



September 7, 2016

Reference No. 082715

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

Dear Ms. Beverly McKeone:

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

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

1. Increase in production
2. Removal of 1 Kubota Engine
3. Addition of 1 Cimarron enclosed combustor
4. Addition of 8 line heaters
5. Addition of 5 HP VRU Ford engines
6. Addition of 2 LP VRU Ford engines
7. Addition of 3 VRTs

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

Enclosed are the following documents:

- Original copy of the G70-C General Permit Modification Application.
- Two CD copies of the G70-C General Permit Modification Application.
- The application fee with check no. 454515 in the amount of \$1,500.00.

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

Sincerely,

GHD Services Inc.

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

Manuel Bautista

MB/ma/270

Encl.

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



## General Permit G70-C Modification Application

Increase in production, the removal of (1) Kubota Engine, and the addition of (1) Cimarron enclosed combustor, (8) line heaters, (5) HP VRU Ford engines, (2) LP VRU Ford engines, and (3) VRTs.

Stanley Well Pad

Antero Resources Corporation

GHD Services Inc.  
6320 Rothway Suite 100 Houston Texas 77040  
082715 | Report No 270 | August 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-C GENERAL PERMIT REGISTRATION APPLICATION

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

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

SECTION 1. GENERAL INFORMATION

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

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

Applicant's Mailing Address: 1615 Wynkoop Street

City: Denver State: CO ZIP Code: 80202

Facility Name: Stanley Well Pad

Operating Site Physical Address: 428 Cabin Run Rd

City: West Union Zip Code: 26456 County: Doddridge

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

Latitude: 39.23680
Longitude: -80.87963

SIC Code: 1311 DAQ Facility ID No. (For existing facilities)
NAICS Code: 211111 017-00156

CERTIFICATION OF INFORMATION

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

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

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

Responsible Official Signature:
Name and Title: Phone: Fax:
Email: Date:

If applicable:
Authorized Representative Signature: Barry Schatz
Name and Title: Barry Schatz/ Senior Environmental & Regulatory Manager Phone: 303-357-7276 Fax: 303-357-7315
Email: bschatz@anteroresources.com Date: 9/7/2016

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

<b>OPERATING SITE INFORMATION</b>	
Briefly describe the proposed new operation and/or any change(s) to the facility: Increase in production, the removal of (1) Kubota Engine, and the addition of (1) Cimarron enclosed combustor, (8) line heaters, (5) HP VRU Ford engines, (2) LP VRU Ford engines, and (3) VRTs	
Directions to the facility: From US 50 W, turn left onto Old US 50 E/Sunnyside Rd. Follow for 1.9 miles and turn left onto Oxford Rd. After 2.0 miles, turn right onto Cabin Run. In 0.4 miles turn right onto the access road and follow 1.4 miles to the pad.	
<b>ATTACHMENTS AND SUPPORTING DOCUMENTS</b>	
<b>I have enclosed the following required documents:</b>	
Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22).	
<input checked="" type="checkbox"/> Check attached to front of application. <input type="checkbox"/> I wish to pay by electronic transfer. Contact for payment (incl. name and email address): <input type="checkbox"/> I wish to pay by credit card. Contact for payment (incl. name and email address):	
<input checked="" type="checkbox"/> \$500 (Construction, Modification, and Relocation) <input type="checkbox"/> \$300 (Class II Administrative Update) <input checked="" type="checkbox"/> \$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO <sup>1</sup> <input type="checkbox"/> \$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH <sup>2</sup>	
<sup>1</sup> Only one NSPS fee will apply. <sup>2</sup> Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ. <i>NSPS and NESHAP fees apply to new construction or if the source is being modified.</i>	
<input checked="" type="checkbox"/> Responsible Official or Authorized Representative Signature (if applicable)	
<input checked="" type="checkbox"/> Single Source Determination Form ( <b>must be completed in its entirety</b> ) – Attachment A	
<input type="checkbox"/> Siting Criteria Waiver (if applicable) – Attachment B	<input checked="" type="checkbox"/> Current Business Certificate – Attachment C
<input checked="" type="checkbox"/> Process Flow Diagram – Attachment D	<input checked="" type="checkbox"/> Process Description – Attachment E
<input checked="" type="checkbox"/> Plot Plan – Attachment F	<input checked="" type="checkbox"/> Area Map – Attachment G
<input checked="" type="checkbox"/> G70-C Section Applicability Form – Attachment H	<input checked="" type="checkbox"/> Emission Units/ERD Table – Attachment I
<input checked="" type="checkbox"/> Fugitive Emissions Summary Sheet – Attachment J	
<input checked="" type="checkbox"/> Gas Well Affected Facility Data Sheet (if applicable) – Attachment K	
<input checked="" type="checkbox"/> Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment L	
<input checked="" type="checkbox"/> Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment M	
<input checked="" type="checkbox"/> Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N	
<input checked="" type="checkbox"/> Tanker Truck Loading Data Sheet (if applicable) – Attachment O	
<input type="checkbox"/> Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment P	
<input type="checkbox"/> Pneumatic Controllers Data Sheet – Attachment Q	
<input checked="" type="checkbox"/> Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment R	
<input checked="" type="checkbox"/> Emission Calculations (please be specific and include all calculation methodologies used) – Attachment S	
<input checked="" type="checkbox"/> Facility-wide Emission Summary Sheet(s) – Attachment T	
<input checked="" type="checkbox"/> Class I Legal Advertisement – Attachment U	
<input checked="" type="checkbox"/> One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments	

GHD SERVICES INC.

▼ PLEASE DETACH AND RETAIN FOR YOUR RECORDS ▼

INVOICE NUMBER	DATE	VOUCHER NO.	AMOUNT
Account Number: CR81216	8/12/2016	40WVDEPAQ 401018242	454515 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  
 60-7053-2213

8/12/2016 NO. 454515

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

*[Handwritten Signature]*  
 AUTHORIZED SIGNATURES

GHD SERVICES INC.

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

⑈ 454515⑈ ⑆ 221370632⑆ 1000000118910⑈

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

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

DATE: January 23, 2015

ATTN.: Director

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

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

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

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

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

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



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

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

\_\_\_\_\_  
Secretary

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



# **Attachment A**

## **Single Source Determination Form**

## ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

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

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

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

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

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

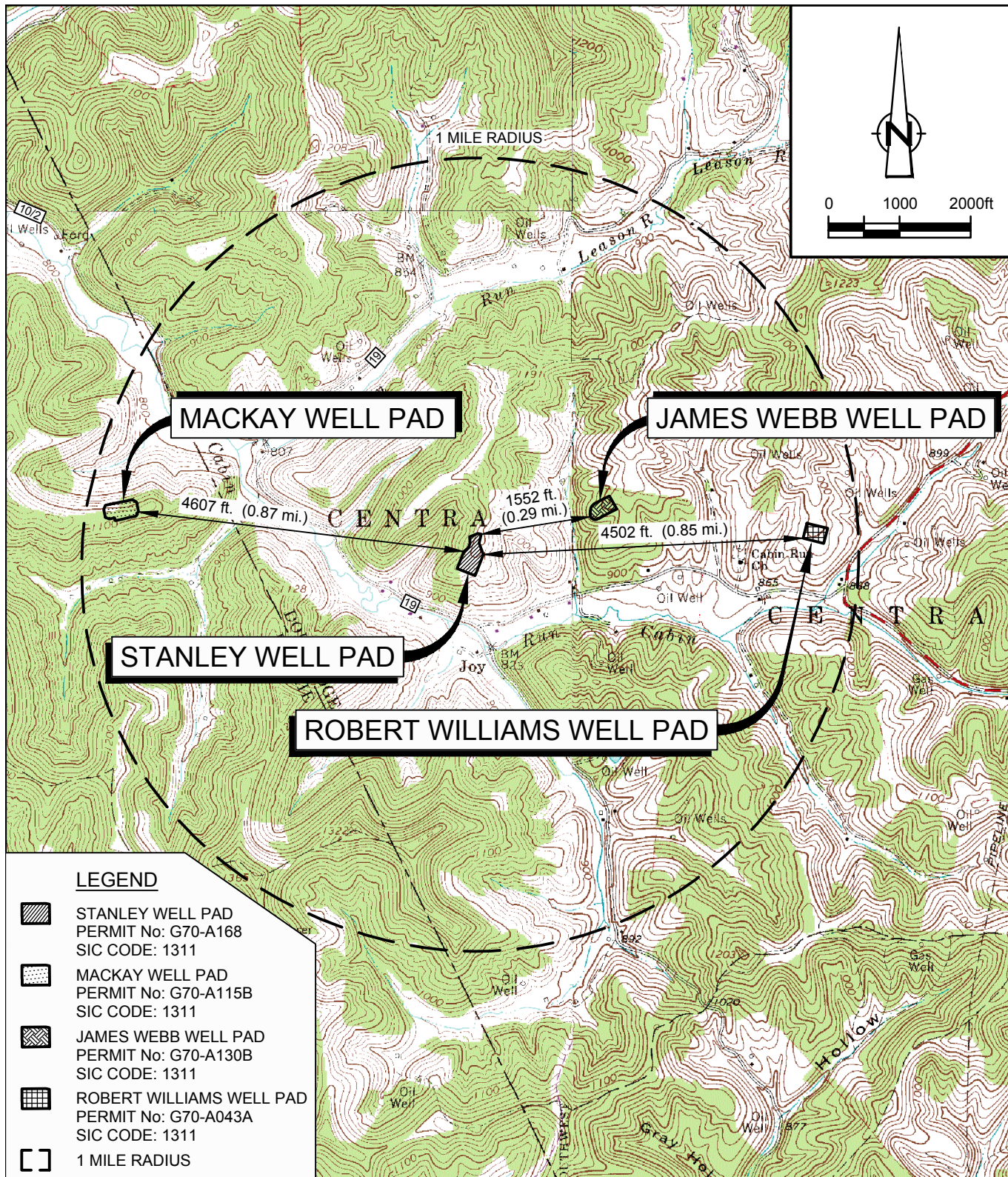
The Stanley Well Pad calculation of potential to emit included all the emissions sources that belong to the same industrial grouping, are located on contiguous or adjacent properties, and are under the control of the same person. The nearest emission source that belongs to the same industrial grouping and under the control of the same person but not located on contiguous or adjacent property is the James Webb Well Pad. This operates independently and is approximately 0.29 mile northeast of the facility. There are two other nearby sources that belong to the same industrial grouping and are under the control of the same person but not located on contiguous or adjacent property. The Robert Williams Well Pad which is located approximately 0.85 mile east of Stanley Well Pad and Mackay Well Pad which is located approximately 0.87 mile west of Stanley Well Pad. These other two well pads operate completely independently.

## 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. <b>Antero Resources has 100% ownership of each facility.</b>	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. <b>No, these facilities operate completely independently.</b>	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. <b>No, these facilities operate completely independently.</b>	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. <b>1311</b>	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. <b>No, these facilities operate completely independently.</b>	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. <b>No, these facilities operate completely independently.</b>	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>



**LEGEND**

-  STANLEY WELL PAD  
PERMIT No: G70-A168  
SIC CODE: 1311
-  MACKAY WELL PAD  
PERMIT No: G70-A115B  
SIC CODE: 1311
-  JAMES WEBB WELL PAD  
PERMIT No: G70-A130B  
SIC CODE: 1311
-  ROBERT WILLIAMS WELL PAD  
PERMIT No: G70-A043A  
SIC CODE: 1311
-  1 MILE RADIUS

SOURCE: USGS QUADRANGLE MAP;  
OXFORD, PENNSBORO, PULLMAN, AND WEST UNION, WEST VIRGINIA

SITE COORDINATES: LAT. 39.236802, LONG. -80.879631

**Attachment A**

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



# **Attachment B**

## **Siting Criteria Waiver**

**Attachment B**

**Siting Waiver**

**Stanley Well Pad**

**Antero Resources Corporation**

**Doddridge County, West Virginia**

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

# **Attachment C**

## **Current Business Certificate**

# State of West Virginia



## Certificate

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

### ANTERO RESOURCES CORPORATION

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

Therefore, I issue this

### CERTIFICATE OF AMENDMENT TO CERTIFICATE OF AUTHORITY



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

*Natalie E. Tennant*

Secretary of State



FILED

JUN 10 2013

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



IN THE OFFICE OF  
SECRETARY OF STATE

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

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

APPLICATION FOR  
AMENDED CERTIFICATE  
OF AUTHORITY

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

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

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

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

# Delaware

PAGE 1

*The First State*

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

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

4520810 8100

130754186



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

  
Jeffrey W. Bullock, Secretary of State  
AUTHENTICATION: 0496546

DATE: 06-10-13

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

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

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

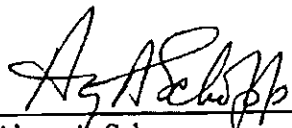
2. This Amendment to the Amended and Restated Certificate of Incorporation has been duly adopted and approved in accordance with Sections 242 of the General Corporation Law of the State of Delaware.

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

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

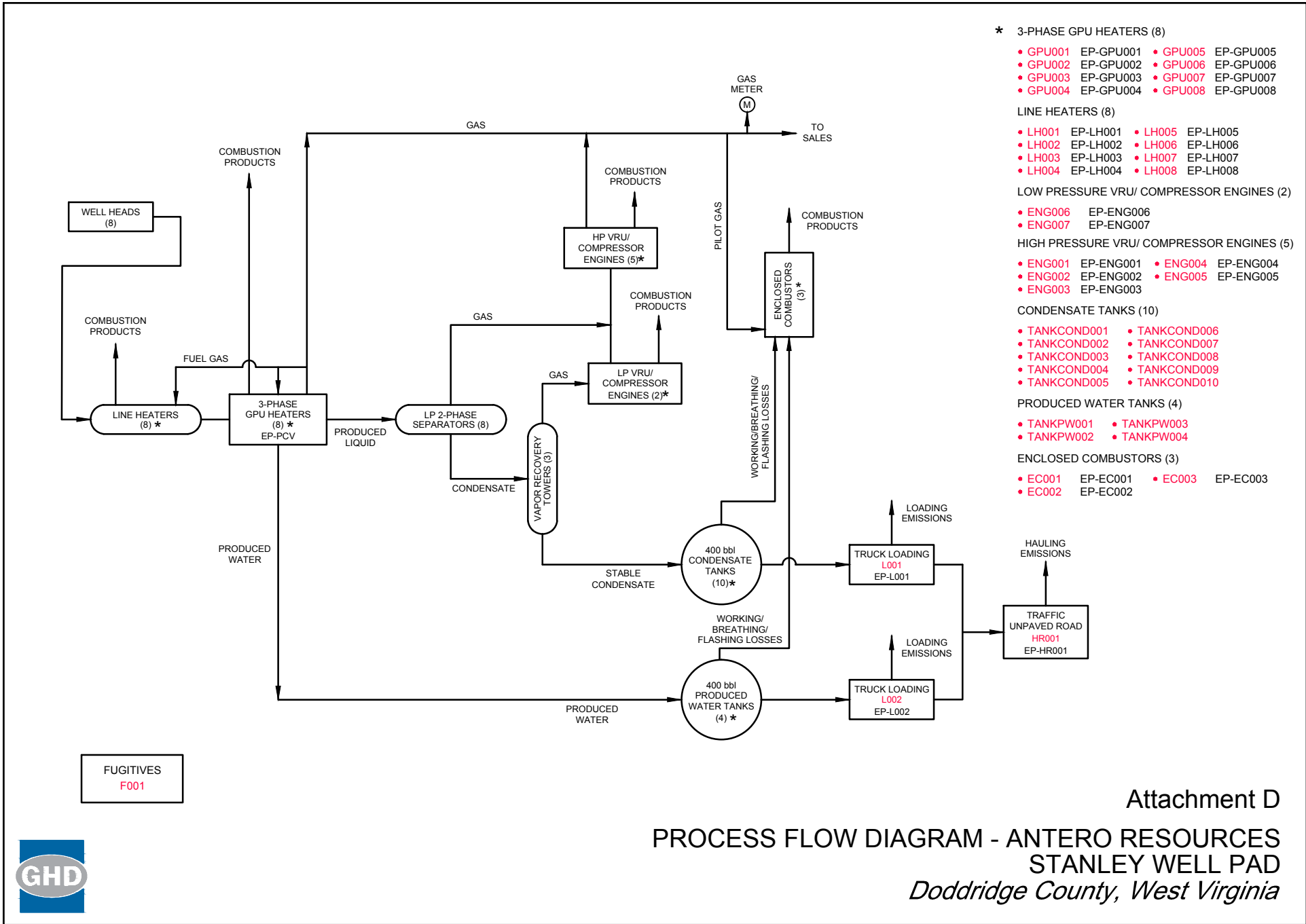
IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be executed by its duly authorized officer on the 10th day of June, 2013.

ANTERO RESOURCES APPALACHIAN CORPORATION

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

# **Attachment D**

## **Process Flow Diagram**



- \* 3-PHASE GPU HEATERS (8)
  - GPU001 EP-GPU001 • GPU005 EP-GPU005
  - GPU002 EP-GPU002 • GPU006 EP-GPU006
  - GPU003 EP-GPU003 • GPU007 EP-GPU007
  - GPU004 EP-GPU004 • GPU008 EP-GPU008
- LINE HEATERS (8)
  - LH001 EP-LH001 • LH005 EP-LH005
  - LH002 EP-LH002 • LH006 EP-LH006
  - LH003 EP-LH003 • LH007 EP-LH007
  - LH004 EP-LH004 • LH008 EP-LH008
- LOW PRESSURE VRU/ COMPRESSOR ENGINES (2)
  - ENG006 EP-ENG006
  - ENG007 EP-ENG007
- HIGH PRESSURE VRU/ COMPRESSOR ENGINES (5)
  - ENG001 EP-ENG001 • ENG004 EP-ENG004
  - ENG002 EP-ENG002 • ENG005 EP-ENG005
  - ENG003 EP-ENG003
- CONDENSATE TANKS (10)
  - TANKCOND001 • TANKCOND006
  - TANKCOND002 • TANKCOND007
  - TANKCOND003 • TANKCOND008
  - TANKCOND004 • TANKCOND009
  - TANKCOND005 • TANKCOND010
- PRODUCED WATER TANKS (4)
  - TANKPW001 • TANKPW003
  - TANKPW002 • TANKPW004
- ENCLOSED COMBUSTORS (3)
  - EC001 EP-EC001 • EC003 EP-EC003
  - EC002 EP-EC002

Attachment D  
 PROCESS FLOW DIAGRAM - ANTERO RESOURCES  
 STANLEY WELL PAD  
 Doddridge County, West Virginia



# **Attachment E**

## **Process Description**

## **Attachment E**

### **Process Description**

#### **Stanley Well Pad**

#### **Antero Resources Corporation**

#### **Doddridge County, West Virginia**

A mixture of condensate, water, and entrained gas from the condensate and gas wells enters the facility through a series of line heaters (LH001-008) and gas production units (GPU001-GPU008) which are 3-phase separators where the gas, condensate, and produced water are separated. The line heaters and GPUs are fueled by a slip stream of the separated gas.

The gas from the three phase separators is metered and sent to the sales gas pipeline. The water flow to the produced water storage tanks (TANKPW001-004). The condensate is then sent to two phase low pressure separators where gas is separated. The gas is routed to the high pressure VRU driven by gas fueled engines (ENG001-005), compressed, metered and sent to the sales gas line. The condensate from the two phase separators then flows to the vapor recovery towers (VRT001-003) where gas is further separated. Gas from the VRTs is recovered via the low pressure VRU driven by gas fueled engines (ENG006-007), compressed, metered and sent to the sales gas line through the high pressure compressors. The condensate from the VRTs flows to the condensate storage tanks (TANKSCOND001-010). The line heaters are only used during the first several months from start of production and will be removed once production has normalized.

