May 10, 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: General Permit G70-D Modification Application
Alexander Well Pad
Antero Resources Corporation

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

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

1. Increase in condensate and produced water production
2. Addition of two wells
3. Addition of two GPU heaters
4. Addition of ten line heaters
5. Addition of two produced water tanks
6. Addition of three HP Ford VRU engines
7. Addition of one LP Ford VRU engines
8. Addition of three enclosed Cimarron combustors
9. Removal of two condensate tanks
10. Removal of one Abutec combustor
11. Removal of one 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:

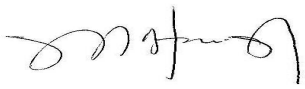
- Original copy of the G70-D General Permit Modification Application.
- Two CD copies of the G70-D General Permit Modification Application.
- The application fee with check no. 476176 in the amount of $1,500.00.

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.

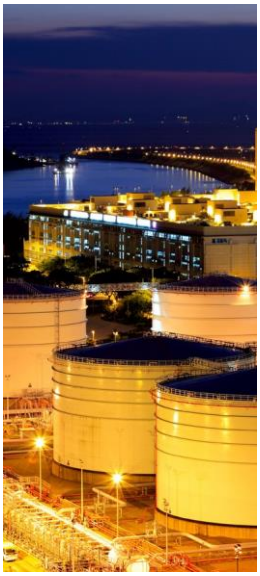


Manuel Bautista

MB/ma/321

Encl.

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


General Permit G70-D Modification Application

Increased production and the addition of two wells, two GPU Heaters, two produced water tanks, three Cimarron enclosed combustors, ten Line Heaters, three HP Ford VRU engines, one LP Ford VRU engine, four VRTs; Removal of Kubota Engine, two condensate water tanks and one Abutec combustor.

Alexander Well Pad

Antero Resources Corporation

GHD 6320 Rothway Suite 100 Houston Texas 77040
082715 | Report No 321 | May 2017

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west virginia department of environmental protection

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

G70-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: Alexander Well Pad

Operating Site Physical Address: 2115 Nutter Frk

City: West Union	Zip Code: 26456	County: Doddridge

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.33587
Longitude: -80.77557

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities) 017-00136

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: 5/10/2017

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: increased production and the addition of two wells, two GPU Heaters, two produced water tanks, three Cimarron enclosed combustors, ten Line Heaters, three HP Ford VRU engines, one LP Ford VRU engine and four VRTs; Removal of Kubota Engine, one Abutec combustor and two condensate tanks.	
Directions to the facility: From West Union, Head north on Neely Ave toward Marie St/Old U.S. 50 E and go 36 ft, Turn right at the 1st cross street onto Marie St/Old U.S. 50 E and go 0.2 mi, Turn left onto Davis St and go 0.2 mi, Turn right onto WV-18 N/Sistersville Pike and go 5.1 mi, Turn right onto Nutter Fork and go 1.8 mi, Turn left onto Wolfpen Run and go 0.2 mi. Facility entrance will be towards 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	

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 ☒

Alexander 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 nearby emission sources that belong to the same industrial grouping and under the control of the same person but not located on contiguous or adjacent property are Yvonne Well Pad and the Strickling Well Pad.

Yvonne Well Pad is located approximately 0.90 miles northeast of the facility. The Strickling Well Pad is located approximately 0.44 miles southwest of the facility.

Attachment B
Siting Criteria Waiver

Attachment B

Siting Waiver
Alexander 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 Alexander 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:

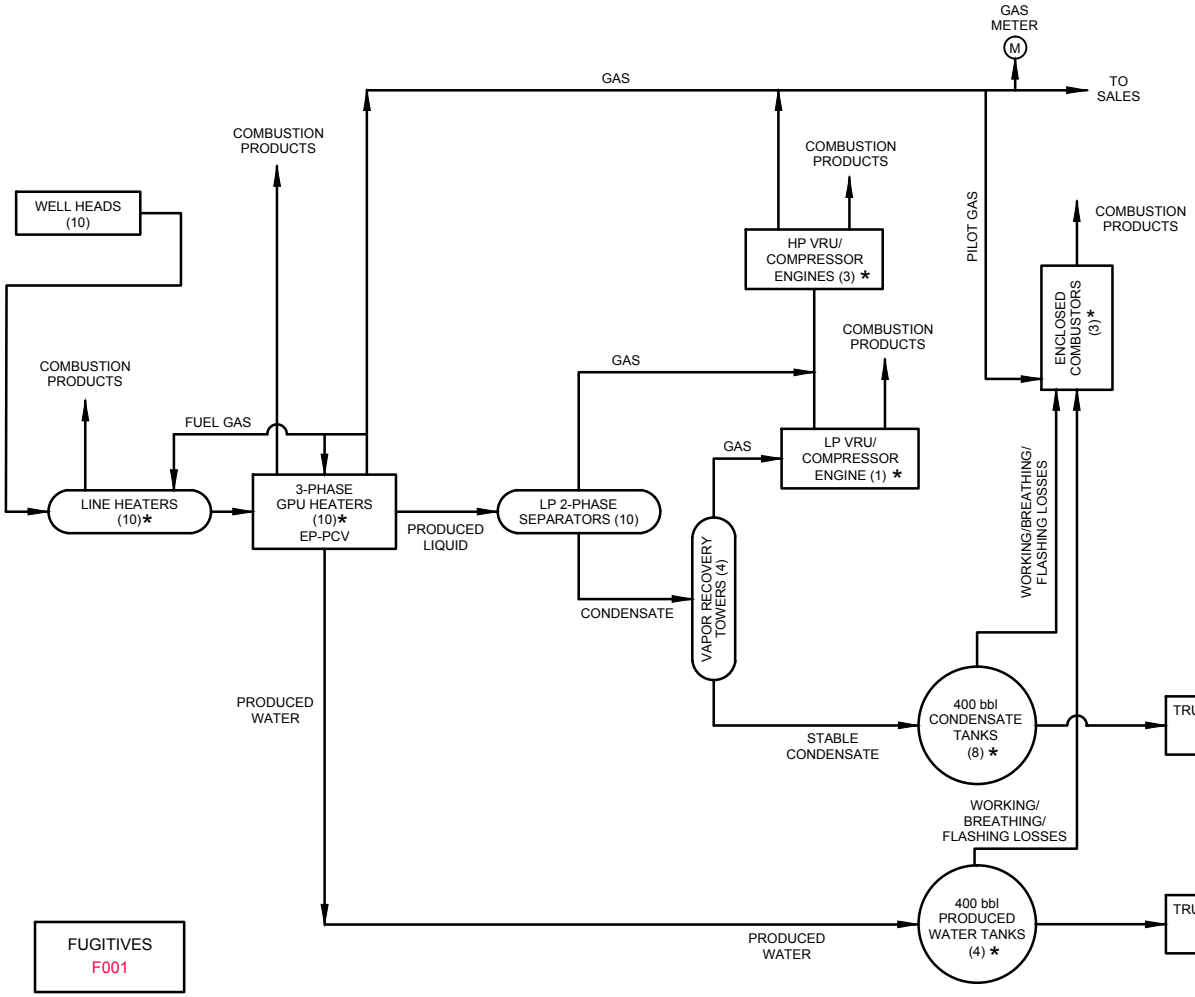
FIRST. The name of the Corporation is Antero Resources Corporation.

