February 7, 2017 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: G70-D General Permit Registration Modification Application
Balli Well Pad
Antero Resources Corporation

GHD Services Inc. (GHD) would like to submit this G70-D General Permit Modification application that we prepared on behalf of Antero Resources Corporation for an oil and gas facility identified as Balli Well Pad.

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

1. Increase in production.
2. Addition of 1 LP engines and 3 HP engine.
3. Addition of 2 thermoelectric generators.
4. Addition of 6 VRT towers
5. Addition of 2 condensate and 2 produced water tanks.
6. Removal of 1 Cimarron enclosed combustors
7. Removal of 1 Kubota engine

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:

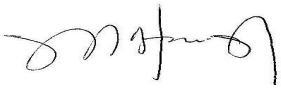
- Original copy of the G70-D General Permit Application.
- Two CD copies of the G70-D General Permit Application.
- The application fee with check no. 468467 in the amount of $1,500.00.

GHD
6320 Rothway Street Suite 100 Houston Texas 77040 USA
T 713 734 3090 **F** 713 734 3391 **W** www.ghd.com

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

Sincerely,

GHD Services Inc.



Manuel Bautista

MB/ma/295

Encl.

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

General Permit G70-D Modification Application

Increased production, addition of two condensate tanks, two produced water tanks, four Ford VRU engines, six VRTs, and removal of Kubota Engine, and one enclosed combustor.

Balli Well Pad

Antero Resources Corporation

GHD | 6320 Rothway Suite 100 Houston Texas 77040
082715 | Report No 295 | February 2017

Table of Contents

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-D 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: Balli Well Pad

Operating Site Physical Address: 600 Ramseys Ridge Rd

City: West Union	Zip Code: 26456	County: Doddridge

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.30211
Longitude: -80.84358

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities) 017-00145

CERTIFICATION OF INFORMATION

This G70-D 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-D Registration Application will be returned to the applicant. Furthermore, if the G70-D 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-D 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: 1/26/2017

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

OPERATING SITE INFORMATION
Briefly describe the proposed new operation and/or any change(s) to the facility: Increase in condensate and produced water throughput. Addition of 2 condensate and 2 produced water tanks, 6 vapor recovery towers, 2- 550 watt Thermoelectric Generators, 4 Ford VRU engines, and removal of 1 Kubota engine and 1 enclosed combustor.
Directions to the facility: From the intersection of Stone Valley Rd and Co Rte 36/1, head west on Co Rte 36/1 and go 1.1 mi, keep right onto Ramsey Ridge Rd and go 0.3 mi to reach destination on the right.

ATTACHMENTS AND SUPPORTING DOCUMENTS	
I have enclosed the following required documents:	
Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22). ☒ Check attached to front of application. ☐ I wish to pay by electronic transfer. Contact for payment (incl. name and email address): ☐ I wish to pay by credit card. Contact for payment (incl. name and email address): ☒$500 (Construction, Modification, and Relocation) ☐$300 (Class II Administrative Update) ☒$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ, OOOO and/or OOOOa [1] ☐$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH [2] [1] Only one NSPS fee will apply. [2] Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ. *NSPS and NESHAP fees apply to new construction or if the source is being modified.*	
☒ Responsible Official or Authorized Representative Signature (if applicable)	
☒ Single Source Determination Form **(must be completed in its entirety)** – Attachment A	
☐ Siting Criteria Waiver (if applicable) – Attachment B	☒ Current Business Certificate – Attachment C
☒ Process Flow Diagram – Attachment D	☒ Process Description – Attachment E
☒ Plot Plan – Attachment F	☒ Area Map – Attachment G
☒ G70-D Section Applicability Form – Attachment H	☒ Emission Units/ERD Table – Attachment I
☒ Fugitive Emissions Summary Sheet – Attachment J	
☒ Gas Well Affected Facility Data Sheet (if applicable) – Attachment K	
☒ 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	
☒ Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment M	
☒ Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N	
☒ Tanker Truck Loading Data Sheet (if applicable) – Attachment O	
☐ Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment P	
☐ Pneumatic Controllers Data Sheet – Attachment Q	
☐ Pneumatic Pump Data Sheet – Attachment R	
☒ Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment S	
☒ Emission Calculations (please be specific and include all calculation methodologies used) – Attachment T	
☒ Facility-wide Emission Summary Sheet(s) – Attachment U	
☒ Class I Legal Advertisement – Attachment V	
☒ 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:		40WVDEPAQ	468467	
CR12417	1/24/2017	401041652		1,500.00

TOTAL : 1,500.00

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

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

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

NO. 468467

1/24/2017

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

TO THE ORDER OF

WEST VIRGINIA DEPT OF ENVIRONMENTAL
PROTECTION - DIVISION AIR QUALITY
601 57th Street SE
Charleston,, WV 25304 US

GHD SERVICES INC.

AUTHORIZED SIGNATURES

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

⑈468467⑈ ⑆221370632⑆6100000011891O⑈

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).

The Source Determination Rule for the oil and gas industry was published in the Federal Register on June 3, 2016 and will become effective on August 2, 2016. EPA defined the term "adjacent" and stated that equipment and activities in the oil and gas sector that are under common control will be considered part of the same source if they are located on the same site or on sites that share equipment and are within ¼ mile of each other.

Is there equipment and activities in the same industrial grouping (defined by SIC code)?
Yes ☒ No ☐

Is there equipment and activities under the control of the same person/people?
Yes ☒ No ☐

Is there equipment and activities located on the same site or on sites that share equipment and are within ¼ mile of each other?
Yes ☐ No ☒

Balli Well Pad calculation of potential to emit included all of the emission sources that belong to the same industrial grouping, are located on contiguous or adjacent properties, and are under the control of the same person. The nearest emission source that belongs to the same industrial grouping and under the control of the same person but not located on contiguous or adjacent property is the Jonathan Davis Well Pad. This is approximately 0.81 miles southeast of the facility.

Attachment B
Siting Criteria Waiver

Attachment B

Siting Waiver
Balli 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 Balli 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

IN THE OFFICE OF SECRETARY OF STATE

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

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

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

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

APPLICATION FOR AMENDED CERTIFICATE OF AUTHORITY

****** 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:**

1. Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachian Corporation

2. Date Certificate of Authority was issued in West Virginia: 6/25/2008

3. Corporate name has been changed to: Antero Resources Corporation
(Attach one Certified Copy of Name Change as filed in home State of incorporation.)

4. Name the corporation elects to use in WV: Antero Resources Corporation
(due to home state name not being available)

5. Other amendments:
(attach additional pages if necessary)

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

Alvyn A. Schopp — Contact Name
(303) 357-7310 — Phone Number

7. **Signature information** (See below ******Important Legal Notice Regarding Signature*):

Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person

Signature: Alvyn A. Schopp **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

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.

Jeffrey W. Bullock, Secretary of State

4520810 8100

130754186

AUTHENTICATION: 0496546

DATE: 06-10-13

You may verify this certificate online at corp.delaware.gov/authver.shtml

State of Delaware
Secretary of State
Division of Corporations
Delivered 09:37 AM 06/10/2013
FILED 09:37 AM 06/10/2013
SRV 130754186 - 4520810 FILE

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:

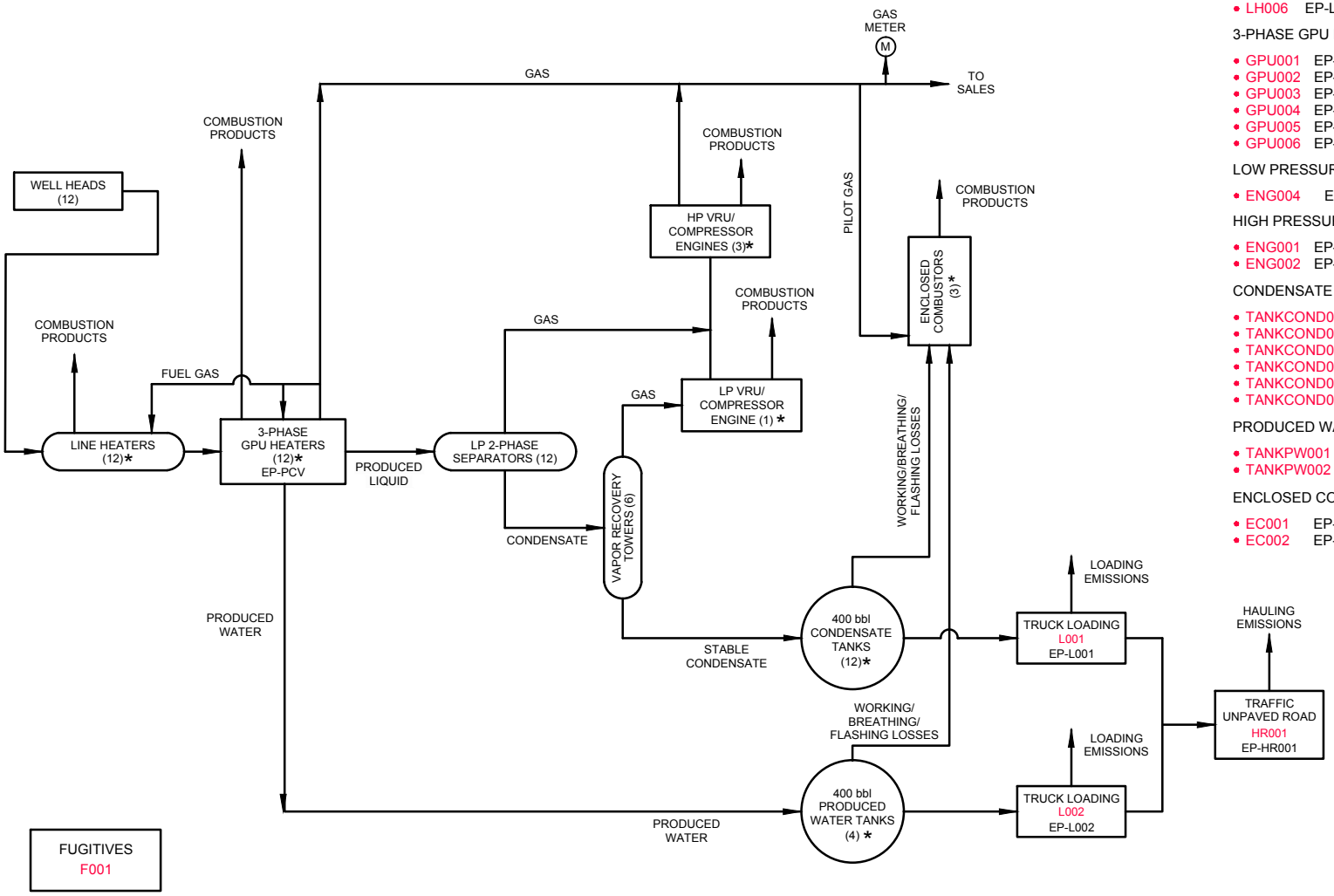
FIRST. The name of the Corporation is Antero Resources Corporation.

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: Alvyn A. Schopp
Title: Vice President of Accounting & Administration / Treasurer

Attachment D
Process Flow Diagram



* LINE HEATERS (12)

- LH001 EP-LH001
- LH002 EP-LH002
- LH003 EP-LH003
- LH004 EP-LH004
- LH005 EP-LH005
- LH006 EP-LH006
- LH007 EP-LH007
- LH008 EP-LH008
- LH009 EP-LH009
- LH010 EP-LH010
- LH011 EP-LH011
- LH012 EP-LH012

3-PHASE GPU HEATERS (12)

- GPU001 EP-GPU001
- GPU002 EP-GPU002
- GPU003 EP-GPU003
- GPU004 EP-GPU004
- GPU005 EP-GPU005
- GPU006 EP-GPU006
- GPU007 EP-GPU007
- GPU008 EP-GPU008
- GPU009 EP-GPU009
- GPU010 EP-GPU010
- GPU011 EP-GPU011
- GPU012 EP-GPU012

LOW PRESSURE VRU/ COMPRESSOR ENGINES (1)

- ENG004 EP-ENG004

HIGH PRESSURE VRU/ COMPRESSOR ENGINES (3)

- ENG001 EP-ENG001
- ENG002 EP-ENG002
- ENG003 EP-ENG003

CONDENSATE TANKS (12)

- TANKCOND001
- TANKCOND002
- TANKCOND003
- TANKCOND004
- TANKCOND005
- TANKCOND006
- TANKCOND007
- TANKCOND008
- TANKCOND009
- TANKCOND010
- TANKCOND011
- TANKCOND012

PRODUCED WATER TANKS (4)

- TANKPW001
- TANKPW002
- TANKPW003
- TANKPW004

ENCLOSED COMBUSTORS (3)

- EC001 EP-EC001
- EC002 EP-EC002
- EC003 EP-EC003

Attachment D

PROCESS FLOW DIAGRAM - ANTERO RESOURCES BALLI WELL PAD

Doddridge County, West Virginia

82715-00(295)GN-WA001 JAN 31, 2017

Attachment E
Process Description

Attachment E

Process Description
Balli 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 (LH001-012) and gas production units (GPU001-GPU012). GPUs 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.

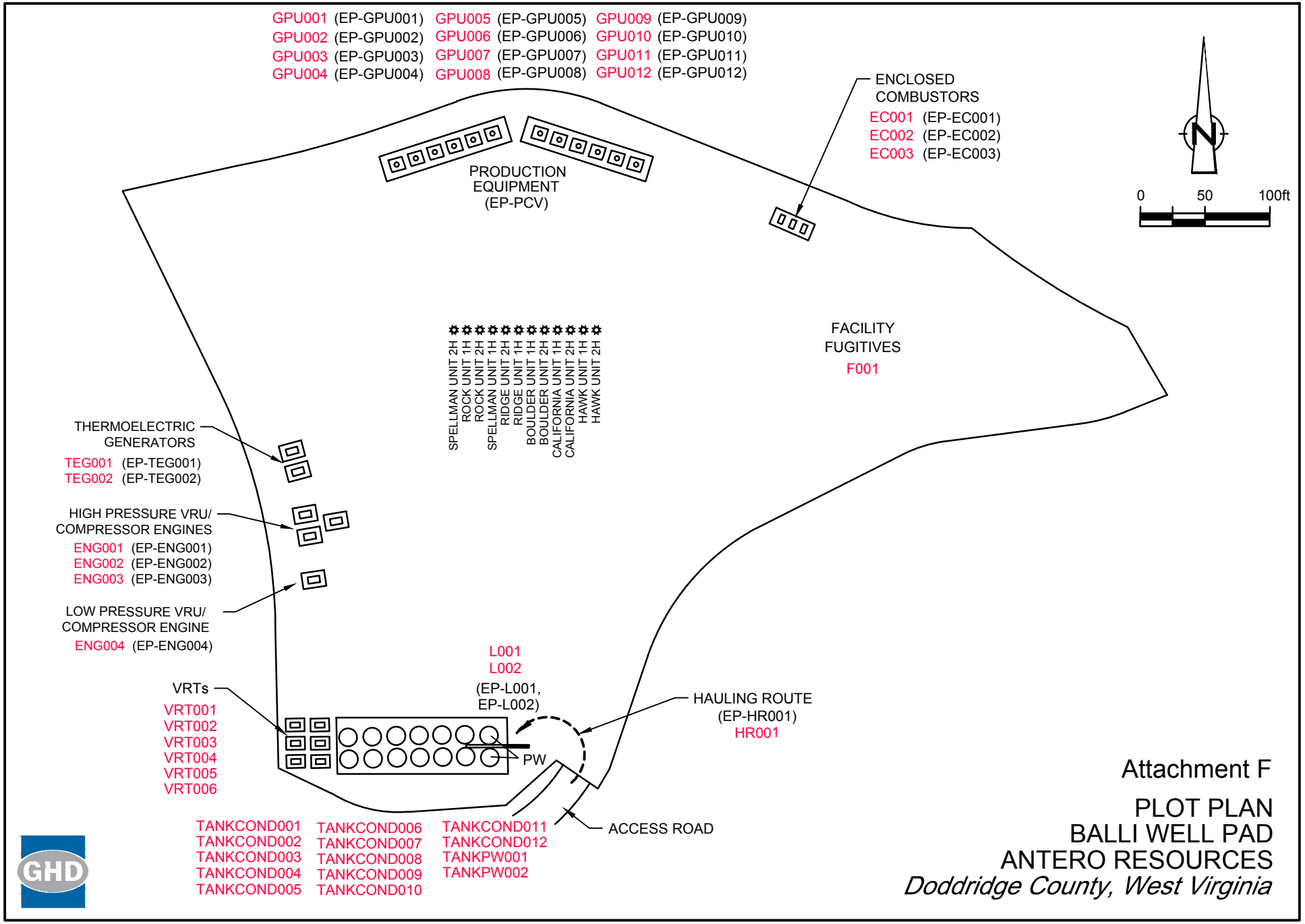
The gas from the three phase separators is metered and sent to the sales gas pipeline. The water flow to the produced water storage tanks (TANKPW001-004). The condensate is then sent to two phase low pressure separators where gas is separated. The gas is routed to the high pressure VRU driven by gas fueled engines (ENG001-003), compressed, metered and sent to the sales gas line. The condensate from the two phase separators then flows to the vapor recovery towers (VRT001-006) where gas is further separated. Gas from the VRTs is recovered via a low pressure VRU driven by gas fueled engine (ENG004), 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 (TANKSCOND001-012). 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 eight (12) tanks (TANKCOND001-012) 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 from Nero No. 2H well in McGill Well Pad and gas analysis from Shale 2H well in Jonathan Davis Well Pad. The extended condensate analysis is considered representative of the materials from Balli Well Pad, being in the same Marcellus rock formation.

Attachment F
Plot Plan

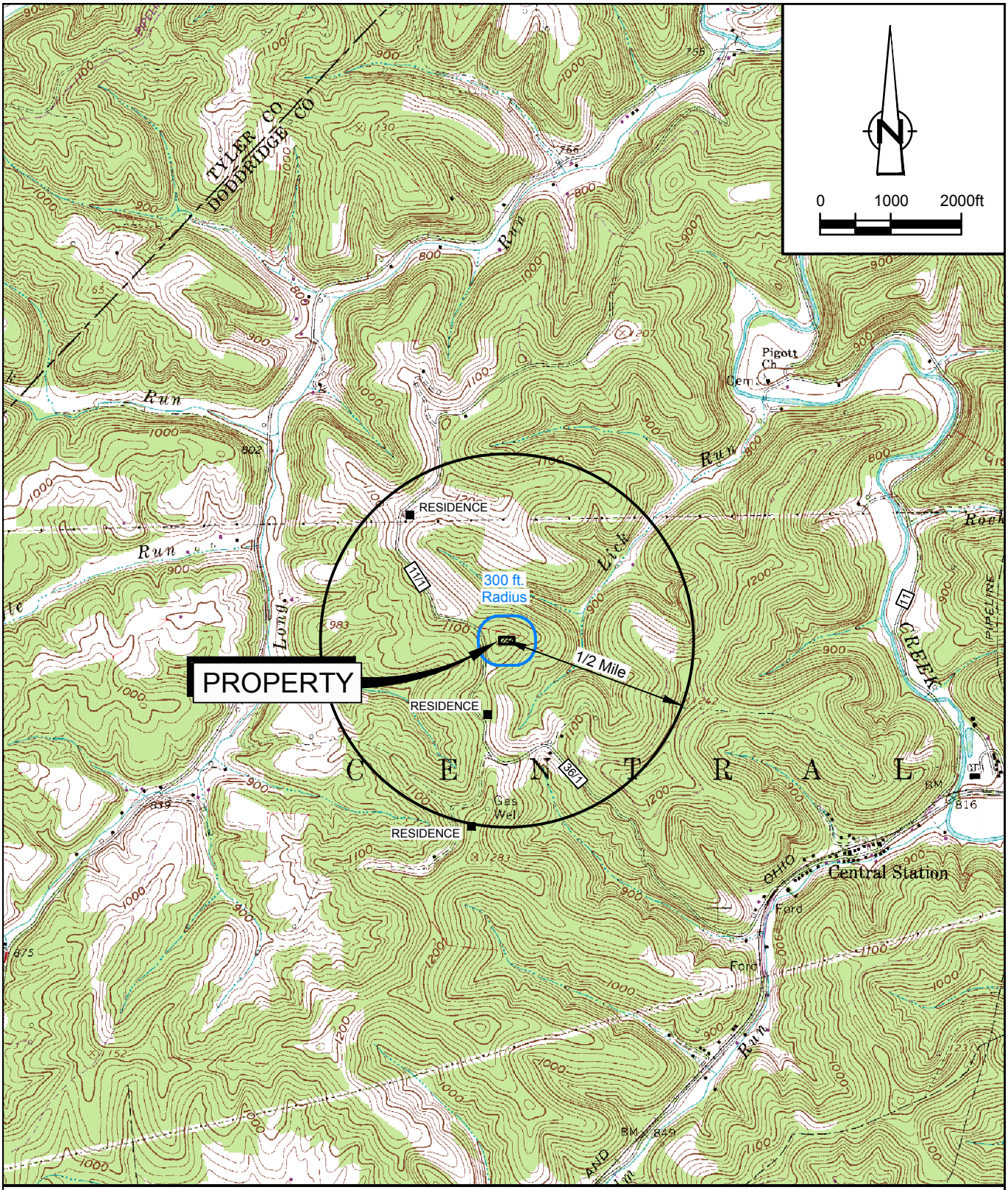


Attachment F

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

82715-00(295)GN-WA002 JAN 31, 2017

Attachment G
Area Map



SOURCE: USGS QUADRANGLE MAP;
WEST UNION, WEST VIRGINIA

SITE COORDINATES: 39.302117, -80.843583
SITE ELEVATION: 1140 ft AMSL

Attachment G

AREA MAP
BALLI WELL PAD
ANTERO RESOURCES
Doddridge County, West Virginia

82715-00(295)GN-WA003 JAN 2017

Attachment H
G70-D Section Applicability Form

ATTACHMENT H – G70-D SECTION APPLICABILITY FORM

General Permit G70-D Registration[1]
Section Applicability Form

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

GENERAL PERMIT G70-D APPLICABLE SECTIONS	
☒Section 5.0	Gas Well Affected Facility (NSPS, Subpart OOOO/OOOOa)
☒Section 6.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☐Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)
☒Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa and/or NESHAP Subpart HH
☒Section 9.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
☐Section 10.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO/OOOOa)
☐Section 11.0	Pneumatic Pump Affected Facility (NSPS, Subpart OOOOa)
☒Section 12.0	Fugitive Emissions GHG and VOC Standards (NSPS, Subpart OOOOa)
☒Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines
☒Section 14.0	Tanker Truck/Rail Car Loading[2]
☐Section 15.0	Glycol Dehydration Units[3]

1 *Applicants that are subject to Section 6 may also be subject to Section 7 if the applicant is subject to the NSPS, Subparts OOOO or OOOOa control requirements or the applicable control device requirements of Section 8.*

2 *Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 8.*

3 *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[1]	Emission Point ID[2]	Emission Unit Description	Year Installed	Manufac. Date[3]	Design Capacity	Type[4] and Date of Change	Control Device(s)[5]	ERD (s)[6]
GPU001 -012	EP-GPU001 -012	Gas Production Unit Heater	2015		1.5 MMBtu/hr	Existing	N/A	
LH001 -012	EP-LH001 -012	Line Heater	2017		2.0 MMBtu/hr	Existing	N/A	
F001	F001	Fugitives	2015		N/A	Existing	N/A	
TANKCOND001-010	EP-EC001, EP-EC002, EP-EC003	Condensate Tank F/W/B	2015, 2017		400 bbl each	Modification[1]	EC001, EC002, EC003	
TANKCOND011-012	EP-EC001, EP-EC002, EP-EC003	Condensate Tank F/W/B	2017		400 bbl each	New	EC001, EC002, EC003	
TANKPW001-002	EP-EC001, EP-EC002, EP-EC003	PW Tank F/W/B	2015, 2017		400 bbl each	Modification[2]	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)	2015		10080 gal/hr 19009200 gal/yr	Modification[3]	N/A	
L002	EP-L002	Loading (Produced Water)	2015		10080 gal/hr 38018400 gal/yr	Modification[4]	N/A	
HR001	EP-HR001	Haul Road	2015		Tanker Trucks Condensate: 2263 trips per year Tanker Trucks PW: 4526 trips per year Pick Up Truck: 730 trips per year	Modification[5]	N/A	
EC001	EP-EC001	Enclosed Combustor	2015		12 MMBtu/hr	Existing	N/A	
EC002	EP-EC002	Enclosed Combustor	2016		12 MMBtu/hr	Existing	N/A	
EC003	EP-EC003	Enclosed Combustor	2016		12 MMBtu/hr	Existing	N/A	
EC004	EP-EC004	Enclosed Combustor	2016		12 MMBtu/hr	Removal	N/A	
PCV	EP-PCV	Pneumatic CV	2017		6.6 scf/day/PCV	Existing	N/A	
ENG001	EP-ENG001	Compressor Engine	2015	2013	24 HP	Removal	Non-Selective Catalytic Reduction	
ENG001-003	EP-ENG001-003	High Pressure VRU Compressor Engine	2017	2015	76 HP	New	Non-Selective Catalytic Reduction	
ENG004	EP-ENG004	Low Pressure VRU Compressor Engine	2017	2015	76 HP	New	Non-Selective Catalytic Reduction	
TEG001, TEG002	EP-TEG001 EP-TEG002	Thermoelectric Generator	2017	2016	550 Watts	New	N/A	

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

Notes:
1. This is not a physical modification. Change in emissions due to increase in condensate throughput.
2. This is not a physical modification. Change in emissions due to increase in PW throughput.
3. This is not physical modification. Change in emissions due to increase in loading throughput.
4. This is not physical modification. Change in emissions due to increase in produced water loading throughput.
5. This is not a physical modification. Change in emissions from increased number of trips.

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	☐ Audible, visual, and olfactory (AVO) inspections	☑ Infrared (FLIR) cameras	☐ Other (please describe)	☐ 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 (methane)	GHG (CO2e)
Valves	☐ Yes ☑ No	600	EPA	gas	3.746	0.618	16.886	422.139
Valves	☐ Yes ☑ No	624	EPA	liquid	14.715	1.036	0.108	2.697
Connections (Not sampling)	☐ Yes ☑ No	708	EPA	gas	0.196	0.032	0.886	22.139
Flanges	☐ Yes ☑ No	156	EPA	gas	0.084	0.014	0.380	9.512

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).

API Number	Date of Flowback	Date of Well Completion	Green Completion and/or Combustion Device	Subject to OOOO or OOOOa?
47-017-06636-00	11/1/2018	3/1/2018	Green	Yes
47-017-06637-00	11/1/2018	3/1/2018	Green	Yes
47-017-06713-00	11/1/2018	3/1/2018	Green	Yes
47-017-06693-00	11/1/2018	3/1/2018	Green	Yes
47-017-06717-00	11/1/2018	3/1/2018	Green	Yes
47-017-06716-00	11/1/2018	3/1/2018	Green	Yes
47-017-06792-00	11/1/2018	3/1/2018	Green	Yes
47-017-06795-00	11/1/2018	3/1/2018	Green	Yes
47-017-06797-00	11/1/2018	3/1/2018	Green	Yes
47-017-06796-00	11/1/2018	3/1/2018	Green	Yes
47-017-06799-00	11/1/2018	3/1/2018	Green	Yes
47-017-06798-00	11/1/2018	3/1/2018	Green	Yes

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 acknowle 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 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 001-012
3. Emission Unit ID number: TANKCOND001-010 TANKCOND011-012	4. Emission Point ID number. EP-EC001, EP-EC002, EP-EC003
5. Date Installed , Modified or Relocated (for existing tanks)	6. Type of change:
2015, 2017 Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? ☑ Yes ☐ No Was the tank manufactured after September 18, 2015? ☑ Yes ☐ No	☑ New construction ☐ New stored material ☐ Other ☐ Relocation

7A. Description of Tank Modification (if applicable)

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

7C. Was USEPA Tanks simulation software utilized?
☐ Yes ☑ No
If Yes, please provide the appropriate documentation and items 8-42 below are not required.

