left.	
ATTACHMENTS AND SUPPORTING DOCUMENTS	
I have enclosed the following required documents:	
Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22).	
<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 checked="" type="checkbox"/> \$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO ¹ <input type="checkbox"/> \$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH ²	
¹ Only one NSPS fee will apply. ² Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ. <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 (must be completed in its entirety) – 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-B 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 (GPUs, 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
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Account Number:
CR30116

3/1/2016

40WVDEPAQ

400995487

440998

1,500.00

TOTAL: 1,500.00

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

GHD SERVICES INC.

2055 NIAGARA FALLS BLVD, SUITE 3
NIAGARA FALLS, NY 14304

M&T BANK

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

3/1/2016

NO. 440998

PAY

*****1,500

DOLLARS AND

*****00

CENTS

\$*****1,500.00

TO THE
ORDER
OF

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

GHD SERVICES INC.

AUTHORIZED SIGNATURES

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

⑈440998⑈ ⑆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).

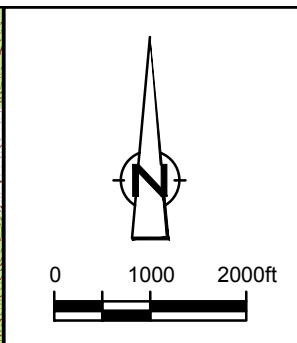
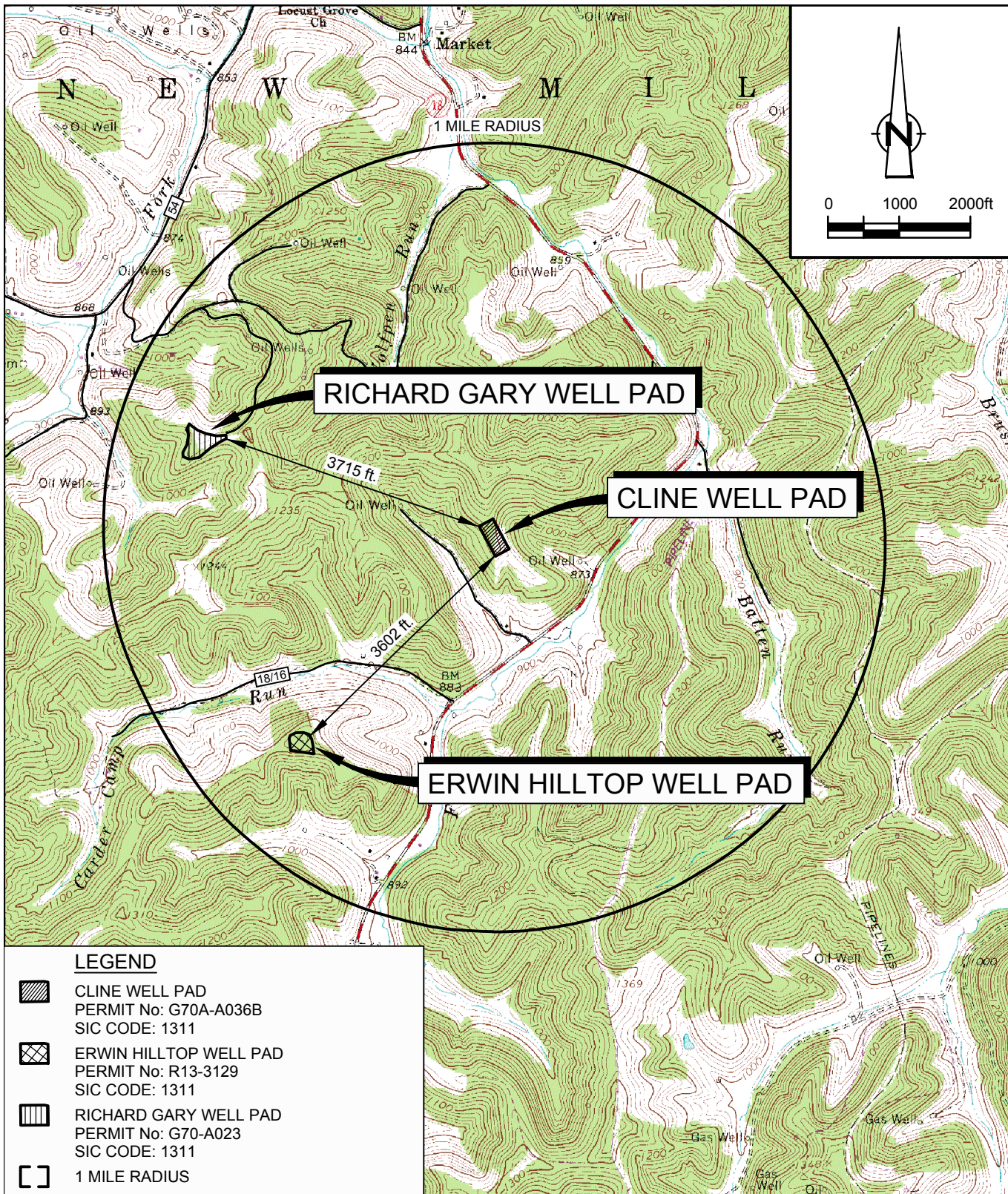
Please provide a source aggregation analysis for the proposed facility below:

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM





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

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

Are the facilities owned by the same parent company or a subsidiary of the parent company? Provide the owners identity and the percentage of ownership of each facility. Antero Resources has 100% ownership of each facility.	Yes <input checked="" 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 checked="" 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 checked="" type="checkbox"/>
Do the facilities share common workforces, plant managers, security forces, corporate executive officers or board executives?	Yes <input checked="" 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 checked="" 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 checked="" type="checkbox"/>
Does one (1) facility operation support the operation of the other facility?	Yes <input type="checkbox"/>	No <input checked="" 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. No, these facilities operate completely independently.	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Are there any financial arrangements between the two (2) entities?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Are there any legal or lease agreements between the two (2) facilities?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Do the facilities share products, byproducts, equipment, or other manufacturing or air pollution control device equipment? Please explain. No, these facilities operate completely independently.	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Do all the pollutant-emitting activities at the facilities belong to the same SIC Code? Please provide the SIC Codes. 1311	Yes <input checked="" 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. No, these facilities operate completely independently.	Yes <input type="checkbox"/>	No <input checked="" 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 checked="" 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. No, these facilities operate completely independently.	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>



LEGEND

-  CLINE WELL PAD
PERMIT No: G70A-A036B
SIC CODE: 1311
-  ERWIN HILLTOP WELL PAD
PERMIT No: R13-3129
SIC CODE: 1311
-  RICHARD GARY WELL PAD
PERMIT No: G70-A023
SIC CODE: 1311
-  1 MILE RADIUS

SOURCE: USGS QUADRANGLE MAP;
NEW MILTON, WEST VIRGINIA

Attachment A

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



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



Penney Barker, Manager
IN THE OFFICE OF Corporations Division
SECRETARY OF STATE Tel: (304)558-8000
Fax: (304)558-8381

Website: www.wvsos.com
E-mail: business@wvsos.com

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

**APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY**

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)

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

Alvyn A. Schopp (303) 367-7310
Contact Name Phone Number

7. 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


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.

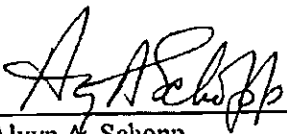
2. This Amendment to the Amended and Restated Certificate of Incorporation has been duly adopted and approved in accordance with Sections 242 of the General Corporation Law of the State of Delaware.

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.

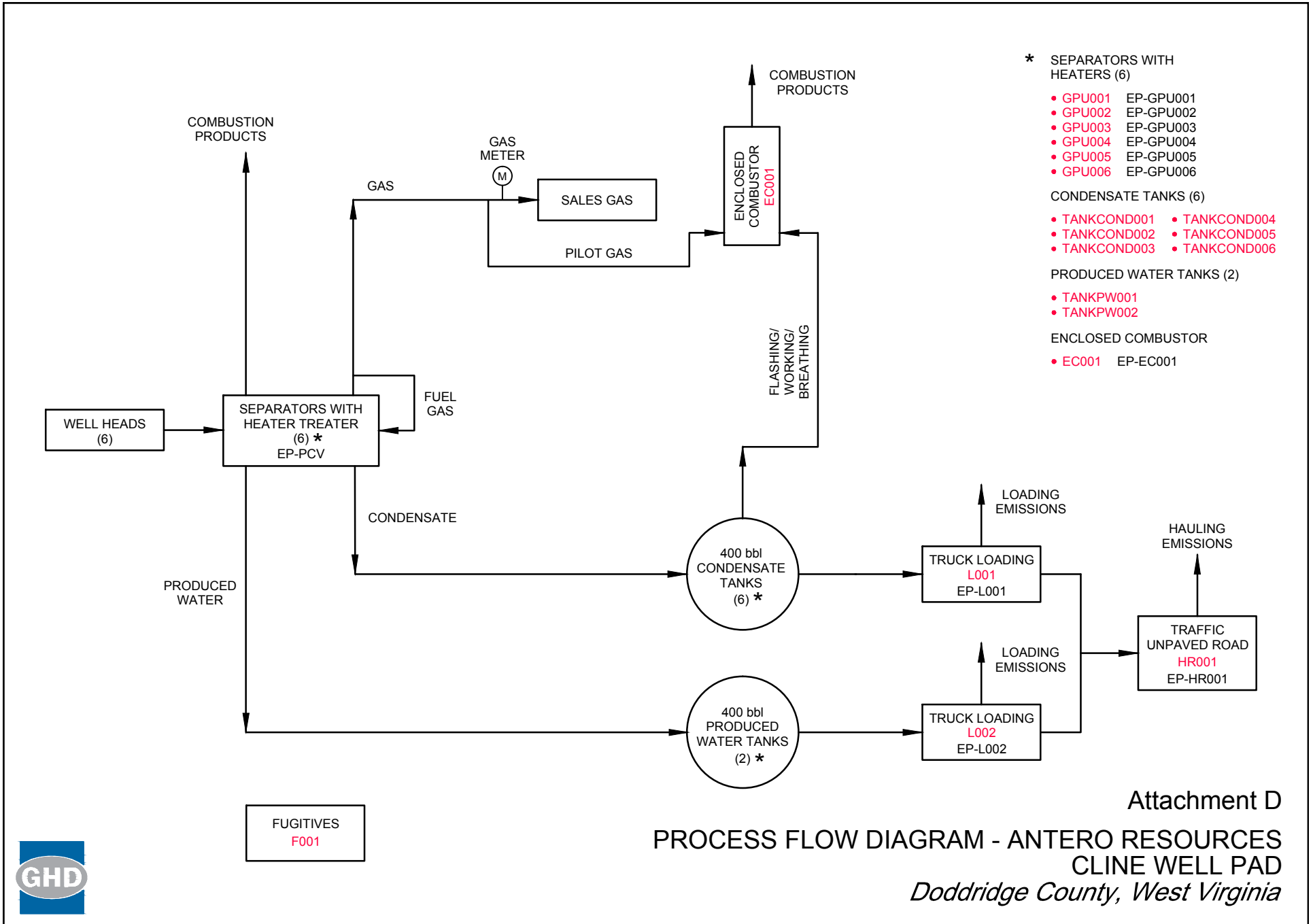
IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be executed by its duly authorized officer on the 10th day of June, 2013.