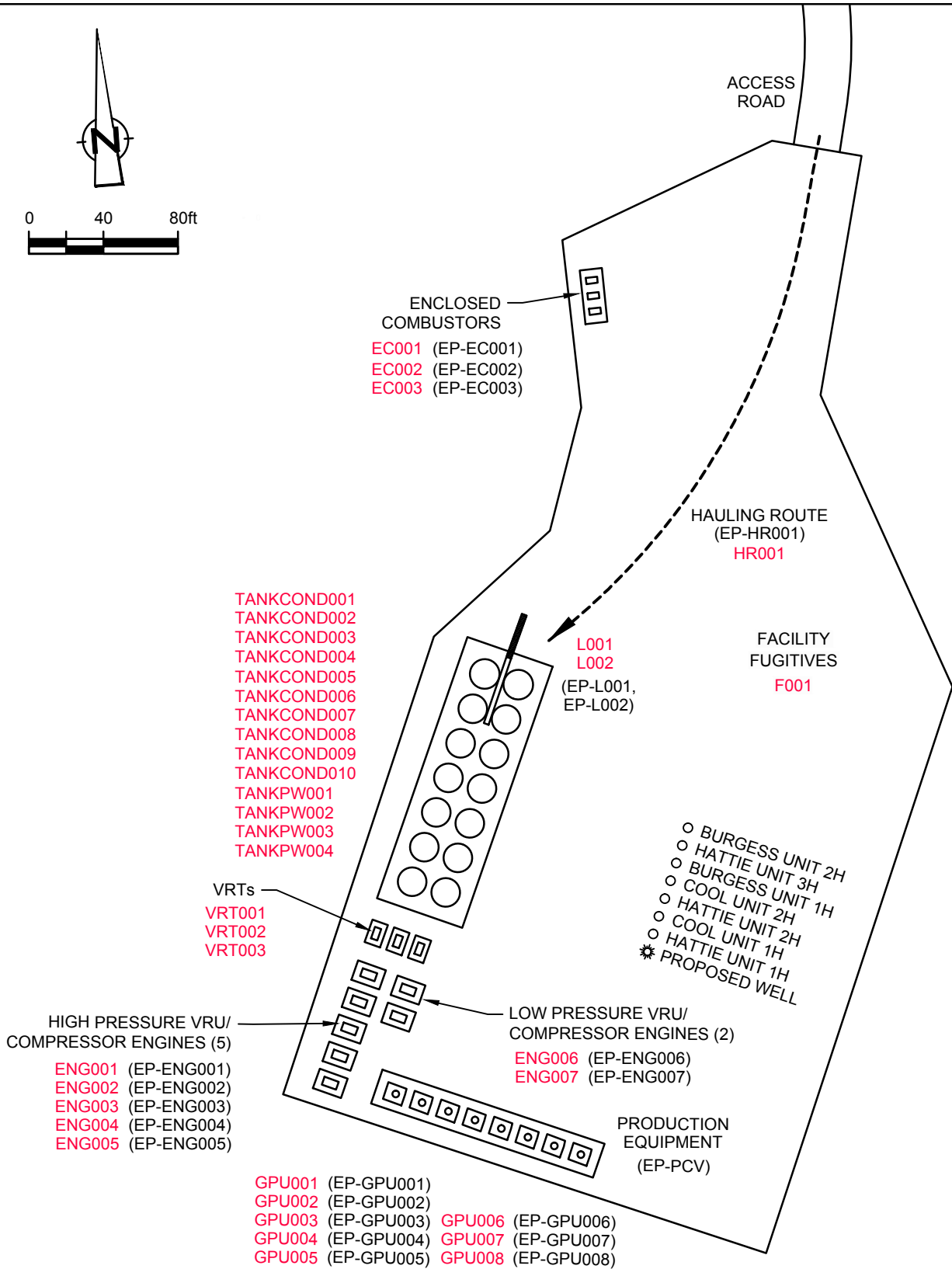
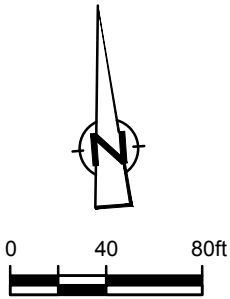
The facility has ten (10) tanks (TANKCOND001-010) on site to store condensate and four (4) tanks (TANKPW001-004) to store produced water prior to removal from the site. The flashing, working and breathing losses from the tanks are routed to three enclosed combustors (EC001-003) to control the emissions. The enclosed combustors that will be used to control emissions are designed to achieve a VOC destruction efficiency of 98 percent.

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

Emissions from the facility's emission sources were calculated using the extended condensate analysis from Seaborne Unit 1H in Vogt Well Pad and gas analysis from Pike Unit 2H in Robert Williams Well Pad. The extended condensate analysis and gas analysis are considered representative of the materials from Stanley Well Pad, being in the same Marcellus rock formation.

# **Attachment F Plot Plan**





**LEGEND**

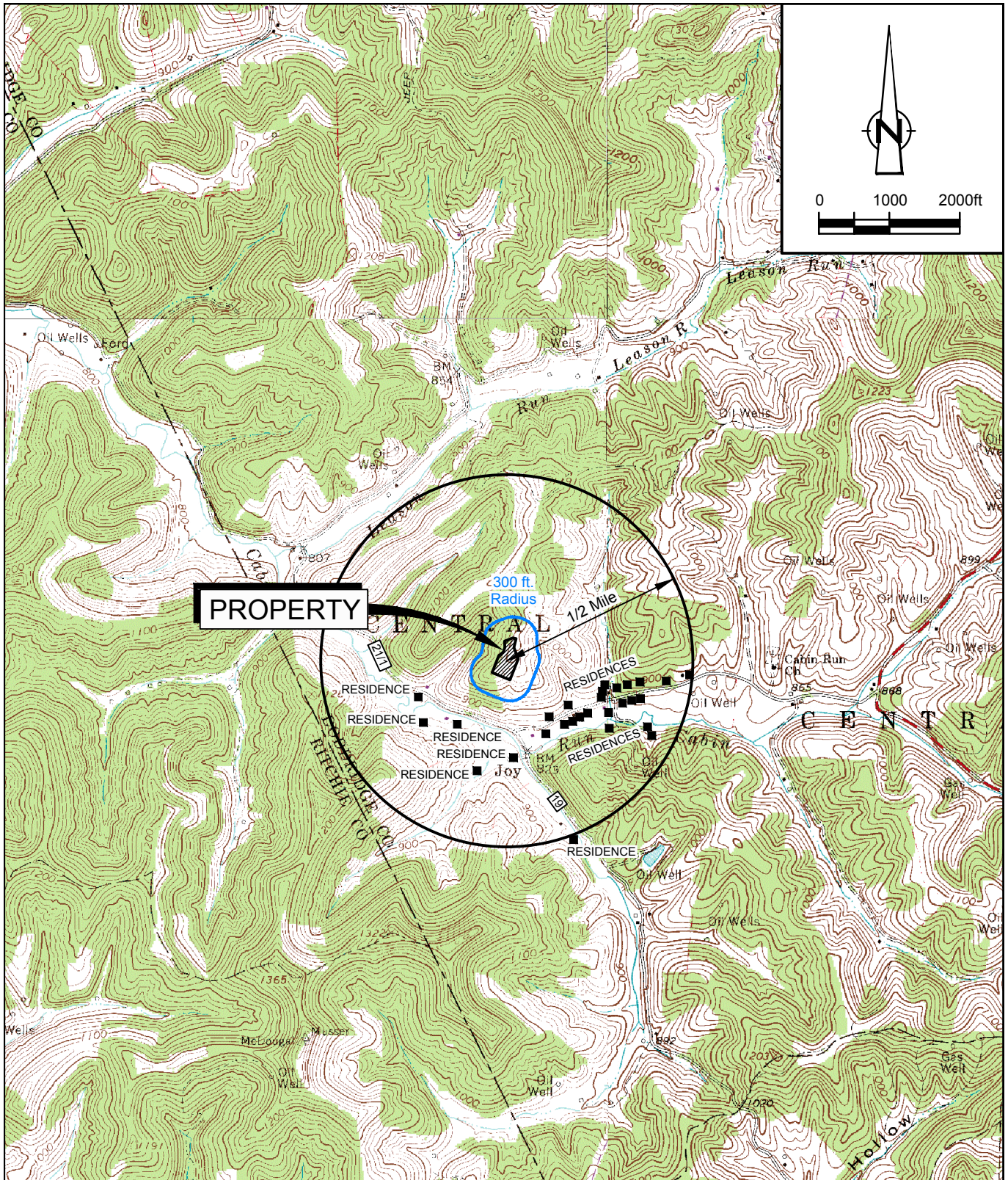
- EXISTING WELL LOCATION
- ✱ PROPOSED WELL LOCATION



**Attachment F**  
**PLOT PLAN**  
**STANLEY WELL PAD**  
**ANTERO RESOURCES**  
*Doddridge County, West Virginia*

# **Attachment G**

## **Area Map**



SOURCE: USGS QUADRANGLE MAP;  
 OXFORD, PENNSBORO, PULLMAN, AND WEST UNION, WEST VIRGINIA

SITE COORDINATES: LAT. 39.236802, LONG. -80.879631  
 SITE ELEVATION: 1095 ft AMSL



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

# **Attachment H**

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

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

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

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

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

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

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

# **Attachment I**

## **Emission Units/ ERD Table**

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

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

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/Modified	Manufac. Date	Design Capacity	Type and Date of Change	Control Device(s)	ERD (s)
GPU001 through GPU008	EP-GPU001 through EP-GPU008	Gas Production Unit Heater	2016		1.5 MMBtu/hr per GPU	Existing	N/A	
LH001 through LH008	EP-LH001 through EP-LH008	Line Heater	2016		2.0 MMBtu/hr per Line Heater	Existing	N/A	
F001	F001	Fugitives	2016		N/A	Existing	N/A	
TANKCOND001-010	EP-EC001, EP-EC002, EP-EC003	Condensate Tank F/W/B	2016		400 bbl each	Modification <sup>1</sup>	EC001, EC002, EC003	
TANKPW001-002	EP-EC001, EP-EC002, EP-EC003	PW Tank F/W/B	2016		400 bbl each	Modification <sup>1</sup>	EC001, EC002, EC003	
TANKPW003-004	EP-EC001, EP-EC002, EP-EC003	PW Tank F/W/B	2016		400 bbl each	New	EC001, EC002, EC003	
L001	EP-L001	Loading (Condensate)	2016		10080 gal/hr 33266100 gal/yr	Modification <sup>2</sup>	N/A	
L002	EP-L002	Loading (Produced Water)	2016		10080 gal/hr 7358400 gal/yr	Modification <sup>2</sup>	N/A	
HR001	EP-HR001	Haul Truck	2016		40 ton capacity	Modification <sup>3</sup>	N/A	
EC001	EP-EC001	Enclosed Combustor	2016		12 MMBtu/hr	Modification <sup>4</sup>	N/A	
EC002	EP-EC002	Enclosed Combustor	2016		12 MMBtu/hr	Modification <sup>4</sup>	N/A	
EC003	EP-EC003	Enclosed Combustor	2016		12 MMBtu/hr	New	N/A	
PCV	EP-PCV	Pneumatic CV	2016		6.6 scf/day/PCV	Existing	N/A	
ENG001	EP-ENG001	Compressor Engine	2016	2013	24 HP	Removal	Non-Selective Catalytic Reduction	
ENG001 through ENG005	EP-ENG001 through EP-ENG005	High Pressure VRU Compressor Engine	2016	2015	76 HP per Engine	New	Non-Selective Catalytic Reduction	
ENG006 through ENG007	EP-ENG006 through EP-ENG007	Low Pressure VRU Compressor Engine	2016	2015	110 HP per Engine	New	Non-Selective Catalytic Reduction	

Notes:

1. This is not a physical modification. Increase in emissions due to increase in condensate throughput.
2. This is not a physical modification. Increase in emissions due to increase in loading throughput.
3. This is not a physical modification. Increase in emissions from increased number of trips.
4. This is not a physical modification. Increase in emissions due to increase in condensate throughput.
- 1 For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S, ... or other appropriate designation.
- 2 For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.
- 3 When required by rule.
- 4 New, modification, removal, existing.
- 5 For Control Devices use the following numbering system: 1C, 2C, 3C, ... or other appropriate designation.
- 6 For ERDs use the following numbering system: 1D, 2D, 3D, ... or other appropriate designation.

# **Attachment J**

## **Fugitive Emissions Summary Sheet**



**ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET**

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

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

Source/Equipment:

Leak Detection Method Used		<input type="checkbox"/> Audible, visual, and	<input checked="" type="checkbox"/> Infrared (FLIR) cameras	<input type="checkbox"/> Other (please describe)	<input type="checkbox"/> None required		
Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)		
					VOC	HAP	GHG (CO <sub>2</sub> e)
Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	400	EPA	gas	2.57	0.47	281.47
Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	416	EPA	liquid	9.61	1.08	3.56
Connections (Not sampling)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	472	EPA	gas	0.13	2.48E-02	14.76
Flanges	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	104	EPA	gas	0.06	1.06E-02	6.34
Loading	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	2	EPA	gas	20.46	1.83E-01	1.74

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

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

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

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

# **Attachment K**

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

**ATTACHMENT K – GAS WELL AFFECTED FACILITY DATA SHEET**

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

<b>API Number</b>	<b>Date of Flowback</b>	<b>Date of Well Completion</b>	<b>Green Completion and/or Combustion Device</b>
47-017-06731-00	1/1/2018	7/1/2017	Green
47-017-06732-00	1/1/2018	7/1/2017	Green
47-017-06737-00	1/1/2018	7/1/2017	Green
47-017-06736-00	1/1/2018	7/1/2017	Green
47-017-06735-00	1/1/2018	7/1/2017	Green
47-017-06734-00	1/1/2018	7/1/2017	Green
47-017-06733-00	1/1/2018	7/1/2017	Green
1 well not permitted			

*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 001-010
3. Emission Unit ID number:	TANKCOND001-010	4. Emission Point ID number: EP-EC001, EP-EC002, EP-EC003
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"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Relocation
7A. Description of Tank Modification (if applicable)		
7B. Will more than one material be stored in this tank? If so, a separate form must be completed for each material.		
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
7C. Was USEPA Tanks simulation software utilized?		
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

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

**TANK INFORMATION**

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 400bbbls		
9A. Tank Internal Diameter (ft): 12	9B. Tank Internal Height (or Length) (ft):	20
10A. Maximum Liquid Height (ft): 18	10B. Average Liquid Height (ft):	10
11A. Maximum Vapor Space Height (ft): 18	11B. Average Vapor Space Height (ft):	10
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.: 400bbbls		
13A. Maximum annual throughput (gal/yr):	33266100	13B. Maximum daily throughput (gal/day):
		91140
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume):	199	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		
<input type="checkbox"/> 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	
<i>Please see Table 6 and Table 7</i>									

**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      2016

22. Shell Condition (if metal and unlined):

- No Rust  Light Rust  Dense Rust  Not applicable

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

23. Operating Pressure Range (psig): 0 psig, atmospheric  
**Must be listed for tanks using VRUs with closed vent system**

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

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

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

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

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

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

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

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

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

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

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

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

27. Closed Vent System with VRU  Yes  No

28. Closed Vent System with Enclosed Combustor?  Yes  No

**ATTACHMENT L – STORAGE VESSEL DATA SHEET**

**SITE INFORMATION**

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

**LIQUID INFORMATION**

36. Average daily temperature range of bulk liquid (F): 65.08	36A. Minimum (°F): 46.56	36B. Maximum (°F): 75.94
37. Average operating pressure range of tank (psig): 0	37A. Minimum (psig): 0	37B. Maximum (psig): 0
38A. Minimum Liquid Surface Temperature (°F): 46.56	38B. Corresponding Vapor Pressure (psia): 1.85	
39A. Average Liquid Surface Temperature (°F): 65.08	39B. Corresponding Vapor Pressure (psia): 2.71	
40A. Maximum Liquid Surface Temperature (°F): 75.94	40B. Corresponding Vapor Pressure (psia): 3.34	

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)	5.6800		
41D. Liquid Molecular Weight (lb/lb-mole)	87.90		
41E. Vapor Molecular Weight (lb/lb-mole)	44.1305		
Maximum Vapor Pressure	3.3419		
41F. True (psia)			
41G. Reid (psia)	4.4500		
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 001-004
3. Emission Unit ID number: TANKPW001-004	4. Emission Point ID number. EP-EC001, EP-EC002, EP-EC003
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 <input type="checkbox"/> Other  <input type="checkbox"/> Relocation
7A. Description of Tank Modification (if applicable)	
7B. Will more than one material be stored in this tank? If so, a separate form must be completed for each material. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Was USEPA Tanks simulation software utilized? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

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

**TANK INFORMATION**

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 400bbbls	
9A. Tank Internal Diameter (ft): 12	9B. Tank Internal Height (or Length) (ft): 20
10A. Maximum Liquid Height (ft): 18	10B. Average Liquid Height (ft): 10
11A. Maximum Vapor Space Height (ft): 18	11B. Average Vapor Space Height (ft): 10
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.: 400bbbls	
13A. Maximum annual throughput (gal/yr): 7358400	13B. Maximum daily throughput (gal/day): 20160
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 110	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 <input type="checkbox"/> Other	



**ATTACHMENT L – STORAGE VESSEL DATA SHEET**

**PRESSURE/VACUUM CONTROL DATA**

19. Check as many as apply:

- Does not apply
- Inert Gas Blanket
- Vent to Vapor Combustion Device (vapor combustors, flares, thermal)
- Conservation Vent (psig)
 

Vacuum Setting	Pressure Setting
----------------	------------------
- Emergency relief Valve (psig)
 

Vacuum Setting	Pressure Setting
----------------	------------------
- Thief Hatch     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     Gunite lined     Epoxy-coated rivets     Other(describe): Steel

21A. Shell Color: Green    21B. Roof Color: Green    21C. Year Last Painted    2016

22. Shell Condition (if metal and unlined):

- No Rust     Light Rust     Dense Rust     Not applicable

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

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

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

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

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

25A. Year Internal Floaters Installed:

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

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

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

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

25F. Describe deck fittings

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

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

26C. Deck seam:  
 5 ft. wide     6 ft. wide     7 ft. wide     5 x 7.5 ft.     5 x 12 ft.     Other

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

27. Closed Vent System with VRU     Yes     No

28. Closed Vent System with Enclosed Combustor?     Yes     No

**ATTACHMENT L – STORAGE VESSEL DATA SHEET**

<b>SITE INFORMATION</b>			
29. Provide the city and state on which the data in this section are based.: Charleston, WV			
30. Daily Average Ambient Temperature (°F): 65.08		31. Annual Average Maximum Temperature (°F): 75.94	
32. Annual Average Minimum Temperature (°F): 46.56		33. Average Wind Speed (miles/hr): 5.9mph	
34. Annual Average Solar Insulation Factor (BTU/(ft <sup>2</sup> ·day)) 1030.236		35. Atmospheric Pressure (psia): 14.8 (based off local conditions, could not find annual)	
<b>LIQUID INFORMATION</b>			
36. Average daily temperature range of bulk liquid (F):	65.08	36A. Minimum (°F):	46.56
		36B. Maximum (°F)	75.94
37. Average operating pressure range of tank (psig):	0	37A. Minimum (psig)	0
		37B. Maximum (psig)	0
38A. Minimum Liquid Surface Temperature (°F)	46.56	38B. Corresponding Vapor Pressure (psia)	0.23
39A. Average Liquid Surface Temperature (°F)	65.08	39B. Corresponding Vapor Pressure (psia)	0.37
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	0.49
41. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
41A. Material Name or Composition	Produced Water		
41B. CAS Number	mix of HC and water		
41C. Liquid Density (lb/gal)	8.3300		
41D. Liquid Molecular Weight (lb/lb-mole)	18.02		
41E. Vapor Molecular Weight (lb/lb-mole)	18.5619		
Maximum Vapor Pressure	0.4928		
41F. True (psia)			
41G. Reid (psia)	1.0238		
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	2016	Existing	1.5	1227.4562
GPU002	EP-GPU002	Gas Production Unit Heater	2016	Existing	1.5	1227.4562
GPU003	EP-GPU003	Gas Production Unit Heater	2016	Existing	1.5	1227.4562
GPU004	EP-GPU004	Gas Production Unit Heater	2016	Existing	1.5	1227.4562
GPU005	EP-GPU005	Gas Production Unit Heater	2016	Existing	1.5	1227.4562
GPU006	EP-GPU006	Gas Production Unit Heater	2016	Existing	1.5	1227.4562
GPU007	EP-GPU007	Gas Production Unit Heater	2016	Existing	1.5	1227.4562
GPU008	EP-GPU008	Gas Production Unit Heater	2016	Existing	1.5	1227.4562
LH001	EP-LH001	Line Heater	2016	New	2.0	1227.4562
LH002	EP-LH002	Line Heater	2016	New	2.0	1227.4562
LH003	EP-LH003	Line Heater	2016	New	2.0	1227.4562
LH004	EP-LH004	Line Heater	2016	New	2.0	1227.4562
LH005	EP-LH005	Line Heater	2016	New	2.0	1227.4562
LH006	EP-LH006	Line Heater	2016	New	2.0	1227.4562
LH007	EP-LH007	Line Heater	2016	New	2.0	1227.4562
LH008	EP-LH008	Line Heater	2016	New	2.0	1227.4562

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 N**

## **Internal Combustion Engine Data Sheet**

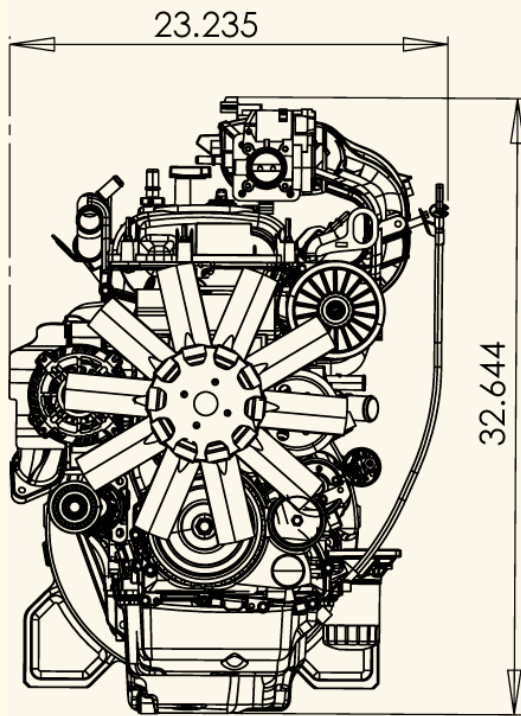
## ATTACHMENT N – INTERNAL COMBUSTION ENGINE DATA SHEET

Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form.*

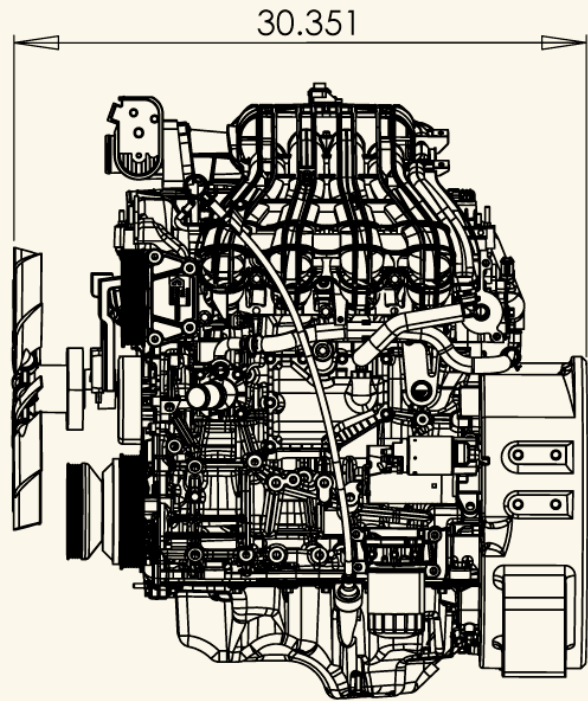
Emission Unit ID#		ENG001, ENG002, ENG003, ENG004, ENG005		ENG006, ENG007		ENG001	
Engine Manufacturer/Model		Engine (MSG-425 2.5L Engine)		Engine (CSG-637 3.7L Engine)		Engine (Kubota DG972-E2)	
Manufacturers Rated bhp/rpm		76 HP @ 3200 rpm		110 HP @ 3200 rpm		24 HP @ 3600 rpm	
Source Status		NS		NS		REM	
Date Installed/ Modified/ Removed/ Relocated		2016		2016		2016	
Engine Manufacturer/ Reconstruction Date		2015		2015		2013	
Check all applicable Federal Rules for the engine (include EPA Certification of Conformity if applicable)		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input checked="" type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input checked="" type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input checked="" type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input checked="" type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input checked="" type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input checked="" type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources	
Engine Type		4SRB		4SRB		4SRB	
APCD Type		NSCR		NSCR		NSCR	
Fuel Type		RG		RG		RG	
H2S (gr/ 100 scf)		0		0		0	
Operating bhp/rpm		60 HP @ 2300 rpm		77 HP @ 2200 rpm		16.5 HP @ 2400 rpm	
BSFC (BTU/bhp-hr)		8469		7856		9773	
Hourly Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)		345.00 ft <sup>3</sup> /hr gal/hr		492.80 ft <sup>3</sup> /hr gal/hr		193 ft <sup>3</sup> /hr gal/hr	
Fuel Usage or Hours of Operation Metered		3.022 MMft <sup>3</sup> /yr gal/yr		4.316928 MMft <sup>3</sup> /yr gal/yr		1.69068 MMft <sup>3</sup> /yr gal/yr	
Calculation Methodology	Pollutant	Hourly PTE (lb/hr)	Annual PTE (tons/year)	Hourly PTE (lb/hr)	Annual PTE (tons/year)	Hourly PTE (lb/hr)	Annual PTE (tons/year)
MD	NOx	0.3126	1.3692	0.1448	0.6341	0.3158	1.3831
MD	CO	2.0631	9.0366	1.1945	5.2317	5.6445	24.7228
AP	VOC	0.0953	0.4173	0.0512	0.2241	0.0071	0.0311
AP	SO2	0.0019	0.0083	0.0010	0.0045	0.0001	0.0006
AP	PM10	0.0306	0.1339	0.0164	0.0719	0.0023	0.0100
AP	Formaldehyde	0.0660	0.2890	0.0354	0.1552	0.0049	0.0215
AP	Total HAPs	0.0739	0.3236	0.0397	0.1738	0.0055	0.0241
OT	GHG (CO2e)	354.0229	1550.6204	190.1084	832.6749	27.7765	121.6612