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 (10)

- 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

3-PHASE GPU HEATERS (10)

- 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

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 (8)

- TANKCOND001
- TANKCOND002
- TANKCOND003
- TANKCOND004
- TANKCOND005
- TANKCOND006
- TANKCOND007
- TANKCOND008

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 ALEXANDER WELL PAD

Doddridge County, West Virginia

82715-00(321)GN-WA001 MAY 3, 2017

Attachment E
Process Description

Attachment E

Process Description
Alexander 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 (LH001-010) and gas production units (GPU001-GPU010). 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.

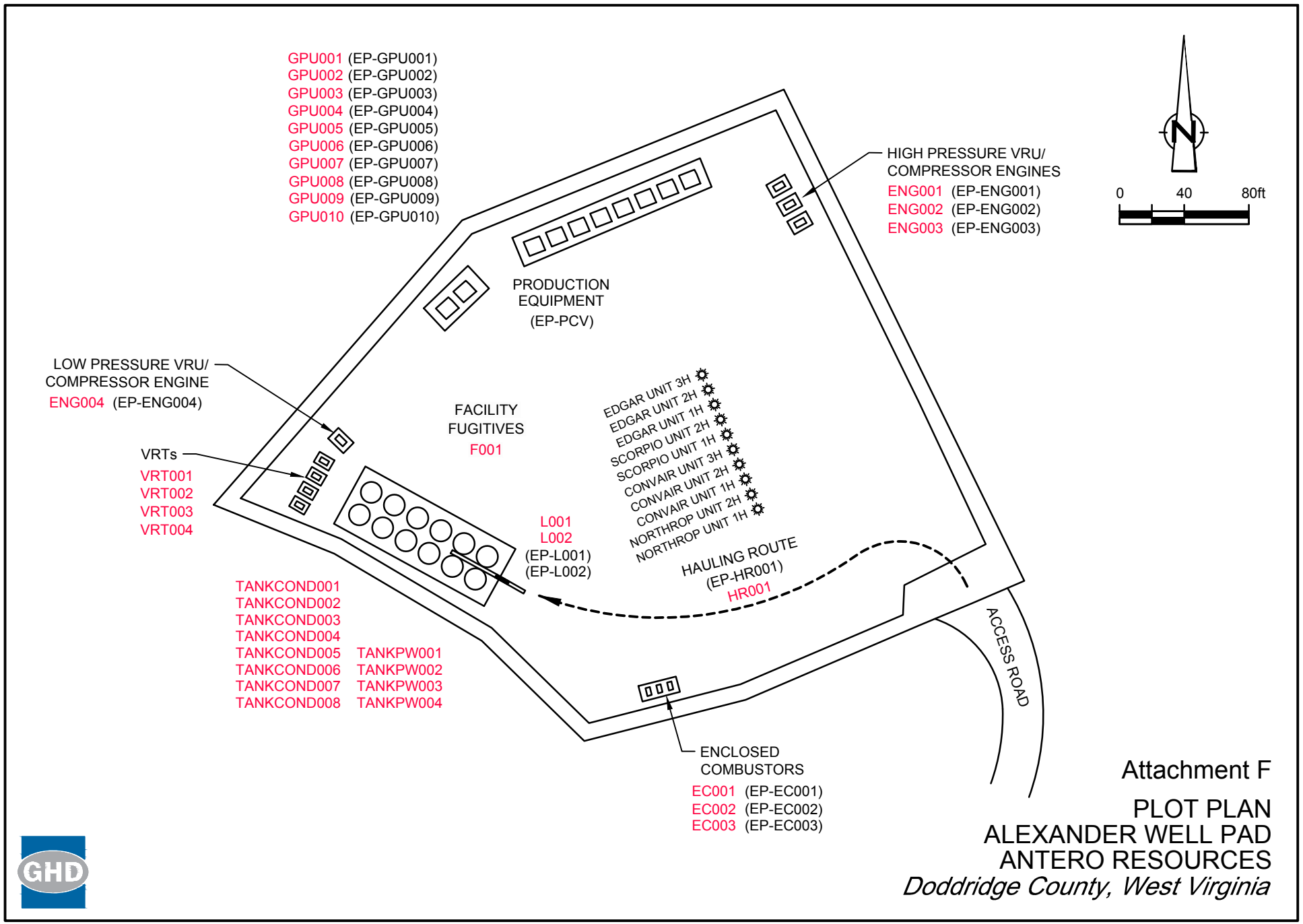
The gas from the three phase separators is metered and sent to the sales gas pipeline. The water flow to the produced water storage tanks (TANKPW001-004). The condensate is sent to two-phase low pressure separators where gas is separated. The gas is routed to the high pressure VRU driven by gas fueled 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 (VRT001-004) 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 (TANKSCOND001-008). 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 (8) tanks (TANKCOND001-008) 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 four 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 Gaskins No. 1H well in Hamilton Well Pad Well Pad and gas analysis from Weinhold Unit 1H well in Melody Well Pad. The extended condensate analysis is considered representative of the materials from Alexander Well Pad, being in the same Marcellus rock formation.