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

Cline Well Pad

Antero Resources Corporation

Doddridge County, West Virginia

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

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

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

Emissions from the facility's emission sources were calculated using the extended analysis of the condensate from Tom's Fork Unit 1H and gas from Erwin Hilltop Unit 1H, one of the wells in the Erwin Hilltop well pad. The extended analyses are considered representative of the materials from Cline well pad, being in the same Marcellus rock formation.

Attachment F

Plot Plan

ENCLOSED
COMBUSTOR
EC001
(EP-EC001)



FACILITY
FUGITIVES
F001

PRODUCTION
EQUIPMENT
(EP-PCV)



GPU001 (EP-GPU001)
GPU002 (EP-GPU002)
GPU003 (EP-GPU003)
GPU004 (EP-GPU004)
GPU005 (EP-GPU005)
GPU006 (EP-GPU006)

- * GEARHART UNIT 2H
- * CARR UNIT 2H
- * FARROW UNIT 2H
- * FARROW UNIT 3H
- * NICKERS UNIT 3H
- * NICKERS UNIT 2H

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

HAULING
ROUTE
(EP-HR001)



HR001

TANKCOND001 TANKCOND005
TANKCOND002 TANKCOND006
TANKCOND003 TANKPW001
TANKCOND004 TANKPW002

ACCESS
ROAD

Attachment F

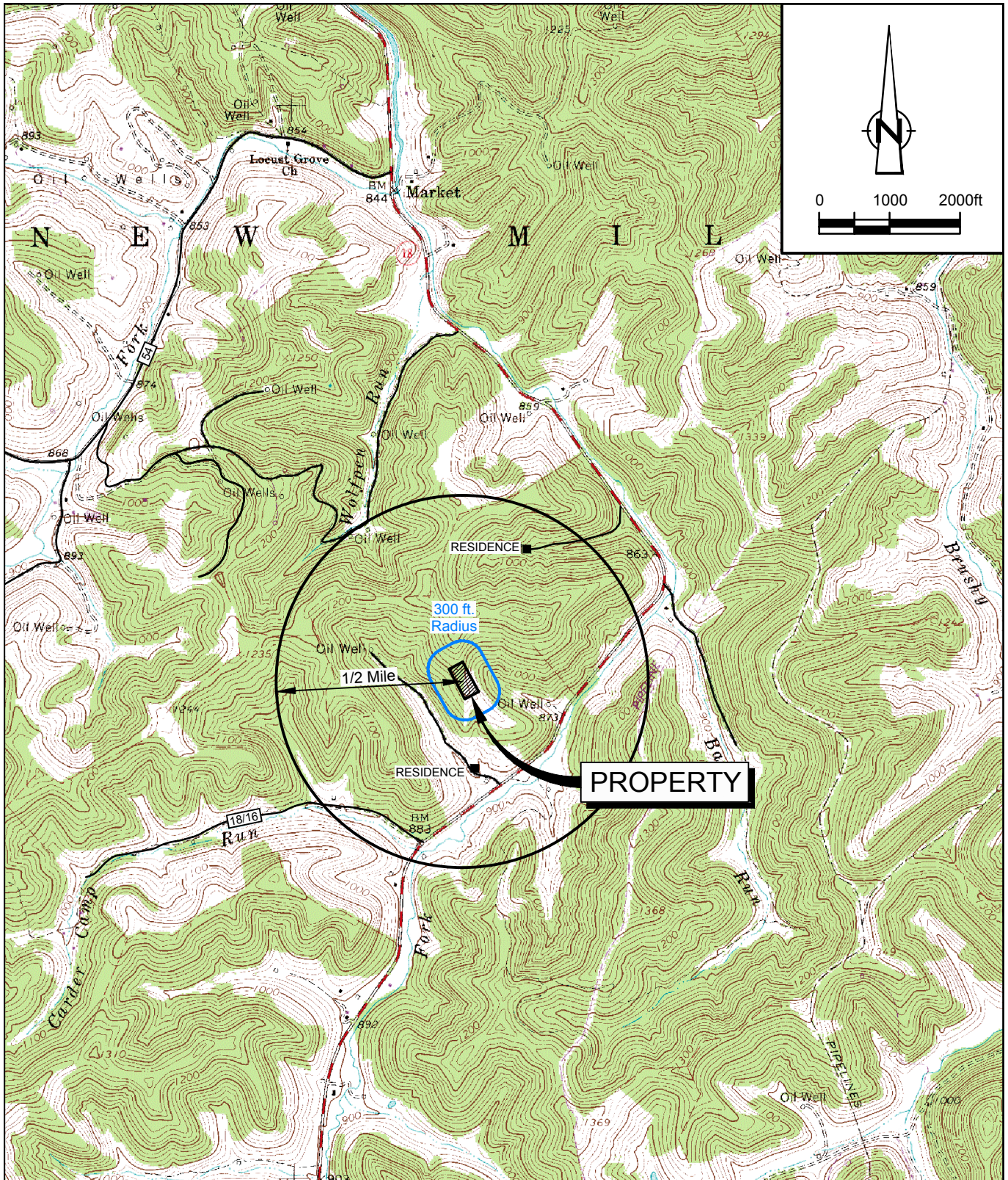
PLOT PLAN CLINE WELL PAD ANTERO RESOURCES

Doddridge County, West Virginia



Attachment G

Area Map



SOURCE: USGS QUADRANGLE MAP;
NEW MILTON, WEST VIRGINIA

SITE COORDINATES: UTM ZONE 17S 525945, 4337443 NAD 83
SITE ELEVATION: 1096 ft AMSL



Attachment G
AREA MAP
CLINE WELL PAD
ANTERO RESOURCES
Doddridge County, West Virginia

Attachment H

G70-B Section Applicability Form

ATTACHMENT H – G70-B SECTION APPLICABILITY FORM

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

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

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

GENERAL PERMIT G70-B APPLICABLE SECTIONS	
<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 ¹
<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) ²
<input type="checkbox"/> Section 12.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO) ²
<input type="checkbox"/> Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines, Microturbines
<input checked="" type="checkbox"/> Section 14.0	Tanker Truck Loading ³
<input type="checkbox"/> Section 15.0	Glycol Dehydration Units ⁴

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

Attachment I

Emission Units/ ERD Table

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

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

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/Modified	Manufac. Date	Design Capacity	Type and Date of Change	Control Device(s)	ERD (s)
GPU001, GPU002, GPU003, GPU004, GPU005, GPU006	EP-GPU001, EP-GPU002, EP-GPU003, EP-GPU004, EP-GPU005, EP-GPU006	Gas Production Unit Heater	(5) 2014 (1) 2015	(5) 2014 (1) 2015	(5) 1.0 MMBtu/hr (1) 1.5 MMBtu/hr	Existing	N/A	
F001	F001	Fugitives	2014	2014	N/A	Existing	N/A	
TANKCOND001-006	EP-EC001	Condensate Tank F/W/B	2014	2014	400 bbl each	Existing	EC001	
TANKPW001-002	EP-EC001	PW Tank F/W/B	2014	2014	400 bbl each	Existing	EC001	
L001	EP-L001	Loading (Condensate)	2014	2014	200 bbl capacity (each)	Existing	N/A	
L002	EP-L002	Loading (Produced Water)	2014	2014	200 bbl capacity (each)	New	N/A	
HR001	EP-HR001	Haul Truck	2014	2014	40 ton capacity	Existing	N/A	
EC001	EP-EC001	Enclosed Combustor	2014	2014	90 scf/min	Existing	N/A	
PCV	EP-PCV	Pneumatic CV	2014	2014	6.6 scf/day/PCV	Existing	N/A	
ENG001	EP-ENG001	Compressor Engine	2015	2015	24 HP	Removal	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	Monitor Frequency	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)			
						VOC	HAP	GHG (CO ₂ e)	
Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	300	Quarterly monitoring	EPA	gas	1.92	0.18	212.14	
Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	312	Quarterly monitoring	EPA	liquid	7.37	0.66	1.23	
Connections (Not sampling)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	354	Quarterly monitoring	EPA	gas	0.10	9.53E-03	11.13	
Flanges	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	78	Quarterly monitoring	EPA	gas	0.04	4.09E-03	4.78	
Loading	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	2	Quarterly monitoring	EPA	gas	1.12	3.95E-03	1.74	

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

Please provide an explanation of the sources of fugitive emissions (e. g. pigging operations, equipment blowdowns, 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
47017064530000	11/14/2014	October 2014	Green
47017063620000	11/26/2014	October 2014	Green
47017062660000	11/8/2014	October 2014	Green
47017063340000	11/8/2014	October 2014	Green
47017063110000	11/26/2014	October 2014	Green
47017063330000	11/15/2014	October 2014	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 001-006
3. Emission Unit ID number: TANKCOND001-006	4. Emission Point ID number: EP-EC001

5. Date Installed, Modified or Relocated (for existing tanks) 2016	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): 919800	13B. Maximum daily throughput (gal/day): 2520
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 10	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 heated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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:	<input type="checkbox"/> Metallic (mechanical) shoe seal	<input type="checkbox"/> Liquid mounted resilient seal
	<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 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 (describe)
-----------------	--