# Installation Drawings

Front End View

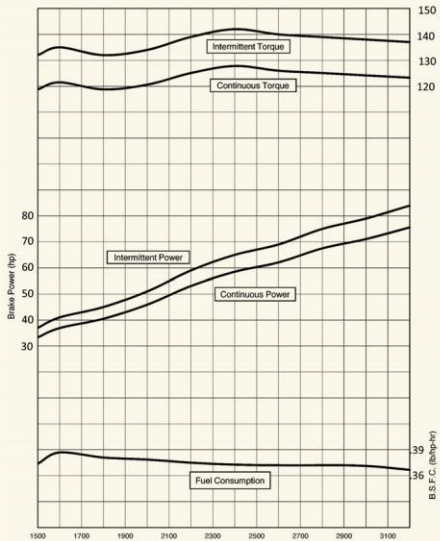


Left Side View



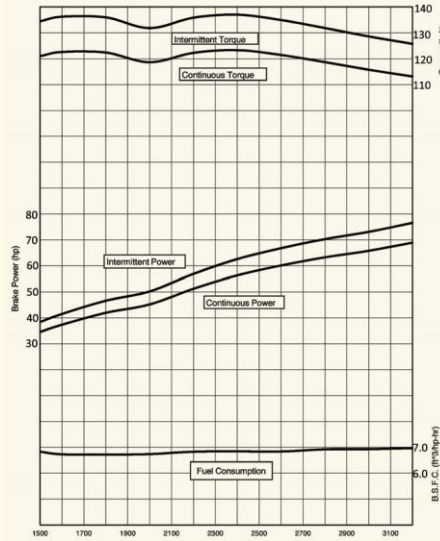
## Power Curves (corrected per SAE J1349)

Gasoline



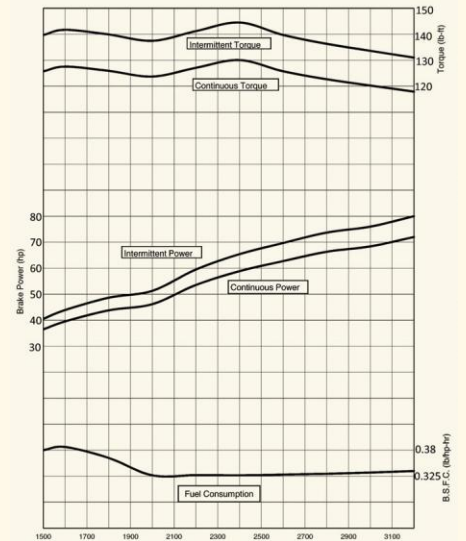
Engine Speed (RPM)

Natural Gas



Engine Speed (RPM)

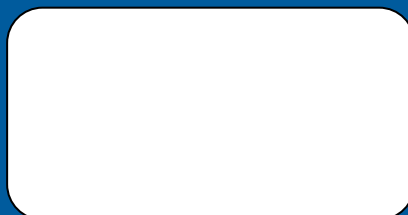
Liquefied Petroleum Gas



Engine Speed (RPM)



Powertrain Assemblies  
& Components  
Provided By Ford  
Component Sales



# MSG-425 EFI

## 2.5 Liter 4-Cylinder



### Options

#### Engine Cooling Fans

- 15" (381mm) diameter suction
- 15" (381mm) diameter pusher

#### Flywheels

- 10" (254mm) SAE over-center clutch
- flat face flywheel

#### Flywheel Housings

- SAE #4

#### Exhaust Manifold

- rear dump down

#### Power Steering Pump

#### Wiring Harnesses

#### Discrete Speed Switch

#### Variable Speed Hand Throttle

#### Variable Speed Foot Pedal

#### Engine Mounts

- Automotive with insulators
- Open power unit

#### Electronic Instrument Panel, Gauges

#### Three Way Catalyst / Muffler Standard

### Transmissions

6R80 electronic shift

C6 Mechanical

### Emissions Information

California Air Resources Board (CARB)

Environmental Protection Agency (EPA)

Emission Certified Packages Available.

### Warranty

Contact Engine Distributors, Inc  
for warranty details.



Powertrain Assemblies  
& Components  
Provided By Ford  
Component Sales

### Specifications

Engine Type .....	I-4
Bore and Stroke .....	3.5"x3.93" (89mm x 100mm)
Displacement .....	2.5L Liter (152.5 CID)
Compression Ratio .....	9.7:1
Oil Capacity .....	7 qts. including filter
Net Weight .....	351 Lbs. with accessories (159 Kgs.)
Dimensions .....	L 30.3" x W 23.3" x H 32.6" (769 mm x 589 mm x 828 mm)

### GASOLINE (corrected per SAE J1349)

Unleaded 87 or 89 octane		
Intermittent Power .....	84 [HP] @ 3200rpm	(62 [kW] @ 3200rpm)
Continuous power .....	75 [HP] @ 3200rpm	(56 [kW] @ 3200rpm)
Intermittent Torque .....	137 [ft-lbs] @ 3200rpm	(185 [N-m] @ 3200rpm)
Continuous Torque .....	123 [ft-lbs] @ 3200rpm	(166 [N-m] @ 3200rpm)

### NATURAL GAS (corrected per SAE J1349)

Fuel Specification .....	1050 BTU/FT <sup>3</sup>	
Intermittent Power .....	76 [HP] @ 3200rpm	(56 [kW] @ 3200rpm)
Continuous power .....	68 [HP] @ 3200rpm	(50 [kW] @ 3200rpm)
Intermittent Torque .....	125 [ft-lbs] @ 3200rpm	(169 [N-m] @ 3200rpm)
Continuous Torque .....	113 [ft-lbs] @ 3200rpm	(153 [N-m] @ 3200rpm)

### LIQUEFIED PETROLEUM GAS (corrected per SAE J1349)

Fuel Specification .....	HD-5	
Intermittent Power .....	80 [HP] @ 3200rpm	(59 [kW] @ 3200rpm)
Continuous power .....	72 [HP] @ 3200rpm	(53 [kW] @ 3200rpm)
Intermittent Torque .....	131 [ft-lbs] @ 3200rpm	(177 [N-m] @ 3200rpm)
Continuous Torque .....	118 [ft-lbs] @ 3200rpm	(160 [N-m] @ 3200rpm)

### Standard Features / Benefits

Set-for-life valvetrain

Deep skirted, ribbed cylinder block casting for rigidity

Aluminum AA319 cylinder block cast with the Cosworth process,  
including cast-in-place iron cylinder liners.

Chain driven dual camshafts with automatic tensioning system

Structural front cover and oil pan

Alternate fuel ready valvetrain components

Individual coil on plug electronic ignition

Cast aluminum camshaft cover to ensure warp-free sealing

Sintered metal connecting rods

Nodular iron crankshaft, featuring five main bearings,  
eight counterweights

Broadband knock sensor, calibrated for individual cylinder use

Gasoline Sequential Port Fuel Injection

Closed loop fuel control for all fuels

Electronic engine management system with built-in engine  
protection against detonation, high coolant temperature, low oil  
pressure, over speed shutdown and starter lockout

Next generation governing - discrete speeds, variable speeds,  
drive by wire - using the highest quality components.



Pursuant to the authority vested in the Air Resources Board by the Health and Safety Code, Division 26, Part 5, Chapters 1 and 2; and

Pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-14-012;

**IT IS ORDERED AND RESOLVED:** That the following new large spark-ignition engines and emission control systems produced by the manufacturer are certified for use in off-road equipment as described below. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY NAME	ENGINE DISPLACEMENT (liters)	FUEL TYPE
2015	FEDIB02.5MSG	2.5	Gasoline, LPG, CNG, Gasoline-LPG Dual Fuel
DURABILITY HOURS	SPECIAL FEATURES & EMISSION CONTROL SYSTEMS		TYPICAL EQUIPMENT USAGE
5000	Three-Way Catalytic Converter, Heated Oxygen Sensor, Sequential Multiport Fuel Injection (Gas), Gaseous Fuel Mixer (LPG, CNG)		Forklift, Aerial Lift, Generator, Compressor, Pump, Other Industrial Equipment
ENGINE MODELS (rated power in kilowatt, kW)		MSG425-DF (64.3 kW), MSG425-GAS (64.3 kW), MSG425-LPG (59.8 kW), MSG425-LP VAPOR (59.8 kW), MSG425-NG (57.3 kW)	

The following are the hydrocarbon plus oxides of nitrogen (HC+NOx) and carbon monoxide (CO) exhaust certification emission standards (Title 13, California Code of Regulations, (13 CCR) Section 2433(b)(1)) and certification emission levels for this engine family in grams per kilowatt-hour (g/kW-hr). Engines within this engine family shall have closed crankcases in conformance with 13 CCR Section 2433(b)(3).

(g/kW-hr)	HC+NOx	CO
<b>Exhaust Standards</b>	0.8	20.6
<b>Certification Levels</b>	0.5	3.3

The following is the evaporative hydrocarbon emission standard (13 CCR Section 2433(b)(4)) and certification emission level for this engine family in grams per gallon of fuel tank capacity (g/gallon).


Evaporative Certification Method	HC Certification Level (g/gallon)	HC Certification Standard (g/gallon)
Design Based	N/A	0.2

**BE IT FURTHER RESOLVED:** That for the listed engines for the aforementioned model-year, the manufacturer has submitted, and the Executive Officer hereby approves, the information and materials to demonstrate certification compliance with 13 CCR Section 2433(c) (certification and test procedures), 13 CCR Section 2434 (emission control labels), and 13 CCR Sections 2435 and 2436 (emission control system warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

**This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.**

Executed at El Monte, California on this 14<sup>th</sup> day of November 2014.

  
 FOR Annette Hebert, Chief  
 Emissions Compliance, Automotive Regulations and Science Division

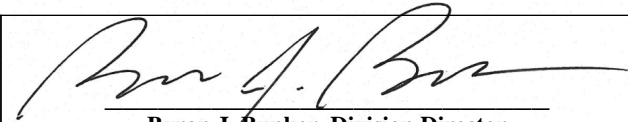


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2015 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105

**Certificate Issued To:** Engine Distributors, Inc.  
(U.S. Manufacturer or Importer)  
**Certificate Number:** FEDIB02.5MSG-002

**Effective Date:**  
12/09/2014  
**Expiration Date:**  
12/31/2015

  
Byron J. Bunker, Division Director  
Compliance Division

**Issue Date:**  
12/09/2014  
**Revision Date:**  
N/A

**Manufacturer:** Engine Distributors, Inc.  
**Engine Family:** FEDIB02.5MSG  
**Certification Type:** Mobile and Stationary  
**Fuel :** LPG/Propane  
Gasoline (up to and including 10% Ethanol)  
Natural Gas (CNG/LNG)  
**Emission Standards :** NMHC + NOx ( g/kW-hr ) : 0.8  
HC + NOx ( g/kW-hr ) : 0.8  
CO ( g/kW-hr ) : 20.6  
NMHC + NOx ( g/kW-hr ) : 0.8  
HC + NOx ( g/kW-hr ) : 0.8  
CO ( g/kW-hr ) : 20.6  
**Emergency Use Only :** N

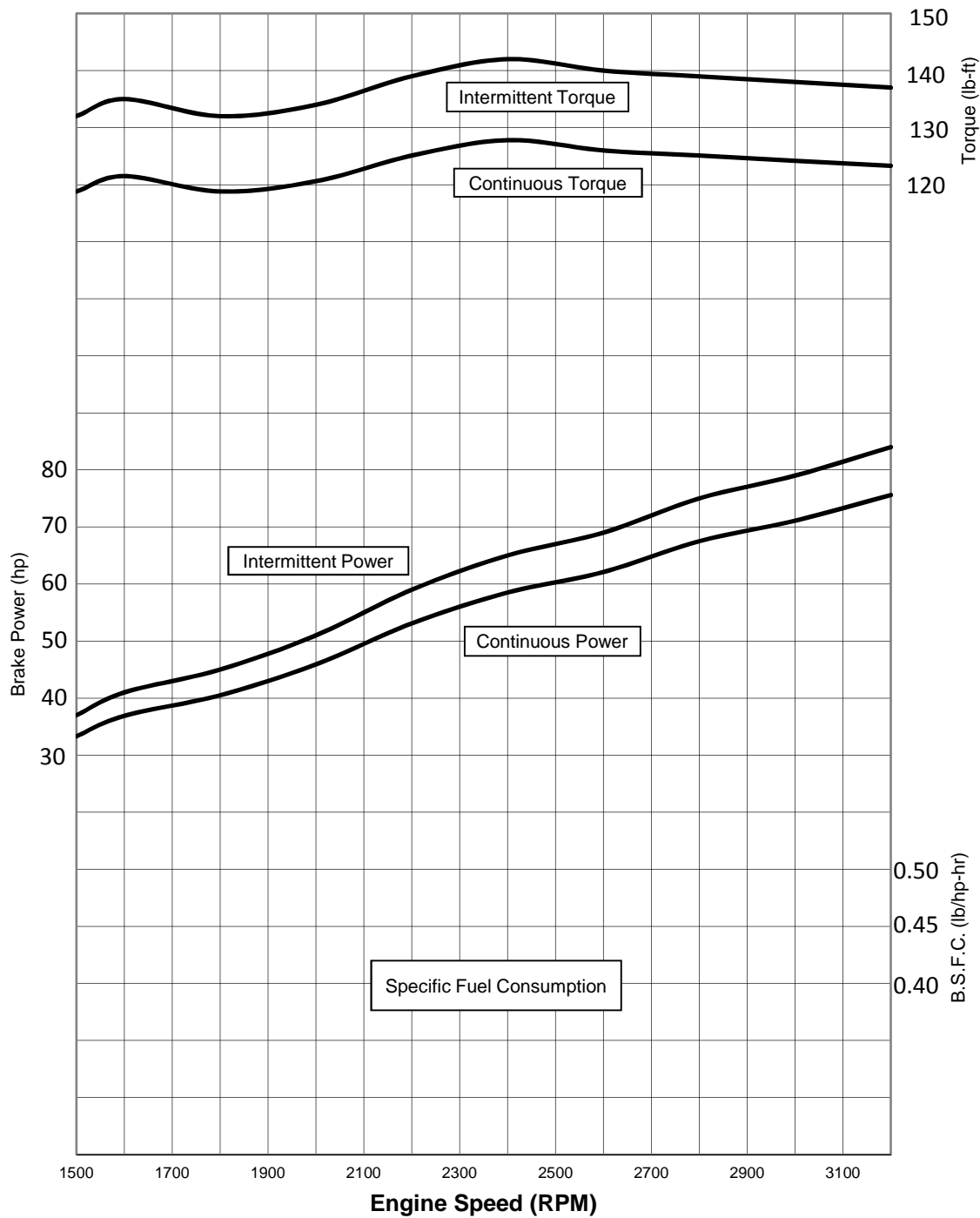
Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 40 CFR Part 1048, 1065, 1068, and 60 ( stationary only and combined stationary and mobile ) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60, 40 CFR Part 1048 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60, 40 CFR Part 1048 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60, 40 CFR Part 1048. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

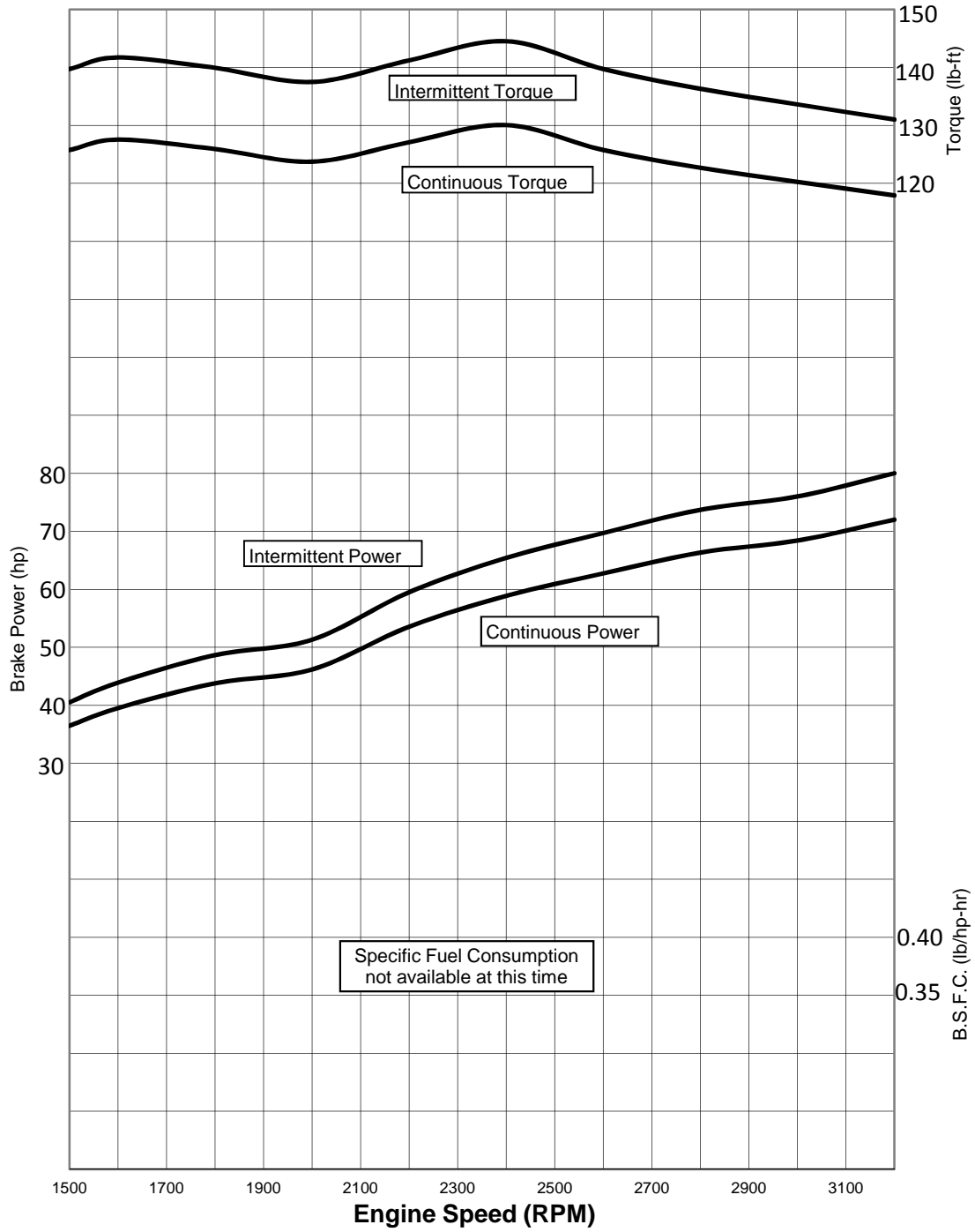
It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60, 40 CFR Part 1048. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60, 40 CFR Part 1048.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