TANK INFORMATION

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

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.: 400bbls

13A. Maximum annual throughput (gal/yr): 19009200	13B. Maximum daily throughput (gal/day): 52080
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 95	15. Maximum tank fill rate (gal/min) 168

16. Tank fill method ☐ Submerged ☑ Splash ☐ Bottom Loading

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

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

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

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

☐ External Floating Roof ☐ pontoon roof ☐ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting

☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm

☐ Pressurized ☐ spherical ☐ cylindrical

☐ other

ATTACHMENT L – STORAGE VESSEL DATA SHEET

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

- ☐ Does Not Apply
- ☐ Inert Gas Blanket of
- ☑ Vent to Vapor Combustion Device (vapor combustors, flares, thermal oxidizers, enclosed
- ☐ Conservation Vent (psig)
  - Vacuum Setting
  - Pressure Setting
- ☐ Emergency relief Valve (psig)
  - Vacuum Setting
  - Pressure Setting
- ☐ 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		[1]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 ☑ Other (describe): Steel

21A. Shell Color: Green	21B. Roof Color: Green	21C. Year Last Painted 2015, 2017

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^2)	26F. For column supported tanks: Number of columns:	26G. For column supported tanks, Diameter of each column:

27. Closed Vent System with VRU ☐ Yes ☑ No

28. Closed Vent System with Enclosed Combustor? ☑ Yes ☐ No

ATTACHMENT L – STORAGE VESSEL DATA SHEET

SITE INFORMATION

29. Provide the city and state on which the data in this section are based.: West Union, WV			
30. Daily Average Ambient Temperature (°F):	72.10	31. Annual Average Maximum Temperature (°F):	75.94
32. Annual Average Minimum Temperature (°F):	46.56	33. Average Wind Speed (miles/hr): 18.5 mph	
34. Annual Average Solar Insulation Factor (BTU/(ft2· day))	1030.235999	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):	72.10	36A. Minimum (°F):	46.56	36B. Maximum (°F)	75.94
37. Average operating pressure range of tank (psig):	atmosphere	37A. Minimum (psig)	0	37B. Maximum (psig)	atmosphere

38A. Minimum Liquid Surface Temperature (°F)	46.56	38B. Corresponding Vapor Pressure (psia)	1.3337
39A. Average Liquid Surface Temperature (°F)	72.10	39B. Corresponding Vapor Pressure (psia)	2.2962
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	2.4806

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	Condensate		
41B. CAS Number	mix of HC		
41C. Liquid Density (lb/gal)	5.9600		
41D. Liquid Molecular Weight (lb/lb-mole)	112.20		
41E. Vapor Molecular Weight (lb/lb-mole)	45.9843		
Maximum Vapor Pressure 41F. True (psia)	2.4806		
41G. Reid (psia)	3.54		
Months Storage per Year 41H. From - To	year round		
Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations 42.	5 psig; 65 F		

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 and on or before September 18, 2015? ☐ Yes ☑ No Was the tank manufactured after September 18, 2015? ☑ Yes ☐ No	6. Type of change: ☑ New construction ☐ New stored material ☐ Other ☐ Relocation

7A. Description of Tank Modification (if applicable)

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

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

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

TANK INFORMATION

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

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.: 400bbls

13A. Maximum annual throughput (gal/yr): 38018400	13B. Maximum daily throughput (gal/day): 104160
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 566	15. Maximum tank fill rate (gal/min) 168

16. Tank fill method ☐ Submerged ☑ Splash ☐ Bottom Loading

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

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

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

☑ Fixed Roof ☑ vertical ☐ horizontal ☑ flat roof ☐ cone roof ☐ dome roof ☐ other (describe)
☐ External Floating Roof ☐ pontoon roof ☐ double deck roof
☐ Domed External (or Covered) Floating Roof
☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting
☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm
☐ Pressurized ☐ spherical ☐ cylindrical

ATTACHMENT L – STORAGE VESSEL DATA SHEET

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does not apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket ☐ Carbon Adsorption

☑ Vent to Vapor Combustion Device (vapor combustors, flares, thermal oxidizers, enclosed combustors)

☐ Conservation Vent (psig)

Vacuum Setting Pressure Setting

☐ Emergency relief Valve (psig)

Vacuum Setting Pressure Setting

☐ 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		[1] 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 ☑ Other(describe): Steel

21A. Shell Color: Green	21B. Roof Color: Green	21C. Year Last Painted 2015, 2017

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 ☐ 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^2)	26F. For column supported tanks: Number of columns:	26G. For column supported tanks, Diameter of each column:

27. Closed Vent System with VRU ☐ Yes ☑ No

28. Closed Vent System with Enclosed Combustor? ☑ Yes ☐ No

ATTACHMENT L – STORAGE VESSEL DATA SHEET

SITE INFORMATION

29. Provide the city and state on which the data in this section are based.: West Union, WV	
30. Daily Average Ambient Temperature (°F): 72.10	31. Annual Average Maximum Temperature (°F): 75.94
32. Annual Average Minimum Temperature (°F): 46.56	33. Average Wind Speed (miles/hr): 5.9 mph
34. Annual Average Solar Insulation Factor (BTU/(ft2·day)) 1030.235999	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): 72.10	36A. Minimum (°F): 46.56	36B. Maximum (°F) 75.94
37. Average operating pressure range of tank (psig): atmosphere	37A. Minimum (psig) 0	37B. Maximum (psig) atmosphere

38A. Minimum Liquid Surface Temperature (°F) 46.56	38B. Corresponding Vapor Pressure (psia) 0.2279
39A. Average Liquid Surface Temperature (°F) 72.10	39B. Corresponding Vapor Pressure (psia) 0.4523
40A. Maximum Liquid Surface Temperature (°F) 75.94	40B. Corresponding Vapor Pressure (psia) 0.4986

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)	18.61		
41E. Vapor Molecular Weight (lb/lb-mole)	18.6080		
Maximum Vapor Pressure 41F. True (psia)	0.4986		
41G. Reid (psia)	1.0330		
Months Storage per Year 41H. From - To	year round		
Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations 42.	325 psig; 70 F		

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	2015	Existing	1.5	1224.7184
GPU002	EP-GPU002	Gas Production Unit Heater	2015	Existing	1.5	1224.7184
GPU003	EP-GPU003	Gas Production Unit Heater	2015	Existing	1.5	1224.7184
GPU004	EP-GPU004	Gas Production Unit Heater	2015	Existing	1.5	1224.7184
GPU005	EP-GPU005	Gas Production Unit Heater	2015	Existing	1.5	1224.7184
GPU006	EP-GPU006	Gas Production Unit Heater	2015	Existing	1.5	1224.7184
GPU007	EP-GPU007	Gas Production Unit Heater	2015	Existing	1.5	1224.7184
GPU008	EP-GPU008	Gas Production Unit Heater	2015	Existing	1.5	1224.7184
GPU009	EP-GPU009	Gas Production Unit Heater	2015	Existing	1.5	1224.7184
GPU010	EP-GPU010	Gas Production Unit Heater	2015	Existing	1.5	1224.7184
GPU011	EP-GPU011	Gas Production Unit Heater	2015	Existing	1.5	1224.7184
GPU012	EP-GPU012	Gas Production Unit Heater	2015	Existing	1.5	1224.7184
LH001	EP-LH001	Line Heater	2017	Existing	2	1224.7184
LH002	EP-LH002	Line Heater	2017	Existing	2	1224.7184
LH003	EP-LH003	Line Heater	2017	Existing	2	1224.7184
LH004	EP-LH004	Line Heater	2017	Existing	2	1224.7184
LH005	EP-LH005	Line Heater	2017	Existing	2	1224.7184
LH006	EP-LH006	Line Heater	2017	Existing	2	1224.7184
LH007	EP-LH007	Line Heater	2017	Existing	2	1224.7184
LH008	EP-LH008	Line Heater	2017	Existing	2	1224.7184
LH009	EP-LH009	Line Heater	2017	Existing	2	1224.7184
LH010	EP-LH010	Line Heater	2017	Existing	2	1224.7184
LH011	EP-LH011	Line Heater	2017	Existing	2	1224.7184
LH012	EP-LH012	Line Heater	2017	Existing	2	1224.7184

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

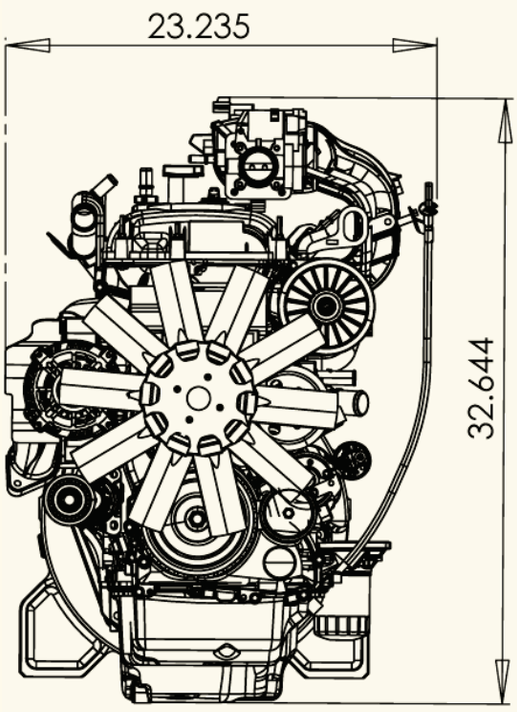
Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form.*

Emission Unit ID#	ENG001	ENG001-004	TEG001, TEG002	
Engine Manufacturer/Model	Engine (Kubota DG972-E2)	Ford MSG425 2.5L Engine	Thermoelectric Generator (GPT 8550)	
Manufacturers Rated bhp/rpm	24 HP @ 3600 rpm	76 HP @ 3200 rpm	550 Watts	
Source Status	REM	NS	NS	
Date Installed/ Modified/ Removed/ Relocated	2017	2017	2017	
Engine Manufacturer/ Reconstruction Date	2013	2015	2016	
Check all applicable Federal Rules for the engine (include EPA Certification of Conformity if applicable)	☑ 40CFR60 Subpart JJJJ ☑ JJJJ Certified? ☐ 40CFR60 Subpart IIII ☐ IIII Certified? ☑ 40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☑ 40CFR60 Subpart JJJJ ☑ JJJJ Certified? ☐ 40CFR60 Subpart IIII ☐ IIII Certified? ☑ 40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐ 40CFR60 Subpart JJJJ ☐ JJJJ Certified? ☐ 40CFR60 Subpart IIII ☐ IIII Certified? ☐ 40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐ 40CFR60 Subpart JJJJ ☐ JJJJ Certified? ☐ 40CFR60 Subpart IIII ☐ IIII Certified? ☐ 40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources
Engine Type	4SRB	4SRB	N/A	
APCD Type	NSCR	NSCR	N/A	
Fuel Type	RG	RG	RG	
H2S (gr/ 100 scf)	0	0	0	
Operating bhp/rpm	16.5 HP @ 2400 rpm	50 HP @ 2300 rpm	N/A	
BSFC (BTU/bhp-hr)	9820	8451	N/A	
Hourly Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	193 ft^3/hr gal/hr	345.00 ft^3/hr gal/hr	70.63 ft^3/hr gal/hr	ft^3/hr gal/hr
Fuel Usage or Hours of Operation Metered	1.6907 $MMft^3/yr$ gal/yr	3.022 $MMft^3/yr$ gal/yr	0.618675 $MMft^3/yr$ gal/yr	$MMft^3/yr$ gal/yr

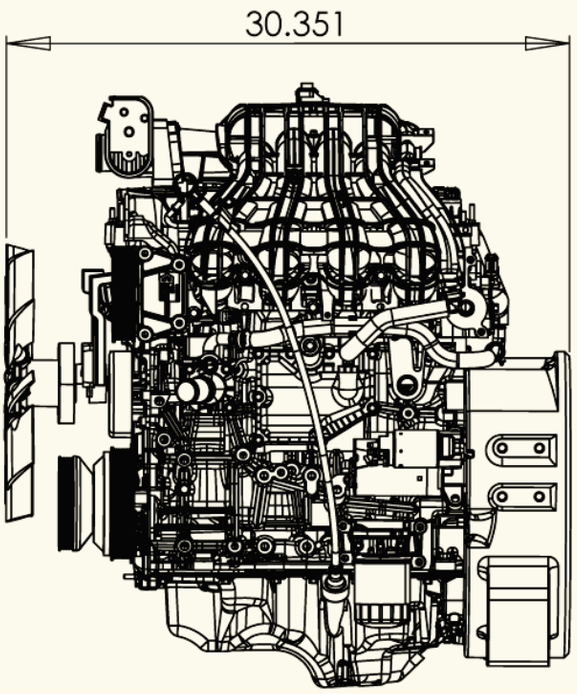
Calculation Methodology	Pollutant	Hourly PTE (lb/hr)	Annual PTE (tons/year)	Hourly PTE (lb/hr)	Annual PTE (tons/year)	Hourly PTE (lb/hr)	Annual PTE (tons/year)	Hourly PTE (lb/hr)	Annual PTE (tons/year)
MD	NOx	0.0000	0.0000	0.2501	1.0953	0.0141	0.0619		
MD	CO	0.0000	0.0000	1.6505	7.2293	0.0119	0.0520		
AP	VOC	0.0000	0.0000	0.0760	0.3331	0.0008	0.0034		
AP	SO2	0.0000	0.0000	0.0015	0.0066	0.0001	0.0004		
AP	PM10	0.0000	0.0000	0.0244	0.1069	0.0011	0.0047		
AP	Formaldehyde	0.0000	0.0000	0.0527	0.2307	0.0000	0.0000		
AP	Total HAPs	0.0000	0.0000	0.0590	0.2583	0.0003	0.0012		
OT	GHG (CO2e)	0.0000	0.0000	297.3582	1302.4289	17.0507	74.6822		

Installation Drawings

Front End View

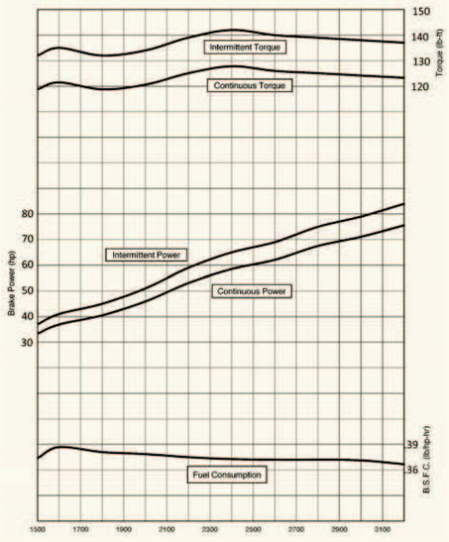


Left Side View

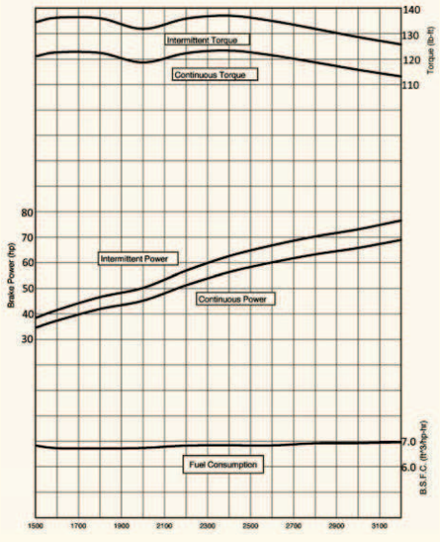


Power Curves (corrected per SAE J1349)

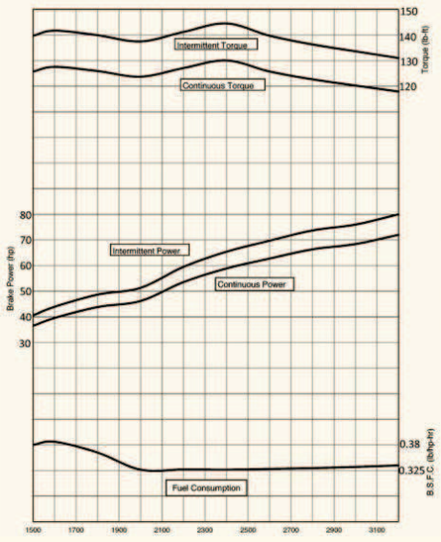
Gasoline



Natural Gas



Liquefied Petroleum Gas



Ford Power Products

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.

Power Products

Powertrain Assemblies & Components Provided By Ford Component Sales

Specifications

Engine Type	I-4
Bore and Stroke	3.5"x 3.93" (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/FT3	
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.

California Environmental Protection Agency **Air Resources Board**	**ENGINE DISTRIBUTORS, INC.**	**EXECUTIVE ORDER U-L-034-0028** New Off-Road Large Spark-Ignition Engines Above 19 Kilowatts

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
Exhaust Standards	0.8	20.6
Certification Levels	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 14th 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) : 20.6NMHC + NOx (g/kW-hr) : 0.8
HC + NOx (g/kW-hr) : 0.8
CO (g/kW-hr) : 20.6
Emergency Use Only : N

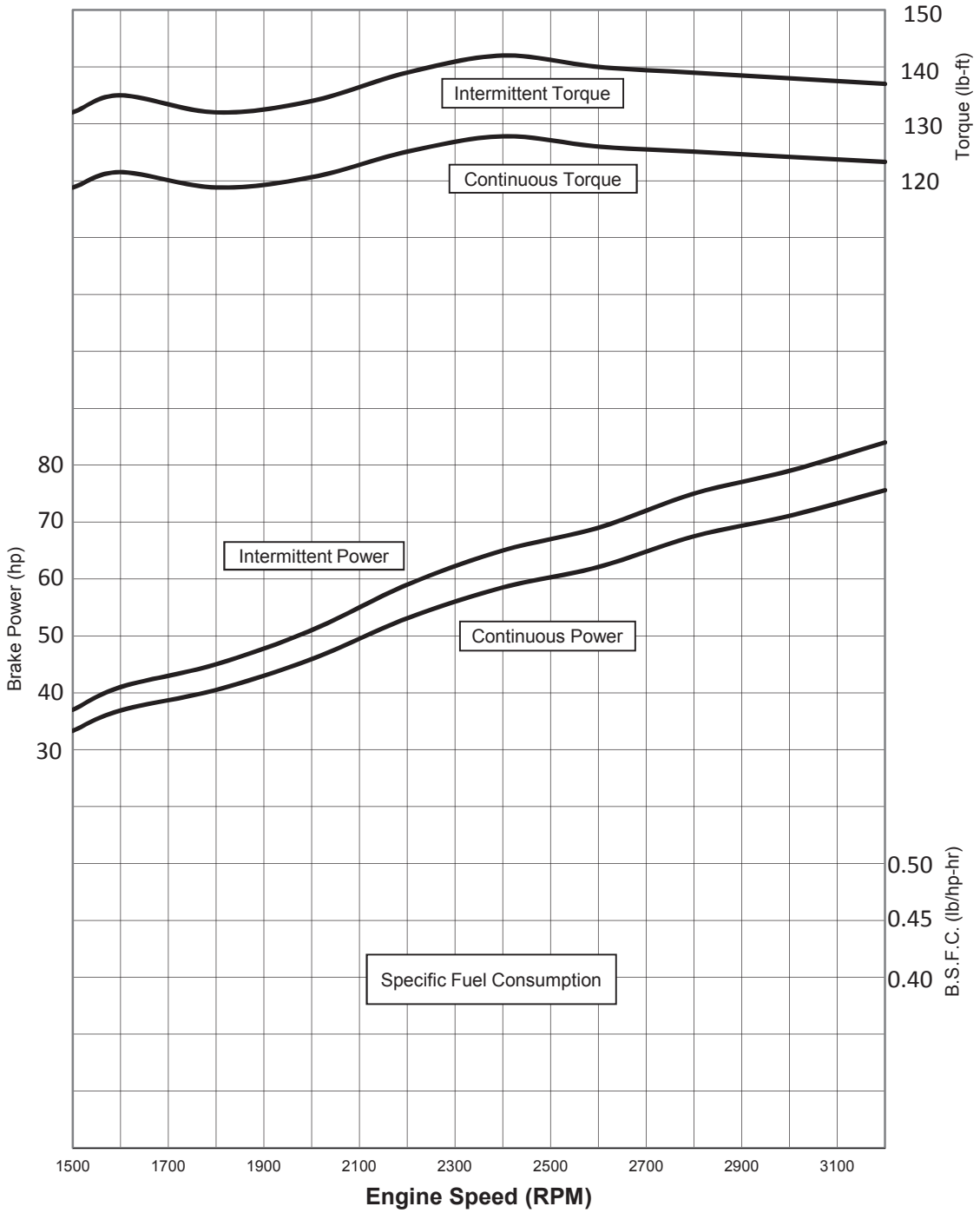
Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 40 CFR Part 1048, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with 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.

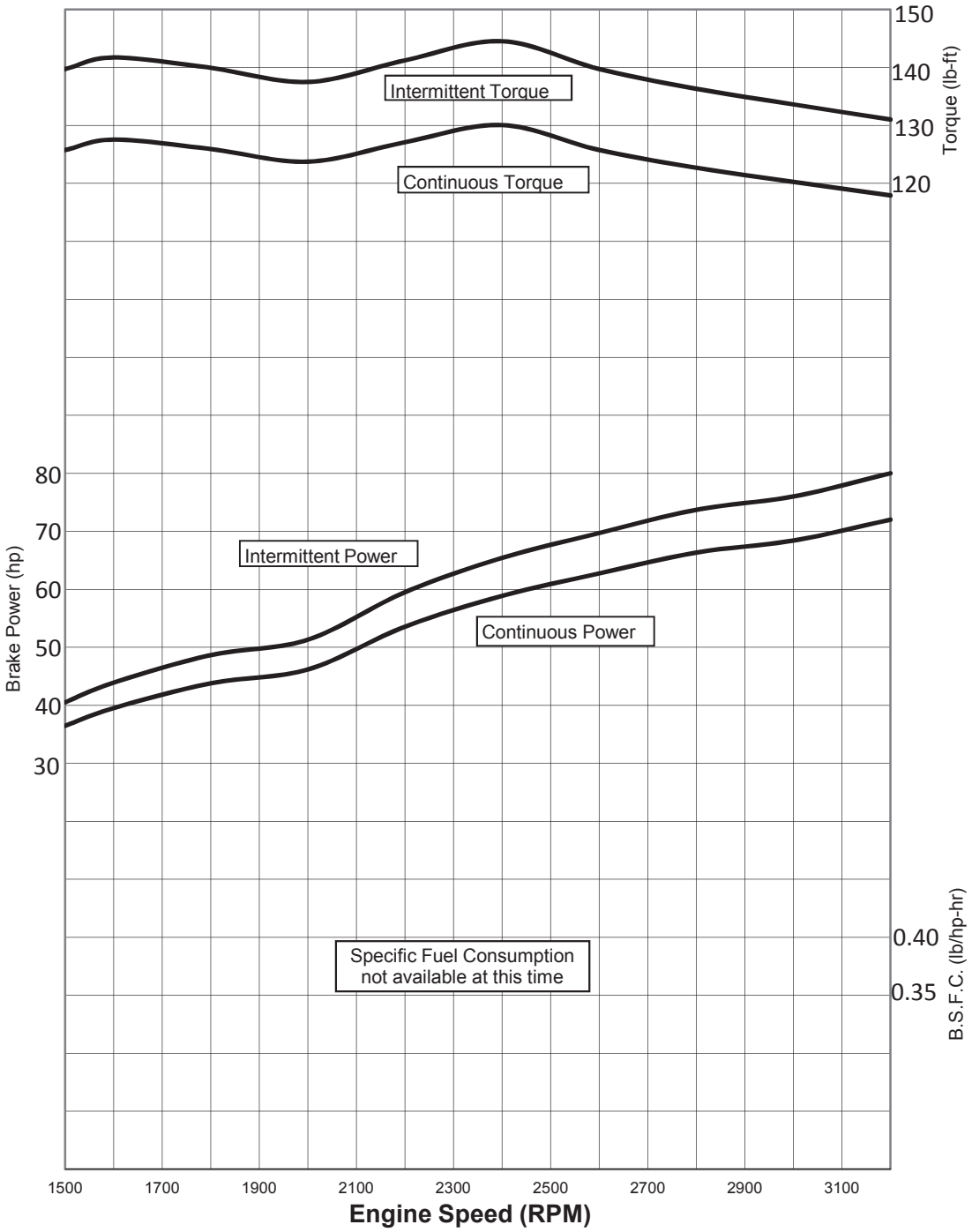
It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons 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.

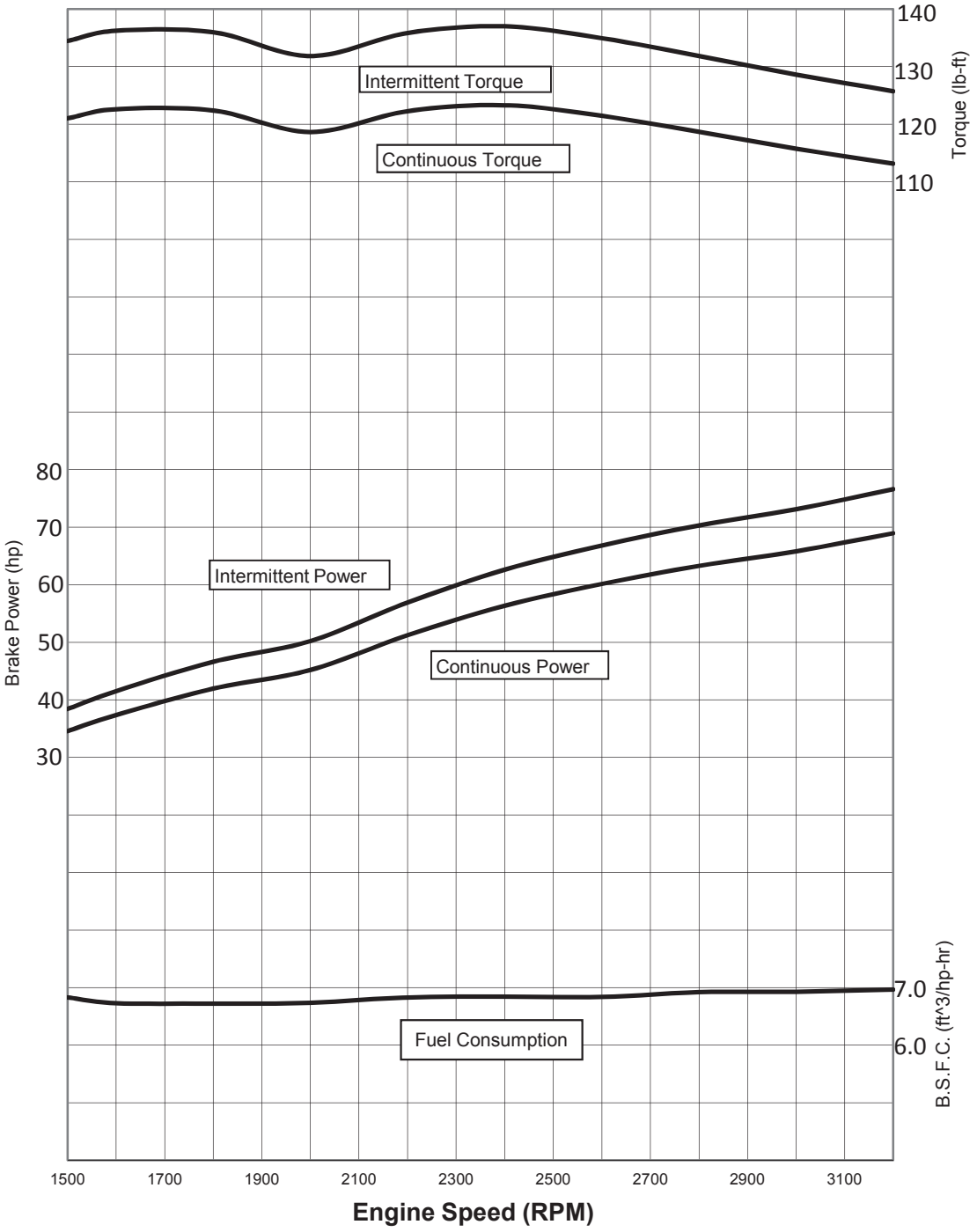
Gasoline


150
140
130
120
Torque (lb-ft)
Intermittent Torque
Continuous Torque
80
70
60
50
40
30
Brake Power (hp)
Intermittent Power
Continuous Power
0.50
0.45
0.40
B.S.F.C. (lb/hp-hr)
Specific Fuel Consumption
1500
1700
1900
2100
2300
2500
2700
2900
3100
Engine Speed (RPM)

LP


150
140
130
120
Torque (lb-ft)
Intermittent Torque
Continuous Torque
80
70
60
50
40
30
Brake Power (hp)
Intermittent Power
Continuous Power
Specific Fuel Consumption
not available at this time
0.40
0.35
B.S.F.C. (lb/hp-hr)
1500
1700
1900
2100
2300
2500
2700
2900
3100
Engine Speed (RPM)

NG


140
130
120
110
Torque (lb-ft)
Intermittent Torque
Continuous Torque
80
70
60
50
40
30
Brake Power (hp)
Intermittent Power
Continuous Power
7.0
6.0
B.S.F.C. (ft^3/hp-hr)
Fuel Consumption
1500
1700
1900
2100
2300
2500
2700
2900
3100
Engine Speed (RPM)

Model 8550 Thermoelectric Generators

Gentherm Global Power Technologies' * (GPT) Model 8550 thermoelectric generator contains no moving parts. It is a reliable, low maintenance source of DC electrical power for any application where regular utilities are unavailable or unreliable.

Power Specifications

Power Rating at 20°C
480 Watts at 12 Volts
550 Watts at 24 Volts
480 Watts at 48 Volts

Electrical

Adjustment:	12 V	11.4 - 12.6 Volts
	24 V	24 - 30 Volts
	48 V	47 - 57 Volts

Reverse current protection included.

Output: Terminal block which accepts up to 8 AWG wire. Opening for 3/4" conduit in the base of the cabinet.

Fuel

Natural Gas:	48.0 m^3/day (1695 Sft^3/day) 1000 BTU/Sft^3 (37.7 MJ/SM^3) gas max 115 mg/Sm^3 (~170 ppm) H_2S max 120 mg/Sm^3 H_2O max 1% free O_2
Propane:	7 6.0l/day (20.1 US gal/day)
Max. Supply Pressure:	172 kPa (25 psi)
Min. Supply Pressure (NG):	103 kPa (15 psi)
Min. Supply Pressure (LPG):	140 kPa (20 psi)
Fuel Connection:	1/4" MNPT

Environmental

Ambient Operation Temperature: Max. +45°C (115°F) Min. -40°C (-40°F).
Operating Conditions: Unsheltered operation
Please contact GPT for operating conditions below -40°C or above +45°C.

Materials of Construction

Cabinet:	304 SS
Cooling Type:	Natural Convection
Fuel System:	Brass, Aluminum & SS

Standard Features
- Automatic Spark Ignition (SI)
- Automatic Fuel Shut-off (SO)
- Fuel Filter
- Low Voltage Alarm Contacts (VSR)

Optional Features
- Cathodic Protection Interface
- Bench Stand
- Ethylene fuelled
- Operation over 4000m elevation

Note: Specifications shown are for standard configurations. Gentherm Global Power Technologies' * (GPT) Integrated Systems Engineering Department is available to design custom voltages, fuel supply systems and non-standard operating temperatures.

Specification data stated in this document is subject to change without notice. To verify these specifications are current, contact your Gentherm Global Power Technologies (GPT) sales representative.