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

27. Closed Vent System with VRU	<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

SITE INFORMATION

29. Provide the city and state on which the data in this section are based.: Charleston, WV	
30. Daily Average Ambient Temperature (°F): 55.3	31. Annual Average Maximum Temperature (°F): 65.9
32. Annual Average Minimum Temperature (°F): 44.6	33. Average Wind Speed (miles/hr): 18.5mph
34. Annual Average Solar Insulation Factor (BTU/(ft ² ·day)) 1030.236	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):	51.7	36A. Minimum (°F):	39.5	36B. Maximum (°F)	63.8
37. Average operating pressure range of tank (psig):	0	37A. Minimum (psig)	0	37B. Maximum (psig)	0
38A. Minimum Liquid Surface Temperature (°F)	39.5	38B. Corresponding Vapor Pressure (psia)	3.9108		
39A. Average Liquid Surface Temperature (°F)	51.7	39B. Corresponding Vapor Pressure (psia)	6.0562		
40A. Maximum Liquid Surface Temperature (°F)	63.8	40B. Corresponding Vapor Pressure (psia)	4.8965		

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)	5.9000		
41D. Liquid Molecular Weight (lb/lb-mole)	103.80		
41E. Vapor Molecular Weight (lb/lb-mole)	39.8158		
Maximum Vapor Pressure	6.9678		
41F. True (psia)			
41G. Reid (psia)	8.2126		
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
5. Date Installed , Modified or Relocated (for existing tanks) 2016 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. 400bbbs	
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.: 400bbbs	
13A. Maximum annual throughput (gal/yr): 1839600	13B. Maximum daily throughput (gal/day): 5040
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 55	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

SITE INFORMATION			
29. Provide the city and state on which the data in this section are based.: Charleston, WV			
30. Daily Average Ambient Temperature (°F): 51.7	31. Annual Average Maximum Temperature (°F): 63.8		
32. Annual Average Minimum Temperature (°F): 39.5	33. Average Wind Speed (miles/hr): 5.9mph		
34. Annual Average Solar Insulation Factor (BTU/(ft ² ·day))	1030.236	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):	51.7	36A. Minimum (°F):	39.5
		36B. Maximum (°F)	63.8
37. Average operating pressure range of tank (psig):	0	37A. Minimum (psig)	0
		37B. Maximum (psig)	0
38A. Minimum Liquid Surface Temperature (°F)	39.5	38B. Corresponding Vapor Pressure (psia)	0.1840
39A. Average Liquid Surface Temperature (°F)	51.7	39B. Corresponding Vapor Pressure (psia)	0.2599
40A. Maximum Liquid Surface Temperature (°F)	63.8	40B. Corresponding Vapor Pressure (psia)	0.3605
41. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
41A. Material Name or Composition	Produced Water		
41B. CAS Number	mix of HC and water		
41C. Liquid Density (lb/gal)	8.3300		
41D. Liquid Molecular Weight (lb/lb-mole)	103.80		
41E. Vapor Molecular Weight (lb/lb-mole)	18.4619		
Maximum Vapor Pressure	0.4472		
41F. True (psia)			
41G. Reid (psia)	1.0242		
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/scf)
GPU001	EP-GPU001	Gas Production Unit Heater	2014	Existing	1	1200.776
GPU002	EP-GPU002	Gas Production Unit Heater	2014	Existing	1	1200.776
GPU003	EP-GPU003	Gas Production Unit Heater	2014	Existing	1	1200.776
GPU004	EP-GPU004	Gas Production Unit Heater	2014	Existing	1	1200.776
GPU005	EP-GPU005	Gas Production Unit Heater	2014	Existing	1	1200.776
GPU006	EP-GPU006	Gas Production Unit Heater	2015	Existing	1.5	1200.776

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

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

Provide description of closed vent system and any bypasses

Are any of the following truck loadout systems utilized? **Yes**

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

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

Time	Jan - Mar	Apr - Jun	Jul - Sept	Oct - Dec
Hours/day	5	5	5	5
Days/week	1	1	1	1

Bulk Liquid Data (use extra pages as necessary)

Liquid Name	Condensate	Produced Water	
Max. Daily Throughput (1000 gal/day)	2.52	5.04	
Max. Annual Throughput (1000 gal/yr)	919.80	1839.60	
Loading Method	BF	BF	
Max. Fill Rate (gal/min)	168	168	
Average Fill Time (min/loading)	50	50	
Max. Bulk Liquid Temperature (F)	72.1	72.1	
True Vapor Pressure	6.97	0.45	
Cargo Vessel Condition	U	U	
Control Equipment or Method	None	None	
Max. Collection Efficiency (%)	0	0	
Max. Control Efficiency (%)	0	0	
Max VOC Emission Rate	Loading (lb/hr)	24.5017	0.0013
	Annual (ton/yr)	1.1179	0.0001
Max HAP Emission Rate	Loading (lb/hr)	0.0866	3.37E-06
	Annual (ton/yr)	0.0039	3.07E-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	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
TANKCOND001-006	Condensate Tanks		
TANKPW001-002	Produced Water Tanks		

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

Assist Type (Flares only) <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
---	-----------------------------	-------------------------------	--

Waste Gas Information

Maximum Waste Gas Flow Rate 5.40 (scfm)	Heat Value of Waste Gas Stream 1,778.93 BTU/ft ³	Exit Velocity of the Emission Stream 0.0103 (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 1	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
---------------------------------	--	--	--

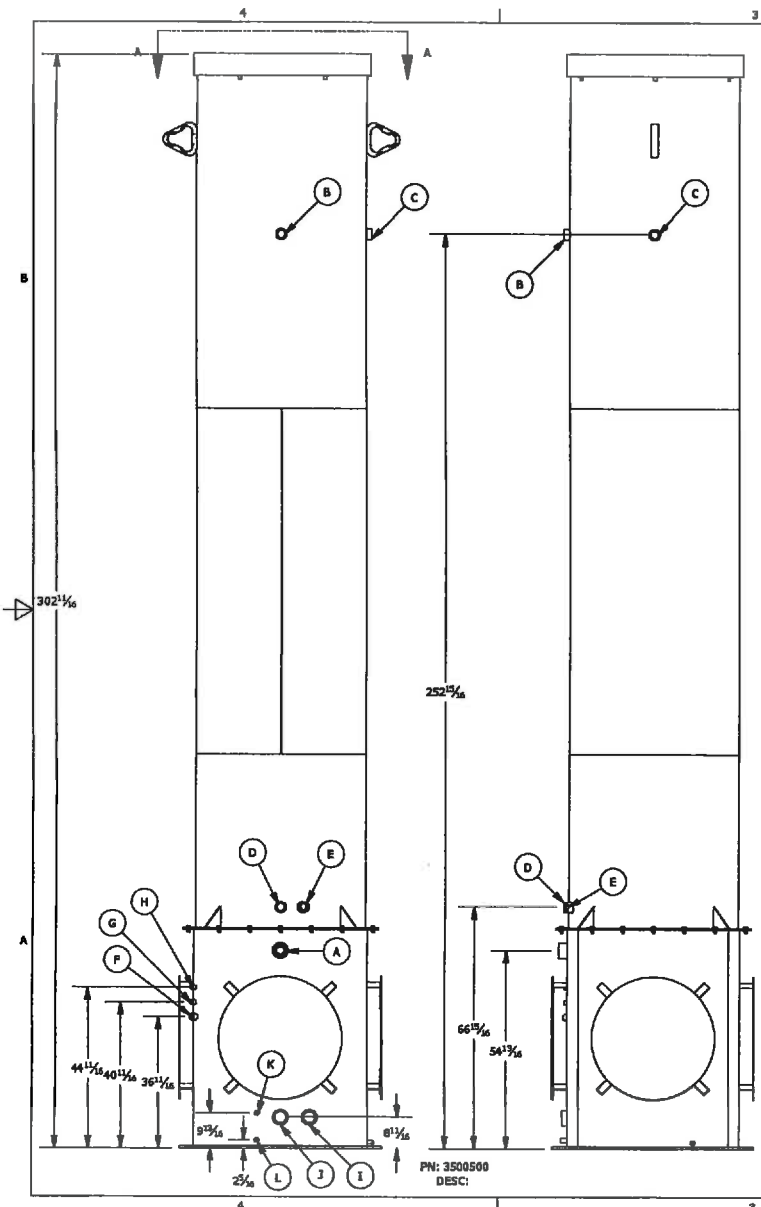
If automatic re-ignition is used, please describe the method. Flame Rectification, a thermocouple equivalent

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).*

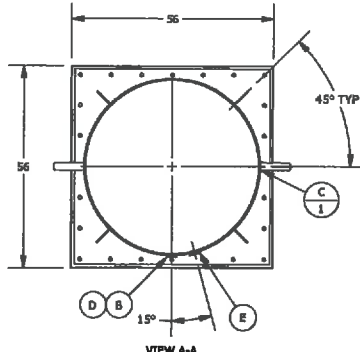
Additional information attached? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Manufacturer's specs sheet
--	----------------------------

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/in²; 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
Cline Well Pad
Doddridge County, West Virginia
Antero Resources Corporation**

Oil and Gas Site General Information

Administrative Information	
Company Name	Antero Resources Corporation
Facility/Well Name	Cline Well Pad
Nearest City/Town	New Milton
API Number/SIC Code	1311
Latitude/Longitude	39.185838, -80.699594
County	Doddridge County

Technical Information	
Max Condensate Site Throughput (bbl/day):	60
Max Produced Water Site Throughput (bbl/day):	120
Are there any sour gas streams at this site?	No
Is this site currently operational/producing?	Yes