Attachment F
Plot Plan



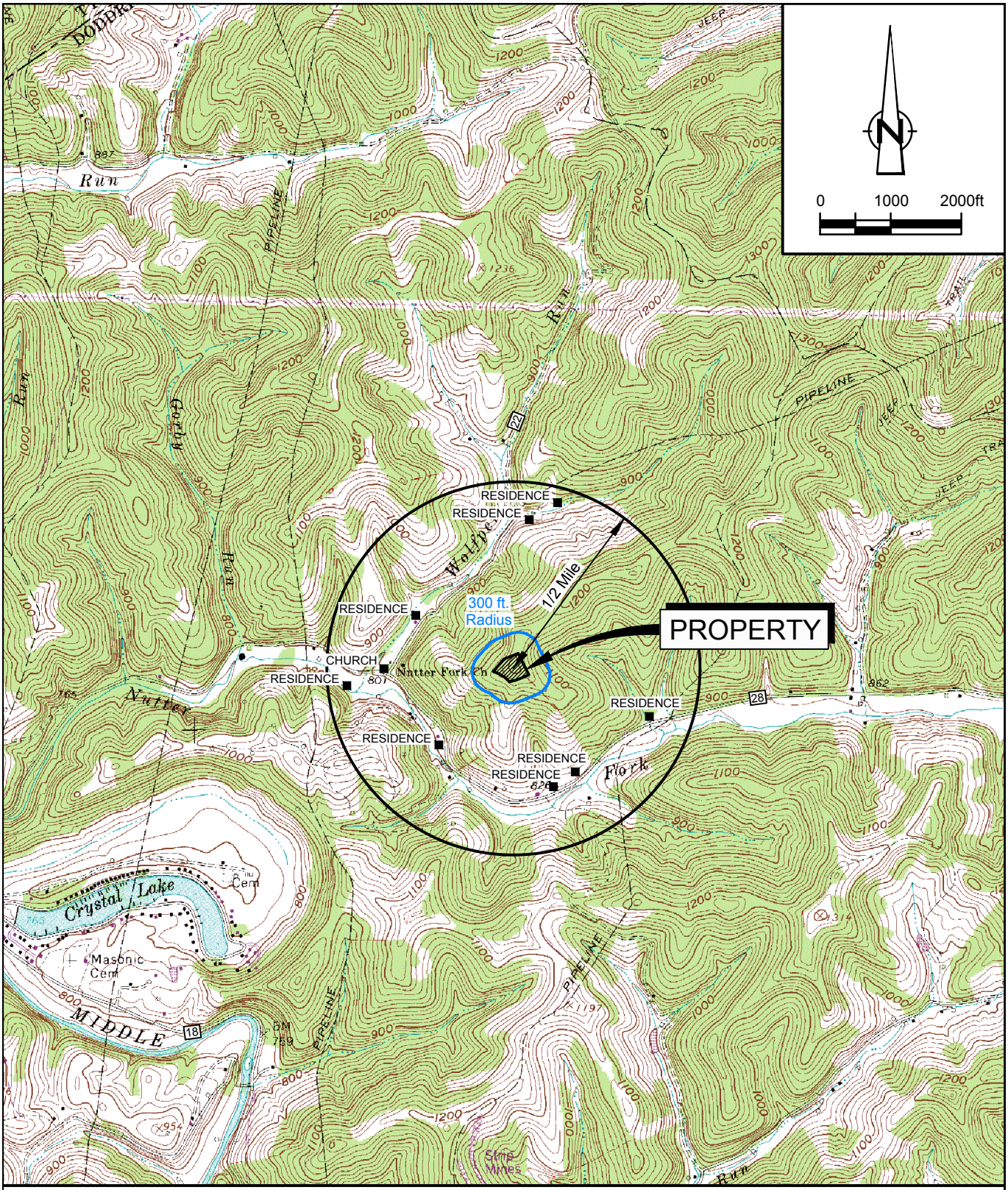
Attachment F

PLOT PLAN
ALEXANDER WELL PAD
ANTERO RESOURCES

Doddridge County, West Virginia

82715-00(321)GN-WA002 MAY 3, 2017

Attachment G
Area Map



SOURCE: USGS QUADRANGLE MAP;
WEST UNION, WEST VIRGINIA

SITE COORDINATES: 39.335875, -80.775574
SITE ELEVATION: 1181 ft AMSL

GHD

Attachment G

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

82715-00(321)GN-WA003 MAY 3, 2017

Attachment H
G70-C 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.*

11

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, GPU002, GPU003, GPU004, GPU005, GPU006, GPU007, GPU008	EP-GPU001, EP-GPU002, EP-GPU003, EP-GPU004, EP-GPU005, EP-GPU006, EP-GPU007, EP-GPU008	Gas Production Unit Heater	2018		1.5 MMBtu/hr	New	N/A	
GPU009,GPU010	EP-GPU009, EP-GPU010	Gas Production Unit Heater	2018		1.5 MMBtu/hr	New	N/A	
LH001 -010	EP-LH001 -010	Line Heater	2018		2.0 MMBtu/hr	New	N/A	
F001	F001	Fugitives	2018		N/A	New	N/A	
TANKCOND001-008	EP-EC001, EP-EC002, EP-EC003	Condensate Tank F/W/B	2018		400 bbl each	New	EP-EC001, EP-EC002, EP-EC003	
TANKCOND009-010	EP-EC001, EP-EC002, EP-EC003	Condensate Tank F/W/B	NA		400 bbl each	Removal	EP-EC001, EP-EC002, EP-EC003	
TANKPW001-002	EP-EC001, EP-EC002, EP-EC003	PW Tank F/W/B	2018		400 bbl each	New	EP-EC001, EP-EC002, EP-EC003	
TANKPW003-004	EP-EC001, EP-EC002, EP-EC003	PW Tank F/W/B	2018		400 bbl each	New	EP-EC001, EP-EC002, EP-EC003	
L001	EP-L001	Loading (Condensate)	2018		10,080 gal/hr 20,848,800 gal/yr	New	N/A	
L002	EP-L002	Loading (Produced Water)	2018		10,080 gal/hr 91,980,000 gal/yr	New	N/A	
HR001	EP-HR001	Haul Road	2018		Tanker Trucks Condensate: 2758 trips per year Tanker Trucks PW: 19910 trips per year Pick Up Truck: 730 trips per year	New	N/A	
EC001	EP-EC001	Enclosed Combustor	NA		18.4 MMBtu/hr	Removal	N/A	
EC001	EP-EC001	Enclosed Combustor	2018		12 MMBtu/hr	New	N/A	
EC002	EP-EC002	Enclosed Combustor	2018		12 MMBtu/hr	New	N/A	
EC003	EP-EC003	Enclosed Combustor	2018		12 MMBtu/hr	New	N/A	
PCV	EP-PCV	Pneumatic CV	2018		6.6 scf/day/PCV	New	N/A	
ENG001	EP-ENG001	Compressor Engine	NA	2013	24 HP	Removal	Non-Selective Catalytic Reduction	
ENG001-003	EP-ENG001-003	High Pressure VRU Compressor Engine	2018	2015	76 HP	New	Non-Selective Catalytic Reduction	
ENG004	ENG004	Low Pressure VRU Compressor Engine	2018	2015	76 HP	New	Non-Selective Catalytic Reduction	

1 For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S, ... or other appropriate designation.
2 For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.
3 When required by rule.
4 New, modification, removal, existing.
5 For Control Devices use the following numbering system: 1C, 2C, 3C, ... or other appropriate designation.
6 For ERDs use the following numbering system: 1D, 2D, 3D, ... or other appropriate designation.

Attachment J
Fugitive Emissions Summary Sheet

ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

Sources of fugitive emissions may include loading operations, equipment leaks, blowdown emissions , etc.
Use extra pages for each associated source or equipment if necessary.