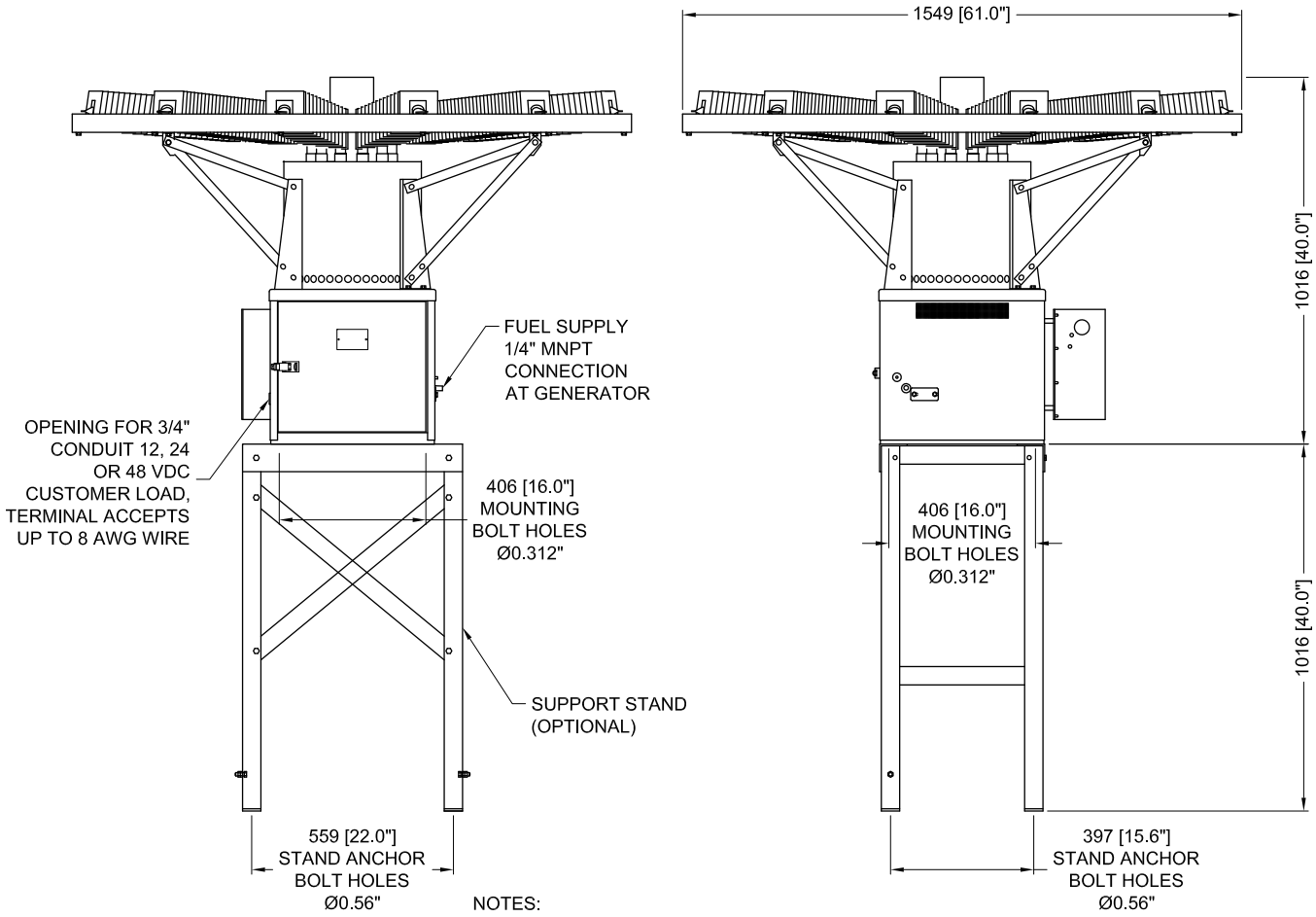
* Formerly Global Thermoelectric

ISO 9001 Registered

Power where you need it.®

GENTHERM
GLOBAL POWER TECHNOLOGIES

Typical Installation



42361 rev1

NOTES:
1. GENERATOR WEIGHT: 102 kg [225 lb]
2. DIMENSIONS IN mm [INCHES].

Attachment O
Tanker Truck Loading Data Sheet

ATTACHMENT O – TANKER TRUCK LOADING DATA S HEET

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:	2015

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	8	8	8	8
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)		52.08	104.16	
Max. Annual Throughput (1000 gal/yr)		19009.20	38018.40	
Loading Method		BF	BF	
Max. Fill Rate (gal/min)		168	168	
Average Fill Time (min/loading)		50	50	
Max. Bulk Liquid Temperature (F)		72.1	72.1	
True Vapor Pressure		2.3	0.5	
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)	11.2706	0.0012	
	Annual (ton/yr)	10.6273	0.0023	
Max HAP Emission Rate	Loading (lb/hr)	1.5630	4.47E-06	
	Annual (ton/yr)	1.4737	8.44E-06	
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 S
Air Pollution Control Device – Emission Reduction Device Sheets

ATTACHMENT S – 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	☐ Yes ☐ No
Secondary Control Device ID:	NA	Make/Model	NA
Control Efficiency (%):	NA	APCD/ERD Data Sheet Completed	☐ Yes ☐ No

VAPOR COMBUSTION (Including Enclosed Combustors)

General Information

Control Device ID#:	EC001-003	Installation Date: ☑ New ☐ Modified ☐ 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 Model: 48" HV ECD		Hours of operation per year?	8760

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		
TANKPW001-002	Produced Water Tanks		

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

Assist Type (Flares only)	Flare height	Tip Diameter	Was the design per §60.18?
☐ Steam ☐ Air ☐ Pressure ☑ Non	25 feet	3.33 feet	☑ Yes ☐ No Provide determination

Waste Gas Information

Maximum Waste Gas Flow Rate	Heat Value of Waste Gas Stream	Exit Velocity of the Emission Stream
35.07 (scfm)	2,245.12 BTU/ft^3	0.0671 (ft/s)

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

Pilot Gas Information

Number of Pilot Lights	Fuel Flow Rate to Pilot Flame per Pilot	Heat Input per Pilot	Will automatic re-ignition be used?
3	17 scfh	12800 BTU/hr	☑ Yes ☐ No

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

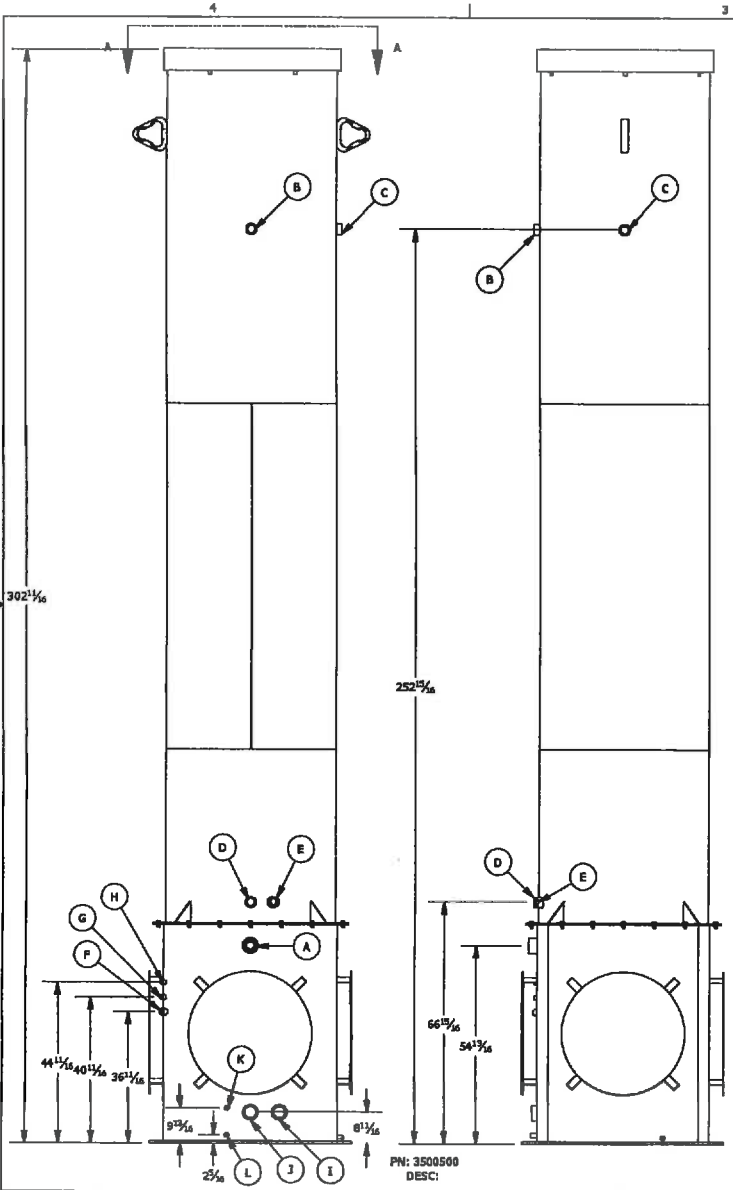
Is pilot flame equipped with a monitor to detect the presence of the flame? ☑ Yes ☐ No

If Yes, What type? ☑ Thermocouple ☐ Infrared ☐ Ultraviolet ☐ Camera ☐ Other:

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

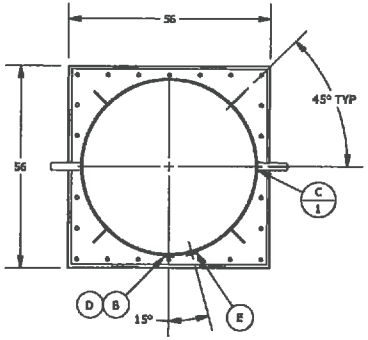
Additional information attached? ☑ Yes ☐ No — Manufacturer's specs sheet

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



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

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



VIEW A-A

PN: 3500500
DESC:

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

UNLESS OTHERWISE SPECIFIED

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

APPROVED FOR A.S.M.E CODE, SECTION VIII DIV 1
_____ED,_____ ADDENDA BY_____ DATE_____

CIMARRON
Energy Inc.

TITLE:
48" HIGH VOLUME ECD

DATE:	WO No.:	SHEET: 1 OF 1

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

Attachment T
Emissions Calculations

Table 1

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

Oil and Gas Site General Information

Administrative Information	
Company Name	Antero Resources Corporation
Facility/Well Name	Balli Well Pad
Nearest City/Town	West Union
API Number/SIC Code	1311
Latitude/Longitude	39.302117, -80.843583
County	Doddridge County

Technical Information	
Max Condensate Site Throughput (bbl/day):	1,240
Max Produced Water Site Throughput (bbl/day):	2,480
Are there any sour gas streams at this site?	No
Is this site currently operational/producing?	No

Equipment/Processes at Site	
Equipment/Process Types	**How many for this site?**
Fugitives	12
IC Engines	4
Gas Production Unit Heaters	12
Line Heaters	12
Condensate Tanks	12
Produced Water Tanks	4
Loading Jobs	2
Vapor Recovery Towers	6
Thermoelectric Generator	2
Enclosed Combustors	3

Table 2

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

Emission Source	VOC		NO_X		CH_4		CO_{2e}		CO		SO_2		$PM_{2.5}$		PM_{10}		Lead		Total HAPs		Benzene		Xylenes		Formaldehyde	
	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)
UNCONTROLLED (Fugitives, Storage Tanks, Engine, Gas Production Unit Heaters, Line Heater, Thermoelectric Generator)																										
Fugitive Emissions (Component Count, PCV and Hauling)[1]	4.3786	19.1781			4.6178	20.2261	115.448	505.66							0.8761	1.4641			0.4046	1.7722	0.0019	0.0084	8.39E-02	3.68E-01		
Flashing, Working and Breathing (F/W/B) Losses[2]	155.0047	678.9207			15.3263	67.1291	384.1772	1682.6959											22.8282	99.9876	0.0120	0.0524	0.0969	0.4242		
VRU Engine Emissions[3]	0.0760	0.3331	0.2501	1.0953	0.5909	2.5880	297.3582	1302.4289	1.6505	7.2293	0.0015	0.0066	0.0244	0.1069	0.0244	0.1069			0.0590	0.2583	0.0041	0.0178	0.0005	0.0022	0.0527	0.2307
Thermoelectric Generator (TEG) Emissions[4]	0.0008	0.0034	0.0141	0.0619	0.0003	0.0014	17.0507	74.6822	0.0119	0.0520	8.48E-05	3.71E-04	0.0011	0.0047	0.0011	0.0047			0.0003	0.0012	2.97E-07	1.30E-06			1.06E-05	4.64E-05
Gas Production Unit Heater Emissions[5]	0.0808	0.3541	1.4697	6.4374	0.0789	0.3455	1,763.67	7,724.88	1.2346	5.4074	0.0088	0.0386	0.1117	0.4892	0.1117	0.4892	7.35E-06	3.22E-05	0.028	0.121	3.09E-05	1.35E-04			0.0011	0.0048
Line Heater Emissions[5]	0.1078	0.4721	1.9596	8.5832			2,351.56	10,299.84	1.6461	7.2099	0.0118	0.0515	0.1489	0.6523	0.1489	0.6523	9.80E-06	4.29E-05	0.037	0.162	4.12E-05	1.80E-04			0.0015	0.0064
TOTALS:	**159.6487**	**699.2614**	**3.6936**	**16.1778**	**20.6142**	**90.2900**	**4929.2659**	**21590.1847**	**4.5430**	**19.8985**	**0.0222**	**0.0971**	**0.2861**	**1.2532**	**1.1622**	**2.7173**	**1.71E-05**	**7.51E-05**	**23.3566**	**102.3020**	**0.0180**	**0.0788**	**0.1813**	**0.7941**	**0.0552**	**0.2420**
UNCONTROLLED (Truck Loading Emissions)																										
Truck Loading Emissions[6]	11.2719	10.6296			0.0639	0.0955	1.6654	2.5049											1.5630	1.4737	0.0005	4.39E-04	0.0038	0.0036		
CONTROLLED EMISSIONS																										
Enclosed Combustor Emissions (from F/W/B losses)[7]	3.1004	13.5796	2.4531	10.7446	0.3340	1.4628	670.7083	2937.7025	11.1643	48.8996	3.06E-05	0.0001	0.0123	0.0538	0.0164	0.0717	1.08E-06	4.72E-06	0.4567	2.0002	0.0002	0.0010	0.0019	0.0085	3.83E-06	1.68E-05
Controlled Fugitive Emissions from Hauling															0.4381	0.7321										
TOTALS:	**3.100**	**13.580**	**2.453**	**10.745**	**0.334**	**1.463**	**670.708**	**2937.702**	**11.164**	**48.900**	**3.06E-05**	**1.34E-04**	**0.012**	**0.054**	**0.454**	**0.804**	**1.08E-06**	**4.72E-06**	**0.457**	**2.000**	**2.39E-04**	**1.05E-03**	**1.94E-03**	**0.008**	**3.83E-06**	**1.68E-05**
POTENTIAL TO EMIT[8]	**7.7444**	**44.5499**	**6.1467**	**26.9224**	**5.6219**	**24.7192**	**5215.7971**	**22847.6961**	**15.7073**	**68.7981**	**0.0222**	**0.0972**	**0.2984**	**1.3070**	**0.7405**	**2.0570**	**1.82E-05**	**7.98E-05**	**0.9850**	**5.7883**	**0.0063**	**0.0279**	**0.0864**	**0.3819**	**0.0553**	**0.2420**
POTENTIAL TO EMIT (Excluding Fugitives)	**3.3658**	**25.3718**	**6.1467**	**26.9224**	**1.0040**	**4.4931**	**5100.3490**	**22342.0334**	**15.7073**	**68.7981**	**0.0222**	**0.0972**	**0.2984**	**1.3070**	**0.3025**	**1.3249**	**1.82E-05**	**7.98E-05**	**0.5804**	**4.0161**	**0.0044**	**0.0196**	**0.0024**	**0.0142**	**0.0553**	**0.2420**

Enter any notes here:	1 - See Tables 4 and 5 for fugitive emission calculations; Table 12 for PM emissions from hauling. 2 - See Tables 6 and 7 for tanks emission calculations 3 - See Table 13 for engine emissions 4 - See Table 14 for Thermoelectric Generator (TEG) emissions calculations 5 - See Table 9 for gas production unit heater and line heater emission calculations 6 - 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 1240 barrels per day, VOC emissions would be 11.2719 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 2.4268 pound per hour. 7- See Table 10 and 11 for enclosed combustion emission calculations. 8 - The hourly potential to emit is the sum of emissions from gas production unit heaters, line heaters, TEG, engine, storage tanks, enclosed combustors, and fugitives. Does not include emissions from loading (see footnote 6). 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

Balli Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Pollutant		Emissions		Threshold Exceeded?		
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	159.6487	7.7444	6	**Yes**	
	tons/yr	709.8910	44.5499	10	**Yes**	**Yes**
NO_X	lbs/hr	3.6936	6.1467	6		**Yes**
	tons/yr	16.1778	26.9224	10	**Yes**	**Yes**
CH_4	lbs/hr	20.6142	5.6219			
	tons/yr	90.3855	24.7192			
CO	lbs/hr	4.5430	15.7073	6		**Yes**
	tons/yr	19.8985	68.7981	10	**Yes**	**Yes**
SO_2	lbs/hr	0.0222	0.0222	6		
	tons/yr	0.0971	0.0972	10		
$PM_{2.5}$	lbs/hr	0.2861	0.2984	6		
	tons/yr	1.2532	1.3070	10		
PM_{10}	lbs/hr	1.1622	0.7405	6		
	tons/yr	2.7173	2.0570	10		
Lead	lbs/hr	1.71E-05	1.82E-05	6		
	tons/yr	7.51E-05	7.98E-05	10		
Total HAPs	lbs/hr	23.3566	0.9850	2	**Yes**	
	tons/yr	103.7757	5.7883	5	**Yes**	**Yes**
Total TAPs	lbs/hr	0.0732	0.0615	1.14		
n-Hexane	lbs/hr	22.9492	0.7839			
	tons/yr	101.9833	4.8993			
Toluene	lbs/hr	0.0797	0.0210			
	tons/yr	0.3512	0.0943			
Ethylbenzene	lbs/hr	0.0729	0.0319			
	tons/yr	0.3210	0.1414			
Xylenes	lbs/hr	0.1813	0.0864			
	tons/yr	0.7977	0.3819			
Benzene	lbs/hr	0.0180	0.0063			
	tons/yr	0.0793	0.0279			

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

Table 4

Fugitive Emissions
Balli 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	0.144
	Benzene frac	0.000
	Toluene	0.000
	Ethylbenzene	0.000
	Xylenes	0.000
	n-Hexane	0.024
	HAPs	0.024
	Methane	0.649

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
600	Valves	Gas VOC	0.004500	0.39	7,492.21
		Non VOC	0.004500	2.31	44,542.19
		HAPs	0.004500	0.06	1,236.37
		CO2e	0.004500	43.81	844,278.36
708	Connectors	VOC	0.000200	0.02	392.92
		Non-VOC	0.000200	0.12	2,335.99
		HAPs	0.000200	0.00	64.84
		CO2e	0.000200	2.30	44,277.71
156	Flanges	VOC	0.000390	0.01	168.82
		Non-VOC	0.000390	0.05	1,003.68
		HAPs	0.000390	0.00	27.86
		CO2e	0.000390	0.987153	19024.405608
			Total VOCs:	0.42	8053.96
			Total THC:	2.90	55935.82
			Total CH4:	1.88	36303.22

Light Liquid Weight Fraction From Analysis:	VOC frac	0.979
	Benzene frac	0.001
	Toluene	0.005
	Ethylbenzene	0.009
	Xylenes	0.024
	n-hexane	0.030
	HAPs	0.069
	Methane	0.007

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
624	Valves	Light Liquid VOC	0.002500	1.53	29,429.62
		Light Liquid Non-VOC	0.002500	0.03	634.70
		Light Liquid HAPs	0.002500	0.11	2,071.23
		CO2e	0.002500	0.28	5393.78
			Total VOC:	1.53	29,429.62
			Total THC:	1.56	30,064.32
			Total CH4:	0.01	215.75

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	37,483.58	4.28	18.74
Ethylbenzene		0.03	0.14
Toluene		0.02	0.08
Xylenes		0.08	0.37
n-Hexane		0.25	1.11
TAPs (Benzene)		0.00	0.01
HAPs		0.39	1.70
CH_4 [3]		4.17	18.26
CO_{2e}	912,974.25	104.22	456.49

Enter Notes Here:	Fugitive emissions based on an estimated component count Global Warming Potentials from EPA site Reference to Emission factors used: 1. Emission factors are for oil and gas production facilities (not refineries) come from the EPA's "Protocol for Equipment Leak Emission Estimates" November 1995, EPA 4531, R-95-017, Table 2-4. 2. Percent of speciated VOCs used in fugitive calculations are based on the total hydrocarbons, not of the total sample. 3. CH_4 emissions are based on percent of CH4 of the total hydrocarbons

Table 5

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

Number of PCVs	48
Bleed Rate (scf/day/PCV)	6.6
Total Bleed Rate (scf/day)	316.8

Component	Mol%	Molecular Weight (lb/lb-mole)	Component Flow (scf/day)	Component Moles (lb-moles)	Component Emissions (lbs/day)	(lbs/hr)	(tons/year)
H2S	0.00E+00	34.08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.4339	14.01	1.3745952	3.62E-03	0.05	2.11E-03	0.01
Carbon Dioxide	0.1709	44.01	0.5414112	1.43E-03	0.06	2.62E-03	1.15E-02
Methane	80.4721	16.04	254.9356128	0.67	10.78	0.45	1.97
Ethane	13.6908	30.07	43.3724544	0.11	3.44	0.14	0.63
Propane	2.7966	44.1	8.8596288	0.02	1.03	0.04	0.19
Isobutane	0.5201	58.12	1.6476768	4.34E-03	0.25	0.01	0.05
n-Butane	0.9055	58.12	2.868624	7.56E-03	0.44	0.02	0.08
Isopentane	0.2466	72.15	0.7812288	2.06E-03	0.15	6.19E-03	0.03
n-Pentane	0.2098	72.15	0.6646464	1.75E-03	0.13	5.27E-03	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	0.5484	86.18	1.7373312	4.58E-03	0.39	0.02	0.07
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	0.0996	0.4363
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	0.0164	0.0720
HAPs Emissions	0.0164	0.0720
TAPs Emissions	0.00E+00	0.00E+00
CH_4 Emissions	0.4490	1.9666
CO_{2e} emissions	11.2273	49.1756

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

Table 6

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

# Hours Operational	8760

	Condensate Tank Flashing Losses			Produced Water Tank Flashing Losses		
	Vapor Mass Fraction	Flashing Losses		Vapor Mass Fraction	Flashing Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
Water	0.0591	0.0875	0.3832	2.4429	0.5648	2.4739
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0004	0.0007	0.0029	0.2941	0.0680	0.2978
Carbon Dioxide	0.0857	0.1270	0.5561	3.7028	0.8561	3.7498
Methane	1.1732	1.7377	7.6112	58.3723	13.4960	59.1126
Ethane	20.8245	30.8447	135.0998	24.3189	5.6227	24.6274
Propane	25.9767	38.4761	168.5252	4.6846	1.0831	4.7440
Isobutane	9.5217	14.1032	61.7722	3.7972	0.8779	3.8454
n-Butane	17.8633	26.4586	115.8888	1.5918	0.3680	1.6120
Isopentane	6.1192	9.0637	39.6989	0.3379	0.0781	0.3422
n-Pentane	5.2512	7.7779	34.0672	0.1107	0.0256	0.1121
2-Methylpentane	0.1354	0.2005	0.8783	0.0038	0.0009	0.0039
3-Methylpentane	0.0917	0.1359	0.5951	0.0063	0.0015	0.0064
n-Hexane	11.7836	17.4535	76.4465	0.1612	0.0373	0.1633
Methylcyclopentane	0.0222	0.0329	0.1442	0.0025	0.0006	0.0026
Benzene	0.0056	0.0083	0.0365	0.0091	0.0021	0.0092
2-Methylhexane	0.1305	0.1932	0.8464	0.0026	0.0006	0.0027
3-Methylhexane	0.1073	0.1590	0.6964	0.0026	0.0006	0.0026
Heptane	0.2295	0.3399	1.4887	0.0023	0.0005	0.0024
Methylcyclohexane	0.1205	0.1785	0.7817	0.0137	0.0032	0.0139
Toluene	0.0284	0.0421	0.1843	0.0428	0.0099	0.0433
Octane	0.2982	0.4417	1.9346	0.0013	0.0003	0.0013
Ethylbenzene	0.0197	0.0292	0.1278	0.0288	0.0066	0.0291
m & p-Xylene	0.0193	0.0286	0.1253	0.0257	0.0060	0.0261
o-Xylene	0.0270	0.0401	0.1754	0.0422	0.0098	0.0428
Nonane	0.0892	0.1322	0.5789	0.0004	0.0001	0.0004
C10+	0.0167	0.0248	0.1086	0.0014	0.0003	0.0015
Total VOCs	77.857	115.32	505.1	10.869	2.5130	11.0068
Total CO_{2e}		43.57	190.8		338.26	1,481.6
CH_4		1.74	7.61		13.50	59.11
Total TAPs (Benzene)		0.0083	0.0365		0.0021	0.0092
Toluene		0.0421	0.1843		0.0099	0.0433
Ethylbenzene		0.0292	0.1278		0.0066	0.0291
Xylenes		0.0687	0.3008		0.0157	0.0688
n-Hexane		17.454	76.446		0.0373	0.1633
Total HAPs		17.602	77.096		0.0716	0.3137
Total	100.00	148.12	648.8	100.00	23.121	101.27

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

Table 7

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

Condensate Tank Information	
Number of Tanks	12
Maximum Working Losses (lbs/hr)	14.3062
Maximum Breathing Losses (lbs/hr)	35.0445
# Hours Operational	8760

	Condensate Tank W/B Losses						
	Vapor Mass Fraction	Working Losses		Breathing Losses		Max W/B Losses	
	wt%	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
H2S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0000	1.16E-06	5.10E-06	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide	0.0607	0.0087	0.0380	0.0213	0.0932	0.0300	0.1312
Methane	0.1778	0.0254	0.1114	0.0623	0.2729	0.0878	0.3844
Ethane	24.4396	3.4964	15.3141	8.5647	37.5136	12.0611	52.8277
Propane	26.7066	3.8207	16.7346	9.3592	40.9932	13.1799	57.7279
Isobutane	9.2993	1.3304	5.8271	3.2589	14.2740	4.5893	20.1011
n-Butane	18.1045	2.5901	11.3445	6.3446	27.7895	8.9347	39.1340
Isopentane	5.3160	0.7605	3.3310	1.8629	8.1597	2.6235	11.4907
n-Pentane	4.4959	0.6432	2.8172	1.5756	6.9010	2.2188	9.7182
2-Methylpentane	0.1157	0.0166	0.0725	0.0406	0.1777	0.0571	0.2502
3-Methylpentane	0.0783	0.0112	0.0490	0.0274	0.1201	0.0386	0.1692
n-Hexane	10.3888	1.4862	6.5097	3.6407	15.9462	5.1269	22.4559
Methylcyclopentane	0.0174	0.0025	0.0109	0.0061	0.0268	0.0086	0.0377
Benzene	0.0031	4.42E-04	0.0019	0.0011	0.0047	0.0015	0.0067
2-Methylhexane	0.0318	4.54E-03	0.0199	0.0111	0.0488	0.0157	0.0687
3-Methylhexane	0.0955	0.0137	0.0598	0.0335	0.1466	0.0471	0.2065
Heptane	0.1911	0.0273	0.1197	0.0670	0.2933	0.0943	0.4130
Methylcyclohexane	0.1026	0.0147	0.0643	0.0359	0.1575	0.0506	0.2217
Toluene	0.0160	2.28E-03	1.00E-02	0.0056	0.0245	0.0079	0.0345
Octane	0.2416	0.0346	0.1514	0.0847	0.3708	0.1192	0.5222
Ethylbenzene	0.0122	1.74E-03	7.64E-03	0.0043	0.0187	0.0060	0.0264
m & p-Xylene	0.0112	1.60E-03	7.01E-03	0.0039	0.0172	0.0055	0.0242
o-Xylene	0.0141	2.02E-03	0.0088	0.0049	0.0216	0.0070	0.0304
Nonane	0.0711	0.0102	0.0446	0.0249	0.1092	0.0351	0.1538
C10+	0.0091	1.30E-03	0.0057	0.0032	0.0139	0.0045	0.0196
Total VOCs	75.322	10.7757	47.197	26.3961	115.6150	37.1718	162.812
Total CO_{2e}		0.6446	2.8235	1.5791	6.9165	2.2237	9.740
CH_4		0.0254	0.1114	0.0623	0.2729	0.0878	0.3844
Total TAPs (Benzene)		4.42E-04	1.94E-03	0.0011	0.0047	0.0015	0.0067
Toluene		2.28E-03	1.00E-02	0.0056	0.0245	0.0079	0.0345
Ethylbenzene		1.74E-03	7.64E-03	0.0043	0.0187	0.0060	0.0264
Xylenes		3.61E-03	0.0158	0.0089	0.0388	0.0125	0.0546
n-Hexane		1.4862	6.5097	3.6407	15.9462	5.1269	22.4559
Total HAPs		1.4943	6.5451	3.6605	16.0329	5.1548	22.5781
Total	100.00	14.3062	62.6610	35.0445	153.4948	49.3506	216.156

Table 7

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

Produced Water Tank Information	
Number of Tanks	4
Maximum Working Losses (lbs/hr)	0.1357
Maximum Breathing Losses (lbs/hr)	0.0169