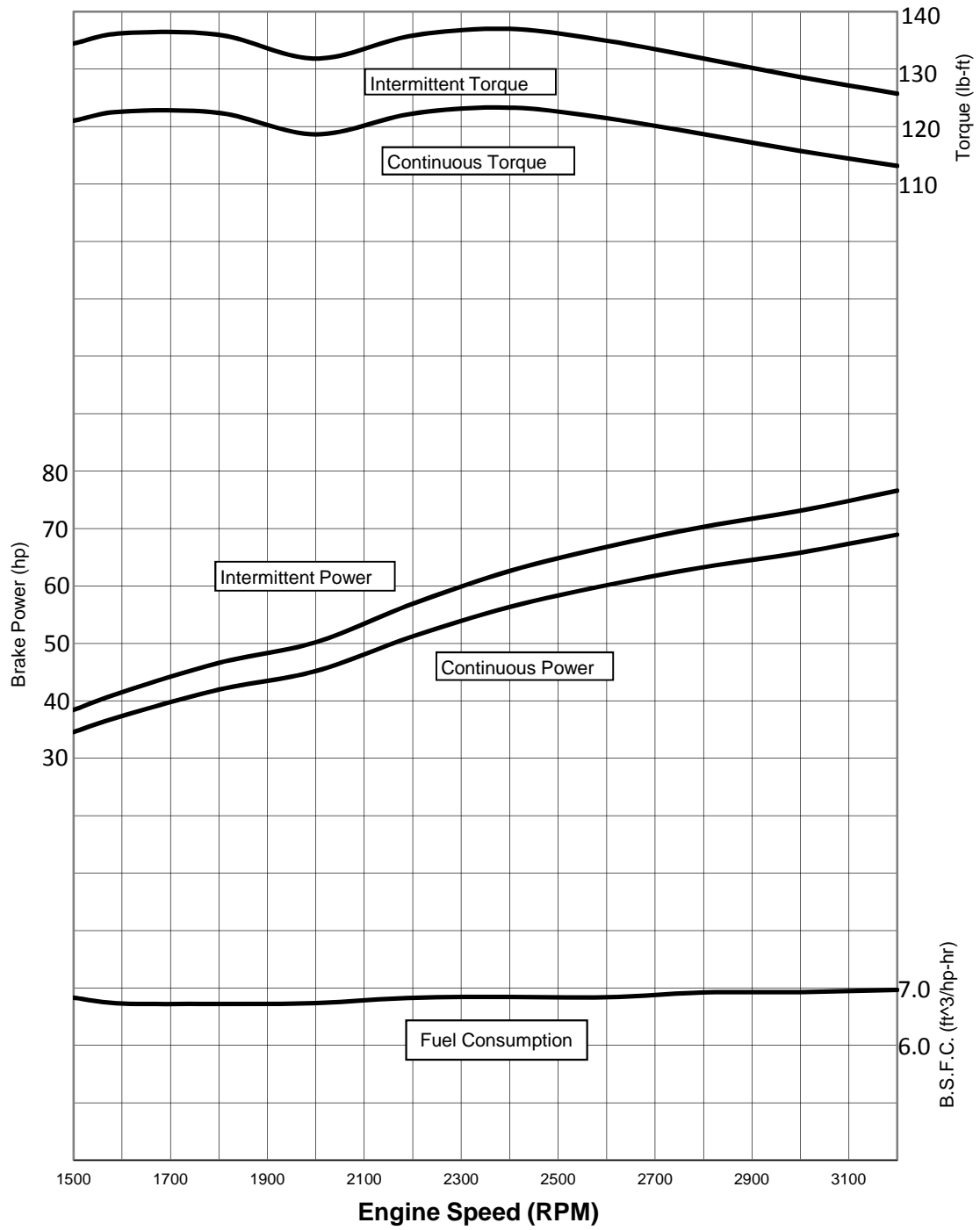
# Gasoline



# LP

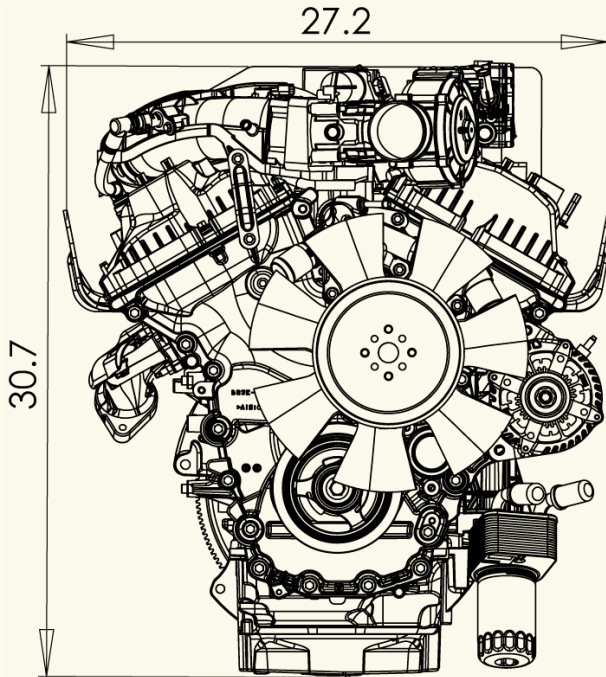


# NG

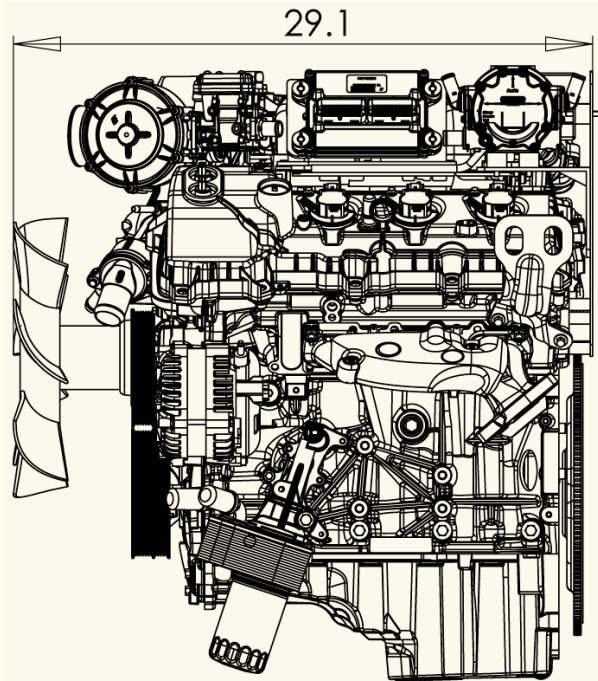


# Installation Drawings

Front End View

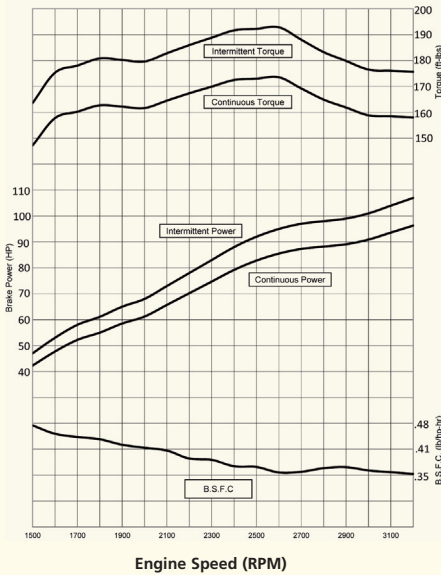


Left Side View

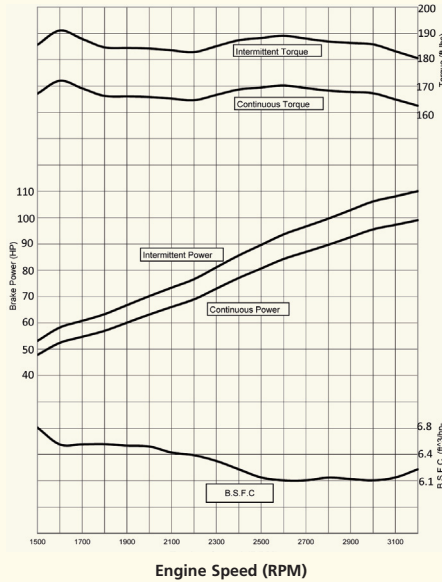


## Power Curves (corrected per SAE J1349)

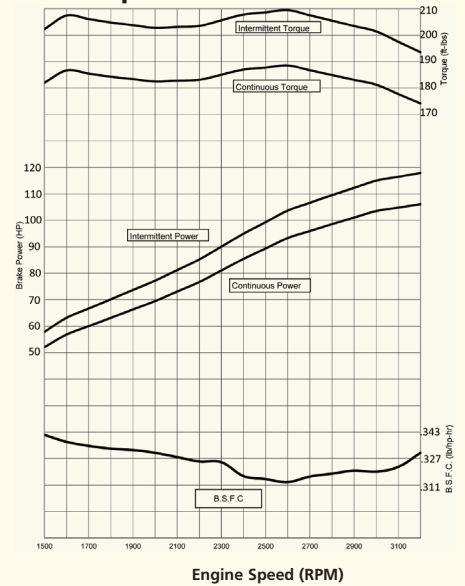
Gasoline



Natural Gas



Liquefied Petroleum Gas



Powertrain Assemblies  
& Components  
Provided By Ford  
Component Sales

For additional information Contact:

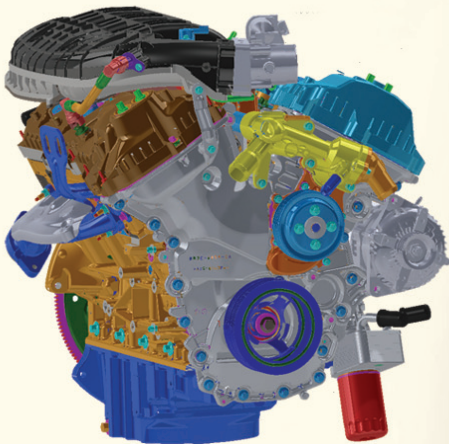
**ENGINE  
DISTRIBUTORS  
INC.**



400 University Ct • Blackwood NJ 08012  
856/228-7298 • Fax:856/228-5531  
www.edi-dist.com

# CSG-637 <sup>EFI</sup>

## 3.7 Liter 6-Cylinder



### Options

#### Engine Cooling Fans

- 14" (355mm) diameter suction
- 14" (355mm) diameter pusher

#### Flywheels

- 11.5" (292mm) SAE over-center clutch
- flat face flywheel

#### Flywheel Housings

- SAE #3

#### Exhaust Manifold

- rear dump down

#### Power Steering Pump

#### Air Conditioning

#### Wiring Harnesses

#### Discrete Speed Switch

#### Variable Speed Hand Throttle

#### Variable Speed Foot Pedal

#### Engine Mounts

- Automotive with insulators
- Open power unit

#### Electronic Instrument Panel, Gauges

#### Three Way Catalyst / Muffler Standard

### Transmissions

6R80 electronic shift

### Emissions Information

California Air Resources Board (CARB)  
Environmental Protection Agency (EPA)  
Emission Certified Packages

### Warranty

Contact Engine Distributors, Inc  
for warranty details.



Powertrain Assemblies  
& Components  
Provided By Ford  
Component Sales

### Specifications

Engine Type .....	V-6
Bore and Stroke .....	3.7" x 3.4" (94mm x 86mm)
Displacement .....	3.7L Liter (225.7 CID)
Compression Ratio .....	10.5:1
Oil Capacity.....	6 qts. including filter
Net Weight .....	355 Lbs. with accessories (161 Kgs.)
Dimensions .....	L 25.4" x W 29.5" x H 29.4" (646 mm x 751 mm x 748 mm)

### Gasoline (corrected per SAE J1349)

Unleaded 87 or 89 octane		
Intermittent Power .....	107 [HP] @ 3200rpm	(80 [kW] @ 3200rpm)
Continuous Power .....	96 [HP] @ 3200rpm	(72 [kW] @ 3200rpm)
Intermittent Torque .....	193 [ft-lbs] @ 2600rpm	(261 [N-m] @ 2600rpm)
Continuous Torque .....	173 [ft-lbs] @ 2600rpm	(235 [N-m] @ 3200rpm)

### Natural Gas (corrected per SAE J1349)

Fuel Specification .....	1050 BTU/FT3	
Intermittent Power .....	110 [HP] @ 3200rpm	(82 [kW] @ 3200rpm)
Continuous Power .....	99 [HP] @ 3200rpm	(74 [kW] @ 3200rpm)
Intermittent Torque .....	191 [ft-lbs] @ 1600rpm	(259 [N-m] @ 1600rpm)
Continuous Torque .....	172 [ft-lbs] @ 1600rpm	(233 [N-m] @ 1600rpm)

### Liquefied Petroleum Gas (corrected per SAE J1349)

Fuel Specification .....	HD-5	
Intermittent Power .....	118 [HP] @ 3200rpm	(88 [kW] @ 3200rpm)
Continuous Power .....	106 [HP] @ 3200rpm	(79 [kW] @ 3200rpm)
Intermittent Torque .....	209 [ft-lbs] @ 2600rpm	(284 [N-m] @ 2600rpm)
Continuous Torque .....	188 [ft-lbs] @ 2600rpm	(255 [N-m] @ 2600rpm)

### Standard Features / Benefits

Set-for-life valvetrain

Deep skirted, ribbed cylinder block casting for rigidity

150 AMP Alternator

Aluminum cylinder block and heads.

Chain driven dual camshafts with automatic tensioning system

Structural front cover and deep sump oil pan

Alternate fuel ready valvetrain components

Individual coil on plug electronic ignition

Four main bolts with side bolts through block for strength  
and durability

Gasoline Sequential Port Fuel Injection

Closed loop fuel control for all fuels

Electronic engine management system with built-in engine  
protection against detonation, high coolant temperature, low oil  
pressure, over speed shutdown and starter lockout

Next generation governing – discrete speeds, variable speeds,  
drive by wire – using the highest quality components.

Variable CAM Timing for intake camshafts - advances or retards  
timing to maximize engine power and fuel efficiency

Forged steel crankshaft

Pursuant to the authority vested in the Air Resources Board by the Health and Safety Code, Division 26, Part 5, Chapters 1 and 2; and

Pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-14-012;

**IT IS ORDERED AND RESOLVED:** That the following new large spark-ignition engines and emission control systems produced by the manufacturer are certified for use in off-road equipment as described below. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY NAME	ENGINE DISPLACEMENT (liters)	FUEL TYPE
2016	GEDIB03.7CSG	3.7	Gasoline, LPG, CNG, Gasoline-LPG Dual Fuel, Gasoline-NG Dual Fuel
DURABILITY HOURS	SPECIAL FEATURES & EMISSION CONTROL SYSTEMS		TYPICAL EQUIPMENT USAGE
5000	Three-Way Catalytic Converter, Heated Oxygen Sensor, Sequential Multiport Fuel Injection (Gas), Gaseous Fuel Mixer (LPG, CNG)		Forklift, Aerial Lift, Generator, Compressor, Pump, Other Industrial Equipment
<b>ENGINE MODELS</b> (rated power in kilowatt, kW)		CSG637-DF-LPG-Gas (88.0 kW), CSG637-GAS (80.0 kW), CSG637-LPG (88.0 kW), CSG637-LP VAPOR (88.0 kW), CSG637-NG (82.0 kW), CSG637-DF-NG-GAS (82.0 kW)	

The following are the hydrocarbon plus oxides of nitrogen (HC+NOx) and carbon monoxide (CO) exhaust certification emission standards (Title 13, California Code of Regulations, (13 CCR) Section 2433(b)(1)) and certification emission levels for this engine family in grams per kilowatt-hour (g/kW-hr). Engines within this engine family shall have closed crankcases in conformance with 13 CCR Section 2433(b)(3).

(g/kW-hr)	HC+NOx	CO
<b>Exhaust Standards</b>	0.8	20.6
<b>Certification Levels</b>	0.4	3.3

The following is the evaporative hydrocarbon emission standard (13 CCR Section 2433(b)(4)) and certification emission level for this engine family in grams per gallon of fuel tank capacity (g/gallon).

Evaporative Certification Method	HC Certification Level (g/gallon)	HC Certification Standard (g/gallon)
Design Based	N/A	0.2

**BE IT FURTHER RESOLVED:** That for the listed engines for the aforementioned model-year, the manufacturer has submitted, and the Executive Officer hereby approves, the information and materials to demonstrate certification compliance with 13 CCR Section 2433(c) (certification and test procedures), 13 CCR Section 2434 (emission control labels), and 13 CCR Sections 2435 and 2436 (emission control system warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

**This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.**

Executed at El Monte, California on this 24 day of November 2015.



Annette Hebert, Chief  
 Emissions Compliance, Automotive Regulations and Science Division





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2016 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105

**Certificate Issued To:** Engine Distributors, Inc.  
(U.S. Manufacturer or Importer)  
**Certificate Number:** GEDIB03.7CSG-002

**Effective Date:**  
10/20/2015  
**Expiration Date:**  
12/31/2016

  
Byron J. Bunker, Division Director  
Compliance Division

**Issue Date:**  
10/20/2015  
**Revision Date:**  
N/A

**Manufacturer:** Engine Distributors, Inc.  
**Engine Family:** GEDIB03.7CSG  
**Mobile/Stationary Certification Type:** Mobile and Stationary  
**Fuel :** Gasoline (up to and including 10% Ethanol)  
Natural Gas (CNG/LNG)  
LPG/Propane  
**Emission Standards :**  
Part 60 Subpart JJJJ Table 1  
CO ( g/kW-hr ) : 20.6  
NOx ( g/kW-hr ) : 1.3  
CO ( g/kW-hr ) : 2.7  
VOC ( g/kW-hr ) : 0.9  
HC + NOx ( g/kW-hr ) : 0.8  
Mobile Part 1048  
CO ( g/kW-hr ) : 20.6  
HC + NOx ( g/kW-hr ) : 0.8  
NMHC + NOx ( g/kW-hr ) : 0.8  
**Emergency Use Only :** N

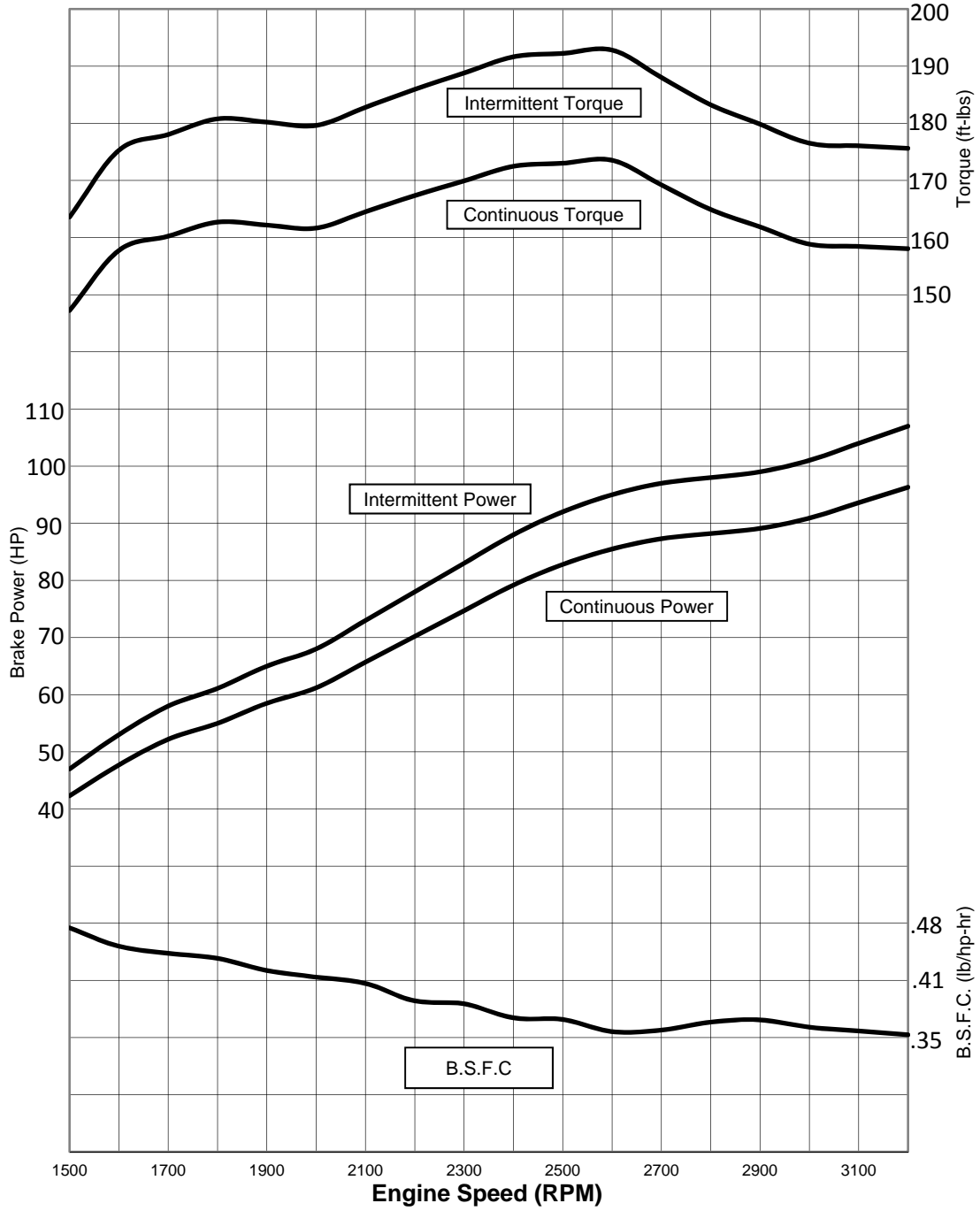
Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 40 CFR Part 1048, 1065, 1068, and 60 ( stationary only and combined stationary and mobile ) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60, 40 CFR Part 1048 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60, 40 CFR Part 1048 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60, 40 CFR Part 1048. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