Source/Equipment:

Leak Detection Method Used	☐ 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	500	EPA	gas	2.333	0.294	14.584	364.612
Valves	☐ Yes ☑ No	520	EPA	liquid	12.232	0.991	0.099	2.479
Connections (Not sampling)	☐ Yes ☑ No	590	EPA	gas	0.122	0.015	0.765	19.122
Flanges	☐ Yes ☑ No	130	EPA	gas	0.053	0.007	0.329	8.216

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?
	12/11/2018	7/25/2018	Green	OOOOa
	12/17/2018	8/6/2018	Green	OOOOa
	12/24/2018	8/19/2018	Green	OOOOa
	12/30/2018	9/1/2018	Green	OOOOa
	1/5/2019	9/14/2018	Green	OOOOa
	1/3/2019	9/27/2018	Green	OOOOa
	12/29/2018	10/8/2018	Green	OOOOa
47-017-06670-00	12/23/2018	10/20/2018	Green	OOOOa
	12/17/2018	11/1/2018	Green	OOOOa
47-017-06791-00	12/11/2018	11/13/2018	Green	OOOOa

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

This is the same API (American Petroleum Institute) well number(s) provided in the well completion notification and as provided to the WVDEP, Office of Oil and Gas for the well permit. The API number 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 001-08
3. Emission Unit ID number: TANKCOND001-008	4. Emission Point ID number. EP-EC001, EP-EC002, EP-EC003
5. Date Installed , Modified or Relocated (for existing tanks)	6. Type of change:
2018 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): 20848800	13B. Maximum daily throughput (gal/day): 57120
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 156	15. Maximum tank fill rate (gal/min) 151.2

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

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

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

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

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

☐ External Floating Roof ☐ pontoon roof ☐ double deck roof

☐ Domed External (or Covered) Floating Roof

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

☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm

☐ Pressurized ☐ spherical ☐ cylindrical

☐ other

ATTACHMENT L – STORAGE VESSEL DATA SHEET

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply

☐ Inert Gas Blanket of

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

☐ Conservation Vent (psig)

Vacuum 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 2018

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)	2.9043
39A. Average Liquid Surface Temperature (°F)	72.10	39B. Corresponding Vapor Pressure (psia)	4.6968
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	5.0290

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)	5.9300		
41D. Liquid Molecular Weight (lb/lb-mole)	106.50		
41E. Vapor Molecular Weight (lb/lb-mole)	39.2598		
Maximum Vapor Pressure 41F. True (psia)	5.0290		
41G. Reid (psia)	6.09		
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) 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	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): 91980000	13B. Maximum daily throughput (gal/day): 252000
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 1369	15. Maximum tank fill rate (gal/min) 151.2