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

Table 2

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

Emission Source	VOC		NO _x		CO _{2e}		CO		SO ₂		PM _{2.5}		PM ₁₀		Lead		Total HAPs		Benzene		Xylenes		Formaldehyde		
	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	
UNCONTROLLED (Fugitives, Storage Tanks, Gas Production Unit Heaters)																									
Fugitive Emissions (Component Count, PCV and Hauling) ¹	2.1954	9.6158			56.799	248.78							0.5544	0.0566			0.1991	0.8721	0.0012	0.0054	5.64E-02	2.47E-01			
Flashing, Working and Breathing (F/W/B) Losses ²	20.0502	87.8199			117.1298	513.0286											0.7756	3.3972	0.0132	0.0580	0.0455	0.1994			
Gas Production Unit Heater Emissions ³	0.0298	0.1304	0.5413	2.3710	649.58	2,845.16	0.4547	1.9916	0.0032	0.0142	0.0411	0.1802	0.0411	0.1802	2.71E-06	1.19E-05	1.02E-02	4.46E-02	1.14E-05	4.98E-05			0.0004	0.0018	
TOTALS:	22.2822	97.5962	0.6662	2.9181	973.4122	4263.5454	0.5596	2.4512	0.0040	0.0175	0.0506	0.2218	0.6050	0.2784	3.33E-06	1.46E-05	0.9873	4.3242	0.0145	0.0635	0.1019	0.4464	0.0005	0.0022	
TOTALS (Excluding Fugitives):	20.0868	87.9804	0.6662	2.9181	916.6128	4014.7641	0.5596	2.4512	0.0040	0.0175	0.0506	0.2218	0.6050	0.2218	3.33E-06	1.46E-05	0.7882	3.4521	0.0133	0.0581	0.0455	0.1994	0.0005	0.0022	
UNCONTROLLED (Truck Loading Emissions)																									
Truck Loading Emissions ⁴	24.5030	1.1180			37.1657	1.7410											0.0866	3.95E-03	0.0010	4.47E-05	0.0155	7.05E-04			
CONTROLLED EMISSIONS																									
Enclosed Combustor Emissions (from F/W/B losses) ⁵	0.4011	1.7567	0.0337	0.1475	93.9425	411.4680	0.0283	0.1239	7.56E-06	0.0000	0.0019	0.0084	0.0026	0.0112	1.68E-07	7.37E-07	0.0155	0.0680	0.0003	0.0012	0.0009	0.0040	9.45E-07	4.14E-06	
Controlled Fugitive Emissions from Hauling													0.2772	0.0283											
TOTALS:	4.01E-01	1.76E+00	3.37E-02	1.47E-01	9.39E+01	4.11E+02	2.83E-02	1.24E-01	7.56E-06	3.31E-05	1.92E-03	8.41E-03	2.80E-01	3.95E-02	1.68E-07	7.37E-07	1.55E-02	6.80E-02	2.65E-04	1.16E-03	9.11E-04	3.99E-03	9.45E-07	4.14E-06	
POTENTIAL TO EMIT⁶	2.6331	12.6510	0.6999	3.0656	950.2248	4163.7259	0.5879	2.5751	0.0040	0.0175	0.0526	0.2302	0.3304	0.2613	3.50E-06	1.53E-05	0.2272	0.9990	0.0015	0.0067	0.0573	0.2516	0.0005	0.0022	
POTENTIAL TO EMIT (Excluding Fugitives)	0.4377	1.9172	0.6999	3.0656	893.4255	3913.2036	0.5879	2.5751	0.0040	0.0175	0.0526	0.2302	0.0532	0.2330	3.50E-06	1.53E-05	0.0281	0.1230	0.0003	0.0012	0.0009	0.0040	0.0005	0.0022	

Enter any notes here:	<p>1 - See Tables 4 and 5 for fugitive emission calculations; Table 12 for PM emissions from hauling.</p> <p>2 - See Tables 6 and 7 for tanks emission calculations</p> <p>3 - See Table 9 for gas production unit heater emission calculations</p> <p>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 60 barrels per day, VOC emissions would be 24.503 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 0.2553 pound per hour.</p> <p>5 - See Table 10 and 11 for enclosed combustion emission calculations.</p> <p>6 - The hourly potential to emit is the sum of emissions from gas production unit heaters, storage tanks, enclosed combustor, and fugitives. Does not include emissions from loading (see footnote 5). The total TPY PTE is the sum of all emissions.</p> <p>PM 10 TPY is the sum of uncontrolled hauling and other PM10 sources.</p>
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Table 3

**Permits Summary
Cline Well Pad
Doddridge County, West Virginia
Antero Resources Corporation**

Pollutant		Emissions		Threshold Exceeded?		
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	22.2822	2.6331	6	Yes	
	tons/yr	98.7142	12.6510	10	Yes	Yes
NO _x	lbs/hr	0.6662	0.6999	6		
	tons/yr	2.9181	3.0656	10		
CO	lbs/hr	0.5596	0.5879	6		
	tons/yr	2.4512	2.5751	10		
SO ₂	lbs/hr	0.0040	0.0040	6		
	tons/yr	0.0175	0.0175	10		
PM _{2.5}	lbs/hr	0.0506	0.0526	6		
	tons/yr	0.2218	0.2302	10		
PM ₁₀	lbs/hr	0.6050	0.3304	6		
	tons/yr	0.2784	0.2613	10		
Lead	lbs/hr	3.33E-06	3.50E-06	6		
	tons/yr	1.46E-05	1.53E-05	10		
Total HAPs	lbs/hr	0.9873	0.2272	2		
	tons/yr	4.3281	0.9990	5		
Total TAPs	lbs/hr	0.0150	0.0020	1.14		
n-Hexane	lbs/hr	0.7734	0.1299			
	tons/yr	3.3901	0.5716			
Toluene	lbs/hr	0.0494	0.0129			
	tons/yr	0.2167	0.0569			
Ethylbenzene	lbs/hr	0.0453	0.0228			
	tons/yr	0.1987	0.1000			
Xylenes	lbs/hr	0.1019	0.0573			
	tons/yr	0.4471	0.2516			
Benzene	lbs/hr	0.0145	0.0015			
	tons/yr	0.0635	0.0067			

Enter any notes here:	<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
Cline Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

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

Gas Weight Fraction From Analysis:	VOC frac	0.148
	Benzene frac	0.000
	Toluene	0.000
	Ethylbenzene	0.000
	Xylenes	0.000
	n-Hexane	0.014
	HAPs	0.014
	Methane	0.652

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
300	Valves	Gas VOC	0.004500	0.20	3,849.79
		Non VOC	0.004500	1.15	22,167.41
		HAPs	0.004500	0.02	363.42
		CO2e	0.004500	22.02	424,278.05
354	Connectors	VOC	0.000200	0.01	201.90
		Non-VOC	0.000200	0.06	1,162.56
		HAPs	0.000200	0.00	19.06
		CO2e	0.000200	1.15	22,251.03
78	Flanges	VOC	0.000390	0.00	86.75
		Non-VOC	0.000390	0.03	499.51
		HAPs	0.000390	0.00	8.19
		CO2e	0.000390	0.496077	9560.398660
Total VOCs:				0.21	4138.44
Total THC:				1.45	27967.91

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

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
312	Valves	Light Liquid VOC	0.002500	0.76	14,739.27
		Light Liquid Non-VOC	0.002500	0.02	292.89
		Light Liquid HAPs	0.002500	0.07	1,320.03
		CO2e	0.002500	0.13	2466.95
Total VOC:				0.76	14,739.27
Total THC:				0.78	15,032.16

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	18,877.71	2.15	9.44
Ethylbenzene		0.02	0.10
Toluene		0.01	0.05
Xylenes		0.06	0.25
n-Hexane		0.10	0.45
TAPs (Benzene)		0.00	0.01
HAPs		0.20	0.86
CO _{2e}	458,556.42	52.35	229.28

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

Table 5

**Pneumatic Control Valve Emissions
Cline Well Pad
Doddridge County, West Virginia
Antero Resources Corporation**

Number of PCVs	19
Bleed Rate (scf/day/PCV)	6.6
Total Bleed Rate (scf/day)	125.4

Component	Mol%	Molecular Weight (lb/lb-mole)	Component Flow (scf/day)	Component Moles (lb-moles)	Component Emissions		
					(lbs/day)	(lbs/hr)	(tons/year)
H2S	0.00E+00	34.08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.3703	14.01	0.4643562	1.22E-03	0.02	7.14E-04	0.00
Carbon Dioxide	0.1488	44.01	0.1865952	4.92E-04	0.02	9.02E-04	3.95E-03
Methane	80.6305	16.04	101.110647	0.27	4.27	0.18	0.78
Ethane	13.169	30.07	16.513926	0.04	1.31	0.05	0.24
Propane	3.6879	44.1	4.6246266	0.01	0.54	0.02	0.10
Isobutane	0.4747	58.12	0.5952738	1.57E-03	0.09	0.00	0.02
n-Butane	0.7783	58.12	0.9759882	2.57E-03	0.15	0.01	0.03
Isopentane	0.2558	72.15	0.3207732	8.45E-04	0.06	2.54E-03	0.01
n-Pentane	0.1633	72.15	0.2047782	5.40E-04	0.04	1.62E-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	0.3214	86.18	0.4030356	1.06E-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	0.0404	0.1769
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	0.0038	0.0167
HAPs Emissions	0.0038	0.0167
TAPs Emissions	0.00E+00	0.00E+00
CO _{2e} emissions	4.4528	19.5031