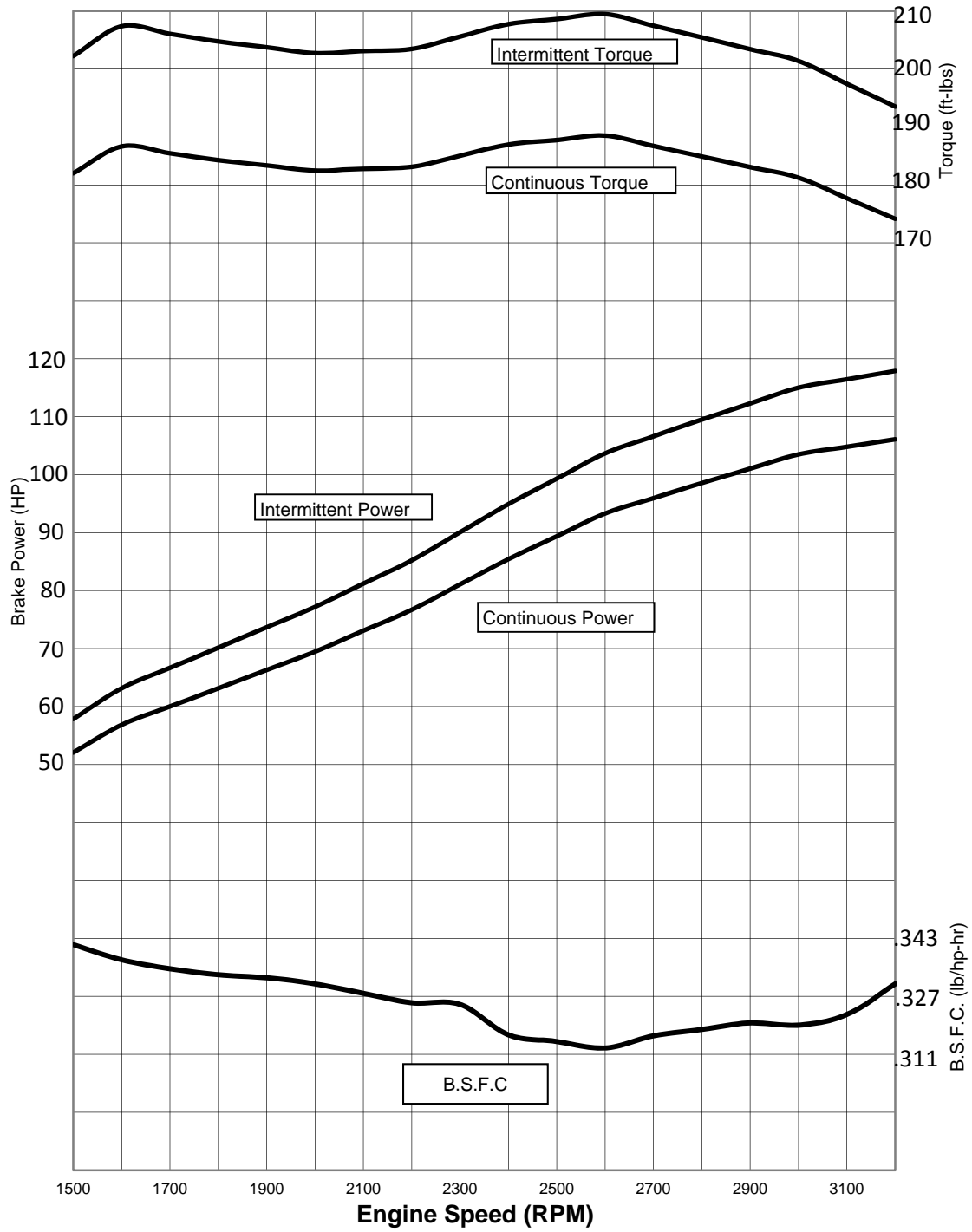
It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60, 40 CFR Part 1048. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60, 40 CFR Part 1048.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

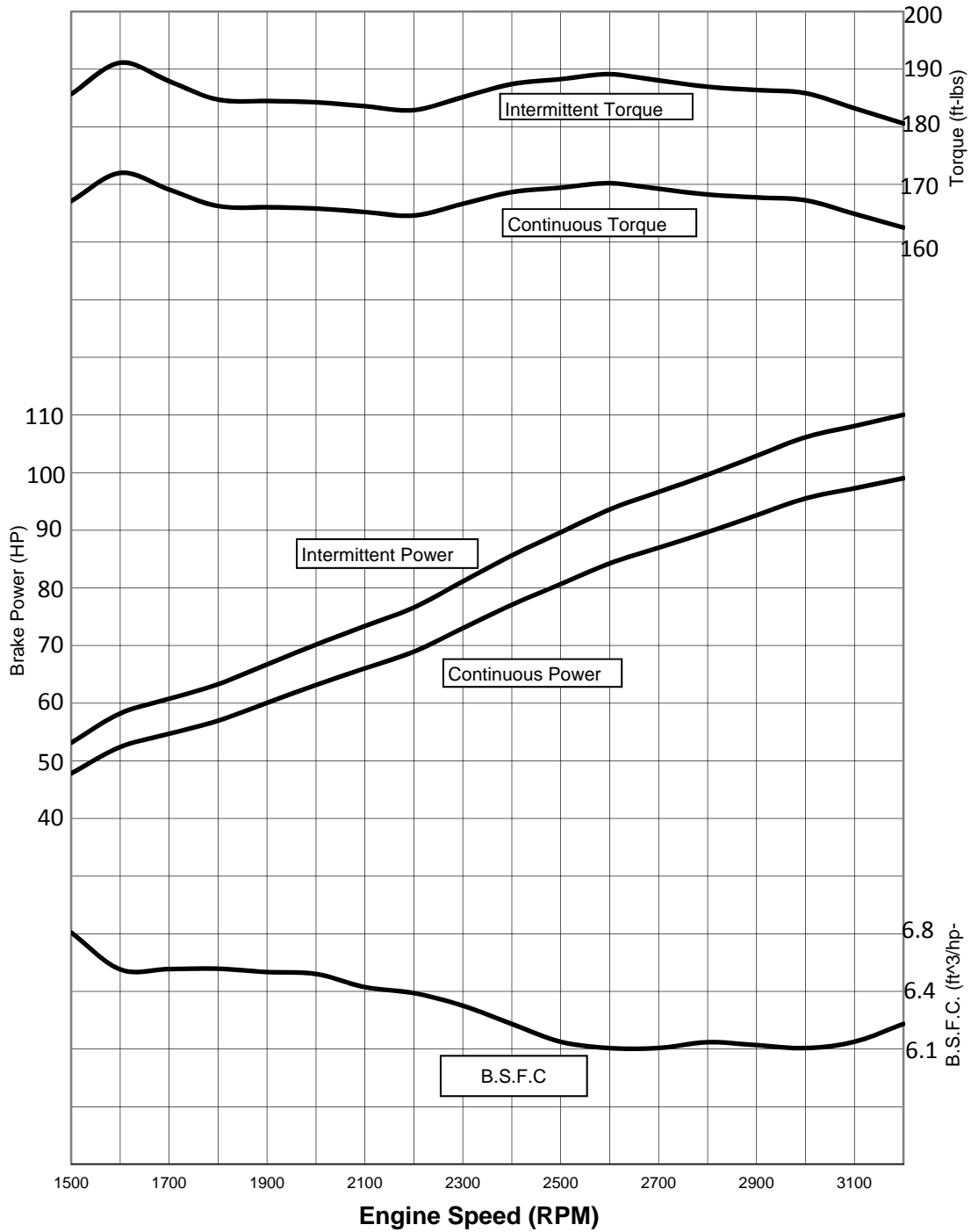
# CSG637 Gasoline



# CSG637 Propane



# CSG637 Natural Gas



# **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: 2016
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Emission Unit Description: **Condensate Loading, Produced Water Loading**

#### Loading Area Data

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

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

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

Provide description of closed vent system and any bypasses

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

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

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

Time	Jan - Mar	Apr - Jun	Jul - Sept	Oct - Dec
Hours/day	6	6	6	6
Days/week	7	7	7	7

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

Liquid Name	Condensate	Produced Water	
Max. Daily Throughput (1000 gal/day)	91.14	20.16	
Max. Annual Throughput (1000 gal/yr)	33266.10	7358.40	
Loading Method	BF	BF	
Max. Fill Rate (gal/min)	168	168	
Average Fill Time (min/loading)	50	50	
Max. Bulk Liquid Temperature (F)	75.94	75.94	
True Vapor Pressure	3.34	0.49	
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)	12.3997	0.0013
	Annual (ton/yr)	20.4608	0.0005
Max HAP Emission Rate	Loading (lb/hr)	0.1109	2.46E-06
	Annual (ton/yr)	0.1830	8.98E-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, EC002, EC003	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
TANKCOND001-010	Condensate Tanks		
TANKPW001-004	Produced Water Tanks		

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

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

Maximum Waste Gas Flow Rate 43.57 (scfm)	Heat Value of Waste Gas Stream 2,536.41 BTU/ft <sup>3</sup>	Exit Velocity of the Emission Stream 0.0834 (ft/s)
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Please see Attachment S, Tables 6 & 7 for VOC composition/ characteristics of the waste gas stream to be burned.

#### Pilot Gas Information

Number of Pilot Lights 3	Fuel Flow Rate to Pilot Flame per Pilot 12.6 scfh	Heat Input per Pilot 12800 BTU/hr	Will automatic re-ignition be used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
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If automatic re-ignition is used, please describe the method. Flame Rectification, a thermocouple equivalent

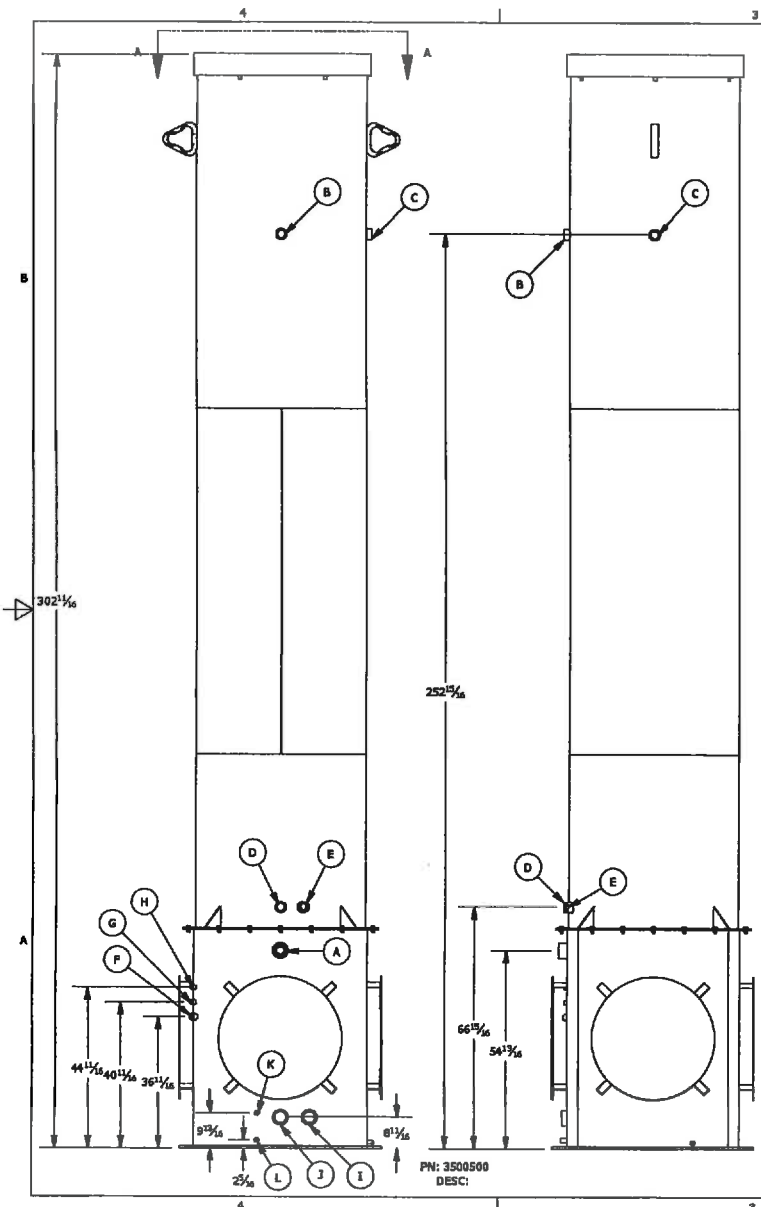
Is pilot flame equipped with a monitor to detect the presence of the flame? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If Yes, What type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infrared <input type="checkbox"/> Ultraviolet <input type="checkbox"/> 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
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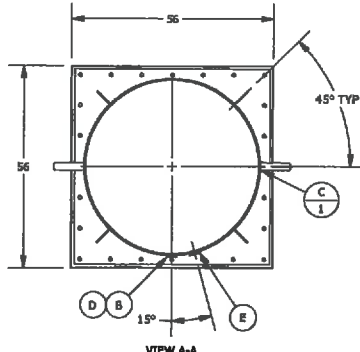
Please attach copies of manufacturer's data sheets, drawings, flame demonstration per §60.18 or §63.11 (b) and performance testing.





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

- \* >98% TVOC DRE, CERTIFIED USEPA 40 CFR 60, APPENDIX A, SOURCE EMISSIONS TEST METHODS REFERENCED. MEETS ALL EPA & CDPHE REGULATIONS.
- \* DESTROYS OIL/CONDENSATE PRODUCTION TANK VAPORS W/ NO VISIBLE FLAME.
- \* EXCELLENT OPACITY AND SMOKELESS OPERATION.
- \* RELIABLE AND CUSTOMIZABLE IGNITION.
- \* VERY LOW CAPITAL AND OPERATING COST.
- \* EASY TO OPERATE AND MAINTAIN.
- \* FIELD TESTED TO DESTROY UP TO 119.5 MDSCFD (131 MCFD) @ 10 oz/in<sup>2</sup>; 2300 BTU/CF WASTE GAS (SG 1.45)
- \* STRUCTURE CERTIFIED FOR 90 MPH 3-SEC WIND GUST PER ASCE 7-05 & IBC 2006 STANDARDS. HIGHER WIND LOAD RATED STRUCTURES AVAILABLE.



PN: 3500500  
DESC:

SCHEDULE OF NOZZLES			
MARK	QTY	DESCRIPTION	SERVICE
A	1	3" HALF COUPLING	2000# BURNER WASTE GAS IN
B	1	2" FULL COUPLING	3000# FLOW TEST/AUTOMATION
C	1	2" FULL COUPLING	3000# FLOW TEST/AUTOMATION
D	1	2" FULL COUPLING	3000# SIGHT GLASS
E	1	2" FULL COUPLING	3000# MANUAL LIGHTING
F	1	1" FULL COUPLING	3000# PILOT GAS IN
G	1	1/2" FULL COUPLING	3000# IGNITOR CABLE
H	1	1/2" FULL COUPLING	3000# AUTOMATION
I	1	3" HALF COUPLING	3000# DRIP TANK WASTE GAS IN
J	1	3" HALF COUPLING	3000# DRIP TANK WASTE GAS OUT
K	1	1/2" FULL COUPLING	3000# AUTOMATION
L	1	1/2" FULL COUPLING	3000# LIQUID DRAIN

- UNLESS OTHERWISE SPECIFIED
1. REMOVE ALL BURRS AND SHARP CORNERS.
  2. COR. RAD .03
  3. DO NOT SCALE DRAWING.
  4. ALL DIMENSIONS ARE IN INCHES.
  5. MACHINE FIN.
  6. FABRICATION AND SHARP CORNERS.
    - .X = ± 0.25
    - .XX = ± 0.125
    - .XXX = ± 0.06
    - ANGLES ± 3°
  7. MACHINE
    - .X = ± 0.030
    - .XX = ± 0.015
    - .XXX = ± 0.005
    - ANGLES ± 1/2°
    - CONTRICTY WITHIN 0.010 TIR

APPROVED FOR A.S.M.E CODE, SECTION VIII DIV 1  
ED, ADDENDA BY, DATE

**CIMARRON**  
Energy Inc.

TITLE:  
48" HIGH VOLLUME BCD

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

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

# **Attachment S**

## **Emissions Calculations**

**Table 1**

**Facility Information  
Stanley Well Pad  
Doddridge County, West Virginia  
Antero Resources Corporation**

**Oil and Gas Site General Information**

<b>Administrative Information</b>	
Company Name	Antero Resources Corporation
Facility/Well Name	Stanley Well Pad
Nearest City/Town	West Union
API Number/SIC Code	1311
Latitude/Longitude	39.2368, -80.87963
County	Doddridge County

<b>Technical Information</b>	
Max Condensate Site Throughput (bbl/day):	2,170
Max Produced Water Site Throughput (bbl/day):	480
Are there any sour gas streams at this site?	No
Is this site currently operational/producing?	No

<b>Equipment/Processes at Site</b>	
<b>Equipment/Process Types</b>	<b>How many for this site?</b>
Fugitives	8
IC Engines	7
Gas Production Unit Heaters	8
Line Heaters	8
Condensate Tanks	10
Produced Water Tanks	4
Loading Jobs	2
Vapor Recovery Towers	3
Enclosed Combustors	3

Table 2

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

Emission Source	VOC		NO <sub>x</sub>		CO <sub>2e</sub>		CO		SO <sub>2</sub>		PM <sub>2.5</sub>		PM <sub>10</sub>		Lead		Total HAPs		Benzene		Xylenes		Formaldehyde			
	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)		
<b>UNCONTROLLED (Fugitives, Storage Tanks, VRU engines, Gas Production Unit Heaters, Line Heaters)</b>																										
Fugitive Emissions (Component Count, PCV and Hauling) <sup>1</sup>	2.8910	12.6625			77.397	339.00								2.1058	2.5090			0.3752	1.6435	0.0064	0.0279	0.0526	0.2302			
Flashing, Working and Breathing (F/W/B) Losses <sup>2</sup>	226.0233	989.9822			143.5140	628.5912												25.2063	110.4035	0.1604	0.7025	0.1543	0.6758			
VRU Engine Emissions <sup>3</sup>	0.1464	0.6413	0.4574	2.0033	572.57	2,507.88	3.2576	14.2683	0.0029	0.0127	0.0470	0.2058	0.0470	0.2058				0.1135	0.4973	0.0078	0.0342	0.0010	0.0042	0.1014	0.4442	
Gas Production Unit Heater Emissions <sup>4</sup>	0.0538	0.2355	0.9776	4.2820	1,173.16	5,138.43	0.8212	3.5969	0.0059	0.0257	0.0743	0.3254	0.0743	0.3254	4.89E-06	2.14E-05		0.0184	0.0806	2.05E-05	0.0001			0.0007	0.0032	
Line Heater Emissions <sup>4</sup>	0.0717	0.3140	1.3035	5.7094	1,564.21	6,851.24	1.0949	4.7959	0.0078	0.0343	0.0991	0.4339	0.0991	0.4339	6.52E-06	2.85E-05		0.0245	0.1075	2.74E-05	0.0001			0.0010	0.0043	
<b>TOTALS:</b>	<b>229.1862</b>	<b>1003.8356</b>	<b>2.7385</b>	<b>11.9947</b>	<b>3530.8538</b>	<b>15465.1395</b>	<b>5.1738</b>	<b>22.6610</b>	<b>0.0166</b>	<b>0.0727</b>	<b>0.2204</b>	<b>0.9652</b>	<b>2.3261</b>	<b>3.4742</b>	<b>1.14E-05</b>	<b>5.00E-05</b>		<b>25.7380</b>	<b>112.7325</b>	<b>0.1746</b>	<b>0.7648</b>	<b>0.2078</b>	<b>0.9102</b>	<b>0.1031</b>	<b>0.4517</b>	
<b>TOTALS (Excluding Fugitives):</b>	<b>226.2952</b>	<b>991.1731</b>	<b>2.7385</b>	<b>11.9947</b>	<b>3453.4571</b>	<b>15126.1420</b>	<b>5.1738</b>	<b>22.6610</b>	<b>0.0166</b>	<b>0.0727</b>	<b>0.2204</b>	<b>0.9652</b>	<b>2.2204</b>	<b>3.4742</b>	<b>1.14E-05</b>	<b>5.00E-05</b>		<b>25.3628</b>	<b>111.0889</b>	<b>0.1683</b>	<b>0.7369</b>	<b>0.1553</b>	<b>0.6800</b>	<b>0.1031</b>	<b>0.4517</b>	
<b>UNCONTROLLED (Truck Loading Emissions)</b>																										
Truck Loading Emissions <sup>5</sup>	12.4010	20.4613			1.7160	1.7355												0.1109	0.1830	0.0006	0.0009	0.0024	0.0040			
<b>CONTROLLED EMISSIONS</b>																										
Enclosed Combustor Emissions (from F/W/B losses) <sup>6</sup>	4.5207	19.8006	2.4518	10.7388	935.3206	4096.7044	11.1632	48.8947	2.27E-05	0.0001	0.0151	0.0662	0.0202	0.0883	1.33E-06	5.81E-06		0.5042	2.2084	0.0032	0.0141	0.0031	0.0135	2.84E-06	1.24E-05	
Controlled Fugitive Emissions from Hauling														1.0529	1.2545											
<b>TOTALS:</b>	<b>4.5207</b>	<b>19.8006</b>	<b>2.4518</b>	<b>10.7388</b>	<b>935.3206</b>	<b>4096.7044</b>	<b>11.1632</b>	<b>48.8947</b>	<b>2.27E-05</b>	<b>9.93E-05</b>	<b>0.0151</b>	<b>0.0662</b>	<b>1.0730</b>	<b>1.3428</b>	<b>1.33E-06</b>	<b>5.81E-06</b>		<b>0.5042</b>	<b>2.2084</b>	<b>0.0032</b>	<b>0.0141</b>	<b>0.0031</b>	<b>0.0135</b>	<b>2.84E-06</b>	<b>1.24E-05</b>	
<b>POTENTIAL TO EMIT<sup>7</sup></b>	<b>7.6835</b>	<b>54.1152</b>	<b>5.1903</b>	<b>22.7335</b>	<b>4322.6604</b>	<b>18934.9882</b>	<b>16.3369</b>	<b>71.5557</b>	<b>0.0166</b>	<b>0.0728</b>	<b>0.2355</b>	<b>1.0314</b>	<b>1.2934</b>	<b>2.3080</b>	<b>1.27E-05</b>	<b>5.58E-05</b>		<b>1.0359</b>	<b>4.7203</b>	<b>0.0174</b>	<b>0.0773</b>	<b>0.0566</b>	<b>0.2520</b>	<b>0.1031</b>	<b>0.4517</b>	
<b>POTENTIAL TO EMIT (Excluding Fugitives)</b>	<b>4.7926</b>	<b>20.9914</b>	<b>5.1903</b>	<b>22.7335</b>	<b>4245.2638</b>	<b>18594.2552</b>	<b>16.3369</b>	<b>71.5557</b>	<b>0.0166</b>	<b>0.0728</b>	<b>0.2355</b>	<b>1.0314</b>	<b>0.2405</b>	<b>1.0535</b>	<b>1.27E-05</b>	<b>5.58E-05</b>		<b>0.6607</b>	<b>2.8938</b>	<b>0.0111</b>	<b>0.0485</b>	<b>0.0041</b>	<b>0.0177</b>	<b>0.1031</b>	<b>0.4517</b>	

**Enter any notes here:**

1 - See Tables 4 and 5 for fugitive emission calculations; Table 12 for PM emissions from hauling.  
2 - See Tables 6 and 7 for tanks emission calculations  
3 - See Table 13 for VRU engine emissions  
4 - See Table 9 for gas production unit heater and line heater emission calculations  
5 - The maximum emission was calculated based on tank truck capacity of 200 barrels and actual fill rate of 50 minutes per tank truck. At a production rate of 2170 barrels per day, VOC emissions would be 12.401 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 4.6715 pound per hour.  
6 - See Table 10 and 11 for enclosed combustion emission calculations.  
7 - The hourly potential to emit is the sum of emissions from gas production unit heaters, line heaters, VRU engines, storage tanks, enclosed combustors, and fugitives. Does not include emissions from loading (see footnote 5). The total TPY PTE is the sum of all emissions.  
PM 10 TPY is the sum of uncontrolled hauling and other PM10 sources.