	Produced Water Tank W/B Losses						
	Vapor Mass Fraction	Working Losses		Breathing Losses		Max W/B Losses	
	wt%	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Water	90.3300	0.1226	0.5370	0.0152	0.0667	0.1378	0.6037
H2S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0057	7.69E-06	3.37E-05	9.55E-07	4.18E-06	8.64E-06	3.79E-05
Carbon Dioxide	4.8695	0.0066	0.0290	0.0008	0.0036	0.0074	0.0325
Methane	3.1293	0.0042	0.0186	0.0005	0.0023	0.0048	0.0209
Ethane	1.5632	0.0021	0.0093	0.0003	0.0012	0.0024	0.0104
Propane	0.0471	6.39E-05	0.0003	7.93E-06	3.47E-05	7.18E-05	0.0003
Isobutane	0.0511	6.93E-05	3.04E-04	8.61E-06	3.77E-05	7.79E-05	3.41E-04
n-Butane	0.0036	4.89E-06	2.14E-05	6.07E-07	2.66E-06	5.50E-06	2.41E-05
Isopentane	0.0002	2.73E-07	1.19E-06	3.38E-08	1.48E-07	3.06E-07	1.34E-06
n-Pentane	0.0000	2.55E-08	1.12E-07	3.17E-09	1.39E-08	2.87E-08	1.26E-07
2-Methylpentane	3.61E-07	4.90E-10	2.15E-09	6.08E-11	2.66E-10	5.51E-10	2.41E-09
3-Methylpentane	1.33E-06	1.81E-09	7.93E-09	2.25E-10	9.85E-10	2.04E-09	8.92E-09
n-Hexane	5.34E-06	7.25E-09	3.17E-08	9.00E-10	3.94E-09	8.15E-09	3.57E-08
Methylcyclopentane	6.47E-07	8.78E-10	3.85E-09	1.09E-10	4.78E-10	9.88E-10	4.33E-09
Benzene	1.40E-04	1.90E-07	8.31E-07	2.36E-08	1.03E-07	2.13E-07	9.34E-07
2-Methylhexane	1.49E-08	2.03E-11	8.87E-11	2.52E-12	1.10E-11	2.28E-11	9.98E-11
3-Methylhexane	5.87E-08	7.96E-11	3.49E-10	9.89E-12	4.33E-11	8.95E-11	3.92E-10
Heptane	1.67E-08	2.27E-11	9.95E-11	2.82E-12	1.23E-11	2.55E-11	1.12E-10
Methylcyclohexane	1.13E-06	1.53E-09	6.70E-09	1.90E-10	8.32E-10	1.72E-09	7.53E-09
Toluene	1.43E-04	1.94E-07	8.49E-07	2.41E-08	1.05E-07	2.18E-07	9.54E-07
Octane	1.12E-09	1.52E-12	6.67E-12	1.89E-13	8.28E-13	1.71E-12	7.50E-12
Ethylbenzene	2.91E-05	3.95E-08	1.73E-07	4.91E-09	2.15E-08	4.44E-08	1.95E-07
m & p-Xylene	1.64E-05	2.23E-08	9.75E-08	2.76E-09	1.21E-08	2.50E-08	1.10E-07
o-Xylene	4.17E-05	5.66E-08	2.48E-07	7.03E-09	3.08E-08	6.37E-08	2.79E-07
Nonane	1.15E-10	1.56E-13	6.84E-13	1.94E-14	8.49E-14	1.75E-13	7.68E-13
C10+	1.97E-10	2.67E-13	1.17E-12	3.32E-14	1.45E-13	3.01E-13	1.32E-12
Total VOCs	0.1023	1.39E-04	0.0006	1.72E-05	7.55E-05	1.56E-04	0.0007
Total CO_{2e}		0.1128	0.4941	0.0140	0.0613	0.1268	0.5554
CH_4		0.0042	0.0186	0.0005	0.0023	0.0048	0.0209
Total TAPs (Benzene)		1.90E-07	8.31E-07	2.36E-08	1.03E-07	2.13E-07	9.34E-07
Toluene		1.94E-07	8.49E-07	2.41E-08	1.05E-07	2.18E-07	9.54E-07
Ethylbenzene		3.95E-08	1.73E-07	4.91E-09	2.15E-08	4.44E-08	1.95E-07
Xylenes		7.89E-08	3.46E-07	9.80E-09	4.29E-08	8.87E-08	3.89E-07
n-Hexane		7.25E-09	3.17E-08	9.00E-10	3.94E-09	8.15E-09	3.57E-08
Total HAPs		5.09E-07	2.23E-06	6.32E-08	2.77E-07	5.72E-07	2.51E-06
Total	100.00	0.1357	0.5945	0.0169	0.0738	0.1526	0.6684

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

Table 8

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

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	3.54	1.0330
Annual Average Temp (F)	72.1	72.1
S (saturation factor)	0.6	0.6
P (true vapor pressure)	2.30	0.45
M (MW of vapor)	45.98	18.61
Collection Efficiency (%)	0.00	0.00
Total Hydrocarbon Loading Loss (lb/10^3 gal)*	1.48	0.12
Maximum Throughput (gallons/hr)**	10,080	10,080
Average Throughput (gallons/yr)	19,009,200	38,018,400
Total Hydrocarbon Loading Emissions (lbs/hr)	14.96	1.19
Total Hydrocarbon Loading Emissions (tpy)	14.11	2.25

	Condensate Tank Loading Losses			Produced Water Tank Loading Losses		
	Vapor Mass Fraction	Loading Losses		Vapor Mass Fraction	Loading Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
H2S	0.0000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0000	1.22E-06	1.15E-06	0.0057	6.76E-05	1.27E-04
Carbon Dioxide	0.0607	0.0091	8.56E-03	4.8695	5.81E-02	1.10E-01
Methane	0.1778	0.0266	2.51E-02	3.1293	3.73E-02	7.04E-02
Ethane	24.4396	3.6570	3.4482	1.5632	1.86E-02	3.52E-02
Propane	26.7066	3.9962	3.77E+00	0.0471	5.61E-04	1.06E-03
Isobutane	9.2993	1.3915	1.31E+00	0.0511	6.09E-04	1.15E-03
n-Butane	18.1045	2.7090	2.55E+00	0.0036	4.30E-05	8.10E-05
Isopentane	5.3160	0.7954	7.50E-01	0.0002	2.40E-06	4.52E-06
n-Pentane	4.4959	0.6727	6.34E-01	0.0000	2.24E-07	4.23E-07
2-Methylpentane	0.1157	0.0173	1.63E-02	3.61E-07	4.31E-09	8.12E-09
3-Methylpentane	0.0783	0.0117	1.10E-02	1.33E-06	1.59E-08	3.00E-08
n-Hexane	10.3888	1.5545	1.47E+00	5.34E-06	6.37E-08	1.20E-07
Methylcyclopentane	0.0174	0.0026	2.46E-03	6.47E-07	7.72E-09	1.46E-08
Benzene	0.0031	0.0005	4.36E-04	0.0001	1.67E-06	3.14E-06
2-Methylhexane	0.0318	0.0048	4.48E-03	1.49E-08	1.78E-10	3.36E-10
3-Methylhexane	0.0955	0.0143	1.35E-02	5.87E-08	7.00E-10	1.32E-09
Heptane	0.1911	0.0286	2.70E-02	1.67E-08	2.00E-10	3.76E-10
Methylcyclohexane	0.1026	0.0153	1.45E-02	1.13E-06	1.34E-08	2.53E-08
Toluene	0.0160	0.0024	2.25E-03	0.0001	1.70E-06	3.21E-06
Octane	0.2416	0.0361	3.41E-02	1.12E-09	1.34E-11	2.52E-11
Ethylbenzene	0.0122	0.0018	1.72E-03	2.91E-05	3.47E-07	6.55E-07
m & p-Xylene	0.0112	0.0017	1.58E-03	1.64E-05	1.96E-07	3.69E-07
o-Xylene	0.0141	0.0021	1.99E-03	4.17E-05	4.98E-07	9.39E-07
Nonane	0.0711	0.0106	1.00E-02	1.15E-10	1.37E-12	2.59E-12
C10+	0.0091	0.0014	1.28E-03	1.97E-10	2.35E-12	4.43E-12
Total VOCs	75.3218	11.2706	10.6273	0.1023	1.22E-03	2.30E-03
Total CH_4		0.0266	0.0251		0.0373	0.0704
Total CO_{2e}		0.6742	0.6358		0.9911	1.8691
Total TAPs (Benzene)		0.0005	4.36E-04		1.67E-06	3.14E-06
Toluene		0.0024	2.25E-03		1.70E-06	3.21E-06
Ethylbenzene		0.0018	1.72E-03		3.47E-07	6.55E-07
Xylenes		0.0038	3.56E-03		6.93E-07	1.31E-06
n-Hexane		1.5545	1.47E+00		6.37E-08	1.20E-07
Total HAPs		1.5630	1.47E+00		4.47E-06	8.44E-06
Total	100.0000	14.9633	14.1092	100.0000	1.1927	2.2492

Enter any notes here

Vapor mass fractions and loading losses from Promax output

Using equation L_L = 12.46 SPM/T from AP-42, Chapter 5, Section 5.2-4
MW was obtained by Promax; RVP was taken from laboratory reports
Annual Average Temp (F) obtained from Charleston, WV (preset in Promax)
S (saturation factor) is based on submerged loading, dedicated service as it was most representative
True vapor pressure (TVP) equation from AP-42, Chapter 7, Figure 7.1-13a

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

Gas Production Unit Heater Emissions

Number of Units	12
GPU Heater Rating (MMBtu/hr)	1.50
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,224.7184

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.470	6.437
CO	84	1.235	5.407
CO_2	120,000	1763.671	7724.878
Lead	0.0005	7.35E-06	3.22E-05
N_2O	2.2	0.032	0.142
PM (Total)	7.6	0.112	0.489
SO_2	0.6	0.009	0.039
TOC	11	0.162	0.708
Methane	2.3	0.034	0.148
VOC	5.5	0.081	0.354
HAPS			
2-Methylnaphthalene	2.40E-05	3.53E-07	1.54E-06
Benzene	2.10E-03	3.09E-05	1.35E-04
Dichlorobenzene	1.20E-03	1.76E-05	7.72E-05
Fluoranthene	3.00E-06	4.41E-08	1.93E-07
Fluorene	2.80E-06	4.12E-08	1.80E-07
Formaldehyde	7.50E-02	1.10E-03	4.83E-03
Hexane	1.80E+00	2.65E-02	1.16E-01
Naphthalene	6.10E-04	8.97E-06	3.93E-05
Phenanathrene	1.70E-05	2.50E-07	1.09E-06
Toluene	3.40E-03	5.00E-05	2.19E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.189	0.826
TOTAL Uncontrolled HAPs	0.065	0.283
TOTAL Uncontrolled TAPs (Benzene)	7.20E-05	3.15E-04
TOTAL Uncontrolled Toluene	1.17E-04	5.11E-04
TOTAL Uncontrolled Hexane	0.062	0.270
TOTAL Uncontrolled TAPs (Formaldehyde)	0.003	0.011
TOTAL CH_4	0.079	0.345
TOTAL CO_{2e} Emissions	4,139.69	18,131.83

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

Line Heater Emissions

Number of Units	12
Line Heater Rating (MMBtu/hr)	2.00
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,224.7184

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.960	8.583
CO	84	1.646	7.210
CO_2	120,000	2351.561	10299.837
Lead	0.0005	9.80E-06	4.29E-05
N_2O	2.2	0.043	0.189
PM (Total)	7.6	0.149	0.652
SO_2	0.6	0.012	0.051
TOC	11	0.216	0.944
Methane	2.3	0.045	0.197
VOC	5.5	0.108	0.472
HAPS			
2-Methylnaphthalene	2.40E-05	4.70E-07	2.06E-06
Benzene	2.10E-03	4.12E-05	1.80E-04
Dichlorobenzene	1.20E-03	2.35E-05	1.03E-04
Fluoranthene	3.00E-06	5.88E-08	2.57E-07
Fluorene	2.80E-06	5.49E-08	2.40E-07
Formaldehyde	7.50E-02	1.47E-03	6.44E-03
Hexane	1.80E+00	3.53E-02	1.54E-01
Naphthalene	6.10E-04	1.20E-05	5.24E-05
Phenanathrene	1.70E-05	3.33E-07	1.46E-06
Toluene	3.40E-03	6.66E-05	2.92E-04

Table 10

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

General Information	
Unit Name:	EC001

Pollutant	Emission Factor (lb/MMscf)
NOx	100
CO	84
PM10	7.6
PM2.5	5.7
SO_2	0.6
CO_2	120,000
VOC	5.5
benzene	2.10E-03
Hexane	1.80E+00
Toluene	3.40E-03
Formaldehyde	7.50E-02
N_2O	2.20
Lead	5.00E-04

Pollutant	Emission Factor[2] (lb/MMBtu)
NO_x	0.068
CO	0.31

Constants	
Btu/MMBtu	1,000,000
scf/MMscf	1,000,000
lb/ton	2,000
H_2S molecular wei	34.08
SO_2 molecular	64.06
seconds/hour	3,600
inches/ft	12

Destruction Efficiency	
VOC percent destruction efficiency (%)	98
H_2S percent destruction efficiency (%)	98

Enclosed Combustor operating hours	8760
No. of Enclosed Combustors	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 (Enter Name of Each Stream Here)	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
Maximum Expected Hourly Volumetric Flow Rate of Stream (scf/hr)	51	--	1,222.33	471.51	407.26	3.11	2,155.21
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	446,760.00	--	10,707,580.24	4,130,421.51	3,567,615.63	27,260.17	18,879,637.56
Heating Content (Btu/ft3)	1,225		2,638.32	1,170.00	2,607.24	101.78	2,245.12

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	-	-	115.320	2.513	37.172	0.000	155.00
Benzene	-	-	0.008	0.002	0.002	0.000	0.012
Toluene	-	-	0.042	0.010	0.008	0.000	0.060
Ethylbenzene	-	-	0.029	0.007	0.006	0.000	0.042
Xylenes	-	-	0.069	0.016	0.012	0.000	0.097
n-Hexane	-	-	17.454	0.037	5.127	0.000	22.618
HAPs	-	-	17.602	0.072	5.155	0.000	22.828
Total Mass Flow	-	-	148.117	23.121	49.351	0.153	220.741
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	-	-	505.101	11.007	162.812	0.001	678.921
Benzene	-	-	0.037	0.009	0.007	0.000	0.052
Toluene	-	-	0.184	0.043	0.034	0.000	0.262
Ethylbenzene	-	-	0.128	0.029	0.026	0.000	0.183
Xylenes	-	-	0.301	0.069	0.055	0.000	0.424
n-Hexane	-	-	76.446	0.163	22.456	0.000	99.066
HAP	-	-	77.096	0.314	22.578	0.000	99.988
Total Mass Flow	-	-	648.754	101.268	216.156	0.668	966.846

Table 10

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

Controlled Emissions							
Hourly (lb/hr)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.005	-	2.448				2.45
CO	0.004	-	11.160				11.16
PM2.5	0.000	-	0.007	0.003	0.002	0.000	0.01
PM10	0.000	-	0.009	0.004	0.003	0.000	0.02
H2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	6.120	-	-	-	-	-	6.12
Total VOC	0.000	-	2.306	0.050	0.743	0.000	3.10
Benzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.001	0.000	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.001	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.001	0.000	0.000	0.000	0.00
n-Hexane	0.000	-	0.349	0.001	0.103	0.000	0.45
HAP	0.000	-	0.352	0.001	0.103	0.000	0.46
N_2O	0.000	-	0.003	0.001	0.001	0.000	0.00
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00
Annual (tpy)							
	1	2	3	4	5	6	Total
Stream Sent to Enclosed Combustor/Vapor Combustor	pilot(s)	added fuel stream(s)	Oil Tank Flash Emissions	Water Tank Flash Emissions	Oil Tank W/B Emissions	Water Tank W/B Emissions	-
NOx	0.022	-	10.722				10.74
CO	0.019	-	48.881				48.90
PM2.5	0.001	-	0.031	0.012	0.010	0.000	0.05
PM10	0.002	-	0.041	0.016	0.014	0.000	0.07
H_2S	0.000	-	0.000	0.000	0.000	0.000	0.00
SO_2	0.000	-	0.000	0.000	0.000	0.000	0.00
CO_2	26.806	-	-	-	-	-	26.81
Total VOC	0.001	-	10.102	0.220	3.256	0.000	13.58
Benzene	0.000	-	0.001	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.004	0.001	0.001	0.000	0.01
Ethylbenzene	0.000	-	0.003	0.001	0.001	0.000	0.00
Xylenes	0.000	-	0.006	0.001	0.001	0.000	0.01
n-Hexane	0.000	-	1.529	0.003	0.449	0.000	1.98
HAP	0.000	-	1.542	0.006	0.452	0.000	2.00
N_2O	0.000	-	0.012	0.005	0.004	0.000	0.02
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	3.10	13.58
NOx	2.453	10.745
CO	11.164	48.900
PM2.5	0.012	0.054
PM10	0.016	0.072
H_2S	1.63E-05	7.13E-05
SO_2	3.06E-05	1.34E-04
Benzene (TAPs)	2.39E-04	1.05E-03
Toluene	1.20E-03	5.24E-03
Ethylbenzene	8.37E-04	3.67E-03
Xylenes	1.94E-03	0.008
Hexanes	0.452	1.982
Formaldehyde (TAPs)	3.83E-06	1.68E-05
HAPs	0.46	2.00
CH_4	0.33	1.46
CO_2e	670.71	2937.70
N_2O	0.005	0.021
Lead	1.08E-06	4.72E-06

Enter any notes here as needed

1. Emission Factors from AP-42 Tables 1.4-1, 1.4-2, and 1.4.3
2. Emission Factors from AP-42 Tables 13.5-1 and 13.5-2 for industrial flares

Table 11

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

Enclosed Combustor CO_2 and CH_4 Emissions

Components	Mole fraction of oil flash gas constituents[a]	Volume of oil flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of water flash gas constituents[a]	Volume of water flash gas sent to Enclosed Combustor *scf/year*	Mole fraction of oil tank vapors constituents[a]	Volume of oil tank vapor sent to Enclosed Combustor *scf/year*	Mole fraction of water tank vapors constituents[a]	Volume of water tank vapors sent to Enclosed Combustor *scf/year*	Component volume of gas sent to Enclosed Combustor *scf/year*	Number of carbon atoms	Combustion Efficiency	Combusted CO_2 Volume[b] *scf/year*	Uncombusted CO_2 and CH_4 Volume[b] *scf/year*	Volume GHGs Emitted *scf/year*
CO_2	0.001	10,707,580	0.0172	4,130,422	0.0006	3,567,616	0.021	27,260	83,538	1	0	--	83,538	49,466,646
Methane	0.034	10,707,580	0.7431	4,130,422	0.0051	3,567,616	0.036	27,260	3,454,583	1	0.98	3,385,491	69,092	69,092
Ethane	0.324	10,707,580	0.1651	4,130,422	0.3747	3,567,616	0.010	27,260	5,486,490	2	0.98	10,753,520	--	
Propane	0.275	10,707,580	0.0217	4,130,422	0.2792	3,567,616	0.000	27,260	4,034,935	3	0.98	11,862,709	--	
i-Butane	0.077	10,707,580	0.0133	4,130,422	0.0738	3,567,616	0.000	27,260	1,138,504	4	0.98	4,462,937	--	
n-Butane	0.144	10,707,580	0.0056	4,130,422	0.1436	3,567,616	0.000	27,260	2,074,262	4	0.98	8,131,109	--	
Pentane	0.074	10,707,580	0.0013	4,130,422	0.0627	3,567,616	0.000	27,260	1,017,954	5	0.98	4,987,973	--	
Hexane	0.065	10,707,580	0.0004	4,130,422	0.0566	3,567,616	0.000	27,260	901,449	6	0.98	5,300,522	--	
Benzene	0.000	10,707,580	0.0000	4,130,422	0.0000	3,567,616	0.000	27,260	524	6	0.98	3,079	--	
Heptanes	0.002	10,707,580	0.0000	4,130,422	0.0016	3,567,616	0.000	27,260	30,325	7	0.98	208,032	--	
Toluene	0.000	10,707,580	0.0001	4,130,422	0.0001	3,567,616	0.000	27,260	2,220	7	0.98	15,228	--	
Octane	0.002	10,707,580	0.0000	4,130,422	0.0015	3,567,616	0.000	27,260	24,538	8	0.98	192,376	--	
Ethyl benzene	0.000	10,707,580	0.0001	4,130,422	0.0001	3,567,616	0.000	27,260	1,346	8	0.98	10,556	--	
Xylenes	0.000	10,707,580	0.0001	4,130,422	0.0001	3,567,616	0.000	27,260	3,118	8	0.98	24,445	--	
Nonane	0.000	10,707,580	0.0000	4,130,422	0.0003	3,567,616	0.000	27,260	4,400	9	0.98	38,806	--	
Decane plus	0.000	10,707,580	0.0000	4,130,422	0.0000	3,567,616	0.000	27,260	645	10	0.98	6,324	--	
											Subtotal	**49,383,107**	--	

Pollutant	Volume Emitted *scf/year*	Density of GHG[c] *lb/scf*	Conversion Factor *lb/ton*	GWF	Emissions[c] *lbs/hr*	Emissions[c] *(tons/yr)*
CO_2	49,466,646	0.12	2000	1	654.83	2,868.15
CH_4	69,092	0.04	2000	25	0.33	1.46
				CO_2e Emissions	**663.2**	**2904.71**

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 60°F and 14.7 psia

Table 12

Haul Road Emissions
Balli Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

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

Tanker Truck Trip Calculation	
Condensate Production (bbl/day)	1,240
PW Production (bbl/day)	2,480
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 (miles/hr)	Vehicle Miles Travelled (miles/year)	PM (lbs/VMT)	PM10 (lbs/VMT)
Tanker Trucks Condensate	10	40	10	0.2500	1	2263	0.2500	565.7500	3.8175	1.7179
Tanker Trucks PW	10	40	10	0.2500	1	4526	0.2500	1131.5000	3.8175	1.7179
Pick Up Truck	4	3	10	0.1100	1	730	0.1100	80.3000	0.3467	0.1560

	Uncontrolled Emissions						Controlled Emissions					
	PM			PM10			PM			PM10		
	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)
Tanker Trucks Condensate	0.9544	2159.7673	1.0799	0.4295	971.8953	0.4859	0.4772	1079.8836	0.5399	0.2147	485.9476	0.2430
Tanker Trucks PW	0.9544	4319.5345	2.1598	0.4295	1943.7905	0.9719	0.4772	2159.7673	1.0799	0.2147	971.8953	0.4859
Pick Up Truck	0.0381	27.8384	0.0139	0.0172	12.5273	0.0063	0.0191	13.9192	0.0070	0.0086	6.2636	0.0031
Total Emissions	1.9469	6,507.1401	3.2536	0.8761	2,928.2131	1.4641	0.9734	3,253.5701	1.6268	0.4381	1,464.1065	0.7321

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

Table 13

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

Ford MSG425 2.5L Engine

Power (hp) [1]	76
Fuel consumption (lbs/BHP-hr) [1]	0.3864
Heat Content of Fuel (Btu/scf)	1224.7184
Density of NG (lb/scf)	0.056
Operating Hours/year	8760
No. of Engines	4

Pollutant	Emission Factors		lb/hr	tpy
	(g/hp-hr)	(lb/MMBtu)		
NOx[2]	0.3731		0.2501	1.0953
CO[2]	2.4627		1.6505	7.2293
CO_2		110.000	282.5866	1,237.73
$PM_{2.5}$		9.500E-03	0.0244	0.1069
PM_{10}		9.500E-03	0.0244	0.1069
PM (Total)		9.910E-03	0.0255	0.1115
SO_2		5.880E-04	0.0015	0.0066
TOC		0.358	0.9197	4.0282
Methane		0.230	0.5909	2.5880
VOC[3]		0.0296	0.0760	0.3331
HAPS				
Benzene		0.0016	0.0041	0.0178
Ethylbenzene		2.48E-05	6.37E-05	2.79E-04
Formaldehyde		0.0205	0.0527	0.2307
Naphthalene		9.71E-05	2.49E-04	0.0011
Toluene		5.58E-04	0.0014	0.0063
Xylene		1.95E-04	5.01E-04	0.0022

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.0760	0.3331
TOTAL Uncontrolled NOx	0.2501	1.0953
TOTAL Uncontrolled HAPs	0.0590	0.2583
TOTAL Uncontrolled TAPs (Benzene)	0.0041	0.0178
TOTAL Uncontrolled Toluene	0.0014	0.0063
TOTAL Uncontrolled Ethylbenzene	0.0001	0.0003
TOTAL Uncontrolled Xylene	0.0005	0.0022
TOTAL Uncontrolled TAPs (Formaldehyde)	0.0527	0.2307
TOTAL CH_4 Emissions	0.5909	2.5880
TOTAL CO_{2e} Emissions	297.3582	1302.4289

Enter Any Notes Here:

1. Emission factors used for the 76 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 110 HP engine NOX and CO emissions are certification levels indicated on CSG-637 CARB document. See CSG-637 CARB document in Appendix N.
2. 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.
3. Hours of operation was calculated based on the 100% operation of the VRU.

Table 14

Thermoelectric Generator Emission
Balli Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

GPT 8550

Number of Units	2
Fuel Consumption[1] (scf/day)	1695
Thermoelectric Generator Input (MMBtu/hr)	0.09
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,224.7

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	0.014	0.062
CO	84	0.012	0.052
CO_2	120,000	16.950	74.241
Lead	0.0005	7.06E-08	3.09E-07
N_2O	2.2	3.11E-04	1.36E-03
PM (Total)	7.6	1.07E-03	4.70E-03
SO_2	0.6	8.48E-05	3.71E-04
TOC	11	1.55E-03	6.81E-03
Methane	2.3	3.25E-04	1.42E-03
VOC	5.5	7.77E-04	3.40E-03
HAPS			
2-Methylnaphthalene	2.40E-05	3.39E-09	1.48E-08
Benzene	2.10E-03	2.97E-07	1.30E-06
Dichlorobenzene	1.20E-03	1.70E-07	7.42E-07
Fluoranthene	3.00E-06	4.24E-10	1.86E-09
Fluorene	2.80E-06	3.96E-10	1.73E-09
Formaldehyde	7.50E-02	1.06E-05	4.64E-05
Hexane	1.80E+00	2.54E-04	1.11E-03
Naphthalene	6.10E-04	8.62E-08	3.77E-07
Phenanathrene	1.70E-05	2.40E-09	1.05E-08
Toluene	3.40E-03	4.80E-07	2.10E-06

	lb/hr	tpy
TOTAL Uncontrolled VOC	7.77E-04	3.40E-03
TOTAL Uncontrolled HAPs	2.66E-04	1.16E-03
TOTAL Uncontrolled TAPs (Benzene)	2.97E-07	1.30E-06
TOTAL Uncontrolled TAPs (Formaldehyde)	1.06E-05	4.64E-05
TOTAL CH_4 Emissions	3.25E-04	1.42E-03
TOTAL CO_{2e} Emissions	17.0507	74.6822

Enter any notes here:
1. Fuel Consumption based on manufacturer's data sheet
2. All Emission Factors based off AP-42 Sec 1.4 Natural Gas Combustion

Table 15

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

	Potential Emissions		Previous Permit Application Emissions		Change in Emissions	
Pollutant	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**	**Hourly PTE**	**Yearly PTE**
$PM_{2.5}$	0.2984	1.3070	1.2302	2.6959	-9.32E-01	-1.3890
PM_{10}	0.7405	2.0570	0.7077	1.8883	0.0328	0.1686
VOC (uncontrolled)	159.6487	709.8910	172.5007	758.1242	-12.8520	-48.2332
CO	15.7073	68.7981	8.7168	38.1797	6.9905	30.6183
NOx	6.1467	26.9224	3.9733	17.4033	2.1733	9.5191
SO2	0.0222	0.0972	0.0204	0.0893	1.82E-03	7.99E-03
Pb	1.82E-05	7.98E-05	1.83E-05	8.01E-05	-6.35E-08	-2.78E-07
HAPs	0.9850	5.7883	0.5405	2.3733	0.4446	3.4150
TAPs	0.0615	0.2699	0.0109	0.0479	5.06E-02	0.2220

Notes:
1. Change in emissions due to the increased production and the addition of two condensate storage tanks, two produced water tanks, one 550 Watt Thermoelectric Generator, 4 HP Ford VRU engines, 6 VRTs and removal of Kubota Engine and one enclosed combustor.

Bryan Research & Engineering, Inc.