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

Table 6

**Uncontrolled Flashing Emissions
Cline Well Pad
Doddridge County, West Virginia
Antero Resources Corporation**

# Hours Operational	8760
---------------------	------

	Condensate Tank Flashing Losses			Produced Water Tank Flashing Losses			
	Vapor Mass Fraction wt%	Flashing Losses		Vapor Mass Fraction wt%	lb/hr	Flashing Losses	
		lbs/hr	tpy			lbs/hr	tpy
Water	0.1442	0.0422	0.1848	2.6887	0.0144	0.0000	0.0000
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0949	0.0278	0.1217	0.6544	0.0035	0.0035	0.0154
Carbon Dioxide	0.3040	0.0889	0.3895	3.0189	0.0162	0.0162	0.0708
Methane	14.4497	4.2276	18.5169	59.9554	0.3212	0.3212	1.4069
Ethane	24.3143	7.1137	31.1581	20.4573	0.1096	0.1096	0.4800
Propane	23.9382	7.0037	30.6761	8.9705	0.0481	0.0481	0.2105
Isobutane	6.2360	1.8245	7.9913	0.5317	0.0028	0.0028	0.0125
n-Butane	11.9058	3.4833	15.2569	1.8402	0.0099	0.0099	0.0432
Isopentane	4.9969	1.4620	6.4034	0.4637	0.0025	0.0025	0.0109
n-Pentane	3.9509	1.1559	5.0630	0.3337	0.0018	0.0018	0.0078
2-Methylpentane	1.3579	0.3973	1.7401	0.0504	0.0003	0.0003	0.0012
3-Methylpentane	0.8858	0.2592	1.1351	0.0880	0.0005	0.0005	0.0021
n-Hexane	2.2252	0.6510	2.8516	0.0650	0.0003	0.0003	0.0015
Methylcyclopentane	0.4362	0.1276	0.5590	0.1298	0.0007	0.0007	0.0030
Benzene	0.0438	0.0128	0.0562	0.0624	0.0003	0.0003	0.0015
2-Methylhexane	0.7361	0.2153	0.9432	0.0258	0.0001	0.0001	0.0006
3-Methylhexane	0.5739	0.1679	0.7354	0.0209	0.0001	0.0001	0.0005
Heptane	0.9183	0.2687	1.1768	0.0372	0.0002	0.0002	0.0009
Methylcyclohexane	0.6596	0.1930	0.8453	0.1228	0.0007	0.0007	0.0029
Toluene	0.1225	0.0359	0.1570	0.1594	0.0009	0.0009	0.0037
Octane	1.0643	0.3114	1.3639	0.0219	0.0001	0.0001	0.0005
Ethylbenzene	0.0747	0.0219	0.0957	0.0983	0.0005	0.0005	0.0023
m & p-Xylene	0.0581	0.0170	0.0745	0.0741	0.0004	0.0004	0.0017
o-Xylene	0.0892	0.0261	0.1143	0.1154	0.0006	0.0006	0.0027
Nonane	0.3037	0.0888	0.3891	0.0097	0.0001	0.0001	0.0002
C10+	0.1157	0.0339	0.1483	0.0043	0.0000	0.0000	0.0001
Total VOCs	60.693	17.76	77.8	13.225		0.0709	0.3103
Total CO _{2e}		105.78	463.3			8.05	35.2
Total TAPs (Benzene)		0.0128	0.0562			0.0003	0.0015
Toluene		0.0359	0.1570			0.0009	0.0037
Ethylbenzene		0.0219	0.0957			0.0005	0.0023
Xylenes		0.0431	0.1888			0.0010	0.0044
n-Hexane		0.651	2.852			0.0003	0.0015
Total HAPs		0.765	3.349			0.0031	0.0135
Total	100.00	29.26	128.1	100.00		0.521	2.28

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

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

Condensate Tank Information	
Number of Tanks	6
Maximum Working Losses (lbs/hr)	1.0141
Maximum Breathing Losses (lbs/hr)	2.5516
# 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	0.0047	4.77E-05	2.09E-04	0.0001	0.0005	0.0002	0.0007
Carbon Dioxide	0.3628	0.0037	0.0161	0.0093	0.0405	0.0129	0.0567
Methane	3.6657	0.0372	0.1628	0.0935	0.4097	0.1307	0.5725
Ethane	33.6453	0.3412	1.4944	0.8585	3.7602	1.1997	5.2546
Propane	28.0148	0.2841	1.2443	0.7148	3.1310	0.9989	4.3753
Isobutane	6.7507	0.0685	0.2998	0.1723	0.7545	0.2407	1.0543
n-Butane	12.6646	0.1284	0.5625	0.3232	1.4154	0.4516	1.9779
Isopentane	5.0462	0.0512	0.2241	0.1288	0.5640	0.1799	0.7881
n-Pentane	3.9473	0.0400	0.1753	0.1007	0.4411	0.1407	0.6165
2-Methylpentane	1.3212	0.0134	0.0587	0.0337	0.1477	0.0471	0.2063
3-Methylpentane	0.8600	0.0087	0.0382	0.0219	0.0961	0.0307	0.1343
n-Hexane	0.1469	0.0015	0.0065	0.0037	0.0164	0.0052	0.0229
Methylcyclopentane	0.3943	0.0040	0.0175	0.0101	0.0441	0.0141	0.0616
Benzene	0.0025	2.52E-05	0.0001	0.0001	0.0003	0.0001	0.0004
2-Methylhexane	0.0456	4.62E-04	0.0020	0.0012	0.0051	0.0016	0.0071
3-Methylhexane	0.5353	0.0054	0.0238	0.0137	0.0598	0.0191	0.0836
Heptane	0.7896	0.0080	0.0351	0.0201	0.0882	0.0282	0.1233
Methylcyclohexane	0.5733	0.0058	0.0255	0.0146	0.0641	0.0204	0.0895
Toluene	0.0147	1.49E-04	6.51E-04	0.0004	0.0016	0.0005	0.0023
Octane	0.8630	0.0088	0.0383	0.0220	0.0965	0.0308	0.1348
Ethylbenzene	0.0168	1.71E-04	7.47E-04	0.0004	0.0019	0.0006	0.0026
m & p-Xylene	0.0169	1.71E-04	7.50E-04	0.0004	0.0019	0.0006	0.0026
o-Xylene	0.0224	2.28E-04	0.0010	0.0006	0.0025	0.0008	0.0035
Nonane	0.2222	0.0023	0.0099	0.0057	0.0248	0.0079	0.0347
C10+	0.0732	7.42E-04	0.0033	0.0019	0.0082	0.0026	0.0114
Total VOCs	62.321	0.6320	2.768	1.5902	6.9651	2.2222	9.733
Total CO _{2e}		0.9330	4.0865	2.3476	10.2826	3.2806	14.369
Total TAPs (Benzene)		2.52E-05	1.10E-04	0.0001	0.0003	0.0001	0.0004
Toluene		1.49E-04	6.51E-04	0.0004	0.0016	0.0005	0.0023
Ethylbenzene		1.71E-04	7.47E-04	0.0004	0.0019	0.0006	0.0026
Xylenes		3.99E-04	0.0017	0.0010	0.0044	0.0014	0.0061
n-Hexane		0.0015	0.0065	0.0037	0.0164	0.0052	0.0229
Total HAPs		0.0022	0.0098	0.0056	0.0246	0.0079	0.0344
Total	100.00	1.0141	4.4416	2.5516	11.1761	3.5657	15.618

Table 7

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

Produced Water Tank Information	
Number of Tanks	2
Maximum Working Losses (lbs/hr)	0.0200
Maximum Breathing Losses (lbs/hr)	0.0083

	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	0.0127	2.54E-06	1.11E-05	1.06E-06	4.63E-06	3.60E-06	1.58E-05
Carbon Dioxide	3.9538	0.0008	0.0035	0.0003	0.0014	0.0011	0.0049
Methane	3.2386	0.0006	0.0028	0.0003	0.0012	0.0009	0.0040
Ethane	1.0198	0.0002	0.0009	0.0001	0.0004	0.0003	0.0013
Propane	0.1090	2.18E-05	0.0001	9.06E-06	3.97E-05	3.08E-05	0.0001
Isobutane	0.0008	1.62E-07	7.08E-07	6.72E-08	2.94E-07	2.29E-07	1.00E-06
n-Butane	0.0042	8.42E-07	3.69E-06	3.50E-07	1.53E-06	1.19E-06	5.22E-06
Isopentane	0.0003	5.32E-08	2.33E-07	2.21E-08	9.68E-08	7.53E-08	3.30E-07
n-Pentane	0.0001	2.79E-08	1.22E-07	1.16E-08	5.08E-08	3.95E-08	1.73E-07
2-Methylpentane	4.02E-06	8.04E-10	3.52E-09	3.34E-10	1.46E-09	1.14E-09	4.99E-09
3-Methylpentane	1.70E-05	3.41E-09	1.49E-08	1.42E-09	6.20E-09	4.82E-09	2.11E-08
n-Hexane	2.01E-07	4.02E-11	1.76E-10	1.67E-11	7.32E-11	5.69E-11	2.49E-10
Methylcyclopentane	5.41E-05	1.08E-08	4.74E-08	4.49E-09	1.97E-08	1.53E-08	6.70E-08
Benzene	7.99E-05	1.60E-08	7.00E-08	6.64E-09	2.91E-08	2.26E-08	9.91E-08
2-Methylhexane	3.38E-08	6.76E-12	2.96E-11	2.81E-12	1.23E-11	9.56E-12	4.19E-11
3-Methylhexane	4.10E-07	8.19E-11	3.59E-10	3.40E-11	1.49E-10	1.16E-10	5.08E-10
Heptane	5.35E-07	1.07E-10	4.69E-10	4.45E-11	1.95E-10	1.52E-10	6.64E-10
Methylcyclohexane	1.09E-05	2.18E-09	9.57E-09	9.08E-10	3.98E-09	3.09E-09	1.35E-08
Toluene	9.82E-05	1.96E-08	8.60E-08	8.16E-09	3.57E-08	2.78E-08	1.22E-07
Octane	6.16E-08	1.23E-11	5.39E-11	5.11E-12	2.24E-11	1.74E-11	7.63E-11
Ethylbenzene	3.41E-05	6.81E-09	2.98E-08	2.83E-09	1.24E-08	9.64E-09	4.22E-08
m & p-Xylene	2.87E-05	5.73E-09	2.51E-08	2.38E-09	1.04E-08	8.12E-09	3.55E-08
o-Xylene	4.67E-05	9.33E-09	4.09E-08	3.88E-09	1.70E-08	1.32E-08	5.79E-08
Nonane	1.28E-08	2.56E-12	1.12E-11	1.06E-12	4.66E-12	3.62E-12	1.59E-11
C10+	8.59E-10	1.72E-13	7.52E-13	7.14E-14	3.13E-13	2.43E-13	1.06E-12
Total VOCs	0.1148	2.30E-05	0.0001	9.54E-06	4.18E-05	3.25E-05	0.0001
Total CO _{2e}		0.0170	0.0744	0.0071	0.0309	0.0240	0.1053
Total TAPs (Benzene)		1.60E-08	7.00E-08	6.64E-09	2.91E-08	2.26E-08	9.91E-08
Toluene		1.96E-08	8.60E-08	8.16E-09	3.57E-08	2.78E-08	1.22E-07
Ethylbenzene		6.81E-09	2.98E-08	2.83E-09	1.24E-08	9.64E-09	4.22E-08
Xylenes		1.51E-08	6.60E-08	6.26E-09	2.74E-08	2.13E-08	9.34E-08
n-Hexane		4.02E-11	1.76E-10	1.67E-11	7.32E-11	5.69E-11	2.49E-10
Total HAPs		5.75E-08	2.52E-07	2.39E-08	1.05E-07	8.14E-08	3.57E-07
Total	100.00	0.0200	0.0876	0.0083	0.0364	0.0283	0.1240

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

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

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	8.21	1.0242
Annual Average Temp (F)	72.1	72.1
S (saturation factor)	0.6	0.6
P (true vapor pressure)	6.97	0.45
M (MW of vapor)	39.82	18.46
Collection Efficiency (%)	0.00	0.00
Loading Loss (lb/10 ³ gal)*	3.90	0.12
Maximum Throughput (gallons/hr)**	10,080	10,080
Average Throughput (gallons/yr)	919,800	1,839,600
Loading Emissions (lbs/hr)	39.32	1.17
Loading Emissions (tpy)	1.79	0.11