**Table 3**

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

Pollutant		Emissions		Threshold Exceeded?		
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	229.1862	7.6835	6	<b>Yes</b>	
	tons/yr	1024.2969	54.1152	10	<b>Yes</b>	<b>Yes</b>
NO <sub>x</sub>	lbs/hr	2.7385	5.1903	6		
	tons/yr	11.9947	22.7335	10	<b>Yes</b>	<b>Yes</b>
CO	lbs/hr	5.1738	16.3369	6		<b>Yes</b>
	tons/yr	22.6610	71.5557	10	<b>Yes</b>	<b>Yes</b>
SO <sub>2</sub>	lbs/hr	0.0166	0.0166	6		
	tons/yr	0.0727	0.0728	10		
PM <sub>2.5</sub>	lbs/hr	0.2204	0.2355	6		
	tons/yr	0.9652	1.0314	10		
PM <sub>10</sub>	lbs/hr	2.3261	1.2934	6		
	tons/yr	3.4742	2.3080	10		
Lead	lbs/hr	1.14E-05	1.27E-05	6		
	tons/yr	5.00E-05	5.58E-05	10		
Total HAPs	lbs/hr	25.7380	1.0359	2	<b>Yes</b>	
	tons/yr	112.9155	4.7203	5	<b>Yes</b>	
Total TAPs	lbs/hr	0.2777	0.1206	1.14		
n-Hexane	lbs/hr	24.9564	0.8120			
	tons/yr	109.4829	3.7309			
Toluene	lbs/hr	0.2115	0.0264			
	tons/yr	0.9288	0.1181			
Ethylbenzene	lbs/hr	0.0841	0.0198			
	tons/yr	0.3698	0.0881			
Xylenes	lbs/hr	0.2078	0.0566			
	tons/yr	0.9142	0.2520			
Benzene	lbs/hr	0.1746	0.0174			
	tons/yr	0.7657	0.0773			

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

**Fugitive Emissions  
Stanley 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	0.027
	HAPs	0.027
	Methane	0.649

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
400	Valves	Gas VOC	0.004500	0.27	5,130.87
		Non VOC	0.004500	1.53	29,558.73
		HAPs	0.004500	0.05	944.91
		CO2e	0.004500	29.21	562,948.98
472	Connectors	VOC	0.000200	0.01	269.09
		Non-VOC	0.000200	0.08	1,550.19
		HAPs	0.000200	0.00	49.56
		CO2e	0.000200	1.53	29,523.55
104	Flanges	VOC	0.000390	0.01	115.62
		Non-VOC	0.000390	0.03	666.06
		HAPs	0.000390	0.00	21.29
		CO2e	0.000390	0.658215	12685.116996
<b>Total VOCs:</b>				0.29	5515.57
<b>Total THC:</b>				1.93	37290.55

Light Liquid Weight Fraction From Analysis:	VOC frac	0.958
	Benzene frac	0.003
	Toluene	0.009
	Ethylbenzene	0.008
	Xylenes	0.023
	n-hexane	0.065
	HAPs	0.108
	Methane	0.014

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
416	Valves	Light Liquid VOC	0.002500	1.00	19,210.51
		Light Liquid Non-VOC	0.002500	0.04	832.37
		Light Liquid HAPs	0.002500	0.11	2,160.95
		CO2e	0.002500	0.37	7110.59
<b>Total VOC:</b>				1.00	19,210.51
<b>Total THC:</b>				1.04	20,042.88

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	24,726.08	2.82	12.36
Ethylbenzene		0.02	0.08
Toluene		0.02	0.09
Xylenes		0.05	0.23
n-Hexane		0.27	1.16
TAPs (Benzene)		0.01	0.03
HAPs		0.36	1.59
CO <sub>2e</sub>	612,268.23	69.89	306.13

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

Table 5

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

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

Component	Mol%	Molecular Weight (lb/lb-mole)	Component Flow (scf/day)	Component Moles (lb-moles)	Component Emissions		
					(lbs/day)	(lbs/hr)	(tons/year)
H2S	0.00E+00	34.08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.4154	14.01	0.8773248	0.00	0.03	0.00	0.01
Carbon Dioxide	0.1709	44.01	0.3609408	0.00	0.04	0.00	0.01
Methane	80.6676	16.04	170.3699712	0.45	7.20	0.30	1.31
Ethane	13.4543	30.07	28.4154816	0.07	2.25	0.09	0.41
Propane	2.6759	44.1	5.6515008	0.01	0.66	0.03	0.12
Isobutane	0.5461	58.12	1.1533632	0.00	0.18	0.01	0.03
n-Butane	0.9324	58.12	1.9692288	0.01	0.30	0.01	0.06
Isopentane	0.2731	72.15	0.5767872	0.00	0.11	0.00	0.02
n-Pentane	0.2342	72.15	0.4946304	0.00	0.09	0.00	0.02
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	0.6301	86.18	1.3307712	0.00	0.30	0.01	0.06
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	0.0684	0.2995
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	0.0126	0.0552
HAPs Emissions	0.0126	0.0552
TAPs Emissions	0.00E+00	0.00E+00
CO <sub>2e</sub> emissions	7.5031	32.8634

<b>Enter any notes here:</b>	1. PCV bleed rate obtained from the user manual for PCV <a href="http://issuu.com/rmcprocesscontrols/docs/mizer-pilot-operation--parts---installation-manual">http://issuu.com/rmcprocesscontrols/docs/mizer-pilot-operation--parts---installation-manual</a> 2. Emissions per hour= Mol % x no. of PCV x bleed rate x MW / 379.48 / 24
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Table 6

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

# Hours Operational	8760
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	Condensate Tank Flashing Losses			Produced Water Tank Flashing Losses		
	Vapor Mass Fraction wt%	Flashing Losses lbs/hr	Flashing Losses tpy	Vapor Mass Fraction wt%	Flashing Losses lbs/hr	Flashing Losses tpy
Water	0.0465	0.1223	0.5358	2.4575	0.0987	0.4324
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0004	0.0012	0.0051	0.2916	0.0117	0.0513
Carbon Dioxide	0.1205	0.3172	1.3892	3.6888	0.1482	0.6491
Methane	1.2227	3.2180	14.0949	60.7140	2.4391	10.6831
Ethane	21.4711	56.5086	247.5077	19.5820	0.7867	3.4456
Propane	24.9919	65.7749	288.0939	5.9333	0.2384	1.0440
Isobutane	9.4768	24.9415	109.2439	4.1026	0.1648	0.7219
n-Butane	17.6698	46.5044	203.6891	1.7895	0.0719	0.3149
Isopentane	6.2910	16.5569	72.5192	0.3857	0.0155	0.0679
n-Pentane	5.5854	14.7000	64.3861	0.3297	0.0132	0.0580
2-Methylpentane	0.6819	1.7947	7.8606	0.0183	0.0007	0.0032
3-Methylpentane	0.4615	1.2147	5.3204	0.0334	0.0013	0.0059
n-Hexane	9.2855	24.4379	107.0382	0.1982	0.0080	0.0349
Methylcyclopentane	0.2107	0.5545	2.4289	0.0455	0.0018	0.0080
Benzene	0.0591	0.1554	0.6807	0.0983	0.0039	0.0173
2-Methylhexane	0.3949	1.0393	4.5522	0.0095	0.0004	0.0017
3-Methylhexane	0.3145	0.8276	3.6250	0.0079	0.0003	0.0014
Heptane	0.5602	1.4744	6.4580	0.0148	0.0006	0.0026
Methylcyclohexane	0.3639	0.9578	4.1950	0.0521	0.0021	0.0092
Toluene	0.0691	0.1818	0.7963	0.1097	0.0044	0.0193
Octane	0.5175	1.3620	5.9653	0.0082	0.0003	0.0014
Ethylbenzene	0.0237	0.0624	0.2735	0.0368	0.0015	0.0065
m & p-Xylene	0.0281	0.0739	0.3238	0.0427	0.0017	0.0075
o-Xylene	0.0275	0.0724	0.3173	0.0447	0.0018	0.0079
Nonane	0.1084	0.2854	1.2500	0.0027	0.0001	0.0005
C10+	0.0174	0.0458	0.2005	0.0028	0.0001	0.0005
Total VOCs	77.139	203.02	889.2	13.266	0.5329	2.3343
Total CO <sub>2e</sub>		80.77	353.8		61.12	267.7
Total TAPs (Benzene)		0.1554	0.6807		0.0039	0.0173
Toluene		0.1818	0.7963		0.0044	0.0193
Ethylbenzene		0.0624	0.2735		0.0015	0.0065
Xylenes		0.1464	0.6411		0.0035	0.0154
n-Hexane		24.438	107.038		0.0080	0.0349
Total HAPs		24.984	109.430		0.0213	0.0933
Total	100.00	263.19	1,152.8	100.00	4.017	17.60

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

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

Condensate Tank Information	
Number of Tanks	10
Maximum Working Losses (lbs/hr)	15.2740
Maximum Breathing Losses (lbs/hr)	15.8201
# 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	0.0000	1.31E-06	5.73E-06	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide	0.1093	0.0167	0.0731	0.0173	0.0757	0.0340	0.1488
Methane	0.1968	0.0301	0.1317	0.0311	0.1364	0.0612	0.2681
Ethane	27.4211	4.1883	18.3447	4.3380	19.0006	8.5263	37.3453
Propane	27.9223	4.2648	18.6800	4.4173	19.3479	8.6822	38.0278
Isobutane	10.1440	1.5494	6.7863	1.6048	7.0290	3.1542	13.8153
n-Butane	18.7560	2.8648	12.5478	2.9672	12.9964	5.8320	25.5441
Isopentane	6.2918	0.9610	4.2092	0.9954	4.3597	1.9564	8.5690
n-Pentane	5.5371	0.8457	3.7043	0.8760	3.8368	1.7217	7.5411
2-Methylpentane	0.6627	0.1012	0.4433	0.1048	0.4592	0.2061	0.9025
3-Methylpentane	0.4485	0.0685	0.3000	0.0709	0.3108	0.1394	0.6108
n-Hexane	0.6150	0.0939	0.4114	0.0973	0.4261	0.1912	0.8376
Methylcyclopentane	0.1922	0.0294	0.1286	0.0304	0.1332	0.0598	0.2618
Benzene	0.0033	5.05E-04	0.0022	0.0005	0.0023	0.0010	0.0045
2-Methylhexane	0.0252	3.86E-03	0.0169	0.0040	0.0175	0.0079	0.0344
3-Methylhexane	0.3031	0.0463	0.2028	0.0480	0.2100	0.0943	0.4128
Heptane	0.4988	0.0762	0.3337	0.0789	0.3457	0.1551	0.6794
Methylcyclohexane	0.3263	0.0498	0.2183	0.0516	0.2261	0.1015	0.4444
Toluene	0.0085	1.30E-03	5.70E-03	0.0013	0.0059	0.0026	0.0116
Octane	0.4254	0.0650	0.2846	0.0673	0.2947	0.1323	0.5793
Ethylbenzene	0.0055	8.40E-04	3.68E-03	0.0009	0.0038	0.0017	0.0075
m & p-Xylene	0.0070	1.08E-03	4.71E-03	0.0011	0.0049	0.0022	0.0096
o-Xylene	0.0071	1.09E-03	0.0048	0.0011	0.0050	0.0022	0.0097
Nonane	0.0820	0.0125	0.0549	0.0130	0.0568	0.0255	0.1117
C10+	0.0107	1.64E-03	0.0072	0.0017	0.0074	0.0033	0.0146
Total VOCs	72.273	11.0389	48.350	11.4336	50.0791	22.4725	98.430
Total CO <sub>2e</sub>		0.7683	3.3653	0.7958	3.4857	1.5642	6.851
Total TAPs (Benzene)		5.05E-04	2.21E-03	0.0005	0.0023	0.0010	0.0045
Toluene		1.30E-03	5.70E-03	0.0013	0.0059	0.0026	0.0116
Ethylbenzene		8.40E-04	3.68E-03	0.0009	0.0038	0.0017	0.0075
Xylenes		2.17E-03	0.0095	0.0022	0.0098	0.0044	0.0193
n-Hexane		0.0939	0.4114	0.0973	0.4261	0.1912	0.8376
Total HAPs		0.0987	0.4325	0.1023	0.4480	0.2010	0.8805
Total	100.00	15.2740	66.8999	15.8201	69.2919	31.0940	136.192

Table 7

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

Produced Water Tank Information	
Number of Tanks	4
Maximum Working Losses (lbs/hr)	0.0505
Maximum Breathing Losses (lbs/hr)	0.0168

	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	0.0056	2.83E-06	1.24E-05	9.39E-07	4.11E-06	3.77E-06	1.65E-05
Carbon Dioxide	4.8537	0.0025	0.0107	0.0008	0.0036	0.0033	0.0143
Methane	3.2411	0.0016	0.0072	0.0005	0.0024	0.0022	0.0096
Ethane	0.9733	0.0005	0.0022	0.0002	0.0007	0.0007	0.0029
Propane	0.0736	3.72E-05	0.0002	1.23E-05	5.41E-05	4.95E-05	0.0002
Isobutane	0.0551	2.78E-05	1.22E-04	9.24E-06	4.05E-05	3.71E-05	1.62E-04
n-Butane	0.0041	2.08E-06	9.12E-06	6.91E-07	3.03E-06	2.77E-06	1.21E-05
Isopentane	0.0002	1.14E-07	4.99E-07	3.78E-08	1.66E-07	1.52E-07	6.65E-07
n-Pentane	0.0001	7.03E-08	3.08E-07	2.33E-08	1.02E-07	9.36E-08	4.10E-07
2-Methylpentane	1.47E-06	7.44E-10	3.26E-09	2.47E-10	1.08E-09	9.91E-10	4.34E-09
3-Methylpentane	6.56E-06	3.31E-09	1.45E-08	1.10E-09	4.82E-09	4.41E-09	1.93E-08
n-Hexane	6.18E-07	3.12E-10	1.37E-09	1.04E-10	4.54E-10	4.16E-10	1.82E-09
Methylcyclopentane	1.99E-05	1.00E-08	4.40E-08	3.33E-09	1.46E-08	1.34E-08	5.86E-08
Benzene	1.31E-04	6.59E-08	2.89E-07	2.19E-08	9.59E-08	8.78E-08	3.85E-07
2-Methylhexane	1.31E-08	6.63E-12	2.90E-11	2.20E-12	9.64E-12	8.83E-12	3.87E-11
3-Methylhexane	1.63E-07	8.24E-11	3.61E-10	2.74E-11	1.20E-10	1.10E-10	4.81E-10
Heptane	2.30E-07	1.16E-10	5.08E-10	3.85E-11	1.69E-10	1.54E-10	6.76E-10
Methylcyclohexane	4.79E-06	2.42E-09	1.06E-08	8.03E-10	3.52E-09	3.22E-09	1.41E-08
Toluene	7.01E-05	3.54E-08	1.55E-07	1.18E-08	5.15E-08	4.72E-08	2.07E-07
Octane	2.36E-08	1.19E-11	5.23E-11	3.96E-12	1.74E-11	1.59E-11	6.97E-11
Ethylbenzene	1.35E-05	6.80E-09	2.98E-08	2.26E-09	9.90E-09	9.06E-09	3.97E-08
m & p-Xylene	1.41E-05	7.13E-09	3.12E-08	2.37E-09	1.04E-08	9.50E-09	4.16E-08
o-Xylene	1.89E-05	9.57E-09	4.19E-08	3.18E-09	1.39E-08	1.27E-08	5.58E-08
Nonane	3.69E-09	1.86E-12	8.16E-12	6.18E-13	2.71E-12	2.48E-12	1.09E-11
C10+	1.22E-09	6.16E-13	2.70E-12	2.05E-13	8.96E-13	8.21E-13	3.60E-12
Total VOCs	0.1334	6.74E-05	0.0003	2.24E-05	9.80E-05	8.98E-05	0.0004
Total CO <sub>2e</sub>		0.0434	0.1900	0.0144	0.0631	0.0578	0.2531
Total TAPs (Benzene)		6.59E-08	2.89E-07	2.19E-08	9.59E-08	8.78E-08	3.85E-07
Toluene		3.54E-08	1.55E-07	1.18E-08	5.15E-08	4.72E-08	2.07E-07
Ethylbenzene		6.80E-09	2.98E-08	2.26E-09	9.90E-09	9.06E-09	3.97E-08
Xylenes		1.67E-08	7.32E-08	5.55E-09	2.43E-08	2.22E-08	9.74E-08
n-Hexane		3.12E-10	1.37E-09	1.04E-10	4.54E-10	4.16E-10	1.82E-09
Total HAPs		1.25E-07	5.48E-07	4.16E-08	1.82E-07	1.67E-07	7.30E-07
Total	100.00	0.0505	0.2212	0.0168	0.0735	0.0673	0.2947

<b>Enter any notes here:</b>	Vapor mass fractions, working losses and breathing losses from Promax output
------------------------------	--

Table 8

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

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	4.45	1.0238
Annual Average Temp (F)	65.08	65.08
S (saturation factor)	0.6	0.6
P (true vapor pressure)	2.71	0.37
M (MW of vapor)	44.13	18.56
Collection Efficiency (%)	0.00	0.00
Loading Loss (lb/10 <sup>3</sup> gal)*	1.70	0.10
Maximum Throughput (gallons/hr)**	10,080	10,080
Average Throughput (gallons/yr)	33,266,100	7,358,400
Loading Emissions (lbs/hr)	17.16	0.99
Loading Emissions (tpy)	28.31	0.36

	Condensate Tank Loading Losses			Produced Water Tank Loading Losses		
	Vapor Mass Fraction wt%	Loading Losses		Vapor Mass Fraction wt%	Loading Losses	
		lbs/hr	tpy		lbs/hr	tpy
H2S	0.0000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0000	1.47E-06	2.42E-06	0.0056	5.56E-05	2.03E-05
Carbon Dioxide	0.1093	0.0187	0.0309	4.8537	0.0482	0.0176
Methane	0.1968	0.0338	0.0557	3.2411	0.0322	0.0117
Ethane	27.4211	4.7046	7.7631	0.9733	0.0097	0.0035
Propane	27.9223	4.7906	7.9050	0.0736	7.31E-04	2.67E-04
Isobutane	10.1440	1.7404	2.8718	0.0551	5.47E-04	2.00E-04
n-Butane	18.7560	3.2179	5.3099	0.0041	4.09E-05	1.49E-05
Isopentane	6.2918	1.0795	1.7813	0.0002	2.24E-06	8.18E-07
n-Pentane	5.5371	0.9500	1.5676	0.0001	1.38E-06	5.04E-07
2-Methylpentane	0.6627	0.1137	0.1876	1.47E-06	1.46E-08	5.34E-09
3-Methylpentane	0.4485	0.0769	0.1270	6.56E-06	6.52E-08	2.38E-08
n-Hexane	0.6150	0.1055	0.1741	6.18E-07	6.14E-09	2.24E-09
Methylcyclopentane	0.1922	0.0330	0.0544	1.99E-05	1.97E-07	7.20E-08
Benzene	0.0033	0.0006	0.0009	0.0001	1.30E-06	4.73E-07
2-Methylhexane	0.0252	0.0043	0.0071	1.31E-08	1.30E-10	4.76E-11
3-Methylhexane	0.3031	0.0520	0.0858	1.63E-07	1.62E-09	5.92E-10
Heptane	0.4988	0.0856	0.1412	2.30E-07	2.28E-09	8.32E-10
Methylcyclohexane	0.3263	0.0560	0.0924	4.79E-06	4.76E-08	1.74E-08
Toluene	0.0085	0.0015	0.0024	0.0001	6.96E-07	2.54E-07
Octane	0.4254	0.0730	0.1204	2.36E-08	2.35E-10	8.57E-11
Ethylbenzene	0.0055	0.0009	0.0016	1.35E-05	1.34E-07	4.88E-08
m & p-Xylene	0.0070	0.0012	0.0020	1.41E-05	1.40E-07	5.12E-08
o-Xylene	0.0071	0.0012	0.0020	1.89E-05	1.88E-07	6.87E-08
Nonane	0.0820	0.0141	0.0232	3.69E-09	3.66E-11	1.34E-11
C10+	0.0107	0.0018	0.0030	1.22E-09	1.21E-11	4.42E-12
Total VOCs	72.2728	12.3997	20.4608	0.1334	0.0013	0.0005
Total CO <sub>2e</sub>		0.8631	1.4241		0.8529	0.3113
Total TAPs (Benzene)		0.0006	0.0009		1.30E-06	4.73E-07
Toluene		0.0015	0.0024		6.96E-07	2.54E-07
Ethylbenzene		0.0009	0.0016		1.34E-07	4.88E-08
Xylenes		0.0024	0.0040		3.28E-07	1.20E-07
n-Hexane		0.1055	0.1741		6.14E-09	2.24E-09
Total HAPs		0.1109	0.1830		2.46E-06	8.98E-07
Total	100.0000	17.1568	28.3106	100.0000	0.9932	0.3625

**Enter any notes here**

Vapor mass fractions and loading losses from Promax output

\*Using equation  $L_i = 12.46 \cdot \text{SPM}/T$  from AP-42, Chapter 5, Section 5.2-4

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

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

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

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

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

Loading emissions are vented to the atmosphere.