ProMax® 3.2

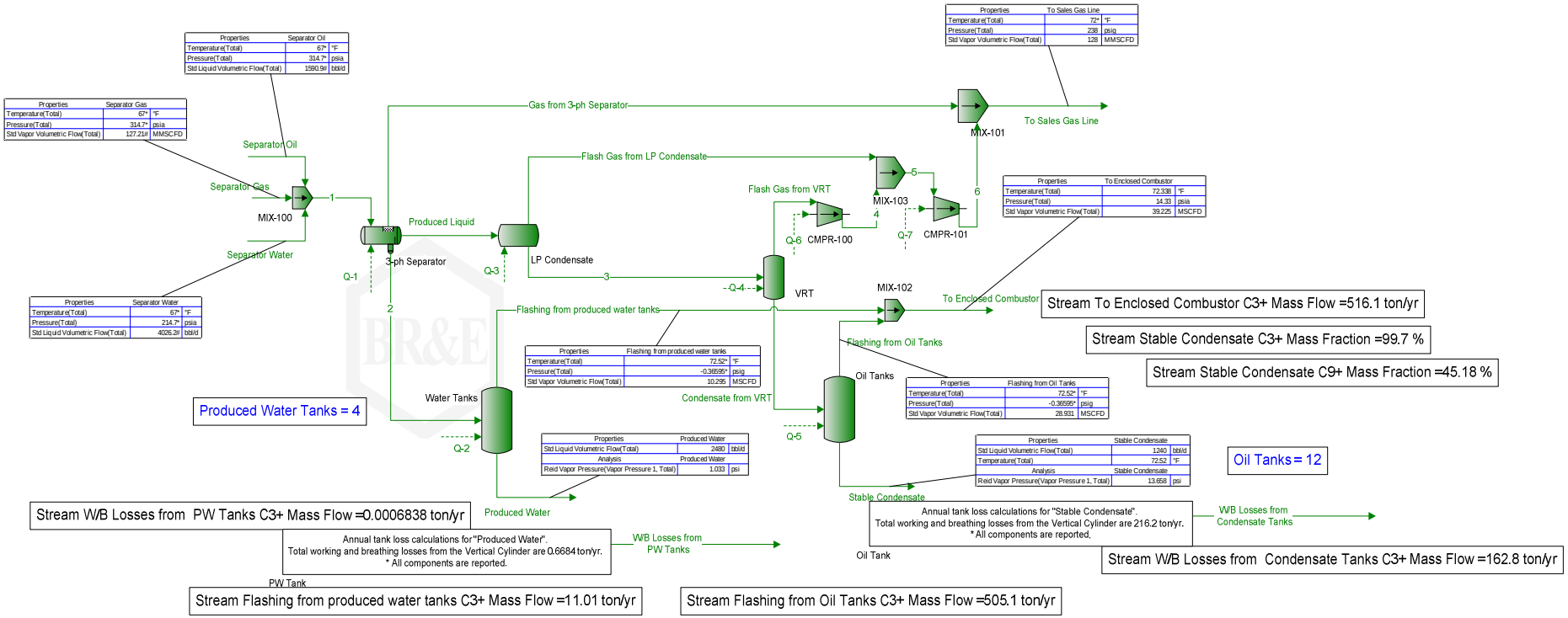
with

TSWEET® & PROSIM®

Simulation Report	
Client Name:	Antero Resources
Location:	DoddridgeCounty, WV
Job:	Balli Wel Pad

Project Name:	Antero Promax Model- VRT
File Name:	\\det-s1.cra.int\Shared\AirQuality\ANTERO RESOURCES\ProMax\Antero WV_VRT\ProMax Model\Antero Promax Model- VRT.pmx
ProMax Version:	4.0.16071.0

Report Created:	2/1/2017 17:42


Properties | Separator Oil
Temperature(Total) | 67* | °F
Pressure(Total) | 314.7* | psia
Std Liquid Volumetric Flow(Total) | 1590.9# | bbl/d
Properties | Separator Gas
Temperature(Total) | 67* | °F
Pressure(Total) | 314.7* | psia
Std Vapor Volumetric Flow(Total) | 127.2# | MMSCFD
Properties | Separator Water
Temperature(Total) | 67* | °F
Pressure(Total) | 214.7* | psia
Std Liquid Volumetric Flow(Total) | 4026.2# | bbl/d
Properties | To Sales Gas Line
Temperature(Total) | 72* | °F
Pressure(Total) | 238 | psig
Std Vapor Volumetric Flow(Total) | 128 | MMSCFD
Properties | To Enclosed Combustor
Temperature(Total) | 72.338 | °F
Pressure(Total) | 14.33 | psia
Std Vapor Volumetric Flow(Total) | 39.225 | MSCFD
Properties | Flashing from produced water tanks
Temperature(Total) | 72.52* | °F
Pressure(Total) | -0.36595* | psig
Std Vapor Volumetric Flow(Total) | 10.295 | MSCFD
Properties | Flashing from Oil Tanks
Temperature(Total) | 72.52* | °F
Pressure(Total) | -0.36595* | psig
Std Vapor Volumetric Flow(Total) | 28.931 | MSCFD
Properties | Produced Water
Std Liquid Volumetric Flow(Total) | 2480 | bbl/d
Analysis | Produced Water
Reid Vapor Pressure(Vapor Pressure 1, Total) | 1.033 | psi
Properties | Stable Condensate
Std Liquid Volumetric Flow(Total) | 1240 | bbl/d
Temperature(Total) | 72.52 | °F
Analysis | Stable Condensate
Reid Vapor Pressure(Vapor Pressure 1, Total) | 13.658 | psi
Separator Oil
Separator Gas
Separator Water
MIX-100
1
2
3-ph Separator
Q-1
Q-2
Q-3
Produced Liquid
Gas from 3-ph Separator
MIX-101
To Sales Gas Line
Flash Gas from LP Condensate
LP Condensate
3
Flash Gas from VRT
MIX-103
4
5
6
Q-6
CMPR-100
Q-7
CMPR-101
Q-4
VRT
MIX-102
To Enclosed Combustor
Flashing from produced water tanks
Flashing from Oil Tanks
Condensate from VRT
Oil Tanks
Q-5
Water Tanks
Produced Water Tanks = 4
Produced Water
Stable Condensate
Oil Tanks = 12
Stream To Enclosed Combustor C3+ Mass Flow =516.1 ton/yr
Stream Stable Condensate C3+ Mass Fraction =99.7 %
Stream Stable Condensate C9+ Mass Fraction =45.18 %
Stream W/B Losses from PW Tanks C3+ Mass Flow =0.0006838 ton/yr
Annual tank loss calculations for "Produced Water".
Total working and breathing losses from the Vertical Cylinder are 0.6684 ton/yr.
* All components are reported.
W/B Losses from PW Tanks
PW Tank
Annual tank loss calculations for "Stable Condensate".
Total working and breathing losses from the Vertical Cylinder are 216.2 ton/yr.
* All components are reported.
W/B Losses from Condensate Tanks
Oil Tank
Stream W/B Losses from Condensate Tanks C3+ Mass Flow =162.8 ton/yr
Stream Flashing from produced water tanks C3+ Mass Flow =11.01 ton/yr
Stream Flashing from Oil Tanks C3+ Mass Flow =505.1 ton/yr

Process Streams		Separator Gas	Separator Water	Separator Oil	1	as from 3-ph Separato	Produced Liquid	2	Produced Water	3	Gas from LP Conder	To Sales Gas Line
Phase: Total	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%
Water		0	100	0	8.18501	0.116935	0.0542629	99.9418	99.9965	0.0237230	0.219465	0.117093
H2S		0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.433923	0	0.0180005	0.396949	0.434745	0.0163034	0.000123300	2.50744E-06	0.000749750	0.100439	0.434191
CO2		0.170909	0	0.0150005	0.156374	0.170790	0.0517976	0.00181335	0.000845746	0.0166528	0.241909	0.170869
Methane		80.4764	0	4.77714	73.6241	80.5902	9.09086	0.0436529	0.00178805	1.24033	51.5574	80.5291
Ethane		13.6915	0	4.94815	12.5402	13.6765	8.71370	0.00990807	0.000602697	4.68979	30.4806	13.7062
Propane		2.79675	0	4.86315	2.57507	2.77989	5.88054	0.00127841	5.60730E-05	5.24221	9.33350	2.79554
Isobutene		0.520128	0	1.36904	0.480529	0.505749	2.95033	0.000933497	0.000154870	3.14835	1.87915	0.509433
n-Butane		0.905548	0	3.81511	0.841623	0.876766	6.47674	0.000328363	1.32464E-05	7.07162	3.25881	0.883244
Isopentane		0.246613	0	2.45607	0.234169	0.231155	3.63430	5.55071E-05	1.62657E-06	4.15296	0.828677	0.232827
n-Pentane		0.209811	0	3.46210	0.204033	0.195178	4.05896	1.78528E-05	2.06544E-07	4.67998	0.699656	0.196592
2-Methylpentane		0	0	1.49804	0.00524861	0.00429521	0.208321	5.16165E-07	8.31477E-09	0.244109	0.0147290	0.00432462
3-Methylpentane		0	0	1.04403	0.00365791	0.00291372	0.156596	8.75003E-07	3.42875E-08	0.183703	0.00996507	0.00293360
n-Hexane		0.548429	0	3.65811	0.514435	0.381006	26.1442	2.16981E-05	1.73740E-07	30.7415	1.27579	0.383523
Methylcyclopentane		0	0	0.276008	0.000967033	0.000714371	0.0494053	3.71113E-07	2.36890E-08	0.0580838	0.00246031	0.000719287
Benzene		0	0	0.0760023	0.000266284	0.000193591	0.0139322	9.48341E-06	8.15358E-06	0.0163833	0.000673480	0.000194935
2-Methylhexane		0	0	2.05306	0.00719318	0.00391753	0.567471	3.04533E-07	3.49303E-09	0.670110	0.0122524	0.00394091
3-Methylhexane		0	0	1.78305	0.00624717	0.00322723	0.517911	3.03329E-07	4.17209E-09	0.611793	0.0100694	0.00324639
n-Heptane		0	0	4.42513	0.0155041	0.00709504	1.41626	2.71422E-07	1.62910E-09	1.67408	0.0216015	0.00713561
Methylcyclohexane		0	0	2.33607	0.00818474	0.00365622	0.760427	1.71382E-06	1.09772E-07	0.898876	0.0115015	0.00367815
Toluene		0	0	0.617019	0.00216181	0.000908214	0.208709	2.98729E-05	2.45419E-05	0.246756	0.00289519	0.000913745
n-Octane		0	0	11.9694	0.0419363	0.00897641	5.29352	1.28322E-07	3.24654E-10	6.26749	0.0249405	0.00902082
Ethylbenzene		0	0	0.908027	0.00318140	0.000609929	0.411550	1.60811E-05	1.29715E-05	0.487305	0.00176369	0.000613124
p-Xylene		0	0	0.925028	0.00324096	0.000602981	0.421954	1.09617E-05	8.17610E-06	0.499638	0.00173224	0.000606114
o-Xylene		0	0	1.53505	0.00537824	0.000848192	0.721859	3.28085E-05	2.82492E-05	0.854856	0.00242459	0.000852554
n-Nonane		0	0	9.20628	0.0322555	0.00264167	4.68193	3.68693E-08	1.00055E-10	5.54621	0.00668546	0.00265292
C10+		0	0	31.9660	0.111997	0.000501875	17.4982	1.00442E-07	5.02074E-09	20.7328	0.000976501	0.000503215
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water		0	2034.89	0	2034.89	26.5363	0.0859923	2008.27	2008.24	0.0317290	0.0542632	26.6132
H2S		0	0	0	0	0	0	0	0	0	0	0
Nitrogen		98.6707	0	0.0156793	98.6863	98.6580	0.0258366	0.00247764	5.03571E-05	0.00100278	0.0248338	98.6838
CO2		38.8634	0	0.0130661	38.8764	38.7579	0.0820855	0.0364381	0.0169852	0.0222728	0.0598126	38.8356
Methane		18299.7	0	4.16111	18303.9	18288.6	14.4066	0.877179	0.0359097	1.65893	12.7477	18302.8
Ethane		3113.34	0	4.31007	3117.65	3103.65	13.8089	0.199097	0.0121040	6.27250	7.53639	3115.19
Propane		635.958	0	4.23603	640.194	630.850	9.31908	0.0256889	0.00112612	7.01136	2.30773	635.377
Isobutene		118.273	0	1.19250	119.465	114.771	4.67548	0.0187581	0.00311027	4.21086	0.464624	115.785
n-Butane		205.914	0	3.32314	209.238	198.967	10.2639	0.00659827	0.000266028	9.45817	0.805748	200.746
Isopentane		56.0779	0	2.13935	58.2172	52.4567	5.75940	0.00111538	3.26665E-05	5.55451	0.204892	52.9174
n-Pentane		47.7094	0	3.01565	50.7250	44.2923	6.43238	0.000358741	4.14803E-06	6.25939	0.172991	44.6819
2-Methylpentane		0	0	1.30487	1.30487	0.974724	0.330133	1.03720E-05	1.66986E-07	0.326491	0.00364179	0.982909
3-Methylpentane		0	0	0.909400	0.909400	0.661219	0.248163	1.75827E-05	6.88599E-07	0.245699	0.00246389	0.666756
n-Hexane		124.708	0	3.18638	127.895	86.4628	41.4316	0.000436009	3.48923E-06	41.1162	0.315443	87.1679
Methylcyclopentane		0	0	0.240416	0.240416	0.162114	0.0782943	7.45729E-06	4.75748E-07	0.0776860	0.000608317	0.163481
Benzene		0	0	0.0662015	0.0662015	0.0439321	0.0220789	0.000190563	0.000163749	0.0219123	0.000166519	0.0443052
2-Methylhexane		0	0	1.78831	1.78831	0.889016	0.899290	6.11940E-06	7.01509E-08	0.896261	0.00302943	0.895699
3-Methylhexane		0	0	1.55312	1.55312	0.732365	0.820751	6.09521E-06	8.37885E-08	0.818262	0.00248969	0.737847
n-Heptane		0	0	3.85450	3.85450	1.61010	2.24439	5.45406E-06	3.27173E-08	2.23905	0.00534102	1.62180
Methylcyclohexane		0	0	2.03483	2.03483	0.829717	1.20507	3.44383E-05	2.20455E-06	1.20223	0.00284377	0.835979
Toluene		0	0	0.537452	0.537452	0.206104	0.330748	0.000600278	0.000492877	0.330032	0.000715842	0.207678
n-Octane		0	0	10.4259	10.4259	2.03704	8.38882	2.57856E-06	6.52005E-09	8.38266	0.00616659	2.05027
Ethylbenzene		0	0	0.790934	0.790934	0.138413	0.652198	0.000323139	0.000260509	0.651762	0.000436076	0.139352
p-Xylene		0	0	0.805742	0.805742	0.136836	0.668686	0.000220270	0.000164202	0.668257	0.000428301	0.137759
o-Xylene		0	0	1.33710	1.33710	0.192483	1.14395	0.000659267	0.000567332	1.14336	0.000599485	0.193770
n-Nonane		0	0	8.01909	8.01909	0.599482	7.41961	7.40866E-07	2.00942E-09	7.41796	0.00165299	0.602962
C10+		0	0	27.8438	27.8438	0.113892	27.7299	2.01832E-06	1.00832E-07	27.7297	0.000241442	0.114372
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%
Water		0	100	0	7.28765	0.105560	0.0111069	99.9319	99.9942	0.00430423	0.146415	0.105616
H2S		0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.605440	0	0.00446920	0.549577	0.610262	0.00518914	0.000191711	3.89893E-06	0.000211528	0.104196	0.608982
CO2		0.374632	0	0.00585098	0.340125	0.376639	0.0259004	0.00442939	0.00206602	0.00738107	0.394257	0.376503
Methane		64.3032	0	0.679231	58.3739	64.7841	1.65701	0.0388687	0.00159221	0.200399	30.6296	64.6818
Ethane		20.5052	0	1.31868	18.6360	20.6068	2.97696	0.0165358	0.00100593	1.42023	33.9409	20.6346
Propane		6.14245	0	1.90060	5.61194	6.14242	2.94620	0.00312883	0.000137246	2.32806	15.2412	6.17191
Isobutene		1.45350	0	0.680779	1.33248	1.42188	1.88075	0.00290697	0.000482313	1.77901	3.90439	1.43106
n-Butane		2.62148	0	1.96529	2.41762	2.55353	4.27710	0.00105929	4.27354E-05	4.13948	7.01425	2.57028
Isopentane		0.886213	0	1.57054	0.834999	0.835695	2.97920	0.000222277	6.51404E-06	3.01767	2.21409	0.841047
n-Pentane		0.753964	0	2.21384	0.727540	0.705627	3.32732	7.14909E-05	8.27161E-07	3.40062	1.86936	0.710155
2-Methylpentane		0	0	1.14416	0.0223540	0.0185474	0.203970	2.46881E-06	3.97725E-08	0.211861	0.0470043	0.0186590
3-Methylpentane		0	0	0.797397	0.0155791	0.0125819	0.153326	4.18513E-06	1.64009E-07	0.159435	0.0318012	0.0126574
n-Hexane		2.35395	0	2.79394	2.19100	1.64524	25.5982	0.000103782	8.31058E-07	26.6804	4.07140	1.65475
Methylcyclopentane		0	0	0.205875	0.00402228	0.00301261	0.0472419	1.73351E-06	1.10662E-07	0.0492315	0.00766783	0.00303084
Benzene		0	0	0.0526164	0.00102799	0.000757734	0.0123648	4.11147E-05	3.53521E-05	0.0128885	0.00194815	0.000762368
2-Methylhexane		0	0	1.82329	0.0356225	0.0196700	0.646055	1.69366E-06	1.94280E-08	0.676251	0.0454650	0.0197711
3-Methylhexane		0	0	1.58350	0.0309376	0.0162040	0.589633	1.68696E-06	2.32049E-08	0.617399	0.0373647	0.0162868
n-Heptane		0	0	3.92989	0.0767802	0.0356243	1.61239	1.50951E-06	9.06092E-09	1.68942	0.0801568	0.0357986
Methylcyclohexane		0	0	2.03289	0.0397175	0.0179886	0.848316	9.33969E-06	5.98258E-07	0.888863	0.0418200	0.0180816
Toluene		0	0	0.503868	0.00984432	0.00419319	0.218490	0.000152769	0.000125516	0.228978	0.00987866	0.00421526
n-Octane		0	0	12.1178	0.236751	0.0513798	6.87020	8.13565E-07	2.05847E-09	7.21030	0.105502	0.0515916
Ethylbenzene		0	0	0.854394	0.0166927	0.00324471	0.496426	9.47572E-05	7.64403E-05	0.521036	0.00693399	0.00325903
p-Xylene		0	0	0.870390	0.0170052	0.00320775	0.508976	6.45918E-05	4.81811E-05	0.534223	0.00681036	0.00322176
o-Xylene		0	0	1.44438	0.0282195	0.00451223	0.870731	0.000193323	0.000166470	0.914028	0.00953235	0.00453170
n-Nonane		0	0	10.4649	0.204459	0.0169773	6.82260	2.62455E-07	7.12302E-10	7.16401	0.0317531	0.0170356
C10+		0	0	49.0414	0.958146	0.00435319	34.4144	9.65000E-07	4.82407E-08	36.1443	0.00625965	0.00436123
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water		0	36659.2	0	36659.2	478.059	1.54917	36179.5	36179.0	0.571607	0.977567	479.445
H2S		0	0	0	0	0	0	0	0	0	0	0
Nitrogen		2764.10	0	0.439231	2764.54	2763.75	0.723771	0.0694073	0.00141067	0.0280912	0.695680	2764.47
CO2		1710.36	0	0.575032	1710.93	1705.72	3.61254	1.60362	0.747510	0.980216	2.63232	1709.13
Methane		293572	0	66.7545	293639	293394	231.117	14.0721	0.576079	26.6132	204.504	293623
Ethane		93615.3	0	129.600	93744.9	93323.7	415.220	5.98665	0.363957	188.608	226.612	93670.6
Propane		28043.0	0	186.790	28229.8	27817.7	410.931	1.13277	0.0496569	309.170	101.761	28017.3
Isobutene		6635.86	0	66.9067	6702.76	6439.39	262.324	1.05245	0.174506	236.256	26.0683	6496.28
n-Butane		11968.2	0	193.148	12161.3	11564.4	596.561	0.383506	0.0154621	549.729	46.8319	11667.8
Isopentane		4045.95	0	154.352	4200.30	3784.69	415.534	0.0804734	0.00235685	400.751	14.7827	3817.93
n-Pentane		3442.17	0	217.576	3659.75	3195.64	464.088	0.0258827	0.000299276	451.607	12.4811	3223.74
2-Methylpentane		0	0	112.447	112.447	83.9972	28.4493	0.000893814	1.43901E-05	28.1355	0.313832	84.7026
3-Methylpentane		0	0	78.3679	78.3679	56.9808	21.3856	0.00151519	5.93402E-05	21.1732	0.212326	57.4580
n-Hexane		10746.8	0	274.588	11021.4	7450.96	3570.38	0.0375733	0.000300686	3543.20	27.1834	7511.73
Methylcyclopentane		0	0	20.2333	20.2333	13.6435	6.58921	0.000627602	4.00387E-05	6.53801	0.0511956	13.7585
Benzene		0	0	5.17112	5.17112	3.43162	1.72462	0.0148853	0.0127908	1.71161	0.0130071	3.46076
2-Methylhexane		0	0	179.192	179.192	89.0811	90.1106	0.000613176	7.02926E-06	89.8070	0.303555	89.7507
3-Methylhexane		0	0	155.626	155.626	73.3844	82.2409	0.000610752	8.39577E-06	81.9914	0.249472	73.9337

Process Streams	Condensate from VRT	g from produced wate	lashing from Oil Tank	o Enclosed Combusto	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW Ta	sses from Condensate Ta
Phase: Total	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction	%	%	%	%	%	%	%	%	%	%	%
Water	0.00735971	2.77365	0.152898	0.840714	0.221599	0.00351853	0.221599	0.220089	0.220089	93.3021	7.14074E-05
H2S	0	0	0	0	0	0	0	0	0	0	0
Nitrogen	1.99858E-05	0.214740	0.000735114	0.0569006	0.00957459	1.11156E-06	0.00957459	0.0738735	0.0738735	0.00376305	1.33548E-05
CO2	0.00359171	1.72098	0.0908219	0.518657	0.174597	0.00128946	0.174597	0.222230	0.222230	2.05890	0.0634138
Methane	0.103990	74.4262	3.40998	22.0482	14.9818	0.0167351	14.9818	40.8639	40.8639	3.62973	0.509685
Ethane	1.83741	16.5430	32.2929	28.1593	39.1827	1.03361	39.1827	33.0248	33.0248	0.967402	37.3753
Propane	3.87884	2.17304	27.4689	20.8300	21.7290	3.25623	21.7290	12.9575	12.9575	0.0198550	27.8505
Isobutene	2.96400	1.38434	7.91321	6.19971	5.37765	2.83337	5.37765	2.90199	2.90199	0.0169348	7.62167
n-Butane	6.86875	0.560206	14.3308	10.7167	9.52484	6.67181	9.52484	5.09078	5.09078	0.00115359	14.3237
Isopentane	4.28930	0.0957866	3.95477	2.94198	2.50427	4.29813	2.50427	1.31856	1.31856	5.17996E-05	3.38815
n-Pentane	4.89166	0.0313704	3.39375	2.51129	2.12010	4.93120	2.12010	1.11495	1.11495	4.84497E-06	2.86549
2-Methylpentane	0.260617	0.000902829	0.0732529	0.0542646	0.0444813	0.265562	0.0444813	0.0234276	0.0234276	7.79500E-08	0.0617593
3-Methylpentane	0.196406	0.00149460	0.0496303	0.0369971	0.0300875	0.200280	0.0300875	0.0158482	0.0158482	2.88184E-07	0.0417624
n-Hexane	32.9682	0.0382646	6.37597	4.71264	3.81470	33.6700	3.81470	2.01808	2.01808	1.15279E-06	5.54358
Methylcyclopentane	0.0622729	0.000617650	0.0123160	0.00924574	0.00742540	0.0635914	0.00742540	0.00391193	0.00391193	1.43087E-07	0.00953118
Benzene	0.0175708	0.00237222	0.00335998	0.00310074	0.00202260	0.0179459	0.00202260	0.00106792	0.00106792	3.33049E-05	0.00181898
2-Methylhexane	0.722568	0.000535171	0.0607098	0.0449169	0.0357605	0.740036	0.0357605	0.0191254	0.0191254	2.77194E-09	0.0145778
3-Methylhexane	0.659962	0.000531824	0.0499520	0.0369817	0.0292942	0.676062	0.0292942	0.0156901	0.0156901	1.08966E-08	0.0438324
n-Heptane	1.80737	0.000479620	0.106781	0.0788822	0.0622554	1.85225	0.0622554	0.0334873	0.0334873	3.10667E-09	0.0876887
Methylcyclohexane	0.970441	0.00285168	0.0572194	0.0429506	0.0334576	0.994544	0.0334576	0.0179207	0.0179207	2.13595E-07	0.0480418
Toluene	0.266467	0.00950169	0.0143729	0.0130945	0.00840519	0.273120	0.00840519	0.00450613	0.00450613	2.88265E-05	0.00796417
n-Octane	6.78006	0.000227545	0.121726	0.0898384	0.0691636	6.95579	0.0691636	0.0378698	0.0378698	1.82817E-10	0.0972520
Ethylbenzene	0.527195	0.00554087	0.00865252	0.00783587	0.00492664	0.540881	0.00492664	0.00268843	0.00268843	5.10166E-06	0.00528177
p-Xylene	0.540556	0.00496029	0.00848572	0.00756047	0.00483907	0.554598	0.00483907	0.00264057	0.00264057	2.87525E-06	0.00484247
o-Xylene	0.924991	0.00813343	0.0118779	0.0108952	0.00673662	0.949091	0.00673662	0.00368528	0.00368528	7.31415E-06	0.00610138
n-Nonane	6.00337	6.53658E-05	0.0324409	0.0239439	0.0178940	6.16096	0.0178940	0.00996244	0.00996244	1.66821E-11	0.0255055
C10+	22.4471	0.000169638	0.00450792	0.00336934	0.00233611	23.0394	0.00233611	0.00137400	0.00137400	2.11798E-11	0.00241327
Molar Flow	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water	0.00909165	0.0313517	0.00485688	0.0362085	0.0226374	0.00423477	0.0226374	0.0769006	0.0769006	0.00765112	7.66348E-07
H2S	0	0	0	0	0	0	0	0	0	0	0
Nitrogen	2.46890E-05	0.00242729	2.33512E-05	0.00245064	0.000978088	1.33783E-06	0.000978088	0.0258119	0.0258119	3.08584E-07	1.43324E-07
CO2	0.00443694	0.0194529	0.00288499	0.0223379	0.0178359	0.00155195	0.0178359	0.0776485	0.0776485	0.000168837	0.000680561
Methane	0.128461	0.841269	0.108319	0.949589	1.53046	0.0201418	1.53046	14.2781	14.2781	0.000297651	0.00546997
Ethane	2.26981	0.186993	1.02580	1.21279	4.00269	1.24401	4.00269	11.5391	11.5391	7.93305E-05	0.401114
Propane	4.79164	0.0245627	0.872560	0.897123	2.21972	3.91908	2.21972	4.52745	4.52745	1.62818E-06	0.298893
Isobutene	3.66151	0.0156478	0.251366	0.267014	0.549352	3.41014	0.549352	1.01398	1.01398	1.38871E-06	0.0817962
n-Butane	8.48516	0.00633224	0.455224	0.461556	0.973007	8.02994	0.973007	1.77875	1.77875	9.45987E-08	0.153723
Isopentane	5.29868	0.00108272	0.125625	0.126707	0.255823	5.17306	0.255823	0.460715	0.460715	4.24776E-09	0.0363618
n-Pentane	6.04281	0.000354593	0.107804	0.108158	0.216578	5.93500	0.216578	0.389570	0.389570	3.97306E-10	0.0307525
2-Methylpentane	0.321947	1.02050E-05	0.00232691	0.00233711	0.00454397	0.319620	0.00454397	0.00818576	0.00818576	6.39218E-12	0.000662804
3-Methylpentane	0.242626	1.68941E-05	0.00157652	0.00159342	0.00307358	0.241049	0.00307358	0.00553746	0.00553746	2.36322E-11	0.000448196
n-Hexane	40.7265	0.000432520	0.202535	0.202968	0.389689	40.5239	0.389689	0.705132	0.705132	9.45326E-11	0.0594940
Methylcyclopentane	0.0769274	6.98154E-06	0.000391221	0.000398203	0.000758539	0.0765362	0.000758539	0.00136686	0.00136686	1.17337E-11	0.000102289
Benzene	0.0217057	2.68141E-05	0.000106731	0.000133545	0.000206618	0.0215990	0.000206618	0.000373138	0.000373138	2.73113E-09	1.95213E-05
2-Methylhexane	0.892607	6.04925E-06	0.00192847	0.00193452	0.00365310	0.890679	0.00365310	0.00668253	0.00668253	2.27309E-13	0.000156450
3-Methylhexane	0.815269	6.01142E-06	0.00158674	0.00159276	0.00299253	0.813682	0.00299253	0.00548223	0.00548223	8.93563E-13	0.000470411
n-Heptane	2.23269	5.42134E-06	0.00339194	0.00339736	0.00635968	2.22930	0.00635968	0.0117007	0.0117007	2.54759E-13	0.000941079
Methylcyclohexane	1.19881	3.22337E-05	0.00181760	0.00184983	0.00341785	1.19699	0.00341785	0.00626161	0.00626161	1.75155E-11	0.000515587
Toluene	0.329173	0.000107401	0.000456561	0.000563963	0.000858629	0.328717	0.000858629	0.00157447	0.00157447	2.36388E-09	8.54719E-05
n-Octane	8.37559	2.57204E-06	0.00386666	0.00386923	0.00706538	8.37173	0.00706538	0.0132320	0.0132320	1.49917E-14	0.00104371
Ethylbenzene	0.651258	6.26307E-05	0.000274851	0.000337481	0.000503279	0.650984	0.000503279	0.000939354	0.000939354	4.18355E-10	5.66842E-05
p-Xylene	0.667763	5.60681E-05	0.000269552	0.000325620	0.000494333	0.667493	0.000494333	0.000922634	0.000922634	2.35781E-10	5.19696E-05
o-Xylene	1.14267	9.19355E-05	0.000377306	0.000469242	0.000688177	1.14229	0.000688177	0.00128766	0.00128766	5.99787E-10	6.54803E-05
n-Nonane	7.41613	7.38857E-07	0.00103050	0.00103124	0.00182795	7.41510	0.00182795	0.00348094	0.00348094	1.36800E-15	0.000273726
C10+	27.7295	1.91748E-06	0.000143196	0.000145113	0.000238644	27.7293	0.000238644	0.000480086	0.000480086	1.73682E-15	2.58994E-05
Mass Fraction	%	%	%	%	%	%	%	%	%	%	%
Water	0.00127191	2.44288	0.0590735	0.380936	0.101255	0.000599332	0.101255	0.129423	0.129423	90.3300	2.79753E-05
H2S	0	0	0	0	0	0	0	0	0	0	0
Nitrogen	5.37084E-06	0.294095	0.000441641	0.0400908	0.00680286	2.94418E-07	0.00680286	0.0675502	0.0675502	0.00566506	8.13566E-06
CO2	0.00151636	3.70282	0.0857206	0.574103	0.194890	0.000536563	0.194890	0.319242	0.319242	4.86946	0.0606905
Methane	0.0160035	58.3723	1.17320	8.89624	6.09595	0.00253843	6.09595	21.3985	21.3985	3.12928	0.177813
Ethane	0.530006	24.3189	20.8245	21.2963	29.8827	0.293860	29.8827	32.4139	32.4139	1.56324	24.4396
Propane	1.64079	4.68460	25.9767	23.1019	24.3019	1.35761	24.3019	18.6505	18.6505	0.0470506	26.7066
Isobutene	1.59531	3.79722	9.52166	8.74874	7.65261	1.50308	7.65261	5.31471	5.31471	0.0510611	9.29934
n-Butane	3.82979	1.59184	17.8633	15.6663	14.0412	3.66649	14.0412	9.65825	9.65825	0.00360324	18.1045
Isopentane	2.96872	0.337865	6.11925	5.33864	4.58264	2.93206	4.58264	3.10529	3.10529	0.000200842	5.31596
n-Pentane	3.38564	0.110652	5.25118	4.55710	3.87964	3.36393	3.87964	2.62576	2.62576	1.87854E-05	4.49591
2-Methylpentane	0.215447	0.00380363	0.135380	0.117615	0.0972224	0.216378	0.0972224	0.0658996	0.0658996	3.60993E-07	0.115738
3-Methylpentane	0.162365	0.00629677	0.0917230	0.0801887	0.0657619	0.163187	0.0657619	0.0445794	0.0445794	1.33461E-06	0.0782633
n-Hexane	27.2541	0.161209	11.7836	10.2143	8.33774	27.4342	8.33774	5.67667	5.67667	5.33865E-06	10.3888
Methylcyclopentane	0.0502755	0.00254129	0.0222290	0.0195707	0.0158500	0.0506019	0.0158500	0.0107465	0.0107465	6.47149E-07	0.0174438
Benzene	0.0131663	0.00905902	0.00562861	0.00609179	0.00400713	0.0132540	0.00400713	0.00272287	0.00272287	0.000139806	0.00308983
2-Methylhexane	0.694559	0.00262167	0.130462	0.113201	0.0908835	0.701123	0.0908835	0.0625544	0.0625544	1.49265E-08	0.0317657
3-Methylhexane	0.634380	0.00260528	0.107344	0.0932020	0.0744496	0.640513	0.0744496	0.0513185	0.0513185	5.86770E-08	0.0955128
n-Heptane	1.73731	0.00234954	0.229466	0.198801	0.158219	1.75486	0.158219	0.109529	0.109529	1.67290E-08	0.191078
Methylcyclohexane	0.914058	0.0136887	0.120487	0.106067	0.0833201	0.923292	0.0833201	0.0574350	0.0574350	1.12704E-06	0.102579
Toluene	0.235526	0.0428008	0.0284010	0.0303453	0.0196424	0.237936	0.0196424	0.0135524	0.0135524	0.000142736	0.0159577
n-Octane	7.42955	0.00127073	0.298198	0.258107	0.200381	7.51253	0.200381	0.141202	0.141202	1.12225E-09	0.241581
Ethylbenzene	0.536917	0.0287587	0.0197003	0.0209233	0.0132659	0.542935	0.0132659	0.00931647	0.00931647	2.91067E-05	0.0121941
p-Xylene	0.550524	0.0257453	0.0193205	0.0201880	0.0130301	0.556705	0.0130301	0.00915063	0.00915063	1.64043E-05	0.0111799
o-Xylene	0.942049	0.0422148	0.0270439	0.0290923	0.0181397	0.952696	0.0181397	0.0127710	0.0127710	4.17297E-05	0.0140864
n-Nonane	7.38626	0.000409860	0.0892309	0.0772383	0.0582085	7.47117	0.0582085	0.0417073	0.0417073	1.14981E-10	0.0711375
C10+	37.2744	0.00143559	0.0167348	0.0146691	0.0102564	37.7080	0.0102564	0.00776349	0.00776349	1.97023E-10	0.00908434
Mass Flow	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water	0.163789	0.564809	0.0874980	0.652307	0.407819	0.0762905	0.407819	1.38539	1.38539	0.137837	1.38060E-05
H2S	0	0	0	0	0	0	0	0	0	0	0
Nitrogen	0.000691623	0.0679966	0.000654146	0.0686507	0.0273996	3.74772E-05	0.0273996	0.723079	0.723079	8.64447E-06	4.01500E-06
CO2	0.195268	0.856114	0.126967	0.983081	0.784949	0.0683004	0.784949	3.41727	3.41727	0.00743044	0.0299511
Methane	2.06083	13.4960	1.73771	15.2337	24.5524	0.323123	24.5524	229.056	229.056	0.00477506	0.0877517
Ethane	68.2509	5.62269	30.8447	36.4674	120.357	37.4062	120.357	346.969	346.969	0.00238539	12.0611
Propane	211.290	1.08311	38.4761	39.5592	97.8799	172.814	97.8799	199.641	199.641	7.17958E-05	13.1799
Isobutene	205.434	0.877940	14.1032	14.9812	30.8221	191.330	30.8221	56.8904	56.8904	7.79156E-05	4.58928
n-Butane	493.176	0.368044	26.4586	26.8267	56.5533	466.718	56.5533	103.385	103.385	5.49828E-06	8.93471
Isopentane	382.294	0.0781166	9.06367	9.14178	18.4573	373.230	18.4573	33.2400	33.2400	3.06470E-07	2.62346
n-Pentane	435.981	0.0255834	7.77790	7.80348	15.6259	428.203	15.6259	28.1070	28.1070	2.86651E-08	2.21876
2-Methylpentane	27.7439	0.000879423	0.200522	0.201401	0.391578	27.5434	0.391578	0.705411	0.705411	5.50849E-10	0.0571174
3-Methylpentane	20.9084	0.00145585	0.135858	0.137313	0.264867	20.7725	0.264867	0.477193	0.477193	2.03651E-09	0.0386234
n-Hexane	3509.62	0.0372726	17.4535	17.4908	33.5816	3492.16	33.5816	60.7650	60.7650	8.14638E-09	5.12692
Methylcyclopentane	6.47417	0.000587563	0.0329250	0.0335125	0.0638382	6.44125	0.0638382	0.115034	0.115034	9.87502E-10	0.00860860
Benzene	1.69547	0.00209450	0.00833695	0.0104315	0.0161393	1.68714	0.0161393	0.0291465	0.0291465	2.13333E-07	0.00152485
2-Methylhexane	89.4410	0.000606147	0.193236	0.193843	0.366048	89.2478	0.366048	0.669603	0.669603	2.27768E-11	0.0156766
3-Methylhexane	81.6916	0.000602356	0.158995	0.159597	0.299858	81.5326	0.299858	0.549330	0.549330	8.95367E-11	0.0471361