	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	0.0047	1.85E-03	8.43E-05	0.0127	1.49E-04	1.36E-05
Carbon Dioxide	0.3628	0.1426	6.51E-03	3.9538	4.63E-02	4.22E-03
Methane	3.6657	1.4412	6.58E-02	3.2386	3.79E-02	3.46E-03
Ethane	33.6453	13.2277	0.6035	1.0198	1.19E-02	1.09E-03
Propane	28.0148	11.0140	5.03E-01	0.1090	1.28E-03	1.16E-04
Isobutane	6.7507	2.6540	1.21E-01	0.0008	9.47E-06	8.64E-07
n-Butane	12.6646	4.9791	2.27E-01	0.0042	4.93E-05	4.50E-06
Isopentane	5.0462	1.9839	9.05E-02	0.0003	3.11E-06	2.84E-07
n-Pentane	3.9473	1.5519	7.08E-02	0.0001	1.63E-06	1.49E-07
2-Methylpentane	1.3212	0.5194	2.37E-02	4.02E-06	4.71E-08	4.30E-09
3-Methylpentane	0.8600	0.3381	1.54E-02	1.70E-05	1.99E-07	1.82E-08
n-Hexane	0.1469	0.0578	2.63E-03	2.01E-07	2.35E-09	2.15E-10
Methylcyclopentane	0.3943	0.1550	7.07E-03	5.41E-05	6.33E-07	5.77E-08
Benzene	0.0025	0.0010	4.46E-05	0.0001	9.35E-07	8.54E-08
2-Methylhexane	0.0456	0.0179	8.17E-04	3.38E-08	3.95E-10	3.61E-11
3-Methylhexane	0.5353	0.2105	9.60E-03	4.10E-07	4.79E-09	4.37E-10
Heptane	0.7896	0.3104	1.42E-02	5.35E-07	6.27E-09	5.72E-10
Methylcyclohexane	0.5733	0.2254	1.03E-02	1.09E-05	1.28E-07	1.17E-08
Toluene	0.0147	0.0058	2.63E-04	0.0001	1.15E-06	1.05E-07
Octane	0.8630	0.3393	1.55E-02	6.16E-08	7.20E-10	6.57E-11
Ethylbenzene	0.0168	0.0066	3.02E-04	3.41E-05	3.99E-07	3.64E-08
m & p-Xylene	0.0169	0.0066	3.03E-04	2.87E-05	3.36E-07	3.06E-08
o-Xylene	0.0224	0.0088	4.02E-04	4.67E-05	5.46E-07	4.98E-08
Nonane	0.2222	0.0873	3.98E-03	1.28E-08	1.50E-10	1.37E-11
C10+	0.0732	0.0288	1.31E-03	8.59E-10	1.01E-11	9.17E-13
Total VOCs	62.3214	24.5017	1.1179	0.1148	1.34E-03	1.23E-04
Total CO _{2e}		36.1721	1.6504		0.9936	0.0907
Total TAPs (Benzene)		0.0010	4.46E-05		9.35E-07	8.54E-08
Toluene		0.0058	2.63E-04		1.15E-06	1.05E-07
Ethylbenzene		0.0066	3.02E-04		3.99E-07	3.64E-08
Xylenes		0.0155	7.05E-04		8.82E-07	8.05E-08
n-Hexane		0.0578	2.63E-03		2.35E-09	2.15E-10
Total HAPs		0.0866	3.95E-03		3.37E-06	3.07E-07
Total	100.0000	39.3150	1.7937	100.0000	1.1701	0.1068

Enter any notes here

Vapor mass fractions and loading losses from Promax output

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

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

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

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

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

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

Loading emissions are vented to the atmosphere.

Table 9

**Gas Production Unit Heater Emissions
Cline Well Pad
Doddridge County, West Virginia
Antero Resources Corporation**

Gas Production Unit Heater Emissions

Number of Units	5
GPU Heater Rating (MMBtu/hr)	1.00
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,201

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	0.416	1.824
CO	84	0.350	1.532
CO ₂	120,000	499.677	2188.585
Lead	0.0005	2.08E-06	9.12E-06
N ₂ O	2.2	0.009	0.040
PM (Total)	7.6	0.032	0.139
SO ₂	0.6	0.002	0.011
TOC	11	0.046	0.201
Methane	2.3	0.010	0.042
VOC	5.5	0.023	0.100
HAPS			
2-Methylnaphthalene	2.40E-05	9.99E-08	4.38E-07
Benzene	2.10E-03	8.74E-06	3.83E-05
Dichlorobenzene	1.20E-03	5.00E-06	2.19E-05
Fluoranthene	3.00E-06	1.25E-08	5.47E-08
Fluorene	2.80E-06	1.17E-08	5.11E-08
Formaldehyde	7.50E-02	3.12E-04	1.37E-03
Hexane	1.80E+00	7.50E-03	3.28E-02
Naphthalene	6.10E-04	2.54E-06	1.11E-05
Phenanthrene	1.70E-05	7.08E-08	3.10E-07
Toluene	3.40E-03	1.42E-05	6.20E-05

Gas Production Unit Heater Emissions

Number of Units	1
Line Heater Rating (MMBtu/hr)	1.50
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,201

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	0.125	0.547
CO	84	0.105	0.460
CO ₂	120,000	149.903	656.575
Lead	0.0005	6.25E-07	2.74E-06
N ₂ O	2.2	0.003	0.012
PM (Total)	7.6	0.009	0.042
SO ₂	0.6	0.001	0.003
TOC	11	0.014	0.060
Methane	2.3	0.003	0.013
VOC	5.5	0.007	0.030
HAPS			
2-Methylnaphthalene	2.40E-05	3.00E-08	1.31E-07
Benzene	2.10E-03	2.62E-06	1.15E-05
Dichlorobenzene	1.20E-03	1.50E-06	6.57E-06
Fluoranthene	3.00E-06	3.75E-09	1.64E-08
Fluorene	2.80E-06	3.50E-09	1.53E-08
Formaldehyde	7.50E-02	9.37E-05	4.10E-04
Hexane	1.80E+00	2.25E-03	9.85E-03
Naphthalene	6.10E-04	7.62E-07	3.34E-06
Phenanthrene	1.70E-05	2.12E-08	9.30E-08
Toluene	3.40E-03	4.25E-06	1.86E-05

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.007	0.030
TOTAL Uncontrolled HAPs	0.002	0.010
TOTAL Uncontrolled TAPs (Benzene)	0.000	0.000
TOTAL Uncontrolled TAPs (Formaldehyde)	0.000	0.000
TOTAL CO _{2e} Emissions	150.79	660.48

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.030	0.130
TOTAL Uncontrolled HAPs	0.010	0.045
TOTAL Uncontrolled TAPs (Benzene)	1.14E-05	4.98E-05
TOTAL Uncontrolled Toluene	1.84E-05	8.06E-05
TOTAL Uncontrolled Hexane	9.74E-03	4.27E-02
TOTAL Uncontrolled TAPs (Formaldehyde)	4.06E-04	1.78E-03
TOTAL CO _{2e} Emissions	653.44	2,862.07

Enter any notes here:

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

Table 10

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

General Information	
Unit Name:	EC001

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

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

Destruction Efficiency	
VOC percent destruction efficiency (%)	98
H ₂ S percent destruction efficiency (%)	98

Enclosed Combustor operating hours	8760
No. of Enclosed Combustors	1

Stream Information							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed/Vapor Combustor (Enter Name of Each Stream Here)	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
Maximum Expected Hourly Volumetric Flow Rate of Stream (scf/hr)	12.6	--	278.85	10.72	33.98	0.58	336.73
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	110,376.00	--	2,442,726.42	93,872.70	297,702.13	5,095.61	2,949,772.86
Heating Content (Btu/ft ³)	1,201		1,876.79	1,053.17	1,876.79	1,053.17	1,778.93

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	-
H ₂ S	-	-	0.000	0.000	0.000	0.000	0.000
Total VOC	-	-	17.757	0.071	2.222	0.000	20.05
Benzene	-	-	0.013	0.000	0.000	0.000	0.013
Toluene	-	-	0.036	0.001	0.001	0.000	0.037
Ethylbenzene	-	-	0.022	0.001	0.001	0.000	0.023
Xylenes	-	-	0.043	0.001	0.001	0.000	0.046
n-Hexane	-	-	0.651	0.000	0.005	0.000	0.657
HAPs	-	-	0.765	0.003	0.008	0.000	0.776
Total Mass Flow	-	-	29.257	0.521	3.566	0.028	33.373

Mass Flow Rates of the Vapors Sent to this Control Device, Annual Basis (tpy)							
	1	2	3	4	5	6	Total
H ₂ S	-	-	0.000	0.000	0.000	0.000	0.000
Total VOC	-	-	77.776	0.310	9.733	0.000	87.820
Benzene	-	-	0.056	0.001	0.000	0.000	0.058
Toluene	-	-	0.157	0.004	0.002	0.000	0.163
Ethylbenzene	-	-	0.096	0.002	0.003	0.000	0.101
Xylenes	-	-	0.189	0.004	0.006	0.000	0.199
n-Hexane	-	-	2.852	0.002	0.023	0.000	2.876
HAP	-	-	3.349	0.013	0.034	0.000	3.397
Total Mass Flow	-	-	128.147	2.283	15.618	0.124	146.172