Table 9

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

**Gas Production Unit Heater Emissions**

Number of Units	8
GPU Heater Rating (MMBtu/hr)	1.50
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,227

**Line Heater Emissions**

Number of Units	8
Line Heater Rating (MMBtu/hr)	2.00
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,227

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	0.978	4.282
CO	84	0.821	3.597
CO <sub>2</sub>	120,000	1173.158	5138.432
Lead	0.0005	4.89E-06	2.14E-05
N <sub>2</sub> O	2.2	0.022	0.094
PM (Total)	7.6	0.074	0.325
SO <sub>2</sub>	0.6	0.006	0.026
TOC	11	0.108	0.471
Methane	2.3	0.022	0.098
VOC	5.5	0.054	0.236
<b>HAPS</b>			
2-Methylnaphthalene	2.40E-05	2.35E-07	1.03E-06
Benzene	0.0021	2.05E-05	8.99E-05
Dichlorobenzene	0.0012	1.17E-05	5.14E-05
Fluoranthene	3.00E-06	2.93E-08	1.28E-07
Fluorene	2.80E-06	2.74E-08	1.20E-07
Formaldehyde	0.0750	7.33E-04	0.0032
Hexane	1.8000	0.0176	0.0771
Naphthalene	6.10E-04	5.96E-06	2.61E-05
Phenanathrene	1.70E-05	1.66E-07	7.28E-07
Toluene	0.0034	3.32E-05	1.46E-04

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.304	5.709
CO	84	1.095	4.796
CO <sub>2</sub>	120,000	1564.211	6851.242
Lead	0.0005	6.52E-06	2.85E-05
N <sub>2</sub> O	2.2	0.029	0.126
PM (Total)	7.6	0.099	0.434
SO <sub>2</sub>	0.6	0.008	0.034
TOC	11	0.143	0.628
Methane	2.3	0.030	0.131
VOC	5.5	0.072	0.314
<b>HAPS</b>			
2-Methylnaphthalene	2.40E-05	3.13E-07	1.37E-06
Benzene	0.0021	2.74E-05	1.20E-04
Dichlorobenzene	0.0012	1.56E-05	6.85E-05
Fluoranthene	3.00E-06	3.91E-08	1.71E-07
Fluorene	2.80E-06	3.65E-08	1.60E-07
Formaldehyde	0.0750	0.0010	0.0043
Hexane	1.8000	0.0235	1.03E-01
Naphthalene	6.10E-04	7.95E-06	3.48E-05
Phenanathrene	1.70E-05	2.22E-07	9.71E-07
Toluene	3.40E-03	4.43E-05	1.94E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.125	0.550
TOTAL Uncontrolled HAPS	0.043	0.188
TOTAL Uncontrolled TAPs (Benzene)	4.79E-05	2.10E-04
TOTAL Uncontrolled Toluene	7.76E-05	3.40E-04
TOTAL Uncontrolled Hexane	0.0411	0.1798
TOTAL Uncontrolled TAPs (Formaldehyde)	0.0017	0.0075
TOTAL CO <sub>2e</sub> Emissions	2,753.64	12,060.92

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

Table 10

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

General Information	
Unit Name:	EC001, EC002, EC003

Pollutant	Emission Factor <sup>1</sup> (lb/MMscf)
NOx	100
CO	84
PM10	7.6
PM2.5	5.7
SO <sub>2</sub>	0.6
CO <sub>2</sub>	120,000
VOC	5.5
benzene	2.10E-03
Hexane	1.80E+00
Toluene	3.40E-03
Formaldehyde	7.50E-02
N <sub>2</sub> O	2.20
Lead	5.00E-04

Pollutant	Emission Factor <sup>2</sup> (lb/MMBtu)
NO <sub>x</sub>	0.068
CO	0.31

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

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

Enclosed Combustor operating hours	8760
No. of Enclosed Combustors	3
Maximum Design Heat Input Per Enclosed Combustor (MMBtu/hr)	12

Stream Information							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed/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	-
Maximum Expected Hourly Volumetric Flow Rate of Stream (scf/hr)	37.8	--	2,263.15	82.13	267.38	1.38	2,651.84
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	331,128.00	--	19,825,213.33	719,461.40	2,342,250.69	12,049.07	23,230,102.49
Heating Content (Btu/ft3)	1,227		2,633.62	1,162.32	2,506.75	96.96	2,536.41

Mass Flow Rates of the Vapors Sent to this Control Device, Hourly Basis (lb/hr)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
H2S	-	-	0.000	0.000	0.000	0.000	0.000
Total VOC	-	-	203.018	0.533	22.472	0.000	226.02
Benzene	-	-	0.155	0.004	0.001	0.000	0.160
Toluene	-	-	0.182	0.004	0.003	0.000	0.189
Ethylbenzene	-	-	0.062	0.001	0.002	0.000	0.066
Xylenes	-	-	0.146	0.004	0.004	0.000	0.154
n-Hexane	-	-	24.438	0.008	0.191	0.000	24.637
HAPs	-	-	24.984	0.021	0.201	0.000	25.206
Total Mass Flow	-	-	263.185	4.017	31.094	0.067	298.364
Mass Flow Rates of the Vapors Sent to this Control Device, Annual Basis (tpy)							
H2S	-	-	0.000	0.000	0.000	0.000	0.000
Total VOC	-	-	889.218	2.334	98.430	0.000	989.982
Benzene	-	-	0.681	0.017	0.005	0.000	0.702
Toluene	-	-	0.796	0.019	0.012	0.000	0.827
Ethylbenzene	-	-	0.273	0.006	0.007	0.000	0.287
Xylenes	-	-	0.641	0.015	0.019	0.000	0.676
n-Hexane	-	-	107.038	0.035	0.838	0.000	107.911
HAP	-	-	109.430	0.093	0.880	0.000	110.404
Total Mass Flow	-	-	1152.751	17.596	136.192	0.295	1306.833

Table 10

**Enclosed Combustor Emissions  
Stanley 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 <sup>3</sup>	0.004	-	2.448				2.45
CO <sup>3</sup>	0.003	-	11.160				11.16
PM2.5	0.000	-	0.013	0.000	0.002	0.000	0.02
PM10	0.000	-	0.017	0.001	0.002	0.000	0.02
H2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO <sub>2</sub>	0.000	-	0.000	0.000	0.000	0.000	0.00
CO <sub>2</sub>	4.536	-	-	-	-	-	4.54
Total VOC	0.000	-	4.060	0.011	0.449	0.000	4.52
Benzene	0.000	-	0.003	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.004	0.000	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.001	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.003	0.000	0.000	0.000	0.00
n-Hexane	0.000	-	0.489	0.000	0.004	0.000	0.49
HAP	0.000	-	0.500	0.000	0.004	0.000	0.50
N <sub>2</sub> O	0.000	-	0.005	0.000	0.001	0.000	0.01
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00
Annual (tpy)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx <sup>3</sup>	0.017	-	10.722				10.74
CO <sup>3</sup>	0.014	-	48.881				48.89
PM2.5	0.001	-	0.057	0.002	0.007	0.000	0.07
PM10	0.001	-	0.075	0.003	0.009	0.000	0.09
H <sub>2</sub> S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO <sub>2</sub>	0.000	-	0.000	0.000	0.000	0.000	0.00
CO <sub>2</sub>	19.868	-	-	-	-	-	19.87
Total VOC	0.001	-	17.784	0.047	1.969	0.000	19.80
Benzene	0.000	-	0.014	0.000	0.000	0.000	0.01
Toluene	0.000	-	0.016	0.000	0.000	0.000	0.02
Ethylbenzene	0.000	-	0.005	0.000	0.000	0.000	0.01
Xylenes	0.000	-	0.013	0.000	0.000	0.000	0.01
n-Hexane	0.000	-	2.141	0.001	0.017	0.000	2.16
HAP	0.000	-	2.189	0.002	0.018	0.000	2.21
N <sub>2</sub> O	0.000	-	0.022	0.001	0.003	0.000	0.03
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	4.52	19.80
NOx	2.45	10.74
CO	11.16	48.89
PM2.5	0.02	0.07
PM10	0.02	0.09
H <sub>2</sub> S	1.21E-05	5.28E-05
SO <sub>2</sub>	2.27E-05	9.93E-05
Benzene (TAPs)	0.00	0.01
Toluene	0.00	0.02
Ethylbenzene	0.00	0.01
Xylenes	0.00	0.01
Hexanes	0.49	2.16
Formaldehyde (TAPs)	2.84E-06	1.24E-05
HAPs	0.50	2.21
CO <sub>2</sub> e	935.32	4096.70
N <sub>2</sub> O	0.01	0.03
Lead	1.33E-06	5.81E-06

**Enter any notes here as needed**

- Emission Factors from AP-42 Tables 1.4-1, 1.4-2, and 1.4.3
- Emission Factors from AP-42 Tables 13.5-1 and 13.5-2 for industrial flares
- Worst case emissions based on enclosed combustors total maximum design heat input

Table 11

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

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

Components	Mole fraction of oil flash gas constituents <sup>a</sup>	Volume of oil flash gas sent to Enclosed Combustor scf/year	Mole fraction of water flash gas constituents <sup>a</sup>	Volume of water flash gas sent to Enclosed Combustor scf/year	Mole fraction of oil tank vapors constituents <sup>a</sup>	Volume of oil tank vapor sent to Enclosed Combustor scf/year	Mole fraction of water tank vapors constituents <sup>a</sup>	Volume of water tank vapors sent to Enclosed Combustor scf/year	Component volume of gas sent to Enclosed Combustor scf/year	Number of carbon atoms	Combustion Efficiency	Combusted CO <sub>2</sub> Volume <sup>b</sup> scf/year	Uncombusted CO <sub>2</sub> and CH <sub>4</sub> Volume <sup>b</sup> scf/year	Volume GHGs Emitted scf/year
CO <sub>2</sub>	0.001	19,825,213	0.0170	719,461	0.0011	2,342,251	0.020	12,049	40,397	1	0	--	40,397	69,666,207
Methane	0.036	19,825,213	0.7676	719,461	0.0054	2,342,251	0.037	12,049	1,271,076	1	0.98	1,245,655	25,422	25,422
Ethane	0.333	19,825,213	0.1321	719,461	0.4036	2,342,251	0.006	12,049	7,650,136	2	0.98	14,994,267	--	
Propane	0.265	19,825,213	0.0273	719,461	0.2802	2,342,251	0.000	12,049	5,922,013	3	0.98	17,410,719	--	
i-Butane	0.076	19,825,213	0.0143	719,461	0.0772	2,342,251	0.000	12,049	1,700,614	4	0.98	6,666,406	--	
n-Butane	0.142	19,825,213	0.0062	719,461	0.1428	2,342,251	0.000	12,049	3,153,325	4	0.98	12,361,035	--	
Pentane	0.077	19,825,213	0.0020	719,461	0.0726	2,342,251	0.000	12,049	1,695,156	5	0.98	8,306,266	--	
Hexane	0.057	19,825,213	0.0006	719,461	0.0089	2,342,251	0.000	12,049	1,141,402	6	0.98	6,711,447	--	
Benzene	0.000	19,825,213	0.0003	719,461	0.0000	2,342,251	0.000	12,049	7,226	6	0.98	42,486	--	
Heptanes	0.007	19,825,213	0.0002	719,461	0.0047	2,342,251	0.000	12,049	151,512	7	0.98	1,039,375	--	
Toluene	0.000	19,825,213	0.0002	719,461	0.0000	2,342,251	0.000	12,049	7,210	7	0.98	49,458	--	
Octane	0.004	19,825,213	0.0001	719,461	0.0031	2,342,251	0.000	12,049	83,639	8	0.98	655,728	--	
Ethyl benzene	0.000	19,825,213	0.0001	719,461	0.0000	2,342,251	0.000	12,049	2,173	8	0.98	17,034	--	
Xylenes	0.000	19,825,213	0.0002	719,461	0.0001	2,342,251	0.000	12,049	5,108	8	0.98	40,048	--	
Nonane	0.000	19,825,213	0.0000	719,461	0.0003	2,342,251	0.000	12,049	8,496	9	0.98	74,937	--	
Decane plus	0.000	19,825,213	0.0000	719,461	0.0000	2,342,251	0.000	12,049	1,117	10	0.98	10,950	--	
<b>Subtotal</b>												<b>69,625,811</b>	<b>--</b>	

Pollutant	Volume Emitted scf/year	Density of GHG <sup>c</sup> lb/scf	Conversion Factor lb/ton	GWF	Emissions <sup>c</sup>	
					lbs/hr	(tons/yr)
CO <sub>2</sub>	69,666,207	0.12	2000	1	922.226	4039.352
CH <sub>4</sub>	25,422	0.09	2000	25	0.270	1.183
<b>CO<sub>2</sub>e Emissions</b>					<b>928.976</b>	<b>4068.915</b>

**GHG Emissions Summary**

Notes

a Flashing/Working/Breathing Losses from ProMax output reports

b 40 CFR 98.233 (n)(4): Eqns: W-19, W-20 and W-21

c 40 CFR 98.233(v) Eqn W-36 - density at 60F and 14.7 psia

Table 12

**Haul Road Emissions  
Stanley 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 <sup>1</sup> (%)	50	50

Tanker Truck Trip Calculation	
Condensate Production (bbl/day)	2,170
PW Production (bbl/day)	480
Truck Capacity (bbl)	200

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

	# of Wheels	Mean Vehicle Weight (W) (tons)	Mean Vehicle Speed (S) (mph)	Miles Per Trip (miles)	Maximum Trips per Hour	Maximum Trips per Year	Vehicle Miles Travelled		PM (lbs/VMT)	PM10 (lbs/VMT)
							(miles/hr)	(miles/year)		
Tanker Trucks Condensate	10	40	10	0.6000	1	3961	0.6000	2376.6000	3.8175	1.7179
Tanker Trucks PW	10	40	10	0.6000	1	876	0.6000	525.6000	3.8175	1.7179
Pick Up Truck	4	3	10	0.2840	1	730	0.2840	207.3200	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	2.2905	9072.7404	4.5364	1.0307	4082.7332	2.0414	1.1453	4536.3702	2.2682	0.5154	2041.3666	1.0207
Tanker Trucks PW	2.2905	2006.4934	1.0032	1.0307	902.9221	0.4515	1.1453	1003.2467	0.5016	0.5154	451.4610	0.2257
Pick Up Truck	0.0985	71.8736	0.0359	0.0443	32.3431	0.0162	0.0492	35.9368	0.0180	0.0222	16.1716	0.0081
<b>Total Emissions</b>	<b>4.6795</b>	<b>11,151.1074</b>	<b>5.5756</b>	<b>2.1058</b>	<b>5,017.9983</b>	<b>2.5090</b>	<b>2.3397</b>	<b>5,575.5537</b>	<b>2.7878</b>	<b>1.0529</b>	<b>2,508.9992</b>	<b>1.2545</b>

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

Vapor Recovery Unit Emissions  
Stanley Well Pad  
Doddridge County, West Virginia  
Antero Resources Corporation

Ford MSG-425 2.5L Engine

Power (hp) <sup>1</sup>	76
Fuel consumption (lbs/BHP-hr) <sup>1</sup>	0.3864
Heat Content of Fuel (Btu/scf)	1227.4562
Density of NG (lb/scf)	0.056
Operating Hours/year	8760
No. of Engines	5

Ford CSG-637 3.7L Engine

Power (hp) <sup>1</sup>	110
Fuel consumption (lbs/BHP-hr) <sup>1</sup>	0.3584
Heat Content of Fuel (Btu/scf)	1227.4562
Density of NG (lb/scf)	0.056
Operating Hours/year	8760
No. of Engines	2

Pollutant	Emission Factors		lb/hr	tpy
	(g/hp-hr)	(lb/MMBtu)		
NOx <sup>2</sup>	0.3731		0.3126	1.3692
CO <sup>2</sup>	2.4627		2.0631	9.0366
CO <sub>2</sub>		110.000	354.0229	1,550.62
PM <sub>2.5</sub>		9.500E-03	0.0306	0.1339
PM <sub>10</sub>		9.500E-03	0.0306	0.1339
PM (Total)		9.910E-03	0.0319	0.1397
SO <sub>2</sub>		5.880E-04	0.0019	0.0083
TOC		0.358	1.1522	5.0466
Methane		0.230	0.7402	3.2422
VOC <sup>3</sup>		0.0296	0.0953	0.4173
HAPS				
Benzene		0.0016	0.0051	0.0223
Ethylbenzene		2.48E-05	7.98E-05	3.50E-04
Formaldehyde		0.0205	0.0660	0.2890
Naphthalene		9.71E-05	3.13E-04	0.0014
Toluene		5.58E-04	0.0018	0.0079
Xylene		1.95E-04	6.28E-04	0.0027

Pollutant	Emission Factors		lb/hr	tpy
	(g/hp-hr)	(lb/MMBtu)		
NOx <sup>2</sup>	0.2985		0.1448	0.6341
CO <sup>2</sup>	2.4627		1.1945	5.2317
CO <sub>2</sub>		110.000	190.1084	832.67
PM <sub>2.5</sub>		9.500E-03	0.0164	0.0719
PM <sub>10</sub>		9.500E-03	0.0164	0.0719
PM (Total)		9.910E-03	0.0171	0.0750
SO <sub>2</sub>		5.880E-04	0.0010	0.0045
TOC		0.358	0.6187	2.7100
Methane		0.230	0.3975	1.7410
VOC <sup>3</sup>		0.0296	0.0512	0.2241
HAPS				
Benzene		0.0016	0.0027	0.0120
Ethylbenzene		2.48E-05	4.29E-05	1.88E-04
Formaldehyde		0.0205	0.0354	0.1552
Naphthalene		9.71E-05	1.68E-04	7.35E-04
Toluene		5.58E-04	9.64E-04	0.0042
Xylene		1.95E-04	3.37E-04	0.0015

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.1464	0.6413
TOTAL Uncontrolled NOx	0.4574	2.0033
TOTAL Uncontrolled HAPS	0.1135	0.4973
TOTAL Uncontrolled TAPs (Benzene)	0.0078	0.0342
TOTAL Uncontrolled Toluene	0.0028	0.0121
TOTAL Uncontrolled Ethylbenzene	0.0001	0.0005
TOTAL Uncontrolled Xylene	0.0010	0.0042
TOTAL Uncontrolled TAPs (Formaldehyde)	0.1014	0.4442
TOTAL CO <sub>2e</sub> Emissions	572.5746	2507.8766

Enter Any Notes Here:

- Engines were manufactured in 2015 for MSG-425 and 2016 for CSG-637. Both engine ratings were taken from manufacturer engine specifications. Please see copies of manufacturer engine specifications in Appendix N.
- Emission factors used for the 68 HP engine NOx and CO emissions are certification levels indicated on MSG-425 CARB document. See MSG-425 CARB document in Appendix N. Emission factors used for the 99 HP engine NOx and CO emissions are certification levels indicated on CSG-637 CARB document. See CSG-637 CARB document in Appendix N.
- Emission factors for all other contaminants including VOCs were obtained from AP-42, Section 3.2 "Natural Gas-fired Reciprocating Engines", Table 3.2-3.
- Hours of operation was calculated based on the 100% operation of the VRU.

**Table 14**

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

Pollutant	Potential Emissions		Previous Permit Application Emissions		Change in Emissions	
	Hourly PTE	Yearly PTE	Hourly PTE	Yearly PTE	Hourly PTE	Yearly PTE
<b>PM</b>	2.5333	3.6354	2.4406	6.3120	9.27E-02	-2.6766
<b>PM10</b>	1.2934	2.3080	1.1536	2.9719	0.1397	-0.6640
<b>VOC (uncontrolled)</b>	229.1862	1024.2969	256.2370	1127.6047	-27.0508	-103.3078
<b>CO</b>	16.3369	71.5557	6.7330	29.4905	9.6039	42.0653
<b>NOx</b>	5.1903	22.7335	1.6116	7.0589	3.5787	15.6746
<b>SO2</b>	0.0166	0.0728	0.0059	0.0260	1.07E-02	4.68E-02
<b>Pb</b>	1.27E-05	5.58E-05	6.48E-06	2.84E-05	6.25E-06	2.74E-05
<b>HAPs</b>	1.0359	4.7203	0.5183	2.2851	0.5176	2.4353
<b>TAPs</b>	0.1206	0.5290	0.0191	0.0842	1.01E-01	0.4448

Notes:

1. Change in emissions due to the increase in production, the removal of (1) Kubota Engine, and the addition of (1) Cimarron enclosed combustor, (8) line heaters, (5) HP VRU Ford engines, (2) LP VRU Ford engines, and (3) VRTs.
2. Change in permit from G70A to G70C.



Bryan Research & Engineering, Inc.