n-Heptane		0	0	386.228	386.228	161.335	224.892	0.000546507	3.27834E-06	224.357	0.535180	162.507	223.720	0.000543229	0.339879	0.340422	0.637252	223.380	0.637252	1.17243	1.17243	2.55273E-11	0.0942980
Methylcyclohexane		0	0	199.792	199.792	81.4667	118.321	0.00338136	0.000216456	118.042	0.279218	82.0815	117.707	0.00316490	0.178463	0.181628	0.335585	117.528	0.335585	0.614803	0.614803	1.71978E-09	0.0506235
Toluene		0	0	49.5200	49.5200	18.9901	30.4746	0.0553087	0.0454129	30.4086	0.0659566	19.1351	30.3295	0.00989580	0.0420668	0.0519626	0.0791127	30.2875	0.0791127	0.145069	0.145069	2.17804E-07	0.00787525
n-Octane		0	0	1190.93	1190.93	232.688	958.243	0.000294545	7.44776E-07	957.539	0.704400	234.200	956.731	0.000293800	0.441683	0.441977	0.807068	956.290	0.807068	1.51147	1.51147	1.71248E-12	0.119222
Ethylbenzene		0	0	83.9695	83.9695	14.6946	69.2406	0.0343061	0.0276569	69.1943	0.0462960	14.7943	69.1409	0.00664919	0.0291795	0.0358287	0.0534306	69.1117	0.0534306	0.0997265	0.0997265	4.44146E-08	0.00601788
p-Xylene		0	0	85.5416	85.5416	14.5272	70.9910	0.0233849	0.0174325	70.9455	0.0454706	14.6252	70.8931	0.00595247	0.0286170	0.0345695	0.0524808	70.8644	0.0524808	0.0979514	0.0979514	2.50317E-08	0.00551736
o-Xylene		0	0	141.953	141.953	20.4349	121.448	0.0699911	0.0602308	121.384	0.0636444	20.5716	121.311	0.00976033	0.0400567	0.0498171	0.0730603	121.271	0.0730603	0.136705	0.136705	6.36764E-08	0.00695172
n-Nonane		0	0	1028.49	1028.49	76.8866	951.603	9.50198E-05	2.57718E-07	951.391	0.212005	77.3330	951.157	9.47621E-05	0.132166	0.132261	0.234444	951.025	0.234444	0.446449	0.446449	1.75452E-13	0.0351068
C10+		0	0	4819.77	4819.77	19.7147	4800.05	0.000349371	1.74540E-05	4800.01	0.0417936	19.7978	4799.97	0.000331917	0.0247872	0.0251191	0.0413093	4799.95	0.0413093	0.0831029	0.0831029	3.00643E-13	0.00448318

Process Streams		Separator Gas	Separator Water	Separator Oil	1	as from 3-ph Separato	Produced Liquid	2	Produced Water	3	Gas from LP Conden	To Sales Gas Line	Condensate from VRT	g from produced wate	lashing from Oil Tank	o Enclosed Combusto	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW T	asses from Condensate Tar
Phase: Total	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	Units																						
Temperature	°F	67.0	67.0	67.0	59.5	70.0	70.0	70.0	72.5	70.0	70.0	72	65	72.52	72.52	72.3375	65	72.52	84.4445	70	781.587	75.9425	75.9425
Pressure	psig	300	200	300	200	325	325	325	-0.365949	55	55	325	5	-0.365949	-0.365949	-0.365949	5	-0.365949	40	40	325	-14.2201	5.72424
Mole Fraction Vapor	%	100	0	0	91.3765	100	0	0	0	0	100	100	0	100	100	100	100	0	98.3360	99.9754	100	100	100
Mole Fraction Light Liquid	%	0	100	100	0.549160	0	100	100	100	100	0	0	100	0	0	0	0	100	1.66399	0.0245715	0	0	0
Mole Fraction Heavy Liquid	%	0	0	0	8.07435	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Molecular Weight	lb/lbmol	20.1	18.0	112.8	20.2	20.0	88.0	18.0	18.0	99.3	27.0	19.9729	104.243	20.4546	46.6285	39.7592	39.4271	105.763	39.4271	30.6357	30.6357	18.6080	45.9843
Mass Density	lb/ft^3	1.2	62.3	45.4	0.9	1.3	42.5	62.3	62.3	43.5	0.3	1.29133	44.0840	0.0515014	0.119180	0.101137	0.140596	43.9767	0.394080	0.304456	0.782797	0.00154120	0.167595
Molar Flow	lbmol/h	22739.2	2034.9	87.1	24861.2	22693.3	158.5	2009.4	2008.3	133.7	24.7	22728.2	123.533	1.13034	3.17654	4.30688	10.2155	120.356	10.2155	34.9407	34.9407	0.00820037	1.07321
Mass Flow	lb/h	456543.7	36659.2	9828.0	503030.9	452878.8	13947.8	36204.2	36181.1	13280.1	667.7	453949	12877.4	23.1206	148.117	171.238	402.766	12729.3	402.766	1070.43	1070.43	0.152593	49.3506
Vapor Volumetric Flow	MCFH	377.1	0.6	0.2	558.3	349.3	0.3	0.6	0.6	0.3	2.0	351.536	0.292110	0.448932	1.24281	1.69312	2.86470	0.289454	1.02204	3.51588	1.36745	0.0990088	0.294463
Liquid Volumetric Flow	Mbbl/d	1611.9	2.5	0.9	2386.3	1493.2	1.4	2.5	2.5	1.3	8.4	1502.67	1.24865	1.91900	5.31248	7.23739	12.2454	1.23730	4.36880	15.0289	5.84526	0.423221	1.25871
Std Vapor Volumetric Flow	MMSCFD	207.1	18.5	0.8	226.4	206.7	1.4	18.3	18.3	1.2	0.2	207.000	1.12509	0.0102947	0.0289307	0.0392254	0.0930385	1.09616	0.0930385	0.318226	0.318226	7.46858E-05	0.00977434
Std Liquid Volumetric Flow	Mbbl/d	93.4	2.5	0.9	96.8	92.9	1.4	2.5	2.5	1.3	0.1	93.0781	1.26009	0.00459119	0.0200921	0.0246833	0.0597863	1.24000	0.0597863	0.178776	0.178776	1.16409E-05	0.00680189
Compressibility		0.923	0.011	0.139	0.865	0.920	0.124	0.017	0.001	0.028	0.969	0.920849	0.00827163	0.996523	0.981669	0.986713	0.980953	0.00603431	0.937156	0.968254	0.998031	0.999551	0.974752
Specific Gravity		0.693	0.999	0.727		0.689	0.681	0.998	0.998	0.698	0.932	0.689611	0.706826	0.706241	1.60996	1.37278	1.36131	0.705106			1.05777	0.642485	1.58771
API Gravity			10.0	62.2			74.6	10.1	10.0	69.8			68.0005					67.4598					
Enthalpy	MMBtu/h	-770.5	-250.4	-8.3	-1029.3	-769.1	-12.8	-247.1	-246.9	-11.8	-0.9	-769.979	-11.3870	-0.0420361	-0.138757	-0.180793	-0.419321	-11.1758	-0.418995	-1.32047	-0.854452	-0.000836604	-0.0462238
Mass Enthalpy	Btu/lb	-1687.8	-6830.5	-848.5	-2046.2	-1698.3	-919.4	-6823.9	-6825.4	-891.2	-1350.2	-1696.18	-884.262	-1818.12	-936.806	-1055.80	-1041.10	-877.962	-1040.29	-1233.58	-798.231	-5482.60	-936.642
Mass Cp	Btu/(lb*°F)	0.5	1.0	0.5	0.5	0.5	0.5	1.0	1.0	0.5	0.5	0.531503	0.502519	0.472769	0.402436	0.411610	0.407656	0.506190	0.429893	0.436956	0.790326	0.438916	0.405340
Ideal Gas CpCv Ratio		1.258	1.326	1.049	1.261	1.259	1.062	1.326	1.326	1.055	1.200	1.25847	1.05299	1.25957	1.11942	1.13917	1.14257	1.05158	1.13838	1.17870	1.09037	1.32142	1.12076
Dynamic Viscosity	cP	0.0	1.0	0.6		0.0	0.3	1.0	1.0	0.4	0.0	0.0110949	0.473195	0.0107388	0.00821493	0.00873708	0.00860397	0.463624			0.0195779	0.0103272	0.00830822
Kinematic Viscosity	cSt	0.6	1.0	0.8		0.5	0.5	1.0	1.0	0.6	1.8	0.536368	0.670097	13.0172	4.30309	5.39304	3.82036	0.658146			1.56134	418.314	3.09475
Thermal Conductivity	Btu/(h*ft*°F)	0.0	0.3	0.1		0.0	0.1	0.3	0.3	0.1	0.0	0.0186585	0.0693084	0.0170749	0.0101980	0.0117004	0.0112035	0.0688543			0.0505926	0.0122324	0.0102837
Surface Tension	lbf/ft		0.005	0.001			0.001	0.005	0.005	0.001			0.00146541					0.00145154					
Net I.G. Heating Value	Btu/ft^3	1101.5	0.0	5673.5	1027.3	1094.2	4464.9	0.6	0.0	5022.3	1449.4	1095.05	5266.34	1059.62	2431.95	2071.78	2071.78	5341.15	2071.78	1631.40	1631.40	49.6551	2402.88
Net Liquid Heating Value	Btu/lb	20764.8	-1059.8	18913.6	19138.2	20753.2	19091.5	-1045.8	-1058.9	19032.7	20260.2	20751.6	19009.0	19575.9	19633.8	19626.0	19791.3	19001.7	19791.3	20083.8	20083.8	49.2186	19670.9
Gross I.G. Heating Value	Btu/ft^3	1215.3	50.3	6090.0	1137.0	1207.6	4806.4	51.0	50.3	5401.4	1587.7	1208.46	5661.76	1170.00	2638.32	2252.96	2253.25	5741.55	2253.25	1782.28	1782.28	101.782	2607.24
Gross Liquid Heating Value	Btu/lb	22916.7	0.0	20313.3	21195.7	22908.4	20563.5	14.6	0.8	20481.1	22202.9	22906.2	20448.1	21623.7	21313.2	21355.1	21537.8	20438.0	21537.8	21952.6	21952.6	1112.3	21357.2

Process Streams		Separator Gas	Separator Water	Separator Oil	1	as from 3-ph Separato	Produced Liquid	2	Produced Water	3	Gas from LP Conden	To Sales Gas Line	Condensate from VRT	g from produced wate	lashing from Oil Tank	o Enclosed Combusto	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW T	asses from Condensate Tar
Phase: Vapor	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		0			0.124544	0.116935	0.116935	0.116935	2.77365	0.219465	0.219465	0.117093	0.221599	2.77365	0.152898	0.840714	0.221599	0.152898	0.225172	0.220140	0.220089	93.3021	7.14074E-05
H2S		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.433923			0.434343	0.434745	0.434745	0.434745	0.214740	0.100439	0.100439	0.434191	0.00957459	0.214740	0.000735114	0.0569006	0.00957459	0.000735114	0.00973563	0.0738916	0.0738735	0.00376305	1.33548E-05
CO2		0.170909			0.170790	0.170790	0.170790	0.170790	1.72098	0.241909	0.241909	0.170869	0.174597	1.72098	0.0908219	0.518657	0.174597	0.0908219	0.177399	0.222281	0.222230	2.05890	0.0634138
Methane		80.4764			80.5335	80.5902	80.5902	80.5902	74.4262	51.5574	51.5574	80.5291	14.9818	74.4262	3.40998	22.0482	14.9818	3.40998	15.2303	40.8738	40.8639	3.62973	0.509685
Ethane		13.6915			13.6841	13.6765	13.6765	13.6765	16.5430	30.4806	30.4806	13.7062	39.1827	16.5430	32.2929	28.1593	39.1827	32.2929	39.7662	33.0319	33.0248	0.967402	37.3753
Propane		2.79675			2.78918	2.77989	2.77989	2.77989	2.17304	9.33350	9.33350	2.79554	21.7290	2.17304	27.4689	20.8300	21.7290	27.4689	21.9548	12.9593	12.9575	0.0198550	27.8505
Isobutene		0.520128			0.510171	0.505749	0.505749	0.505749	1.38434	1.87915	1.87915	0.509433	5.37765	1.38434	7.91321	6.19971	5.37765	7.91321	5.37081	2.90174	2.90199	0.0169348	7.62167
n-Butane		0.905548			0.885976	0.876766	0.876766	0.876766	0.560206	3.25881	3.25881	0.883244	9.52484	0.560206	14.3308	10.7167	9.52484	14.3308	9.46330	5.08985	5.09078	0.00115359	14.3237
Isopentane		0.246613			0.235158	0.231155	0.231155	0.231155	0.0957866	0.828677	0.828677	0.232827	2.50427	0.0957866	3.95477	2.94198	2.50427	3.95477	2.42355	1.31759	1.31856	5.17996E-05	3.38815
n-Pentane		0.209811			0.199215	0.195178	0.195178	0.195178	0.0313704	0.699656	0.699656	0.196592	2.12010	0.0313704	3.39375	2.51129	2.12010	3.39375	2.02184	1.11376	1.11495	4.84497E-06	2.86549
2-Methylpentane		0			0.00442664	0.00429521	0.00429521	0.00429521	0.000902829	0.0147290	0.0147290	0.00432462	0.0444813	0.000902829	0.0732529	0.0542646	0.0444813	0.0732529	0.0388791	0.0233555	0.0234276	7.79500E-08	0.0617593
3-Methylpentane		0			0.00300770	0.00291372	0.00291372	0.00291372	0.00149460	0.00996507	0.00996507	0.00293360	0.0300875	0.00149460	0.0496303	0.0369971	0.0300875	0.0496303	0.0259009	0.0157935	0.0158482	2.88184E-07	0.0417624
n-Hexane		0.548429			0.392526	0.381006	0.381006	0.381006	0.0382646	1.27579	1.27579	0.383523	3.81470	0.0382646	6.37597	4.71264	3.81470	6.37597	3.14836	2.00882	2.01808	1.15279E-06	5.54358
Methylcyclopentane		0			0.000741114	0.000714371	0.000714371	0.000714371	0.000617650	0.00246031	0.00246031	0.000719287	0.00742540	0.000617650	0.0123160	0.00924574	0.00742540	0.0123160	0.00613266	0.00389419	0.00391193	1.43087E-07	0.00953118
Benzene		0			0.000200496	0.000193591	0.000193591	0.000193591	0.00237222	0.000673480	0.000673480	0.000194935	0.00202260	0.00237222	0.00335998	0.00310074	0.00202260	0.00335998	0.00169604	0.00106322	0.00106792	3.33049E-05	0.00181898
2-Methylhexane		0			0.00399406	0.00391753	0.00391753	0.00391753	0.000535171	0.0122524	0.0122524	0.00394091	0.0357605	0.000535171	0.0607098	0.0449169	0.0357605	0.0607098	0.0240651	0.0189222	0.0191254	2.77194E-09	0.0145778
3-Methylhexane		0			0.00328053	0.00322723	0.00322723	0.00322723	0.000531824	0.0100694	0.0100694	0.00324639	0.0292942	0.000531824	0.0499520	0.0369817	0.0292942	0.0499520	0.0190616	0.0155046	0.0156901	1.08966E-08	0.0438324
n-Heptane		0			0.00713434	0.00709504	0.00709504	0.00709504	0.000479620	0.0216015	0.0216015	0.00713561	0.0622554	0.000479620	0.106781	0.0788822	0.0622554	0.106781	0.0375787	0.0329912	0.0334873	3.10667E-09	0.0876887
Methylcyclohexane		0			0.00372122	0.00365622	0.00365622	0.00365622	0.00285168	0.0115015	0.0115015	0.00367815	0.0334576	0.00285168	0.0572194	0.0429506	0.0334576	0.0572194	0.0198095	0.0176467	0.0179207	2.13595E-07	0.0480418
Toluene		0			0.000921310	0.000908214	0.000908214	0.000908214	0.00950169	0.00289519	0.00289519	0.000913745	0.00840519	0.00950169	0.0143729	0.0130945	0.00840519	0.0143729	0.00513875	0.00443697	0.00450613	2.88265E-05	0.00796417
n-Octane		0			0.00845844	0.00897641	0.00897641	0.00897641	0.000227545	0.0249405	0.0249405	0.00902082	0.0691636	0.000227545	0.121726	0.0898384	0.0691636	0.121726	0.0227407	0.0360815	0.0378698	1.82817E-10	0.0972520
Ethylbenzene		0			0.000579136	0.000609929	0.000609929	0.000609929	0.00554087	0.00176369	0.00176369	0.000613124	0.00492664	0.00554087	0.00865252	0.00783587	0.00492664	0.00865252	0.00165275	0.00255740	0.00268843	5.10166E-06	0.00528177
p-Xylene		0			0.000572315	0.000602981	0.000602981	0.000602981	0.00496029	0.00173224	0.00173224	0.000606114	0.00483907	0.00496029	0.00848572	0.00756047	0.00483907	0.00848572	0.00157560	0.00250770	0.00264057	2.87525E-06	0.00484247
o-Xylene		0			0.000796090	0.000848192	0.000848192	0.000848192	0.00813343	0.00242459	0.00242459	0.000852554	0.00673662	0.00813343	0.0118779	0.0108952	0.00673662	0.0118779	0.00190447	0.00345789	0.00368528	7.31415E-06	0.00610138
n-Nonane		0			0.00228631	0.00264167	0.00264167	0.00264167	6.53658E-05	0.00668546	0.00668546	0.00265292	0.0178940	6.53658E-05	0.0324409	0.0239439	0.0178940	0.0324409	0.00238042	0.00854709	0.00996244	1.66821E-11	0.0255055
C10+		0			0.000341141	0.000501875	0.000501875	0.000501875	0.000169638	0.000976501	0.000976501	0.000503215	0.00233611	0.000169638	0.00450792	0.00336934	0.00233611	0.00450792	1.78215E-05	0.000273633	0.00137400	2.11798E-11	0.00241327
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water		0			28.2931	26.5363	0	0	0	0	0.0542632	26.6132	0	0.0313517	0.00485688	0.0362085	0.0226374	0	0.0226196	0.0768995	0.0769006	0.00765112	7.66348E-07
H2S		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		98.6707			98.6709	98.6580	0	0	0	0	0.0248338	98.6838	0	0.00242729	2.33512E-05	0.00245064	0.000978088	0	0.000977990	0.0258119	0.0258119	3.08584E-07	1.43324E-07
CO2		38.8634			38.7988	38.7579	0	0	0	0	0.0598126	38.8356	0	0.0194529	0.00288499	0.0223379	0.0178359	0	0.0178206	0.0776475	0.0776485	0.000168837	0.000680561
Methane		18299.7			18295.0	18288.6	0	0	0	0	12.7477	18302.8	0	0.841269	0.108319	0.945989	1.53046	0	1.52996	14.2781	14.2781	0.000297651	0.00546997
Ethane		3113.34			3108.66	3103.65	0	0	0	0	7.53639	3115.19	0	0.186993	1.02580	1.21279	4.00269	0	3.99471	11.5387	11.5391	7.93305E-05	0.401114
Propane		635.958			633.626	630.850	0	0	0	0	2.30773	635.377	0	0.0245627	0.872560	0.897123	2.21972	0	2.20546	4.52694	4.52745	1.62818E-06	0.298893
Isobutene		118.273			115.897	114.771	0	0	0	0	0.464624	115.785	0	0.0156478	0.251366	0.267014	0.549352	0	0.539523	1.01364	1.01398	1.38871E-06	0.0817962
n-Butane		205.914			201.270	198.967	0	0	0	0	0.805748	200.746	0	0.00633224	0.455224	0.461556	0.973007	0	0.950634	1.77799	1.77875	9.45987E-08	0.153723
Isopentane		56.0779			53.4215	52.4567	0	0	0	0	0.204892	52.9174	0	0.00108272	0.125625	0.126707	0.255823	0	0.243457	0.460261	0.460715	4.24776E-09	0.0363618
n-Pentane		47.7094			45.2563	44.2923	0	0	0	0	0.172991	44.6819	0	0.00035493	0.107804	0.108158	0.216578	0	0.203104	0.389058	0.389570	3.97306E-10	0.0307525
2-Methylpentane		0			1.00561	0.974724	0	0	0	0	0.0364179	0.982909	0	1.02050E-05	0.00232691	0.00233711	0.00454397	0	0.00390559	0.00815855	0.00818576	6.39218E-12	0.000662804
3-Methylpentane		0			0.683268	0.661219	0	0	0	0	0.00246389	0.666756	0	1.68941E-05	0.00157652	0.00159342	0.00307358	0	0.00260186	0.00551698	0.00553746	2.36322E-11	0.000448196
n-Hexane		124.708			89.1713	86.4628	0	0	0	0	0.315443	87.1679	0	0.000432520	0.202535	0.202968	0.389689	0	0.316268	0.701723	0.705132	9.45326E-11	0.0594940
Methylcyclopentane		0			0.168361	0.162114	0	0	0	0	0.000608317	0.163481	0	6.98154E-06	0.000391221	0.000398203	0.000758539	0	0.000616055	0.00136032	0.00136686	1.17337E-11	0.000102289
Benzene		0			0.0455473	0.0439321	0	0	0	0	0.000166519	0.0443052	0	2.68141E-05	0.000106731	0.000133545	0.000206618	0	0.000170375	0.000371406	0.000373138	2.73113E-09	1.95213E-05
2-Methylhexane		0			0.907342	0.889016	0	0	0	0	0.00302943	0.895699	0	6.04925E-06	0.00192847	0.00193452	0.00365310	0	0.00241746	0.00660991	0.00668253	2.27309E-13	0.000156450
3-Methylhexane		0			0.745248	0.732365	0	0	0	0	0.00248969	0.737847	0	6.01142E-06	0.00158674	0.00159276	0.00299253	0	0.00191483	0.00541606	0.00548223	8.93563E-13	0.000470411
n-Heptane		0			1.62073	1.61010	0	0	0	0	0.00534102	1.62180	0	5.42134E-06	0.00339194	0.00339736	0.00635968	0	0.00377496	0.0115245	0.0117007	2.54759E-13	0.000941079
Methylcyclohexane		0			0.845360	0.829717	0	0	0	0	0.00284377	0.835979	0	3.22337E-05	0.00181760	0.00184983	0.00341785	0	0.00198996	0.00616435	0.00626161	1.75155E-11	0.000515587