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 2018

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 ☐ 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))	1030.236	35. Atmospheric Pressure (psia): 14.8 (based off local conditions, could not find annual)	

LIQUID INFORMATION

36. Average daily temperature range of bulk liquid (F):	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)	0.2281
39A. Average Liquid Surface Temperature (°F)	72.10	39B. Corresponding Vapor Pressure (psia)	0.4526
40A. Maximum Liquid Surface Temperature (°F)	75.94	40B. Corresponding Vapor Pressure (psia)	0.4990

41. Provide the following for each 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)	18.51		
41E. Vapor Molecular Weight (lb/lb-mole)	18.5079		
Maximum Vapor Pressure 41F. True (psia)	0.4990		
41G. Reid (psia)	1.0336		
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.	169 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	2018	New	1.5	1197.2056
GPU002	EP-GPU002	Gas Production Unit Heater	2018	New	1.5	1197.2056
GPU003	EP-GPU003	Gas Production Unit Heater	2018	New	1.5	1197.2056
GPU004	EP-GPU004	Gas Production Unit Heater	2018	New	1.5	1197.2056
GPU005	EP-GPU005	Gas Production Unit Heater	2018	New	1.5	1197.2056
GPU006	EP-GPU006	Gas Production Unit Heater	2018	New	1.5	1197.2056
GPU007	EP-GPU007	Gas Production Unit Heater	2018	New	1.5	1197.2056
GPU008	EP-GPU008	Gas Production Unit Heater	2018	New	1.5	1197.2056
GPU009	EP-GPU009	Gas Production Unit Heater	2018	New	1.5	1197.2056
GPU010	EP-GPU010	Gas Production Unit Heater	2018	New	1.5	1197.2056
LH001	EP-LH001	Line Heater	2018	New	2	1197.2056
LH002	EP-LH002	Line Heater	2018	New	2	1197.2056
LH003	EP-LH003	Line Heater	2018	New	2	1197.2056
LH004	EP-LH004	Line Heater	2018	New	2	1197.2056
LH005	EP-LH005	Line Heater	2018	New	2	1197.2056
LH006	EP-LH006	Line Heater	2018	New	2	1197.2056
LH007	EP-LH007	Line Heater	2018	New	2	1197.2056
LH008	EP-LH008	Line Heater	2018	New	2	1197.2056
LH009	EP-LH009	Line Heater	2018	New	2	1197.2056
LH010	EP-LH010	Line Heater	2018	New	2	1197.2056

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

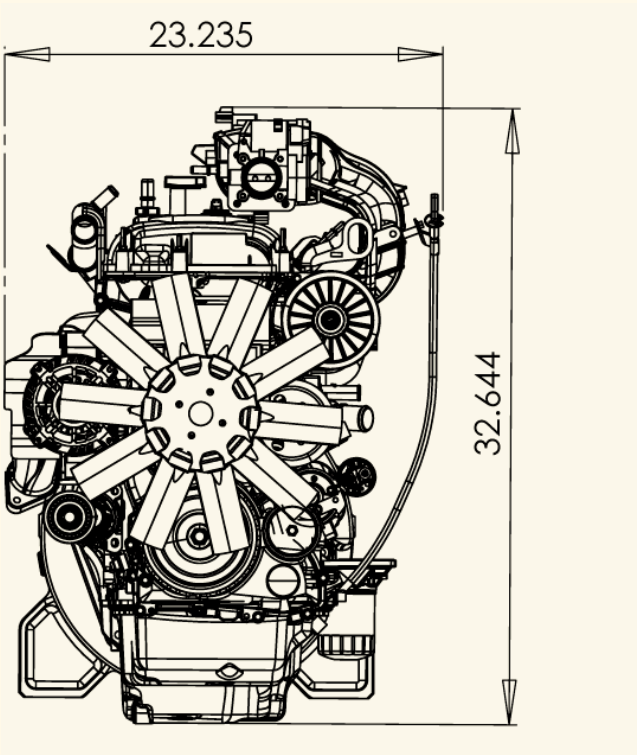
Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form.*

Emission Unit ID#	ENG001	ENG001-004
Engine Manufacturer/Model	Engine (Kubota DG972-E2)	Ford MSG425 2.5L Engine
Manufacturers Rated bhp/rpm	24 HP @ 3600 rpm	76 HP @ 3200 rpm
Source Status	REM	NS
Date Installed/ Modified/ Removed/ Relocated	NA	2018
Engine Manufacturer/ Reconstruction Date	2013	2015
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
Engine Type	4SRB	4SRB
APCD Type	NSCR	NSCR
Fuel Type	RG	RG
H2S (gr/ 100 scf)	0	0
Operating bhp/rpm	16.5 HP @ 2400 rpm	50 HP @ 2300 rpm
BSFC (BTU/bhp-hr)	9599	8261
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
Fuel Usage or Hours of Operation Metered	1.6907 $MMft^3/yr$ gal/yr	3.022 $MMft^3/yr$ gal/yr