Table 10

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

Controlled Emissions							
Hourly (lb/hr)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.001	-	0.028	0.001	0.003	0.000	0.03
CO	0.001	-	0.023	0.001	0.003	0.000	0.03
PM2.5	0.000	-	0.002	0.000	0.000	0.000	0.00
PM10	0.000	-	0.002	0.000	0.000	0.000	0.00
H2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO ₂	0.000	-	0.000	0.000	0.000	0.000	0.00
CO ₂	1.512	-	-	-	-	-	1.51
Total VOC	0.000	-	0.355	0.001	0.044	0.000	0.40
Benzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.001	0.000	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.001	0.000	0.000	0.000	0.00
n-Hexane	0.000	-	0.013	0.000	0.000	0.000	0.01
HAP	0.000	-	0.015	0.000	0.000	0.000	0.02
N ₂ O	0.000	-	0.001	0.000	0.000	0.000	0.00
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00
Annual (tpy)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.006	-	0.122	0.005	0.015	0.000	0.15
CO	0.005	-	0.103	0.004	0.013	0.000	0.12
PM2.5	0.000	-	0.007	0.000	0.001	0.000	0.01
PM10	0.000	-	0.009	0.000	0.001	0.000	0.01
H ₂ S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO ₂	0.000	-	0.000	0.000	0.000	0.000	0.00
CO ₂	6.623	-	-	-	-	-	6.62
Total VOC	0.000	-	1.556	0.006	0.195	0.000	1.76
Benzene	0.000	-	0.001	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.003	0.000	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.002	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.004	0.000	0.000	0.000	0.00
n-Hexane	0.000	-	0.057	0.000	0.000	0.000	0.06
HAP	0.000	-	0.067	0.000	0.001	0.000	0.07
N ₂ O	0.000	-	0.003	0.000	0.000	0.000	0.00
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00

Enclosed Combustor/Vapor Combustor Total Emissions		
	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Total VOC	0.40	1.76
NOx	3.37E-02	1.47E-01
CO	2.83E-02	1.24E-01
PM2.5	1.92E-03	8.41E-03
PM10	2.56E-03	1.12E-02
H ₂ S	4.02E-06	1.76E-05
SO ₂	7.56E-06	3.31E-05
Benzene (TAPs)	2.65E-04	1.16E-03
Toluene	7.45E-04	3.26E-03
Ethylbenzene	4.60E-04	2.01E-03
Xylenes	9.11E-04	3.99E-03
Hexanes	1.32E-02	5.76E-02
Formaldehyde (TAPs)	9.45E-07	4.14E-06
HAPs	0.02	0.07
CO ₂ e	93.94	411.47
N ₂ O	7.41E-04	3.24E-03
Lead	1.68E-07	7.37E-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
Cline Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Enclosed Combustor CO₂ and CH₄ Emissions

Components	Mole fraction of oil flash gas constituents ^a	Volume of oil flash gas sent to Enclosed Combustor scf/year	Mole fraction of water flash gas constituents ^a	Volume of water flash gas sent to Enclosed Combustor scf/year	Mole fraction of oil tank vapors constituents ^a	Volume of oil tank vapor sent to Enclosed Combustor scf/year	Mole fraction of water tank vapors constituents ^a	Volume of water tank vapors sent to Enclosed Combustor scf/year	Component volume of gas sent to Enclosed Combustor scf/year	Number of carbon atoms	Combustion Efficiency	Combusted CO ₂ Volume ^b scf/year	Uncombusted CO ₂ and CH ₄ Volume ^b scf/year	Volume GHGs Emitted scf/year
CO ₂	0.002	2,442,726	0.0139	93,873	0.0033	297,702	0.017	5,096	8,361	1	0	--	8,361	6,611,736
Methane	0.320	2,442,726	0.7552	93,873	0.0910	297,702	0.037	5,096	880,580	1	0.98	862,968	17,612	17,612
Ethane	0.287	2,442,726	0.1375	93,873	0.4455	297,702	0.006	5,096	847,838	2	0.98	1,661,762	--	--
Propane	0.193	2,442,726	0.0411	93,873	0.2530	297,702	0.000	5,096	550,613	3	0.98	1,618,802	--	--
i-Butane	0.038	2,442,726	0.0018	93,873	0.0462	297,702	0.000	5,096	107,129	4	0.98	419,944	--	--
n-Butane	0.073	2,442,726	0.0064	93,873	0.0868	297,702	0.000	5,096	204,343	4	0.98	801,025	--	--
Pentane	0.044	2,442,726	0.0022	93,873	0.0496	297,702	0.000	5,096	122,697	5	0.98	601,214	--	--
Hexane	0.018	2,442,726	0.0005	93,873	0.0108	297,702	0.000	5,096	48,284	6	0.98	283,911	--	--
Benzene	0.000	2,442,726	0.0002	93,873	0.0000	297,702	0.000	5,096	506	6	0.98	2,978	--	--
Heptanes	0.010	2,442,726	0.0005	93,873	0.0073	297,702	0.000	5,096	26,037	7	0.98	178,611	--	--
Toluene	0.000	2,442,726	0.0003	93,873	0.0001	297,702	0.000	5,096	1,207	7	0.98	8,279	--	--
Octane	0.006	2,442,726	0.0003	93,873	0.0053	297,702	0.000	5,096	15,542	8	0.98	121,846	--	--
Ethyl benzene	0.000	2,442,726	0.0002	93,873	0.0001	297,702	0.000	5,096	647	8	0.98	5,075	--	--
Xylenes	0.000	2,442,726	0.0004	93,873	0.0001	297,702	0.000	5,096	1,283	8	0.98	10,060	--	--
Nonane	0.001	2,442,726	0.0000	93,873	0.0007	297,702	0.000	5,096	2,264	9	0.98	19,969	--	--
Decane plus	0.000	2,442,726	0.0000	93,873	0.0002	297,702	0.000	5,096	707	10	0.98	6,931	--	--
Subtotal												6,603,375	--	--

Pollutant	Volume Emitted scf/year	Density of GHG ^c lb/scf	Conversion Factor lb/ton	GWF	Emissions ^c	
					lbs/hr	(tons/yr)
CO ₂	6,611,736	0.12	2000	1	87.52	383.36
CH ₄	17,612	0.09	2000	25	0.19	0.82
CO₂e Emissions					92.2	403.84

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
Cline Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

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

Tanker Truck Trip Calculation	
Condensate Production (bb/day)	60
PW Production (bb/day)	120
Truck Capacity (bb)	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	0.1500	1	110	0.1500	16.5000	3.8175	1.7179
Tanker Trucks PW	10	40	10	0.1500	1	219	0.1500	32.8500	3.8175	1.7179
Pick Up Truck	4	3	10	0.2500	1	730	0.2500	182.5000	0.3467	0.1560

	Uncontrolled Emissions						Controlled Emissions					
	PM			PM10			PM			PM10		
	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)
Tanker Trucks Condensate	0.5726	62.9892	0.0315	0.2577	28.3452	0.0142	0.2863	31.4946	0.0157	0.1288	14.1726	0.0071
Tanker Trucks PW	0.5726	125.4058	0.0627	0.2577	56.4326	0.0282	0.2863	62.7029	0.0314	0.1288	28.2163	0.0141
Pick Up Truck	0.0867	63.2690	0.0316	0.0390	28.4711	0.0142	0.0433	31.6345	0.0158	0.0195	14.2355	0.0071
Total Emissions	1.2319	251.6641	0.1258	0.5544	113.2489	0.0566	0.6160	125.8321	0.0629	0.2772	56.6244	0.0283

Enter any notes here:	1 EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (11/06); assume 2:1 moisture ratio Section 13.2.2 Unpaved Roads (11/06) Source: Attachment L, Fugitive Emissions from Unpaved Haul Roads, Rev 03/2007, West Virginia Department of Environmental Protection
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Table 13

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

Pollutant	Potential Emissions		Initial Permit Application Emissions		Change in Emissions	
	Hourly PTE	Yearly PTE	Hourly PTE	Yearly PTE	Hourly PTE	Yearly PTE
PM	0.6692	0.2959	0.3764	0.4244	2.93E-01	-0.1285
PM10	0.3304	0.2613	0.1950	0.3032	0.1354	-0.0419
VOC (uncontrolled)	22.2822	98.7142	18.9329	86.1246	3.3493	12.5896
CO	0.5879	2.5751	6.1356	26.8740	-5.5477	-24.2989
NOx	0.6999	3.0656	0.9005	3.9441	-0.2006	-0.8785
SO2	0.0040	0.0175	0.0034	0.0148	6.35E-04	2.78E-03
Pb	3.50E-06	1.53E-05	2.92E-06	1.28E-05	5.76E-07	2.52E-06
HAPs	0.2272	0.9990	0.2223	0.9852	0.0048	0.0138
TAPs	0.0020	0.0089	0.0070	0.0309	-5.00E-03	-0.0220

Notes:

1. The change in emissions is due to removal of Kubota engine and change in storage tanks service.
2. Change in permit from G70A to G70B.



Bryan Research & Engineering, Inc.

ProMax[®] 3.2

with
TSWEET[®] & PROSIM[®]

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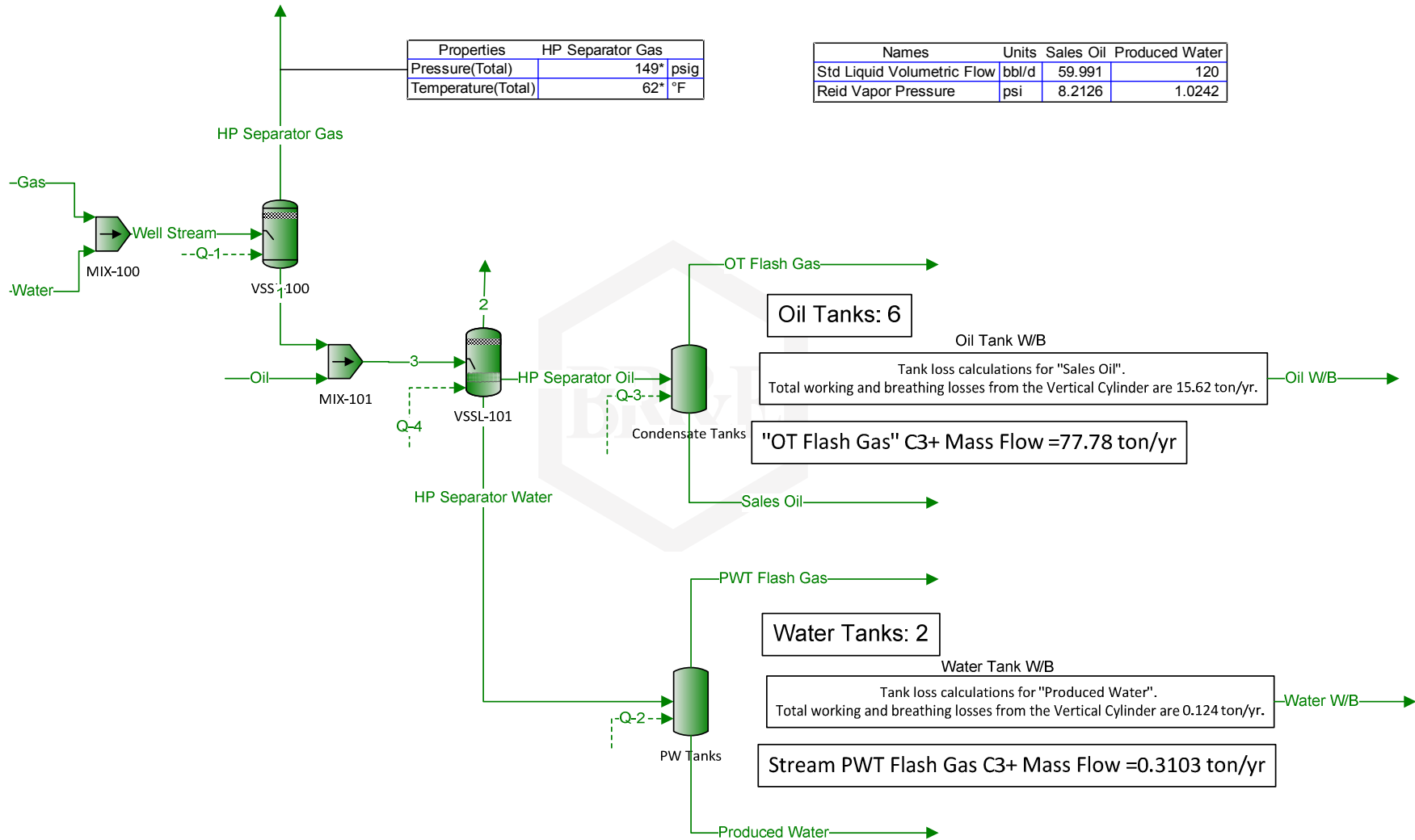
Simulation Report