Toluene		0			0.209297	0.206104	0	0	0	0	0.000715842	0.207678	0	0.000107401	0.000456561	0.000563963	0.000858629	0	0.000516212	0.00154993	0.00157447	2.36388E-09	8.54719E-05	
n-Octane		0			1.92153	2.03704	0	0	0	0	0.00616659	2.05027	0	2.57204E-06	0.00386666	0.00386923	0.00706538	0	0.00228441	0.0126040	0.0132320	1.49917E-14	0.00104371	
Ethylbenzene		0			0.131564	0.138413	0	0	0	0	0.000436076	0.139352	0	6.26307E-05	0.000274851	0.000337481	0.000503279	0	0.000166026	0.000893354	0.000939354	4.18355E-10	5.66842E-05	
p-Xylene		0			0.130015	0.136836	0	0	0	0	0.000428301	0.137759	0	5.60681E-05	0.000269552	0.000325620	0.000494333	0	0.000158277	0.000875990	0.000922634	2.35781E-10	5.19696E-05	
o-Xylene		0			0.180850	0.192483	0	0	0	0	0.000599485	0.193770	0	9.19355E-05	0.000377306	0.000469242	0.000688177	0	0.000191313	0.00120791	0.00128766	5.99787E-10	6.54803E-05	
n-Nonane		0			0.519387	0.599482	0	0	0	0	0.00165299	0.602962	0	7.38857E-07	0.00103050	0.00103124	0.00182795	0	0.00023912	0.00298568	0.00348094	1.36800E-15	0.00027326	
C10+		0			0.0774979	0.113892	0	0	0	0	0.000241442	0.114372	0	1.91748E-06	0.000143196	0.000145113	0.000238644	0	1.79025E-06	9.55856E-05	0.000480086	1.73682E-15	2.58994E-05	
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Water		0			0.112310	0.105560	0.105560	0.105560	2.44288	0.146415	0.146415	0.105616	0.101255	2.44288	0.0590735	0.380936	0.101255	0.0590735	0.104445	0.129509	0.129423	90.3300	2.79753E-05	
H2S		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Nitrogen		0.605440			0.609051	0.610262	0.610262	0.610262	0.294095	0.104196	0.104196	0.608982	0.00680286	0.294095	0.000441641	0.0400908	0.00680286	0.000441641	0.00702202	0.0675961	0.0675502	0.00566506	8.13566E-06	
CO2		0.374632			0.376239	0.376639	0.376639	0.376639	3.70282	0.394257	0.394257	0.376503	0.194890	3.70282	0.0857206	0.574103	0.194890	0.0857206	0.201015	0.319455	0.319242	4.86946	0.0606905	
Methane		64.3032			64.6701	64.7841	64.7841	64.7841	58.3723	30.6296	30.6296	64.6818	6.09595	58.3723	1.17320	8.89624	6.09595	1.17320	6.29088	21.4130	21.3985	3.12928	0.177813	
Ethane		20.5052			20.5964	20.6068	20.6068	20.6068	24.3189	33.9409	33.9409	20.6346	29.8827	24.3189	20.8245	21.2963	29.8827	20.8245	30.7869	32.4350	32.4139	1.56324	24.4396	
Propane		6.14245			6.15641	6.14242	6.14242	6.14242	4.68460	15.2412	15.2412	6.17191	24.3019	4.68460	25.9767	23.1019	24.3019	25.9767	24.9262	18.6611	18.6505	0.0470506	26.7066	
Isobutene		1.45350			1.43279	1.42188	1.42188	1.42188	3.79722	3.90439	3.90439	1.43106	7.65261	3.79722	9.52166	8.74874	7.65261	9.52166	7.75859	5.31657	5.31471	0.0510611	9.29934	
n-Butane		2.62148			2.57763	2.55353	2.55353	2.55353	1.59184	7.01425	7.01425	2.57028	14.0412	1.59184	17.8633	15.6663	14.0412	17.8633	14.1617	9.66069	9.65825	0.00360324	18.1045	
Isopentane		0.886213			0.849266	0.835695	0.835695	0.835695	0.337865	2.21409	2.21409	0.841047	4.58264	0.337865	6.11925	5.33864	4.58264	6.11925	4.50207	3.10435	3.10529	0.000200842	5.31596	
n-Pentane		0.753964			0.719461	0.705627	0.705627	0.705627	0.110652	1.86936	1.86936	0.710155	3.87964	0.110652	5.25118	4.55710	3.87964	5.25118	3.75585	2.62410	2.62576	1.87854E-05	4.49591	
2-Methylpentane		0			0.0190947	0.0185474	0.0185474	0.0185474	0.00380363	0.0470043	0.0470043	0.0186590	0.0972224	0.00380363	0.135380	0.117615	0.0972224	0.135380	0.0862642	0.0657253	0.0658996	3.60993E-07	0.115738	
3-Methylpentane		0			0.0129740	0.0125819	0.0125819	0.0125819	0.00629677	0.0318012	0.0318012	0.0126574	0.0657619	0.00629677	0.0917230	0.0801887	0.0657619	0.0917230	0.0574684	0.0444448	0.0445794	1.33461E-06	0.0782633	
n-Hexane		2.35395			1.69320	1.64524	1.64524	1.64524	0.161209	4.07140	4.07140	1.65475	8.33774	0.161209	11.7836	10.2143	8.33774	11.7836	6.98554	5.65308	5.67667	5.33865E-06	10.3888	
Methylcyclopentane		0			0.00312208	0.00301261	0.00301261	0.00301261	0.00254129	0.00766783	0.00766783	0.00303084	0.0158500	0.00254129	0.0222290	0.0195707	0.0158500	0.0222290	0.0132887	0.0107024	0.0107465	6.47149E-07	0.0174438	
Benzene		0			0.000783932	0.000757734	0.000757734	0.000757734	0.00905902	0.00194815	0.00194815	0.000762368	0.00400713	0.00905902	0.00562861	0.00609179	0.00400713	0.00562861	0.00341102	0.00271208	0.00272287	0.000139806	0.00308983	
2-Methylhexane		0			0.0200330	0.0196700	0.0196700	0.0196700	0.00262167	0.0454650	0.0454650	0.0197711	0.0908835	0.00262167	0.130462	0.113201	0.0908835	0.130462	0.0820864	0.0619167	0.0625544	1.49265E-08	0.0317657	
3-Methylhexane		0			0.0164542	0.0162040	0.0162040	0.0162040	0.00260528	0.0373647	0.0373647	0.0162868	0.0744496	0.00260528	0.107344	0.0932020	0.0744496	0.107344	0.0491777	0.0507337	0.0513185	5.86770E-08	0.0955128	
n-Heptane		0			0.0357837	0.0356243	0.0356243	0.0356243	0.00234954	0.0801568	0.0801568	0.0357986	0.158219	0.00234954	0.229466	0.198801	0.158219	0.229466	0.0969504	0.107953	0.109529	1.67290E-08	0.191078	
Methylcyclohexane		0			0.0182890	0.0179886	0.0179886	0.0179886	0.0136887	0.0418200	0.0418200	0.0180816	0.0833201	0.0136887	0.120487	0.106067	0.0833201	0.120487	0.0500789	0.0565814	0.0574350	1.12704E-06	0.102579	
Toluene		0			0.00424915	0.00419319	0.00419319	0.00419319	0.0428008	0.00987866	0.00987866	0.00421526	0.0196424	0.0428008	0.0284010	0.0303453	0.0196424	0.0284010	0.0121907	0.0133502	0.0133524	0.000142736	0.0159577	
n-Octane		0			0.0483638	0.0513798	0.0513798	0.0513798	0.00127073	0.105502	0.105502	0.0515916	0.200381	0.00127073	0.298198	0.258107	0.200381	0.298198	0.0668822	0.134592	0.141202	1.12225E-09	0.241581	
Ethylbenzene		0			0.00307764	0.00324471	0.00324471	0.00324471	0.0287587	0.00693399	0.00693399	0.00325903	0.0132659	0.0287587	0.0197003	0.0209233	0.0132659	0.0197003	0.00451773	0.00886628	0.00931647	2.91067E-05	0.0121941	
p-Xylene		0			0.00304139	0.00320775	0.00320775	0.00320775	0.0257453	0.00681036	0.00681036	0.00322176	0.0130301	0.0257453	0.0193205	0.0201880	0.0130301	0.0193205	0.00430685	0.00869395	0.00915063	1.64043E-05	0.0111799	
o-Xylene		0			0.00423057	0.00451223	0.00451223	0.00451223	0.0422148	0.00953235	0.00953235	0.00453170	0.0181397	0.0422148	0.0270439	0.0290923	0.0181397	0.0270439	0.00520580	0.0119882	0.0127710	4.17297E-05	0.0140864	
n-Nonane		0			0.0146779	0.0169773	0.0169773	0.0169773	0.000409860	0.0317531	0.0317531	0.0170356	0.0582085	0.000409860	0.0892309	0.0772383	0.0582085	0.0892309	0.00786066	0.0357976	0.0417073	1.14981E-10	0.0711375	
C10+		0			0.00295588	0.00435319	0.00435319	0.00435319	0.00143559	0.00625965	0.00625965	0.00436123	0.0102564	0.00143559	0.0167348	0.0146691	0.0102564	0.0167348	7.94277E-05	0.00154677	0.00776349	1.97023E-10	0.00908434	
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	
Water		0			509.707	478.059	0	0	0	0	0.977567	479.445	0	0.564809	0.0874980	0.652307	0.407819	0	0.407498	1.38537	1.38539	0.137837	1.38060E-05	
H2S		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Nitrogen		2764.10			2764.11	2763.75	0	0	0	0	0.695680	2764.47	0	0.0679966	0.000654146	0.0686507	0.0273996	0	0.0273968	0.723078	0.723079	8.64447E-06	4.01500E-06	
CO2		1710.36			1707.52	1705.72	0	0	0	0	2.63232	1709.13	0	0.856114	0.126967	0.983081	0.784949	0	0.784274	3.41723	3.41727	0.0074344	0.0299511	
Methane		293572			293497	293394	0	0	0	0	204.504	293623	0	13.4960	1.73771	15.2337	24.5524	0	24.5443	229.055	229.056	0.00477506	0.0877517	
Ethane		93615.3			93474.5	93323.7	0	0	0	0	226.612	93670.6	0	5.62269	30.8447	36.4674	120.357	0	120.117	346.958	346.969	0.00238539	12.0611	
Propane		28043.0			27940.1	27817.7	0	0	0	0	101.761	28017.3	0	1.08311	38.4761	39.5592	97.8799	0	97.2511	199.618	199.641	7.17958E-05	13.1799	
Isobutene		6635.86			6502.56	6439.39	0	0	0	0	26.0683	6496.28	0	0.877940	14.1032	14.9812	30.8221	0	30.2707	56.8716	56.8904	7.79156E-05	4.58928	
n-Butane		11968.2			11698.2	11564.4	0	0	0	0	46.8319	11667.8	0	0.368044	26.4586	26.8267	56.5533	0	55.2529	103.341	103.385	5.49828E-06	8.93471	
Isopentane		4045.95			3854.29	3784.69	0	0	0	0	14.7827	3817.93	0	0.0781166	9.06367	9.14178	18.4573	0	17.5651	33.2073	33.2400	3.06470E-07	2.62346	
n-Pentane		3442.17			3265.19	3195.64	0	0	0	0	12.4811	3223.74	0	0.0255834	7.77790	7.80348	15.6259	0	14.6537	28.0701	28.1070	2.86651E-08	2.21876	
2-Methylpentane		0			86.6591	83.9972	0	0	0	0	0.313832	84.7026	0	0.000879423	0.200522	0.201401	0.391578	0	0.336565	0.703066	0.705411	5.50849E-10	0.0571174	
3-Methylpentane		0			58.8809	56.9808	0	0	0	0	0.212326	57.4580	0	0.00145585	0.135858	0.137313	0.264867	0	0.224217	0.475428	0.477193	2.03651E-09	0.0386234	
n-Hexane		10746.8			7684.37	7450.96	0	0	0	0	27.1834	7511.73	0	0.0372726	17.4535	17.4908	33.5816	0	27.2545	60.4712	60.7650	8.14638E-09	5.12692	
Methylcyclopentane		0			14.1692	13.6435	0	0	0	0	0.0511956	13.7585	0	0.000587563	0.0329250	0.0335125	0.0638382	0	0.0518469	0.114484	0.115034	9.87502E-10	0.00860860	
Benzene		0			3.55778	3.43162	0	0	0	0	0.0130071	3.46076	0	0.00209450	0.00833695	0.0104315	0.0161393	0	0.0133083	0.0290112	0.0291465	2.13333E-07	0.00152485	
2-Methylhexane		0			90.9174	89.0811	0	0	0	0	0.303555	89.7507	0	0.000606147	0.193236	0.193843	0.366048	0	0.242234	0.662325	0.669603	2.27768E-11	0.0156766	
3-Methylhexane		0			74.6753	73.3844	0	0	0	0	0.249472	73.9337	0	0.000602356	0.158995	0.159597	0.299858	0	0.191870	0.542700	0.549330	8.95367E-11	0.0471361	
n-Heptane		0			162.400	161.335	0	0	0	0	0.535180	162.507	0	0.000543229	0.339879	0.340422	0.637252	0	0.378258	1.15478	1.17243	2.55273E-11	0.0942980	
Methylcyclohexane		0			83.0026	81.4667	0	0	0	0	0.279218	82.0815	0	0.00316490	0.178463	0.181628	0.335585	0	0.195386	0.605253	0.614803	1.71978E-09	0.0506235	
Toluene		0			19.2843	18.9901	0	0	0	0	0.0659566	19.1351	0	0.00989580	0.0420668	0.0519626	0.0791127	0	0.0475630	0.142808	0.145069	2.17804E-07	0.00787525	
n-Octane		0			219.493	232.688	0	0	0	0	0.704400	234.200	0	0.000293800	0.441683	0.441977	0.807068	0	0.260945	1.43974	1.51147	1.71248E-12	0.119222	
Ethylbenzene		0			13.9675	14.6946	0	0	0	0	0.0462960	14.7943	0	0.00664919	0.0291795	0.0358287	0.0534306	0	0.0176262	0.0948429	0.0997265	4.44146E-08	0.00601788	
p-Xylene		0			13.8030	14.5272	0	0	0	0	0.0454706	14.6252	0	0.00595247	0.0286170	0.0345695	0.0524808	0	0.0168034	0.0929995	0.0979514	2.50317E-08	0.00551736	
o-Xylene		0			19.2000	20.4349	0	0	0	0	0.0636444	20.5716	0	0.00976033	0.0400567	0.0498171	0.0730603	0	0.0203108	0.128238	0.136705	6.36764E-08	0.00695172	
n-Nonane		0			66.6141	76.8866	0	0	0	0	0.212005	77.3330	0	9.47621E-05	0.132166	0.132261	0.234444	0	0.0306689	0.382928	0.446449	1.75452E-13	0.0351068	
C10+		0			13.4149	19.7147	0	0	0	0	0.0417936	19.7978	0	0.000331917	0.0247872	0.0251191	0.0413093	0	0.000309892	0.0165459	0.0831029	3.00643E-13	0.00448318	
Process Streams		**Separator Gas**	**Separator Water**	**Separator Oil**	**1**	**as from 3-ph Separato**	**Produced Liquid**	**2**	**Produced Water**	**3**	**Gas from LP Conden**	**To Sales Gas Line**	**Condensate from VRT**	**g from produced wate**	**lashing from Oil Tank**	**o Enclosed Combust**	**Flash Gas from VRT**	**Stable Condensate**	**4**	**5**	**6**	**Losses from PW T**	**sses from Condensate Tar**	
Phase: Vapor	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	
Property	**Units**																							
Temperature	°F	67.0			59.5	70.0	70.0	70.0	72.5	70.0	70.0	72	65	72.52	72.52	72.3375	65	72.52	84.4445	70	781.587	75.9425	75.9425	
Pressure	psig	300			200	325	325	325	-0.365949	55	55	325	5	-0.365949	-0.365949	-0.365949	5	-0.365949	40	40	325	-14.2201	5.72424	
Mole Fraction Vapor	%	100			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
Mole Fraction Light Liquid	%	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Mole Fraction Heavy Liquid	%	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Molecular Weight	lb/lbmol	20.1			20.0	20.0	20.0	20.0	20.5	27.0	27.0	19.9729	39.4271	20.4546	46.6285	39.7592	39.4271	46.6285	38.8390	30.6224	30.6357	18.6080	45.9843	
Mass Density	lb/ft^3	1.2			0.8	1.3	1.3	1.3	0.1	0.3	0.3	1.29133	0.140596	0.0515014	0.119180	0.101137	0.140596	0.119180	0.381862	0.304251	0.782797	0.00154120	0.167595	
Molar Flow	lbmol/h	22739.2			22717.3	22693.3	0.0	0.0	0.0	0.0	24.7	22728.2	0	1.13034	3.17654	4.30688	10.2155	0	10.0455	34.9321	34.9407	0.00820037	1.07321	
Mass Flow	lb/h	456543.7			453838.1	452878.8	0.0	0.0	0.0	0.0	667.7	453949	0	23.1206	148.117	171.238	402.766	0	390.156	1069.70	1070.43	0.152593	49.3506	
Vapor Volumetric Flow	MCFH	377.1			557.4	349.3	0.0	0.0	0.0	0.0	2.0	351.536	0	0.448932	1.24281	1.69312	2.86470	0	1.02172	3.51586	1.36745	0.0990088	0.294463	
Liquid Volumetric Flow	Mbbl/d	1611.9			2382.6	1493.2	0.0	0.0	0.0	0.0	8.4	1502.67	0	1.91900	5.31248	7.23739	12.2454	0	4.36743	15.0289	5.84526	0.423221	1.25871	
Std Vapor Volumetric Flow	MMSCFD	207.1			206.9	206.7	0.0	0.0	0.0	0.0	0.2	207.000	0	0.0102947	0.0289307	0.0392254	0.0930385	0	0.0914903	0.318148	0.318226	7.46858E-05	0.00977434	
Std Liquid Volumetric Flow	Mbbl/d	93.4			93.0	92.9	0.0	0.0	0.0	0.0	0.1	93.0781	0	0.00459119	0.0200921	0.0246833	0.0597863	0	0.0584210	0.178701	0.178776	1.16409E-05	0.00680189	
Compressibility		0.923			0.945	0.920	0.920	0.920	0.997	0.969	0.969	0.920849	0.980953	0.996523	0.981669	0.986713	0.980953	0.981669	0.952715	0.968487	0.998031	0.999551	0.974752	
Specific Gravity		0.693			0.690	0.689	0.689	0.689	0.706	0.932	0.932	0.689611	1.36131	0.706241	1.60996	1.37278	1.36131	1.60996	1.34101	1.05731	1.05777	0.642485	1.58771	
API Gravity																								
Enthalpy	MMBtu/h	-770.5			-770.3	-769.1	0.0	0.0	0.0	0.0	-0.9	-769.979	0	-0.0420361	-0.138757	-0.180793	-0.419321	0	-0.406692	-1.31978	-0.854452	-0.000836604	-0.0462238	

Mass Enthalpy	Btu/lb	-1687.8			-1697.2	-1698.3	-1698.3	-1698.3	-1818.1	-1350.2	-1350.2	-1696.18	-1041.10	-1818.12	-936.806	-1055.80	-1041.10	-936.806	-1042.38	-1233.78	-798.231	-5482.60	-936.642
Mass Cp	Btu/(lb*°F)	0.5			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.531503	0.407656	0.472769	0.402436	0.411610	0.407656	0.402436	0.425829	0.436894	0.790326	0.438916	0.405340
Ideal Gas CpCv Ratio		1.258			1.262	1.259	1.259	1.259	1.260	1.200	1.200	1.25847	1.14257	1.25957	1.11942	1.13917	1.14257	1.11942	1.14056	1.17877	1.09037	1.32142	1.12076
Dynamic Viscosity	cP	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0110949	0.00860397	0.0107388	0.00821493	0.00873708	0.00860397	0.00821493	0.00903511	0.00949538	0.0195779	0.0103272	0.00830822
Kinematic Viscosity	cSt	0.6			0.8	0.5	0.5	0.5	13.0	1.8	1.8	0.536368	3.82036	13.0172	4.30309	5.39304	3.82036	4.30309	1.47709	1.94832	1.56134	418.314	3.09475
Thermal Conductivity	Btu/(h*ft*°F)	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0186585	0.0112035	0.0170749	0.0101980	0.0117004	0.0112035	0.0101980	0.0121202	0.0138088	0.0505926	0.0122324	0.0102837
Surface Tension	lbf/ft																						
Net I.G. Heating Value	Btu/ft^3	1101.5			1095.2	1094.2	1094.2	1094.2	1059.6	1449.4	1449.4	1095.05	2071.78	1059.62	2431.95	2071.78	2071.78	2431.95	2042.56	1630.74	1631.40	49.6551	2402.88
Net Liquid Heating Value	Btu/lb	20764.8			20749.6	20753.2	20753.2	20753.2	19575.9	20260.2	20260.2	20751.6	19791.3	19575.9	19633.8	19626.0	19791.3	19633.8	19808.3	20084.4	20083.8	49.2186	19670.9
Gross I.G. Heating Value	Btu/ft^3	1215.3			1208.6	1207.6	1207.6	1207.6	1170.0	1587.7	1587.7	1208.46	2253.25	1170.00	2638.32	2252.96	2253.25	2638.32	2221.94	1781.57	1782.28	101.782	2607.24
Gross Liquid Heating Value	Btu/lb	22916.7			22903.9	22908.4	22908.4	22908.4	21623.7	22202.9	22202.9	22906.2	21537.8	21623.7	21313.2	21355.1	21537.8	21313.2	21560.9	21953.5	21952.6	1112.3	21357.2

Process Streams		Separator Gas	Separator Water	Separator Oil	1	as from 3-ph Separato	Produced Liquid	2	Produced Water	3	Gas from LP Conden	To Sales Gas Line	Condensate from VRT	from produced wate	lashing from Oil Tank	Enclosed Combusto	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW Ta	sses from Condensate Tan
Phase: Light Liquid	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water			100	0	0.0433631	0.0542629	0.0542629	99.9418	99.9965	0.0237230	0.0237230		0.00735971	99.9965	0.00351853		0.00735971	0.00351853	0.0104646	0.0133800		100.0000	1.90422E-06
H2S			0	0	0	0	0	0	0	0	0		0	0	0		0	0	0	0		0	0
Nitrogen			0	0.0180005	0.0100849	0.0163034	0.0163034	0.000123300	2.50744E-06	0.000749750	0.000749750		1.99858E-05	2.50744E-06	1.11156E-06		1.99858E-05	1.11156E-06	5.75910E-05	0.000412065		1.42705E-09	2.86455E-08
CO2			0	0.0150005	0.0368584	0.0517976	0.0517976	0.00181335	0.000845746	0.0166528	0.0166528		0.00359171	0.000845746	0.00128946		0.00359171	0.00128946	0.00902117	0.0122697		3.24804E-05	0.00126223
Methane			0	4.77714	6.00795	9.09086	9.09086	0.0436529	0.00178805	1.24033	1.24033		0.103990	0.00178805	0.0167351		0.103990	0.0167351	0.298625	0.798377		2.84006E-06	0.00360255
Ethane			0	4.94815	6.47282	8.71370	8.71370	0.00990807	0.000602697	4.68979	4.68979		1.83741	0.000602697	1.03361		1.83741	1.03361	4.69965	4.22791		1.13566E-06	1.69543
Propane			0	4.86315	4.79551	5.88054	5.88054	0.00127841	5.60730E-05	5.24221	5.24221		3.87884	5.60730E-05	3.25623		3.87884	3.25623	8.38798	5.89064		1.65354E-08	4.52921
Isobutene			0	1.36904	2.60113	2.95033	2.95033	0.000933497	0.000154870	3.14835	3.14835		2.96400	0.000154870	2.83337		2.96400	2.83337	5.78206	3.92049		6.00769E-08	3.66905
n-Butane			0	3.81511	5.83189	6.47674	6.47674	0.000328363	1.32464E-05	7.07162	7.07162		6.86875	1.32464E-05	6.67181		6.86875	6.67181	13.1616	8.88259		8.85400E-10	8.92923
Isopentane			0	2.45607	3.51189	3.63430	3.63430	5.55071E-05	1.62657E-06	4.15296	4.15296		4.28930	1.62657E-06	4.29813		4.28930	4.29813	7.27474	5.28238		2.82532E-11	4.84585
n-Pentane			0	3.46210	4.00533	4.05896	4.05896	1.78528E-05	2.06544E-07	4.67998	4.67998		4.89166	2.06544E-07	4.93120		4.89166	4.93120	7.92711	5.95569		1.05653E-12	5.44780
2-Methylpentane			0	1.49804	0.219182	0.208321	0.208321	5.16165E-07	8.31477E-09	0.244109	0.244109		0.260617	8.31477E-09	0.265562		0.260617	0.265562	0.375556	0.316907		2.34587E-14	0.292802
3-Methylpentane			0	1.04403	0.165618	0.156596	0.156596	8.75003E-07	3.42875E-08	0.183703	0.183703		0.196406	3.42875E-08	0.200280		0.196406	0.200280	0.277504	0.238518		2.14584E-13	0.220267
n-Hexane			0	3.65811	28.3628	26.1442	26.1442	2.16981E-05	1.73740E-07	30.7415	30.7415		32.9682	1.73740E-07	33.6700		32.9682	33.6700	43.1926	39.7077		1.72532E-13	38.0367
Methylcyclopentane			0	0.276008	0.0527715	0.0494053	0.0494053	3.71113E-07	2.36890E-08	0.0580838	0.0580838		0.0622729	2.36890E-08	0.0635914		0.0622729	0.0635914	0.0838214	0.0761041		1.76993E-13	0.0644690
Benzene			0	0.0760023	0.0149860	0.0139322	0.0139322	9.48341E-06	8.15358E-06	0.0163833	0.0163833		0.0175708	8.15358E-06	0.0179459		0.0175708	0.0179459	0.0213215	0.0201657		3.61274E-09	0.0122577
2-Methylhexane			0	2.05306	0.645264	0.567471	0.567471	3.04533E-07	3.49303E-09	0.670110	0.670110		0.722568	3.49303E-09	0.740036		0.722568	0.740036	0.726914	0.845908		5.73798E-16	0.228112
3-Methylhexane			0	1.78305	0.591725	0.517911	0.517911	3.03229E-07	4.17209E-09	0.611793	0.611793		0.659962	4.17209E-09	0.676062		0.659962	0.676062	0.633999	0.770611		2.69258E-15	0.759947
n-Heptane			0	4.42513	1.63612	1.41626	1.41626	2.71422E-07	1.62910E-09	1.67408	1.67408		1.80737	1.62910E-09	1.85225		1.80737	1.85225	1.52056	2.05211		3.44632E-16	1.91919
Methylcyclohexane			0	2.33607	0.871201	0.760427	0.760427	1.71382E-06	1.09772E-07	0.898876	0.898876		0.970441	1.09772E-07	0.994544		0.970441	0.994544	0.840012	1.13293		2.63914E-13	1.06828
Toluene			0	0.617019	0.239904	0.208709	0.208709	2.98729E-05	2.45419E-05	0.246756	0.246756		0.266467	2.45419E-05	0.273120		0.266467	0.273120	0.201440	0.285886		2.36530E-09	0.184648
n-Octane			0	11.9694	6.22902	5.29352	5.29352	1.28322E-07	3.24654E-10	6.26749	6.26749		6.78006	3.24654E-10	6.95579		6.78006	6.95579	2.81259	7.31385		8.66919E-18	6.87477
Ethylbenzene			0	0.908027	0.482706	0.411550	0.411550	1.60811E-05	1.29715E-05	0.487305	0.487305		0.527195	1.29715E-05	0.540881		0.527195	0.540881	0.198402	0.535791		3.76311E-10	0.396033
p-Xylene			0	0.925028	0.494773	0.421954	0.421954	1.09617E-05	8.17610E-06	0.499638	0.499638		0.540556	8.17610E-06	0.554598		0.540556	0.554598	0.197698	0.543281		1.51255E-10	0.378357
o-Xylene			0	1.53505	0.846392	0.721859	0.721859	3.28085E-05	2.82492E-05	0.854856	0.854856		0.924991	2.82492E-05	0.949091		0.924991	0.949091	0.292300	0.928905		8.02767E-10	0.584471
n-Nonane			0	9.20628	5.49318	4.68193	4.68193	3.68693E-08	1.00055E-10	5.54621	5.54621		6.00337	1.00055E-10	6.16096		6.00337	6.16096	0.934688	5.76867		8.12903E-19	5.91900
C10+			0	31.9660	20.3375	17.4982	17.4982	1.00442E-07	5.02074E-09	20.7328	20.7328		22.4471	5.02074E-09	23.0394		22.4471	23.0394	0.139338	4.47851		1.98271E-17	13.9392
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water			2034.89	0	0.0592027	0	0.0859923	2008.27	2008.24	0.0317290	0		0.00909165	0	0		0	0.00423477	1.77882E-05	1.14874E-06		0	0
H2S			0	0	0	0	0	0	0	0	0		0	0	0		0	0	0	0		0	0
Nitrogen			0	0.0156793	0.0137687	0	0.0258366	0.00247764	5.03571E-05	0.00100278	0		2.46890E-05	0	0		0	1.33783E-06	9.78959E-08	3.53777E-08		0	0
CO2			0	0.0130661	0.0503220	0	0.0820855	0.0364381	0.0169852	0.0222728	0		0.00443694	0	0		0	0.00155195	1.53346E-05	1.05341E-06		0	0
Methane			0	4.16111	8.20251	0	14.4066	0.877179	0.0359097	1.65893	0		0.128461	0	0		0	0.0201418	0.000507617	6.85443E-05		0	0
Ethane			0	4.31007	8.83719	0	13.8089	0.199097	0.0121040	6.27250	0		2.26981	0	0		0	1.24401	0.00798868	0.000362985		0	0
Propane			0	4.23603	6.54720	0	9.31908	0.0256889	0.00112612	7.01136	0		4.79164	0	0		0	3.91908	0.0142583	0.000505739		0	0
Isobutene			0	1.19250	3.55127	0	4.67548	0.0187581	0.00311027	4.21086	0		3.66151	0	0		0	3.41014	0.00982862	0.000336592		0	0
n-Butane			0	3.32314	7.96215	0	10.2639	0.00659827	0.000266028	9.45817	0		8.48516	0	0		0	8.02994	0.0223726	0.000762611		0	0
Isopentane			0	2.13935	4.79470	0	5.75940	0.00111538	3.26665E-05	5.55451	0		5.29868	0	0		0	5.17306	0.0123659	0.000453516		0	0
n-Pentane			0	3.01565	5.46839	0	6.43238	0.000358741	4.14803E-06	6.25939	0		6.04281	0	0		0	5.93500	0.0134749	0.000511323		0	0
2-Methylpentane			0	1.30487	0.299244	0	0.330133	1.03720E-05	1.66986E-07	0.326491	0		0.321947	0	0		0	0.319620	0.000638386	2.72079E-05		0	0
3-Methylpentane			0	0.909400	0.226114	0	0.248163	1.75827E-05	6.88599E-07	0.245699	0		0.242626	0	0		0	0.241049	0.000471713	2.04778E-05		0	0
n-Hexane			0	3.18638	38.7231	0	41.4316	0.000436009	3.48923E-06	41.1162	0		40.7265	0	0		0	40.5239	0.0734207	0.00340909		0	0
Methylcyclopentane			0	0.240416	0.0720477	0	0.0782943	7.45729E-06	4.75748E-07	0.0776860	0		0.0769274	0	0		0	0.0765362	0.000142483	6.53389E-06		0	0
Benzene			0	0.0662015	0.0204601	0	0.0220789	0.000190563	0.000163749	0.0219123	0		0.0217057	0	0		0	0.0215990	3.62432E-05	1.73132E-06		0	0
2-Methylhexane			0	1.78831	0.880963	0	0.899290	6.11940E-06	7.01509E-08	0.896261	0		0.892607	0	0		0	0.890679	0.00123564	7.26251E-05		0	0
3-Methylhexane			0	1.55312	0.807868	0	0.820751	6.09521E-06	8.37885E-08	0.818262	0		0.815269	0	0		0	0.813682	0.00107770	6.61605E-05		0	0
n-Heptane			0	3.85450	2.23376	0	2.24439	5.45406E-06	3.27173E-08	2.23905	0		2.23269	0	0		0	2.22930	0.00258472	0.000176183		0	0
Methylcyclohexane			0	2.03483	1.18943	0	1.20507	3.44383E-05	2.20455E-06	1.20223	0		1.19881	0	0		0	1.19699	0.00142789	9.72675E-05		0	0
Toluene			0	0.537452	0.327535	0	0.330748	0.000600278	0.000492877	0.330032	0		0.329173	0	0		0	0.328717	0.000342417	2.45447E-05		0	0
n-Octane			0	10.4259	8.50434	0	8.38882	2.57856E-06	6.52005E-09	8.38266	0		8.37559	0	0		0	8.37173	0.00478096	0.000627927		0	0
Ethylbenzene			0	0.790934	0.659028	0	0.652198	0.000323139	0.000260509	0.651762	0		0.651258	0	0		0	0.650984	0.000337252	4.60001E-05		0	0
p-Xylene			0	0.805742	0.675503	0	0.668686	0.000220270	0.000164202	0.668257	0		0.667763	0	0		0	0.667493	0.000336056	4.66432E-05		0	0
o-Xylene			0	1.33710	1.15556	0	1.14395	0.000659267	0.000567332	1.14336	0		1.14267	0	0		0	1.14229	0.000496864	7.97508E-05		0	0
n-Nonane			0	8.01909	7.49971	0	7.41961	7.40866E-07	2.00942E-09	7.41796	0		7.41613	0	0		0	7.41510	0.00158883	0.000495267		0	0
C10+			0	27.8438	27.7663	0	27.7299	2.01832E-06	1.00832E-07	27.7297	0		27.7295	0	0		0	27.7293	0.000236854	0.000384501		0	0