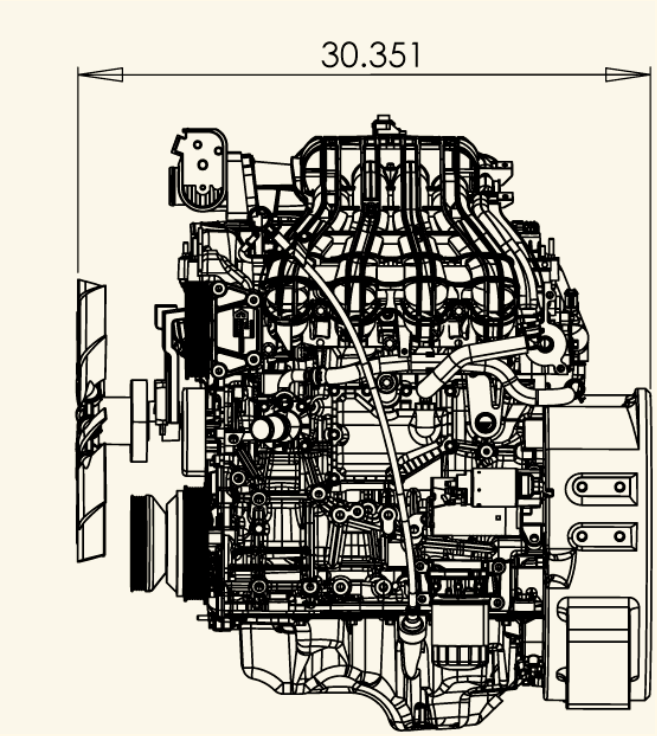
Calculation Methodology	Pollutant	Hourly PTE (lb/hr)	Annual PTE (tons/year)	Hourly PTE (lb/hr)	Annual PTE (tons/year)
MD	NOx			0.2501	1.0953
MD	CO			1.6505	7.2293
AP	VOC			0.0743	0.3256
AP	SO2			0.0015	0.0065
AP	PM10			0.0239	0.1045
AP	Formaldehyde			0.0515	0.2255
AP	Total HAPs			0.0576	0.2525
OT	GHG (CO2e)			290.6782	1273.1704

Installation Drawings

Front End View

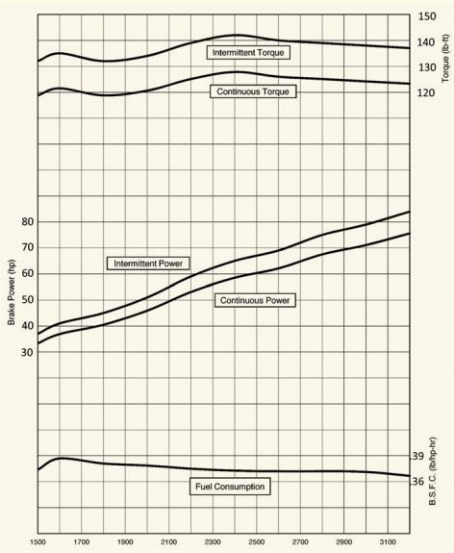


Left Side View

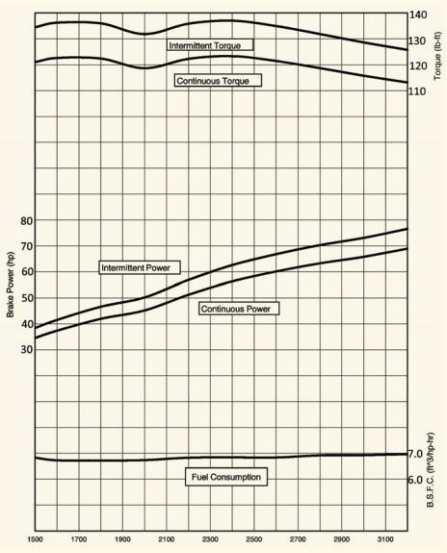


Power Curves (corrected per SAE J1349)