Client Name:	Antero Resources Corporation
Location:	West Virginia
Job:	Cline Well Pad
Project Name:	PROMAX SCENARIO 3
File Name:	ProMax@V:\AirQuality\ANTERO RESOURCES\ProMax\Antero WV_Old\PROMAX SCENARIO 3.PMX
ProMax Version:	3.2.13330.0
Report Created:	3/15/2016 13:52

Stream HP Separator Gas C3+ Mass Flow =2.270E+04 ton/yr

Properties	HP Separator Gas
Pressure(Total)	149* psig
Temperature(Total)	62* °F

Names	Units	Sales Oil	Produced Water
Std Liquid Volumetric Flow	bbl/d	59.991	120
Reid Vapor Pressure	psi	8.2126	1.0242



Oil Tanks: 6

Oil Tank W/B
Tank loss calculations for "Sales Oil".
Total working and breathing losses from the Vertical Cylinder are 15.62 ton/yr.

"OT Flash Gas" C3+ Mass Flow =77.78 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 0.124 ton/yr.

Stream PWT Flash Gas C3+ Mass Flow =0.3103 ton/yr



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

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

Date Sampled: 05/17/2013

Date Analyzed: 06/03/2013

Job Number: J33542

Sample: Tom's Fork No. 1H

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

(1) - Scf of water saturated vapor per barrel of stock tank water

(2) - Air = 1.000

(3) - Separator volume / Stock tank volume

Analyst: A. A.

Piston No. : WF-305*

Base Conditions: 14.65 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

 David Dannhaus 361-661-7015

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

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

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

Date Sampled: 05/17/13

Job Number: 33542.001

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT

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

Computed Real Characteristics Of Heptanes Plus:

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

Computed Real Characteristics Of Total Sample:

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

*Hydrogen Sulfide tested in laboratory by: Stained Tube Method (GPA 2377)

Results: <0.013 Gr/100 CF, <0.2 PPMV or <0.001 Mol %

Base Conditions: 14.650 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

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

David Dannhaus 361-661-7015

**CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT**

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

Computed Real Characteristics Of Total Sample:

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

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

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

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

Date Sampled: 05/17/13

Job Number: 33542.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

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

Characteristics of Heptanes Plus:

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

Characteristics of Total Sample:

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

Base Conditions: 14.650 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

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

David Dannhaus 361-661-7015

TOTAL EXTENDED REPORT

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

Antero Resources Erwin Unit 1H well

Erwin Hilltop Well Pad

Tag Name	Value	Units	Timestamp
Accumulated Gas Flow	770780.8	MCF	7/2/2013 16:05:12
Well Casing Pressure	292.29	PSIA	7/2/2013 16:05:31
Current Day Gas Flow	1055.6	MCF	7/2/2013 16:05:12
Differential Pressure	14.43	inH2O	7/2/2013 16:05:12
Flow Rate	4126.29	MCF Per Day	7/2/2013 16:05:12
Sales Line Pressure	145.44	PSIA	7/2/2013 16:05:12
Previous Day Energy	4957.7	MBTU	7/2/2013 16:05:16
Previous Day Gas Flow	4128.74	MCF	7/2/2013 16:05:16
Separator Temperature	72.74	F	7/2/2013 16:05:12
Well Tubing Pressure	515.39	PSIA	7/2/2013 16:05:31
Hourly AP	145.52	PSIA	7/2/2013 11:00:00
Hourly DP	14.45	Inches	7/2/2013 11:00:00
Hourly Energy	207	MBTU	7/2/2013 11:00:00
Hourly Flow Time	3600	Seconds	7/2/2013 11:00:00
Hourly Tf	70.6	F	7/2/2013 11:00:00
Hourly Volume	172.4	MCF	7/2/2013 11:00:00
Daily AP	14.58	PSIA	7/2/2013 10:00:00
Daily DP	143.44	inH2O	7/2/2013 10:00:00
Daily Energy	4957.7	MBTU	7/2/2013 10:00:00
Daily Flow	4128.74	MCF	7/2/2013 10:00:00
Sales Line Temperature Daily Tf	70.01	F	7/2/2013 10:00:00
Argon	0	%	7/2/2013 16:05:11
BTU	1200.776	BTU	7/2/2013 16:05:12
C02	0.1488	%	7/2/2013 16:05:11
Carbon Monoxide	0	%	7/2/2013 16:05:11
Decane	0	%	7/2/2013 16:05:11
Ethane	13.169	%	7/2/2013 16:05:11
Helium	0	%	7/2/2013 16:05:11
Heptane	0	%	7/2/2013 16:05:11
Hexane	0.3214	%	7/2/2013 16:05:11
Hydrogen	0	%	7/2/2013 16:05:11
Hydrogen Sulfide	0	%	7/2/2013 16:05:11
Iso-Butane	0.4747	%	7/2/2013 16:05:11
Iso-Pentane	0.2558	%	7/2/2013 16:05:11
Methane	80.6305	%	7/2/2013 16:05:11
N2	0.3703	%	7/2/2013 16:05:11
N-Butane	0.7783	%	7/2/2013 16:05:11
Nonane	0	%	7/2/2013 16:05:11
N-Pentane	0.1633	%	7/2/2013 16:05:11
Octane	0	%	7/2/2013 16:05:11
Oxygen	0	%	7/2/2013 16:05:11
Plate Size	3.75	Inches	7/2/2013 16:05:15
Propane	3.6879	%	7/2/2013 16:05:11
SPG	0.6913		7/2/2013 16:05:12
Water	0	%	7/2/2013 16:05:11

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									0.2772	0.0283				
EP-PCV					0.0404	0.1769							4.4528	19.5031
F001					2.1550	9.4389							52.3466	229.2782
EP-GPU001, EP-GPU002, EP-GPU003, EP-GPU004, EP-GPU005, EP-GPU006	0.5413	2.3710	0.4547	1.9916	0.0298	0.1304	0.0032	0.0142	0.0411	0.1802	0.0411	0.1802	649.5799	2845.1601
EP-L001					24.5017	1.1179							36.1721	1.6504
EP-L002					1.34E-03	1.23E-04							0.9936	0.0907
EP-EC001	0.0337	0.1475	0.0283	0.1239	0.4011	1.7567	7.56E-06	3.31E-05	0.0026	0.0112	0.0019	0.0084	93.9425	411.4680
TOTAL	0.6999	3.0656	0.5879	2.5751	0.4377	1.9172	0.0040	0.0175	0.0532	0.2330	0.0526	0.2302	893.4255	3913.2036

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	0.0038	0.0167	0.0038	0.0167
F001			0.0012	0.0054	0.0122	0.0533	0.0223	0.0977	0.0564	0.2470	0.1032	0.4520	0.1953	0.8553
EP-GPU001, EP-GPU002, EP-GPU003, EP-GPU004, EP-GPU005, EP-GPU006	0.0004	0.0018	1.14E-05	4.98E-05	1.42E-05	0.0001			0.00E+00	0.00E+00	0.0075	0.0328	0.0102	0.0446
L001			9.77E-04	4.46E-05	5.77E-03	2.63E-04	6.62E-03	3.02E-04	1.55E-02	7.05E-04	5.78E-02	2.63E-03	8.66E-02	3.95E-03
L002			9.35E-07	8.54E-08	1.15E-06	1.05E-07	3.99E-07	3.64E-08	8.82E-07	8.05E-08	2.35E-09	2.15E-10	3.37E-06	3.07E-07
EP-EC001	9.45E-07	4.14E-06	0.0003	0.0012	0.0007	0.0033	0.0005	0.0020	0.0009	0.0040	0.0132	0.0576	0.0155	0.0680
TOTAL	0.0005	0.0022	0.0003	0.0012	0.0008	0.0033	0.0005	0.0020	0.0009	0.0040	0.0229	0.1003	0.0281	0.1230

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
Cline Well Pad
Antero Resources Corporation
Doddridge County, West Virginia**

Notice is given that Antero Resources Corporation has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-B General Permit Modification for an Oil and Natural Gas Production facility located at near the intersection of WV 18 S and Co Rte 18/16, near New Milton in Doddridge County, West Virginia.

The latitude and longitude coordinates are: 39.185838 degrees N and -80.699594 degrees W

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

Pollutants	TOTALS (tpy):
NO _x	3.0656
CO	2.5751
PM _{2.5}	0.2302
PM ₁₀	0.2330
VOC	1.9172
SO ₂	0.0175
Formaldehyde	0.0022
Benzene	0.0012
Toluene	0.0033
Ethylbenzene	0.0020
Xylenes	0.0040
Hexane	0.1003
Total HAPs	0.1230

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

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

Dated this the __ day of _____, 2016

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

www.ghd.com