Process Streams		Separator Gas	Separator Water	Separator Oil	1	as from 3-ph Separato	Produced Liquid	2	Produced Water	3	Gas from LP Conden	To Sales Gas Line	Condensate from VRT	from produced wate	lashing from Oil Tank	Enclosed Combusto	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW Ta	sses from Condensate Tan
Phase: Light Liquid	**Status**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	**Units**																						
Temperature	°F		67.0	67.0	59.5	70.0	70.0	70.0	72.5	70.0	70.0		65	72.52	72.52		65	72.52	84.4445	70		75.9425	75.9425
Pressure	psig		200	300	200	325	325	325	-0.365949	55	55		5	-0.365949	-0.365949		5	-0.365949	40	40		-14.2201	5.72424
Mole Fraction Vapor	%		0	0	0	0	0	0	0	0	0		0	0	0		0	0	0	0		0	0
Mole Fraction Light Liquid	%		100	100	100	100	100	100	100	100	100		100	100	100		100	100	100	100		100	100
Mole Fraction Heavy Liquid	%		0	0	0	0	0	0	0	0	0		0	0	0		0	0	0	0		0	0
Molecular Weight	lb/lbmol		18.0	112.8	95.4	88.0	88.0	18.0	18.0	99.3	99.3		104.243	18.0157	105.763		104.243	105.763	74.1801	84.9411		18.0153	95.6155
Mass Density	lb/ft^3		62.3	45.4	43.6	42.5	42.5	62.3	62.3	43.5	43.5		44.0840	62.2561	43.9767		44.0840	43.9767	39.2786	41.6310		62.2234	42.7117
Molar Flow	lbmol/h		2034.9	87.1	136.5	0.0	158.5	2009.4	2008.3	133.7	0.0		123.533	0	0		0	120.356	0.169985	0.00858546		0	0
Mass Flow	lb/h		36659.2	9828.0	13026.1	0.0	13947.8	36204.2	36181.1	13280.1	0.0		12877.4	0	0		0	12729.3	12.6095	0.729258		0	0
Vapor Volumetric Flow	MCFH		0.6	0.2	0.3	0.0	0.3	0.6	0.6	0.3	0.0		0.292110	0	0		0	0.289454	0.000321026	1.75172E-05		0	0

Liquid Volumetric Flow	Mbbl/d		2.5	0.9	1.3	0.0	1.4	2.5	2.5	1.3	0.0		1.24865	0	0		0	1.23730	0.00137225	7.48786E-05		0	0
Std Vapor Volumetric Flow	MMSCFD		18.5	0.8	1.2	0.0	1.4	18.3	18.3	1.2	0.0		1.12509	0	0		0	1.09616	0.00154815	7.81930E-05		0	0
Std Liquid Volumetric Flow	Mbbl/d		2.5	0.9	1.3	0.0	1.4	2.5	2.5	1.3	0.0		1.26009	0	0		0	1.24000	0.00136531	7.55669E-05		0	0
Compressibility			0.011	0.139	0.084	0.124	0.124	0.017	0.001	0.028	0.028		0.00827163	0.000726081	0.00603431		0.00827163	0.00603431	0.0176902	0.0196330		2.39691E-05	0.00795292
Specific Gravity			0.999	0.727	0.699	0.681	0.681	0.998	0.998	0.698	0.698		0.706826	0.998190	0.705106		0.706826	0.705106	0.629778	0.667495		0.997665	0.684823
API Gravity			10.0	62.2	70.9	74.6	74.6	10.1	10.0	69.8	69.8		68.0005	10.0027	67.4598		68.0005	67.4598	88.3366	78.8179		10.0006	72.7152
Enthalpy	MMBtu/h		-250.4	-8.3	-11.8	0.0	-12.8	-247.1	-246.9	-11.8	0.0		-11.3870	0	0		0	-11.1758	-0.0123030	-0.000687017		0	0
Mass Enthalpy	Btu/lb		-6830.5	-848.5	-905.9	-919.4	-919.4	-6823.9	-6825.4	-891.2	-891.2		-884.262	-6825.38	-877.962		-884.262	-877.962	-975.699	-942.076		-6822.32	-909.197
Mass Cp	Btu/(lb*°F)		1.0	0.5	0.5	0.5	0.5	1.0	1.0	0.5	0.5		0.502519	0.981992	0.506190		0.502519	0.506190	0.555654	0.527078		0.981771	0.519002
Ideal Gas CpCv Ratio			1.326	1.049	1.058	1.062	1.062	1.326	1.326	1.055	1.055		1.05299	1.32572	1.05158		1.05299	1.05158	1.07213	1.06452		1.32556	1.05662
Dynamic Viscosity	cP		1.0	0.6	0.4	0.3	0.3	1.0	1.0	0.4	0.4		0.473195	0.964467	0.463624		0.473195	0.463624	0.228012	0.310896		0.924434	0.372244
Kinematic Viscosity	cSt		1.0	0.8	0.6	0.5	0.5	1.0	1.0	0.6	0.6		0.670097	0.967129	0.658146		0.670097	0.658146	0.362393	0.466205		0.927473	0.544076
Thermal Conductivity	Btu/(h*ft*°F)		0.3	0.1	0.1	0.1	0.1	0.3	0.3	0.1	0.1		0.0693084	0.348210	0.0688543		0.0693084	0.0688543	0.0649267	0.0682734		0.349835	0.0681405
Surface Tension	lbf/ft		0.005	0.001	0.001	0.001	0.001	0.005	0.005	0.001	0.001		0.00146541	0.00501315	0.00145154		0.00146541	0.00145154	0.00103065	0.00122834		0.00498784	0.00134421
Net I.G. Heating Value	Btu/ft^3		0.0	5673.5	4829.1	4464.9	4464.9	0.6	0.0	5022.3	5022.3		5266.34	0.0360213	5341.15		5266.34	5341.15	3799.01	4323.61		4.66394E-05	4848.78
Net Liquid Heating Value	Btu/lb		-1059.8	18913.6	19046.5	19091.5	19091.5	-1045.8	-1058.9	19032.7	19032.7		19009.0	-1058.94	19001.7		19009.0	19001.7	19267.6	19149.7		-1059.76	19081.9
Gross I.G. Heating Value	Btu/ft^3		50.3	6090.0	5194.8	4806.4	4806.4	51.0	50.3	5401.4	5401.4		5661.76	50.3477	5741.55		5661.76	5741.55	4103.41	4661.85		50.3101	5220.13
Gross Liquid Heating Value	Btu/lb		0.0	20313.3	20500.4	20563.5	20563.5	14.6	0.8	20481.1	20481.1		20448.1	0.824525	20438.0		20448.1	20438.0	20824.3	20660.3		0.00101963	20555.4

Process Streams		Separator Gas	Separator Water	Separator Oil	1	as from 3-ph Separato	Produced Liquid	2	Produced Water	3	n Gas from LP Conder	To Sales Gas Line	Condensate from VRT	p from produced wate	lashing from Oil Tank	o Enclosed Combust	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW Ta	sses from Condensate Tar
Phase: Heavy Liquid	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water					99.9581	99.9418	99.9418																
H2S					0	0	0																
Nitrogen					8.37093E-05	0.000123300	0.000123300																
CO2					0.00136120	0.00181335	0.00181335																
Methane					0.0304351	0.0436529	0.0436529																
Ethane					0.00766872	0.00990807	0.00990807																
Propane					0.00104341	0.00127841	0.00127841																
Isobutene					0.000847890	0.000933497	0.000933497																
n-Butane					0.000280669	0.000328363	0.000328363																
Isopentane					5.25673E-05	5.55071E-05	5.55071E-05																
n-Pentane					1.53298E-05	1.78528E-05	1.78528E-05																
2-Methylpentane					4.85080E-07	5.16165E-07	5.16165E-07																
3-Methylpentane					8.41926E-07	8.75003E-07	8.75003E-07																
n-Hexane					2.01715E-05	2.16981E-05	2.16981E-05																
Methylcyclopentane					3.60748E-07	3.71113E-07	3.71113E-07																
Benzene					9.67192E-06	9.48341E-06	9.48341E-06																
2-Methylhexane					3.30592E-07	3.04533E-07	3.04533E-07																
3-Methylhexane					3.35604E-07	3.03329E-07	3.03329E-07																
n-Heptane					2.68940E-07	2.71422E-07	2.71422E-07																
Methylcyclohexane					1.75620E-06	1.71382E-06	1.71382E-06																
Toluene					3.08672E-05	2.98729E-05	2.98729E-05																
n-Octane					1.18742E-07	1.28322E-07	1.28322E-07																
Ethylbenzene					1.70553E-05	1.60811E-05	1.60811E-05																
p-Xylene					1.12119E-05	1.09617E-05	1.09617E-05																
o-Xylene					3.42113E-05	3.28085E-05	3.28085E-05																
n-Nonane					3.84339E-08	3.68693E-08	3.68693E-08																
C10+					9.77906E-08	1.00442E-07	1.00442E-07																
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water					99.9496	99.9319	99.9319																
H2S					0	0	0																
Nitrogen					0.000130155	0.000191711	0.000191711																
CO2					0.00332499	0.00442939	0.00442939																
Methane					0.0270999	0.0388687	0.0388687																
Ethane					0.0127987	0.0165358	0.0165358																
Propane					0.00255371	0.00312883	0.00312883																
Isobutene					0.00264042	0.00290697	0.00290697																
n-Butane					0.000905439	0.00105929	0.00105929																
Isopentane					0.000210507	0.000222277	0.000222277																
n-Pentane					6.13887E-05	7.14909E-05	7.14909E-05																
2-Methylpentane					2.32016E-06	2.46881E-06	2.46881E-06																
3-Methylpentane					4.02698E-06	4.18513E-06	4.18513E-06																
n-Hexane					9.64813E-05	0.000103782	0.000103782																
Methylcyclopentane					1.68511E-06	1.73351E-06	1.73351E-06																
Benzene					4.19326E-05	4.11147E-05	4.11147E-05																
2-Methylhexane					1.83862E-06	1.69366E-06	1.69366E-06																
3-Methylhexane					1.86649E-06	1.68696E-06	1.68696E-06																
n-Heptane					1.49573E-06	1.50951E-06	1.50951E-06																
Methylcyclohexane					9.57073E-06	9.33969E-06	9.33969E-06																
Toluene					0.000157856	0.000152769	0.000152769																
n-Octane					7.52840E-07	8.13565E-07	8.13565E-07																
Ethylbenzene					0.000100499	9.47572E-05	9.47572E-05																
p-Xylene					6.60669E-05	6.45918E-05	6.45918E-05																
o-Xylene					0.000201592	0.000193323	0.000193323																
n-Nonane					2.73597E-07	2.62455E-07	2.62455E-07																
C10+					9.39542E-07	9.65000E-07	9.65000E-07																
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water					36148.4	0	0																
H2S					0	0	0																
Nitrogen					0.0470727	0	0																
CO2					1.20254	0	0																
Methane					9.80111	0	0																
Ethane					4.62884	0	0																

Propane					0.923589	0	0																
Isobutene					0.954952	0	0																
n-Butane					0.327467	0	0																
Isopentane					0.0761333	0	0																
n-Pentane					0.0222022	0	0																
2-Methylpentane					0.000839125	0	0																
3-Methylpentane					0.00145642	0	0																
n-Hexane					0.0348940	0	0																
Methylcyclopentane					0.000609448	0	0																
Benzene					0.0151656	0	0																
2-Methylhexane					0.000664965	0	0																
3-Methylhexane					0.000675045	0	0																
n-Heptane					0.000540954	0	0																
Methylcyclohexane					0.00346141	0	0																
Toluene					0.0570911	0	0																
n-Octane					0.000272277	0	0																
Ethylbenzene					0.0363471	0	0																
p-Xylene					0.0238942	0	0																
o-Xylene					0.0729090	0	0																
n-Nonane					9.89508E-05	0	0																
C10+					0.000339801	0	0																

Process Streams		Separator Gas	Separator Water	Separator Oil	1	as from 3-ph Separato	Produced Liquid	2	Produced Water	3	Gas from LP Conden	To Sales Gas Line	Condensate from VRT	g from produced wate	lashing from Oil Tank	Enclosed Combust	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW Ta	ses from Condensate Tar
Phase: Heavy Liquid	Status	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Property	Units																						
Temperature	°F				59.5	70.0	70.0																
Pressure	psig				200	325	325																
Mole Fraction Vapor	%				0	0	0																
Mole Fraction Light Liquid	%				0	0	0																
Mole Fraction Heavy Liquid	%				100	100	100																
Molecular Weight	lb/lbmol				18.0	18.0	18.0																
Mass Density	lb/ft^3				62.4	62.3	62.3																
Molar Flow	lbmol/h				2007.4	0.0	0.0																
Mass Flow	lb/h				36166.6	0.0	0.0																
Vapor Volumetric Flow	MCFH				0.6	0.0	0.0																
Liquid Volumetric Flow	Mbbl/d				2.5	0.0	0.0																
Std Vapor Volumetric Flow	MMSCFD				18.3	0.0	0.0																
Std Liquid Volumetric Flow	Mbbl/d				2.5	0.0	0.0																
Compressibility					0.011	0.017	0.017																
Specific Gravity					1.000	0.998	0.998																
API Gravity					10.0	10.1	10.1																
Enthalpy	MMBtu/h				-247.2	0.0	0.0																
Mass Enthalpy	Btu/lb				-6835.4	-6823.9	-6823.9																
Mass Cp	Btu/(lb*°F)				1.0	1.0	1.0																
Ideal Gas CpCv Ratio					1.326	1.326	1.326																
Dynamic Viscosity	cP				1.1	1.0	1.0																
Kinematic Viscosity	cSt				1.1	1.0	1.0																
Thermal Conductivity	Btu/(h*ft*°F)				0.3	0.3	0.3																
Surface Tension	lbf/ft				0.005	0.005	0.005																
Net I.G. Heating Value	Btu/ft^3				0.5	0.6	0.6																
Net Liquid Heating Value	Btu/lb				-1049.4	-1045.8	-1045.8																
Gross I.G. Heating Value	Btu/ft^3				50.8	51.0	51.0																
Gross Liquid Heating Value	Btu/lb				10.8	14.6	14.6																

November 6, 2014

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

For: Antero Resources Appalachian Corp.
1615 Wynkoop Street
Denver, Colorado 80202

Sample: Nero No. 2H
First Stage Separator Hydrocarbon Liquid
Sampled @ 168 psig & 81 °F

Date Sampled: 10/14/14 Job Number: 45832.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.018	0.004	0.005
Carbon Dioxide	0.015	0.005	0.006
Methane	4.777	1.626	0.682
Ethane	4.948	2.658	1.324
Propane	4.863	2.691	1.908
Isobutane	1.369	0.900	0.708
n-Butane	3.815	2.416	1.973
2,2 Dimethylpropane	0.071	0.055	0.046
Isopentane	2.456	1.804	1.576
n-Pentane	3.391	2.469	2.177
2,2 Dimethylbutane	0.121	0.101	0.093
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.214	0.176	0.164
2 Methylpentane	1.498	1.249	1.149
3 Methylpentane	1.044	0.856	0.801
n-Hexane	2.751	2.273	2.109
Heptanes Plus	68.649	80.716	85.281
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

Specific Gravity	0.7559	(Water=1)
°API Gravity	55.70	@ 60°F
Molecular Weight	139.6	
Vapor Volume	17.18	CF/Gal
Weight	6.30	Lbs/Gal

Characteristics of Total Sample:

Specific Gravity	0.7154	(Water=1)
°API Gravity	66.29	@ 60°F
Molecular Weight	112.4	
Vapor Volume	20.20	CF/Gal
Weight	5.96	Lbs/Gal

Base Conditions: 14.850 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: XG
Processor: XGdjv
Cylinder ID: W-872

David Dannhaus 361-661-7015

TANKS DATA INPUT REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.015	0.005	0.006
Nitrogen	0.018	0.004	0.005
Methane	4.777	1.626	0.682
Ethane	4.948	2.658	1.324
Propane	4.863	2.691	1.908
Isobutane	1.369	0.900	0.708
n-Butane	3.887	2.471	2.019
Isopentane	2.456	1.804	1.576
n-Pentane	3.391	2.469	2.177
Other C-6's	2.877	2.383	2.206
Heptanes	9.109	8.235	7.991
Octanes	14.305	13.813	13.908
Nonanes	9.207	10.205	10.397
Decanes Plus	31.967	45.408	49.244
Benzene	0.076	0.043	0.053
Toluene	0.617	0.415	0.506
E-Benzene	0.908	0.704	0.858
Xylenes	2.460	1.894	2.324
n-Hexane	2.751	2.273	2.109
2,2,4 Trimethylpentane	0.000	0.000	0.000
Totals:	100.000	100.000	100.000

Characteristics of Total Sample:

Specific Gravity	0.7154	(Water=1)
°API Gravity	66.29	@ 60°F
Molecular Weight	112.4	
Vapor Volume	20.20	CF/Gal
Weight	5.96	Lbs/Gal

Characteristics of Decanes (C10) Plus:

Specific Gravity	0.7759	(Water=1)
Molecular Weight	173.1	

Characteristics of Atmospheric Sample:

°API Gravity	59.77	@ 60°F
Reid Vapor Pressure (ASTM D-5191)	3.54	psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
Cylinder Number	------	W-872*	W-298
Pressure, PSIG	168	154	150
Temperature, °F	81	70	70

* Sample used for analysis

TOTAL EXTENDED REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.018	0.004	0.005
Carbon Dioxide	0.015	0.005	0.006
Methane	4.777	1.626	0.682
Ethane	4.948	2.658	1.324
Propane	4.863	2.691	1.908
Isobutane	1.369	0.900	0.708
n-Butane	3.815	2.416	1.973
2,2 Dimethylpropane	0.071	0.055	0.046
Isopentane	2.456	1.804	1.576
n-Pentane	3.391	2.469	2.177
2,2 Dimethylbutane	0.121	0.101	0.093
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.214	0.176	0.164
2 Methylpentane	1.498	1.249	1.149
3 Methylpentane	1.044	0.856	0.801
n-Hexane	2.751	2.273	2.109
Methylcyclopentane	0.276	0.196	0.207
Benzene	0.076	0.043	0.053
Cyclohexane	0.572	0.391	0.428
2-Methylhexane	2.053	1.918	1.831
3-Methylhexane	1.783	1.644	1.590
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	0.995	0.907	0.878
n-Heptane	3.430	3.179	3.058
Methylcyclohexane	2.336	1.886	2.041
Toluene	0.617	0.415	0.506
Other C-8's	8.334	8.186	8.173
n-Octane	3.635	3.740	3.694
E-Benzene	0.908	0.704	0.858
M & P Xylenes	0.925	0.721	0.874
O-Xylene	1.535	1.172	1.450
Other C-9's	6.075	6.665	6.824
n-Nonane	3.131	3.540	3.573
Other C-10's	7.205	8.687	9.057
n-decane	2.282	2.813	2.888
Undecanes(11)	6.933	8.576	9.068
Dodecanes(12)	4.501	6.014	6.448
Tridecanes(13)	3.174	4.548	4.943
Tetradecanes(14)	2.056	3.156	3.476
Pentadecanes(15)	1.432	2.354	2.624
Hexadecanes(16)	0.949	1.667	1.874
Heptadecanes(17)	0.752	1.397	1.586
Octadecanes(18)	0.575	1.124	1.283
Nonadecanes(19)	0.436	0.889	1.020
Eicosanes(20)	0.329	0.698	0.806
Heneicosanes(21)	0.255	0.568	0.660
Docosanes(22)	0.213	0.494	0.578
Tricosanes(23)	0.164	0.395	0.464
Tetracosanes(24)	0.142	0.355	0.419
Pentacosanes(25)	0.103	0.267	0.317
Hexacosanes(26)	0.089	0.238	0.283
Heptacosanes(27)	0.071	0.198	0.237
Octacosanes(28)	0.054	0.156	0.188
Nonacosanes(29)	0.047	0.140	0.169
Triacontanes(30)	0.035	0.107	0.130
Hentriacontanes Plus(31+)	0.168	0.566	0.726
Total	100.000	100.000	100.000

November 6, 2014

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

For: Antero Resources Appalachian Corp.
1615 Wynkoop Street
Denver, Colorado 80202

Date Sampled: 10/14/14

Date Analyzed: 10/24/14

Sample: Nero No. 2H

Job Number: J45832

FLASH LIBERATION OF HYDROCARBON LIQUID		
	First Stage Separator HC Liquid	**Stock Tank**
Pressure, psig	168	0
Temperature, °F	81	70
Gas Oil Ratio (1)	------	112
Gas Specific Gravity (2)	------	1.194
Separator Volume Factor (3)	1.0721	1.000

STOCK TANK FLUID PROPERTIES	
Shrinkage Recovery Factor (4)	0.9328
Oil API Gravity at 60 °F	59.77
Reid Vapor Pressure, psi (5)	3.54

Quality Control Check			
	Sampling Conditions	**Test Samples**	
Cylinder No.	------	W-872*	W-298
Pressure, psig	168	154	150
Temperature, °F	81	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: T. G.
* Sample used for flash study
Base Conditions: 14.85 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

David Dannhaus 361-661-7015

October 28, 2014

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

For: Antero Resources Appalachian Corp.
1615 Wynkoop Street
Denver, Colorado 80202

Sample: Nero No. 2H
Gas Evolved from Hydrocarbon Liquid Flashed
From 168 psig & 81 °F to 0 psig & 70 °F

Date Sampled: 10/14/14 Job Number: 45832.001

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2286

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.132	
Carbon Dioxide	0.650	
Methane	34.713	
Ethane	29.751	8.019
Propane	18.532	5.146
Isobutane	2.953	0.974
n-Butane	6.222	1.977
2-2 Dimethylpropane	0.064	0.025
Isopentane	1.702	0.627
n-Pentane	1.747	0.638
Hexanes	1.654	0.687
Heptanes Plus	1.880	0.832
Totals	100.000	18.925

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.543	(Air=1)
Molecular Weight	101.49	
Gross Heating Value	5409	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.194	(Air=1)
Compressibility (Z)	0.9890	
Molecular Weight	34.21	
Gross Heating Value		
Dry Basis	2005	BTU/CF
Saturated Basis	1971	BTU/CF

*Hydrogen Sulfide tested in laboratory by: Stain 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: IM
Cylinder ID: FL-7S

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2286
TOTAL REPORT

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.132		0.108
Carbon Dioxide	0.650		0.836
Methane	34.713		16.278
Ethane	29.751	8.019	26.150
Propane	18.532	5.146	23.887
Isobutane	2.953	0.974	5.017
n-Butane	6.222	1.977	10.571
2,2 Dimethylpropane	0.064	0.025	0.135
Isopentane	1.702	0.627	3.590
n-Pentane	1.747	0.638	3.684
2,2 Dimethylbutane	0.059	0.025	0.149
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.094	0.039	0.237
2 Methylpentane	0.497	0.208	1.252
3 Methylpentane	0.315	0.130	0.794
n-Hexane	0.689	0.286	1.736
Methylcyclopentane	0.060	0.021	0.148
Benzene	0.026	0.007	0.059
Cyclohexane	0.100	0.034	0.246
2-Methylhexane	0.198	0.093	0.580
3-Methylhexane	0.203	0.093	0.595
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.191	0.084	0.554
n-Heptane	0.309	0.144	0.905
Methylcyclohexane	0.214	0.087	0.614
Toluene	0.064	0.022	0.172
Other C8's	0.333	0.156	1.073
n-Octane	0.086	0.044	0.287
Ethylbenzene	0.002	0.001	0.006
M & P Xylenes	0.016	0.006	0.050
O-Xylene	0.002	0.001	0.006
Other C9's	0.067	0.034	0.247
n-Nonane	0.006	0.003	0.022
Other C10's	0.003	0.002	0.012
n-Decane	0.000	0.000	0.000
Undecanes (11)	0.000	0.000	0.000
Totals	100.000	18.925	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.194	(Air=1)
Compressibility (Z)	0.9890	
Molecular Weight	34.21	
Gross Heating Value		
Dry Basis	2005	BTU/CF
Saturated Basis	1971	BTU/CF

GAS ANALYTICAL SERVICES

C6+ Gas Analysis Report

Gas Analytical

Report Date: Feb 15, 2016 8:49a

Client:	Antero Resources	Date Sampled:	Feb 2, 2016 11:55a
Site:	Shale Unit 2H	Analysis Date:	Feb 10, 2016 10:05a
Field No:	9998	Collected By:	Doug Lipscomb
Meter:	40490	Date Effective:	Feb 2, 2016 12:00a
Source Laboratory	Clarksburg (Bridgeport), WV	Sample Pressure (PSI):	143.3
Lab File No:	**X_CH1-9482.CHR**	Sample Temp (°F):	63
Sample Type:	Spot	Field H2O:	No Test
Reviewed By:		Field H2S:	No Test

Component	Mol %	Gal/MSCF
Methane	80.4721	
Ethane	13.6908	3.64
Propane	2.7966	0.77
I-Butane	0.5201	0.17
N-Butane	0.9055	0.28
I-Pentane	0.2466	0.09
N-Pentane	0.2098	0.08
Nitrogen	0.4339	
Oxygen	0.0053	
Carbon Dioxide	0.1709	
Hexanes+	0.5484	0.23
TOTAL	100.0000	5.25

Analytical Results at Base Conditions (Real)		
BTU/SCF (Dry):	1,224.7184	BTU/ft³
BTU/SCF (Saturated):	1,204.2806	BTU/ft³
PSIA:	14.730	PSI
Temperature (°F):	60.00	°F
Z Factor (Dry):	0.99670	
Z Factor (Saturated):	0.99630	

Analytical Results at Contract Conditions (Real)		
BTU/SCF (Dry):	1,224.7184	BTU/ft³
BTU/SCF (Saturated):	1,204.2806	BTU/ft³
PSIA:	14.730	PSI
Temperature (°F):	60.00	°F
Z Factor (Dry):	0.99670	
Z Factor (Saturated):	0.99630	

Calculated Specific Gravities			
Ideal Gravity:	0.6949	Real Gravity:	0.6969
Molecular Wt:	20.1270	lb/lbmol	

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

Source	Date	Notes

<MDL = Less than Method Detection Limits, NG = Not Given, NT = Not Tested

Attachment U
Facility-wide Emissions Summary Sheet(s)

ATTACHMENT U – 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		CH_4		GHG (CO2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
EP-HR001									0.4381	0.7321						
EP-PCV					0.0996	0.4363							0.4490	1.9666	11.2273	49.1756
F001					4.2789	18.7418							4.1688	18.2595	104.2208	456.4871
EP-L001					11.2706	10.6273							0.0266	0.0251	0.6742	0.6358
EP-L002					1.22E-03	2.30E-03							0.0373	0.0704	0.9911	1.8691
EP-TEG001 EP-TEG002	0.014	0.062	0.0119	0.0520	0.0008	0.0034	8.48E-05	3.71E-04	1.07E-03	4.70E-03	1.07E-03	4.70E-03	3.25E-04	1.42E-03	17.0507	74.6822
EP-ENG001-004 (emissions per EPN)	0.0625	0.2738	0.4126	1.8073	0.0190	0.0833	0.0004	0.0017	0.0061	0.0267	0.0061	0.0267	0.1477	0.6470	74.3395	325.6072
EP-GPU001 -012 (emissions per EPN)	0.1225	0.5364	0.1029	0.4506	0.0067	0.0295	0.0007	0.0032	0.0093	0.0408	0.0093	0.0408	0.0028	0.0123	146.9726	643.7398
EP-LH001 -012 (emissions per EPN)	0.1633	0.7153	0.1372	0.6008	0.0090	0.0393	0.0010	0.0043	0.0124	0.0544	0.0124	0.0544	0.0038	0.0165	195.9634	858.3198
EP-EC001 -003 (emissions per EPN)	0.8177	3.5815	3.7214	16.2999	1.0335	4.5265	0.0000	0.0000	0.0055	0.0239	0.0041	0.0179	0.1113	0.4874	223.5694	979.2342
TOTAL	6.1467	26.9224	15.7073	68.7981	3.3658	25.3718	0.0222	0.0972	0.3025	1.3249	0.2984	1.3070	1.0040	4.4931	5100.3490	22342.0334

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 – 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	0.0164	0.0720	0.0164	0.0720
F001			0.0019	0.0084	0.0183	0.0800	0.0310	0.1357	0.0839	0.3677	0.2531	1.1084	0.3882	1.7002
EP-L001			4.62E-04	4.36E-04	2.39E-03	2.25E-03	1.82E-03	1.72E-03	0.004	3.56E-03	1.555	1.466	1.563	1.474
EP-L002			1.67E-06	3.14E-06	1.70E-06	3.21E-06	3.47E-07	6.55E-07	6.93E-07	1.31E-06	6.37E-08	1.20E-07	4.47E-06	8.44E-06
EP-TEG001 EP-TEG002	1.06E-05	4.64E-05	2.97E-07	1.30E-06	4.80E-07	2.10E-06			0.00E+00	0.00E+00	2.54E-04	1.11E-03	2.66E-04	1.16E-03
EP-ENG001-004 (emissions per EPN)	0.0132	0.0577	0.0010	0.0044	0.0004	0.0016	1.59E-05	6.98E-05	0.0001	0.0005			0.0147	0.0646
EP-GPU001 -012 (emissions per EPN)	0.0001	0.0004	2.57E-06	1.13E-05	4.16E-06	1.82E-05			0.00E+00	0.00E+00	0.0022	0.0097	0.0023	0.0101
EP-LH001 -012 (emissions per EPN)	0.0001	0.0005	3.43E-06	1.50E-05	5.55E-06	2.43E-05			0.00E+00	0.00E+00	0.0029	0.0129	0.0031	0.0135
EP-EC001 -003 (emissions per EPN)	1.28E-06	5.58E-06	0.0001	0.0003	0.0004	0.0017	0.0003	0.0012	0.0006	0.0028	0.1508	0.6606	0.1522	0.6667
TOTAL	0.0553	0.2420	0.0044	0.0196	0.0027	0.0143	0.0009	0.0057	0.0024	0.0142	0.5144	3.7190	0.5804	4.0161

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 V
Class I Legal Advertisement

Attachment V

Air Quality Permit Notice
Notice of Application
Balli 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-D General Permit Modification for an Oil and Natural Gas Production facility located at 600 Ramseys Ridge Rd West Union, WV 26456 , in Doddridge County, West Virginia.

The latitude and longitude coordinates are: 39.302117 and -80.843583

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

Pollutants	TOTALS (tpy):
NO_X	26.9224
CO	68.7981
$PM_{2.5}$	1.3070
PM_{10}	1.3249
VOC	25.3718
SO_2	0.0972
CO_{2e}	22342.0334
CH_4	4.4931
Formaldehyde	0.2420
Benzene	0.0196
Toluene	0.0143
Ethylbenzene	0.0057
Xylenes	0.0142
Hexane	3.7190
Total HAPs	4.0161

Proposed new equipment will be installed by January 01, 2018 and the facility is expected to begin the operations by November 01, 2018. 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 _____, 2017

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

www.ghd.com