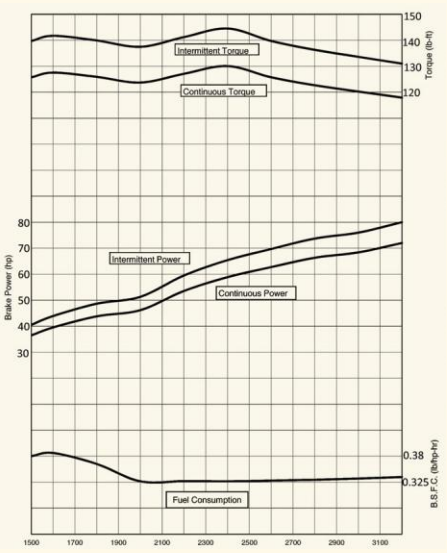
Gasoline



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

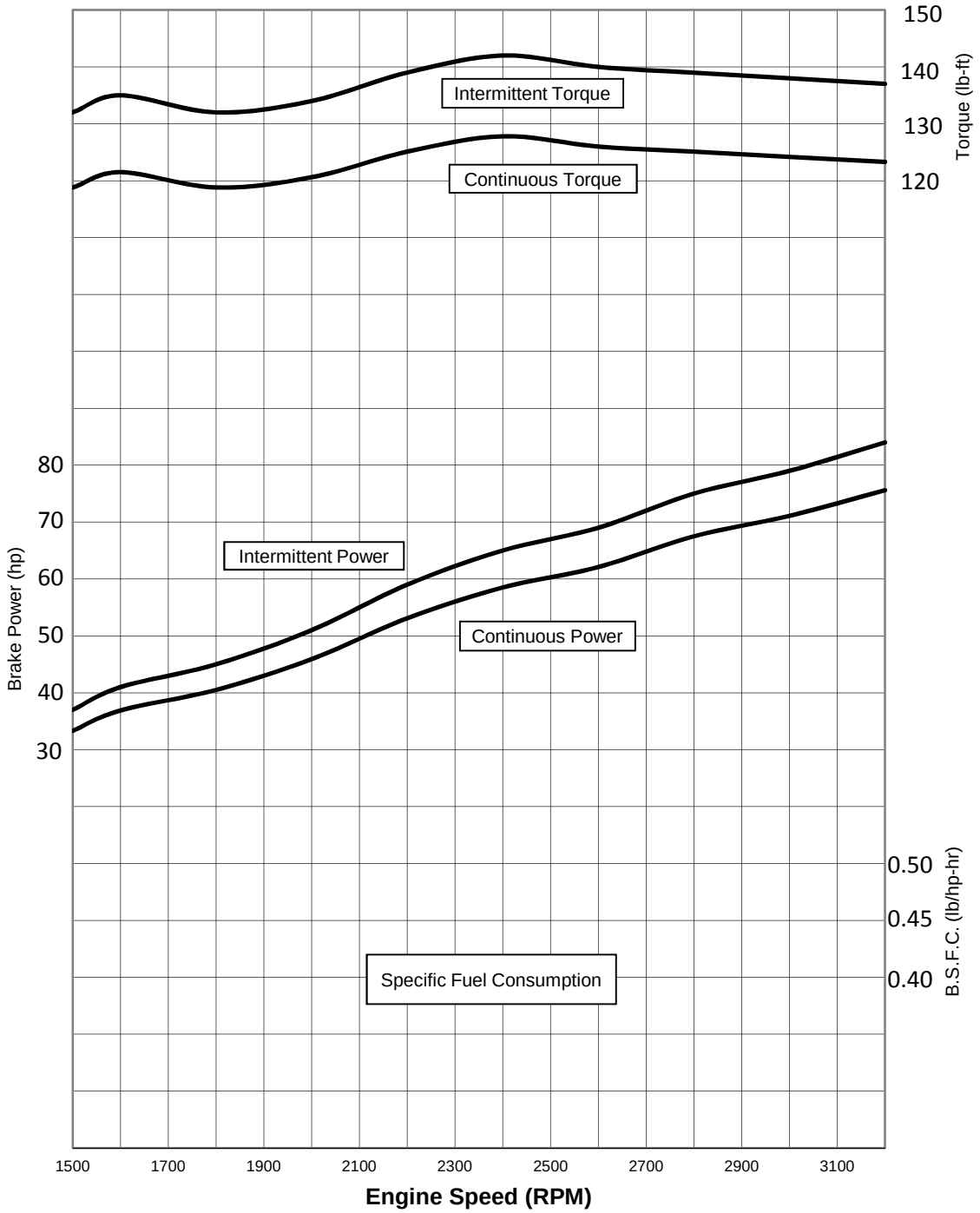
Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 40 CFR Part 1048, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with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

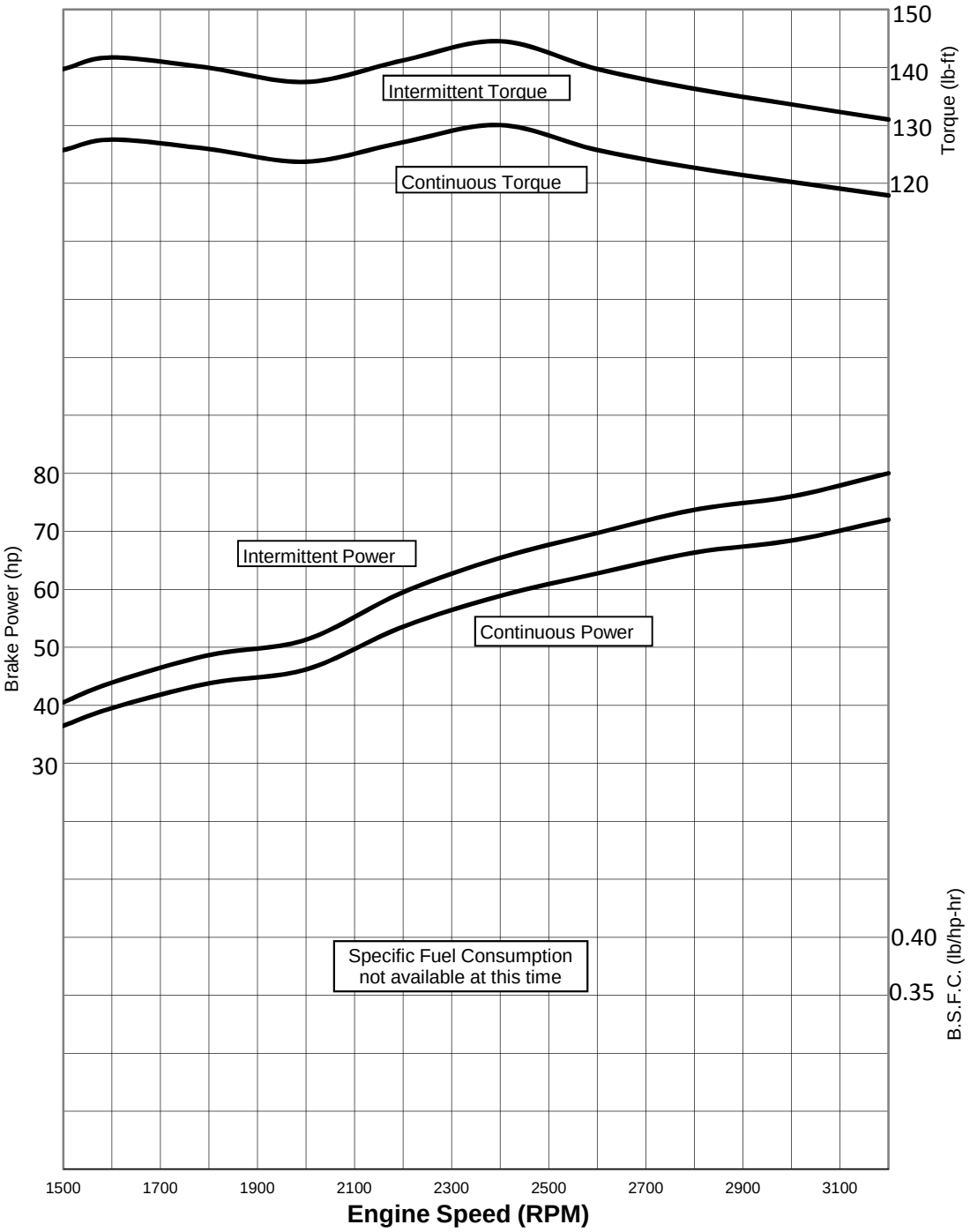
It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons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