# ProMax<sup>®</sup> 3.2

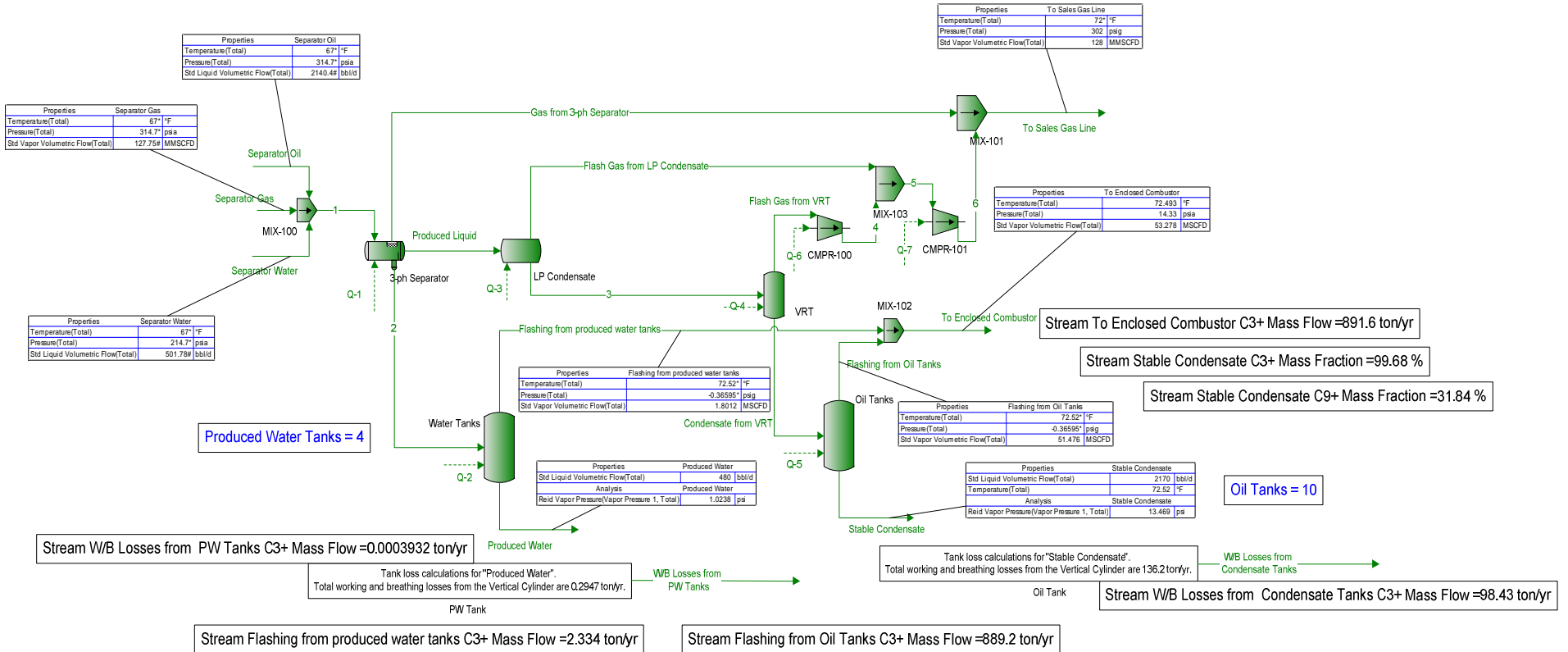
with  
**TSWEET<sup>®</sup> & PROSIM<sup>®</sup>**

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### Simulation Report

Client Name:	Antero Resources
Location:	Doddridge County, WV
Job:	Stanley Well Pad
Project Name:	Antero Promax Model- VRT
File Name:	ProMax@Z:\AirQuality\ANTERO RESOURCES\ProMax\Antero WV_VRT\ProMax Model\Antero Promax Model- VRT.pmx
ProMax Version:	
Report Created:	8/19/2016 8:42

[Moniker]



















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

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

**Sample:** Seaborne No. 1H (Vogt Pad well sample)  
 Separator Hydrocarbon Liquid  
 Sampled @ 320 psig & 72 °F

Date Sampled: 09/20/13

Job Number: 35820.002

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

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.026	0.007	0.008
Carbon Dioxide	0.022	0.009	0.011
Methane	7.703	3.192	1.406
Ethane	7.916	5.177	2.708
Propane	7.595	5.117	3.810
Isobutane	2.047	1.638	1.353
n-Butane	5.957	4.593	3.939
2,2 Dimethylpropane	0.080	0.075	0.066
Isopentane	3.263	2.918	2.678
n-Pentane	4.477	3.969	3.675
2,2 Dimethylbutane	0.231	0.236	0.226
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.514	0.515	0.504
2 Methylpentane	2.662	2.702	2.610
3 Methylpentane	1.907	1.904	1.870
n-Hexane	4.853	4.880	4.758
Heptanes Plus	<u>50.748</u>	<u>63.069</u>	<u>70.379</u>
Totals:	100.000	100.000	100.000

**Characteristics of Heptanes Plus:**

Specific Gravity -----	0.7601	(Water=1)
°API Gravity -----	54.66	@ 60°F
Molecular Weight -----	121.9	
Vapor Volume -----	19.79	CF/Gal
Weight -----	6.33	Lbs/Gal

**Characteristics of Total Sample:**

Specific Gravity -----	0.6812	(Water=1)
°API Gravity -----	76.24	@ 60°F
Molecular Weight -----	87.9	
Vapor Volume -----	24.60	CF/Gal
Weight -----	5.68	Lbs/Gal

Base Conditions: 14.850 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: XG  
 Processor: JCdjv  
 Cylinder ID: W-1016

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

**TANKS DATA INPUT REPORT**

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.022	0.009	0.011
Nitrogen	0.026	0.007	0.008
Methane	7.703	3.192	1.406
Ethane	7.916	5.177	2.708
Propane	7.595	5.117	3.810
Isobutane	2.047	1.638	1.353
n-Butane	6.037	4.668	4.005
Isopentane	3.263	2.918	2.678
n-Pentane	4.477	3.969	3.675
Other C-6's	5.314	5.356	5.209
Heptanes	12.616	13.622	14.000
Octanes	14.845	16.794	18.294
Nonanes	6.279	8.213	9.061
Decanes Plus	13.338	21.169	24.822
Benzene	0.310	0.212	0.276
Toluene	0.818	0.670	0.858
E-Benzene	0.657	0.620	0.794
Xylenes	1.883	1.768	2.275
n-Hexane	4.853	4.880	4.758
2,2,4 Trimethylpentane	<u>0.000</u>	<u>0.000</u>	<u>0.000</u>
Totals:	100.000	100.000	100.000

**Characteristics of Total Sample:**

Specific Gravity -----	0.6812 (Water=1)
°API Gravity -----	76.24 @ 60°F
Molecular Weight-----	87.9
Vapor Volume -----	24.60 CF/Gal
Weight -----	5.68 Lbs/Gal

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

Specific Gravity -----	0.7987 (Water=1)
Molecular Weight-----	163.6

**Characteristics of Atmospheric Sample:**

°API Gravity -----	63.19 @ 60°F
Reid Vapor Pressure (ASTM D-5191)-----	4.45 psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
Cylinder Number	-----	W-1016*	T-3025
Pressure, PSIG	320	302	301
Temperature, °F	72	70	70

\* Sample used for analysis

## TOTAL EXTENDED REPORT

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.026	0.007	0.008
Carbon Dioxide	0.022	0.009	0.011
Methane	7.703	3.192	1.406
Ethane	7.916	5.177	2.708
Propane	7.595	5.117	3.810
Isobutane	2.047	1.638	1.353
n-Butane	5.957	4.593	3.939
2,2 Dimethylpropane	0.080	0.075	0.066
Isopentane	3.263	2.918	2.678
n-Pentane	4.477	3.969	3.675
2,2 Dimethylbutane	0.231	0.236	0.226
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.514	0.515	0.504
2 Methylpentane	2.662	2.702	2.610
3 Methylpentane	1.907	1.904	1.870
n-Hexane	4.853	4.880	4.758
Methylcyclopentane	1.031	0.892	0.987
Benzene	0.310	0.212	0.276
Cyclohexane	1.009	0.840	0.966
2-Methylhexane	2.934	3.336	3.345
3-Methylhexane	2.426	2.723	2.765
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	0.828	0.881	0.935
n-Heptane	4.388	4.950	5.002
Methylcyclohexane	3.402	3.344	3.800
Toluene	0.818	0.670	0.858
Other C-8's	8.240	9.437	10.332
n-Octane	3.203	4.013	4.162
E-Benzene	0.657	0.620	0.794
M & P Xylenes	0.877	0.832	1.059
O-Xylene	1.007	0.936	1.216
Other C-9's	4.414	5.647	6.340
n-Nonane	1.865	2.566	2.721
Other C-10's	3.956	5.561	6.358
n-decane	1.123	1.685	1.817
Undecanes(11)	3.018	4.353	5.047
Dodecanes(12)	1.740	2.710	3.186
Tridecanes(13)	1.212	2.024	2.412
Tetradecanes(14)	0.714	1.277	1.543
Pentadecanes(15)	0.441	0.846	1.034
Hexadecanes(16)	0.286	0.585	0.722
Heptadecanes(17)	0.207	0.449	0.559
Octadecanes(18)	0.165	0.377	0.471
Nonadecanes(19)	0.114	0.271	0.342
Eicosanes(20)	0.081	0.201	0.255
Heneicosanes(21)	0.065	0.168	0.214
Docosanes(22)	0.051	0.137	0.175
Tricosanes(23)	0.036	0.102	0.131
Tetracosanes(24)	0.030	0.088	0.114
Pentacosanes(25)	0.022	0.066	0.086
Hexacosanes(26)	0.020	0.064	0.083
Heptacosanes(27)	0.017	0.055	0.072
Octacosanes(28)	0.012	0.039	0.051
Nonacosanes(29)	0.010	0.033	0.044
Triacontan(30)	0.006	0.020	0.027
Hentriacontan Plus(31+)	<u>0.014</u>	<u>0.059</u>	<u>0.080</u>
Total	100.000	100.000	100.000



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

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

**Date Sampled:** 09/20/13

**Date Analyzed:** 10/02/13

**Sample:** Seaborne No. 1H (Vogt Pad well sample)

**Job Number:** J35820

FLASH LIBERATION OF HYDROCARBON LIQUID		
	Separator HC Liquid	Stock Tank
Pressure, psig	320	0
Temperature, °F	72	70
Gas Oil Ratio (1)	-----	327
Gas Specific Gravity (2)	-----	1.303
Separator Volume Factor (3)	1.1969	1.000

STOCK TANK FLUID PROPERTIES	
Shrinkage Recovery Factor (4)	0.8355
Oil API Gravity at 60 °F	63.19
Reid Vapor Pressure, psi (5)	4.45

Quality Control Check			
	Sampling Conditions	Test Samples	
Cylinder No.	-----	W-1016*	T-3025
Pressure, psig	320	302	301
Temperature, °F	72	70	70

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

(2) - Air = 1.000

(3) - Separator volume / Stock tank volume

(4) - Fraction of first stage separator liquid

(5) - Absolute pressure at 100 deg F

Analyst: \_\_\_\_\_ M. G. \_\_\_\_\_

\* Sample used for flash study

**Base Conditions: 14.85 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:** Seaborne No. 1H (Vogt Pad well sample)  
 Gas Evolved from Hydrocarbon Liquid Flashed  
 From 320 psig & 72 °F to 0 psig & 70 °F

Date Sampled: 09/20/13

Job Number: 35820.001

**CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT**

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.084	
Carbon Dioxide	0.109	
Methane	28.979	
Ethane	27.515	7.417
Propane	21.197	5.886
Isobutane	3.988	1.315
n-Butane	9.085	2.887
2-2 Dimethylpropane	0.097	0.037
Isopentane	2.547	0.939
n-Pentane	2.631	0.961
Hexanes	2.134	0.886
Heptanes Plus	<u>1.634</u>	<u>0.724</u>
Totals	100.000	21.052

**Computed Real Characteristics Of Heptanes Plus:**

Specific Gravity ----- 3.558 (Air=1)  
 Molecular Weight ----- 101.68  
 Gross Heating Value ----- 5428 BTU/CF

**Computed Real Characteristics Of Total Sample:**

Specific Gravity ----- 1.303 (Air=1)  
 Compressibility (Z) ----- 0.9868  
 Molecular Weight ----- 37.25  
 Gross Heating Value  
     Dry Basis ----- 2191 BTU/CF  
     Saturated Basis ----- 2153 BTU/CF

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

Base Conditions: 14.850 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: MR  
 Processor: ANB  
 Cylinder ID: FL# 9 S

David Dannhaus 361-661-7015



**CHROMATOGRAPH EXTENDED ANALYSIS  
TOTAL REPORT**

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.084		0.063
Carbon Dioxide	0.109		0.129
Methane	28.979		12.483
Ethane	27.515	7.417	22.213
Propane	21.197	5.886	25.095
Isobutane	3.988	1.315	6.223
n-Butane	9.085	2.887	14.177
2,2 Dimethylpropane	0.097	0.037	0.188
Isopentane	2.547	0.939	4.934
n-Pentane	2.631	0.961	5.097
2,2 Dimethylbutane	0.081	0.034	0.187
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.128	0.053	0.296
2 Methylpentane	0.661	0.277	1.529
3 Methylpentane	0.408	0.168	0.944
n-Hexane	0.856	0.355	1.981
Methylcyclopentane	0.072	0.025	0.163
Benzene	0.024	0.007	0.050
Cyclohexane	0.109	0.037	0.246
2-Methylhexane	0.178	0.083	0.479
3-Methylhexane	0.178	0.082	0.479
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.179	0.079	0.477
n-Heptane	0.248	0.115	0.667
Methylcyclohexane	0.177	0.072	0.467
Toluene	0.039	0.013	0.096
Other C8's	0.232	0.109	0.687
n-Octane	0.065	0.034	0.199
Ethylbenzene	0.002	0.001	0.006
M & P Xylenes	0.018	0.007	0.051
O-Xylene	0.002	0.001	0.006
Other C9's	0.070	0.036	0.237
n-Nonane	0.014	0.008	0.048
Other C10's	0.021	0.012	0.080
n-Decane	0.004	0.002	0.015
Undecanes (11)	<u>0.002</u>	<u>0.001</u>	<u>0.008</u>
Totals	100.000	21.052	100.000

**Computed Real Characteristics Of Total Sample:**

Specific Gravity -----	1.303	(Air=1)
Compressibility (Z) -----	0.9868	
Molecular Weight -----	37.25	
Gross Heating Value		
Dry Basis -----	2191	BTU/CF
Saturated Basis -----	2153	BTU/CF

## Gas Analytical

Report Date: Feb 26, 2016 7:27a

Client:	Antero Resources	Date Sampled:	Feb 18, 2016 9:40a
Site:	Pike Unit 2H	Analysis Date:	Feb 25, 2016 11:54a
Field No:	9998	Collected By:	M. Hileman
Meter:	40551	Date Effective:	Feb 18, 2016 12:00a
Source Laboratory	Clarksburg (Bridgeport), WV	Sample Pressure (PSI):	219.0
<b>Lab File No:</b>	<b>X_CH1-9841.CHR</b>	Sample Temp (°F):	61
Sample Type:	Spot	Field H2O:	No Test
Reviewed By:		Field H2S:	No Test

Component	Mol %	Gal/MSCF
Methane	80.6676	
Ethane	13.4543	3.58
Propane	2.6759	0.74
I-Butane	0.5461	0.18
N-Butane	0.9324	0.29
I-Pentane	0.2731	0.10
N-Pentane	0.2342	0.08
Nitrogen	0.4154	
Oxygen	<MDL	
Carbon Dioxide	0.1709	
Hexanes+	0.6301	0.26
TOTAL	100.0000	5.23

Analytical Results at Base Conditions (Real)	
BTU/SCF (Dry):	1,227.4562 BTU/ft <sup>3</sup>
BTU/SCF (Saturated):	1,206.9708 BTU/ft <sup>3</sup>
PSIA:	14.730 PSI
Temperature (°F):	60.00 °F
Z Factor (Dry):	0.99669
Z Factor (Saturated):	0.99629

Analytical Results at Contract Conditions (Real)	
BTU/SCF (Dry):	1,227.4562 BTU/ft <sup>3</sup>
BTU/SCF (Saturated):	1,206.9708 BTU/ft <sup>3</sup>
PSIA:	14.730 PSI
Temperature (°F):	60.00 °F
Z Factor (Dry):	0.99669
Z Factor (Saturated):	0.99629

Calculated Specific Gravities		
Ideal Gravity:	0.6964	Real Gravity: 0.6985
Molecular Wt:	20.1707 lb/lbmol	

Gross Heating Values are Based on:  
 GPA 2145-09, 2186  
 Compressibility is Calculated using AGA-8.

Source	Date	Notes

# **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									1.0529	1.2545				
EP-PCV					0.0684	0.2995							7.5031	32.8634
F001					2.8226	12.3630							69.8936	306.1341
EP-L001					12.3997	20.4608							0.8631	1.4241
EP-L002					0.0013	0.0005							0.8529	0.3113
EP-ENG001 through EP-ENG005 (emissions per EPN)	0.0625	0.2738	0.4126	1.8073	0.0191	0.0835	0.0004	0.0017	0.0061	0.0268	0.0061	0.0268	74.5057	326.3351
EP-ENG006 through EP-ENG007 (emissions per EPN)	0.0724	0.3171	0.5972	2.6158	0.0256	0.1120	0.0005	0.0022	0.0082	0.0360	0.0082	0.0360	100.0230	438.1005
EP-GPU001 through EP-GPU008 (emissions per EPN)	0.1222	0.5353	0.1027	0.4496	0.0067	0.0294	7.33E-04	0.0032	0.0093	0.0407	0.0093	0.0407	146.6447	642.3040
EP-LH001 through EP-LH008 (emissions per EPN)	0.1629	0.7137	0.1369	0.5995	0.0090	0.0393	0.0010	0.0043	0.0124	0.0542	0.0124	0.0542	195.5263	856.4053
EP-EC001 through EP-EC003 (emissions per EPN)	0.8173	3.5796	3.7211	16.2982	1.5069	6.6002	7.56E-06	3.31E-05	0.0067	0.0294	0.0050	0.0221	311.7735	1365.5681
<b>TOTAL</b>	<b>5.1903</b>	<b>22.7335</b>	<b>16.3369</b>	<b>71.5557</b>	<b>4.7926</b>	<b>20.9914</b>	<b>0.0166</b>	<b>0.0728</b>	<b>0.2405</b>	<b>1.0535</b>	<b>0.2355</b>	<b>1.0314</b>	<b>4245.2638</b>	<b>18594.2552</b>

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

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

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

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

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
EP-HR001														
EP-PCV			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0126	0.0552	0.0126	0.0552
F001			0.0064	0.0279	0.0198	0.0868	0.0183	0.0803	0.0526	0.2302	0.2656	1.1632	0.3626	1.5884
EP-L001			0.0006	0.0009	0.0015	0.0024	0.0009	0.0016	0.0024	0.0040	0.1055	0.1741	0.1109	0.1830
EP-L002			1.30E-06	4.73E-07	6.96E-07	2.54E-07	1.34E-07	4.88E-08	3.28E-07	1.20E-07	6.14E-09	2.24E-09	2.46E-06	8.98E-07
EP-ENG001 through EP-ENG005 (emissions per EPN)	0.0132	0.0578	0.0010	0.0045	0.0004	0.0016	1.60E-05	6.99E-05	1.26E-04	5.50E-04	0.00E+00	0.00E+00	0.0148	0.0647
EP-ENG006 through EP-ENG007 (emissions per EPN)	0.0177	0.0776	0.0014	0.0060	4.82E-04	0.0021	2.14E-05	9.39E-05	1.69E-04	7.38E-04	0.00E+00	0.00E+00	0.0198	0.0869
EP-GPU001 through EP-GPU008 (emissions per EPN)	9.17E-05	4.01E-04	2.57E-06	1.12E-05	4.15E-06	1.82E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0022	0.0096	0.0023	0.0101
EP-LH001 through EP-LH008 (emissions per EPN)	1.22E-04	5.35E-04	3.42E-06	1.50E-05	5.54E-06	2.43E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0029	0.0128	0.0031	0.0134
EP-EC001 through EP-EC003 (emissions per EPN)	9.45E-07	4.14E-06	0.0011	0.0047	0.0013	0.0055	4.37E-04	0.0019	0.0010	0.0045	0.1643	0.7195	0.1681	0.7361
<b>TOTAL</b>	<b>0.1031</b>	<b>0.4517</b>	<b>0.0111</b>	<b>0.0485</b>	<b>0.0066</b>	<b>0.0290</b>	<b>0.0014</b>	<b>0.0063</b>	<b>0.0041</b>	<b>0.0177</b>	<b>0.5339</b>	<b>2.3384</b>	<b>0.6607</b>	<b>2.8938</b>

Annual emissions shall be based on 8760 hours per year of operation for all emission units except emergency generators. According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above

# **Attachment U**

## **Class I Legal Advertisement**

**Attachment U**

**Air Quality Permit Notice  
Notice of Application  
Stanley 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-C General Permit Modification for an Oil and Natural Gas Production facility located at 428 Cabin Run Rd., near West Union in Doddridge County, West Virginia.

The latitude and longitude coordinates are: 39.2368 and -80.87963

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

Pollutants	TOTALS (tpy):
NO <sub>x</sub>	22.7335
CO	71.5557
PM <sub>2.5</sub>	1.0314
PM <sub>10</sub>	1.0535
VOC	20.9914
SO <sub>2</sub>	0.0728
Formaldehyde	0.4517
Benzene	0.0485
Toluene	0.0290
Ethylbenzene	0.0063
Xylenes	0.0177
Hexane	2.3384
Total HAPs	2.8938

Proposed new equipment will be installed upon permit issuance. Startup of operation using new equipment is planned to begin on or about July 2017. 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](http://www.ghd.com)