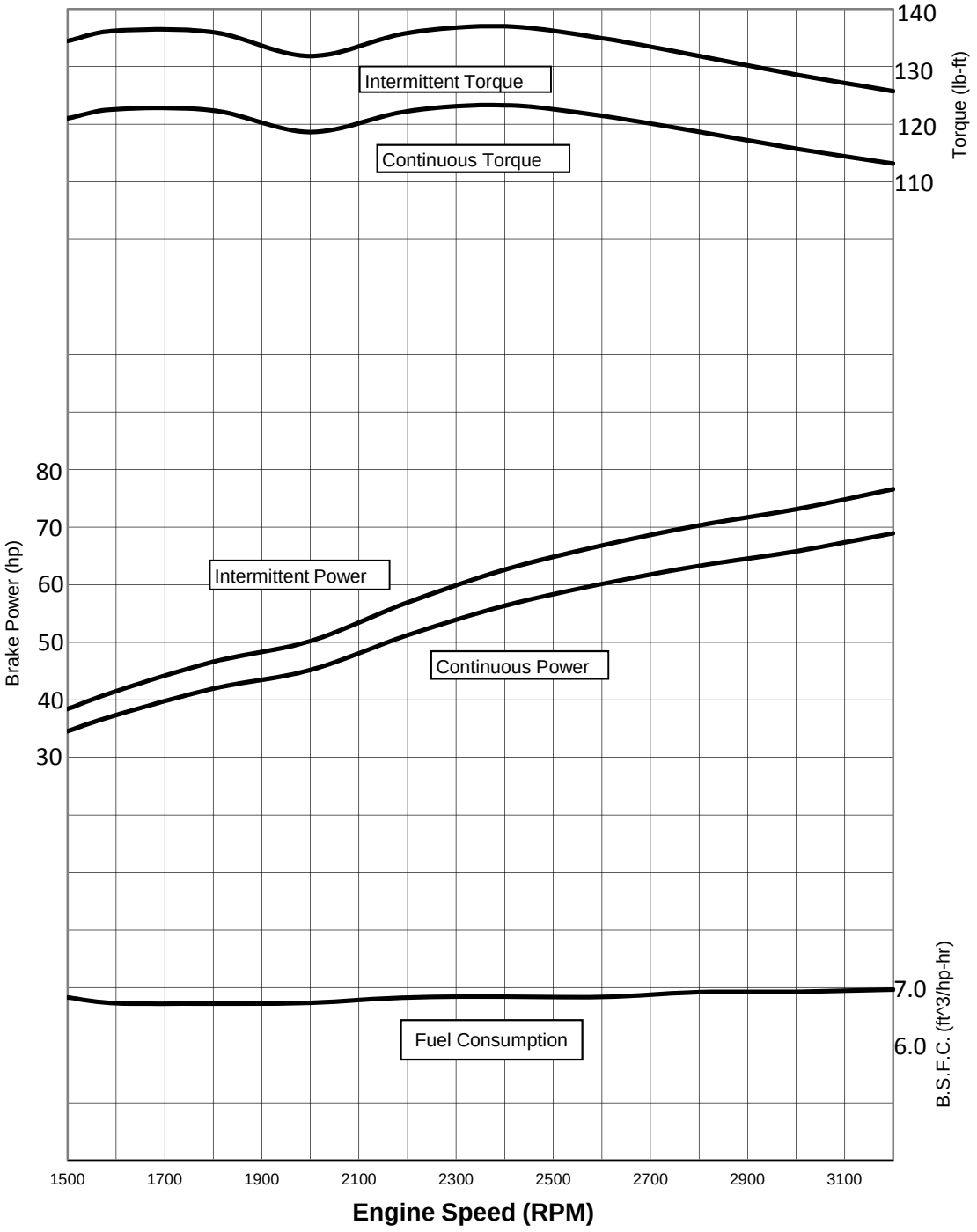
Gasoline


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)

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:	2018

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	17	17	17	17
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)		57.12	252.00	
Max. Annual Throughput (1000 gal/yr)		20848.80	91980.00	
Loading Method		BF	BF	
Max. Fill Rate (gal/min)		151.2	151.2	
Average Fill Time (min/loading)		50	50	
Max. Bulk Liquid Temperature (F)		72.1	72.1	
True Vapor Pressure		4.7	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)	13.9119	0.0011	
	Annual (ton/yr)	14.3872	0.0049	
Max HAP Emission Rate	Loading (lb/hr)	1.4248	1.19E-05	
	Annual (ton/yr)	1.4735	5.43E-05	
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 Q
Pneumatic Controllers Data Sheet

ATTACHMENT Q – PNEUMATIC CONTROLLERS DATA SHEET

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Attachment R
Pneumatic Pump Data Sheet

ATTACHMENT R – PNEUMATIC PUMP DATA SHEET

Are there any natural gas-driven diaphragm pumps located at a well site that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list.

Source ID #	Date	Pump Make/Model	Pump Size

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		Maximum Design Heating Input (from mfg. spec sheet)	Design Heat Content
5458 scfh	131000 scfd	12.0 MMBTU/hr	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
TANKCOND001-008	Condensate Tanks		
TANKPW001-002 TANKPW003-004	Produced Water Tanks		

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

Assist Type (Flares only)	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
21.78 (scfm)	1,638.01 BTU/ft^3	0.0417 (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	20352 BTU/hr	☑ Yes ☐ No

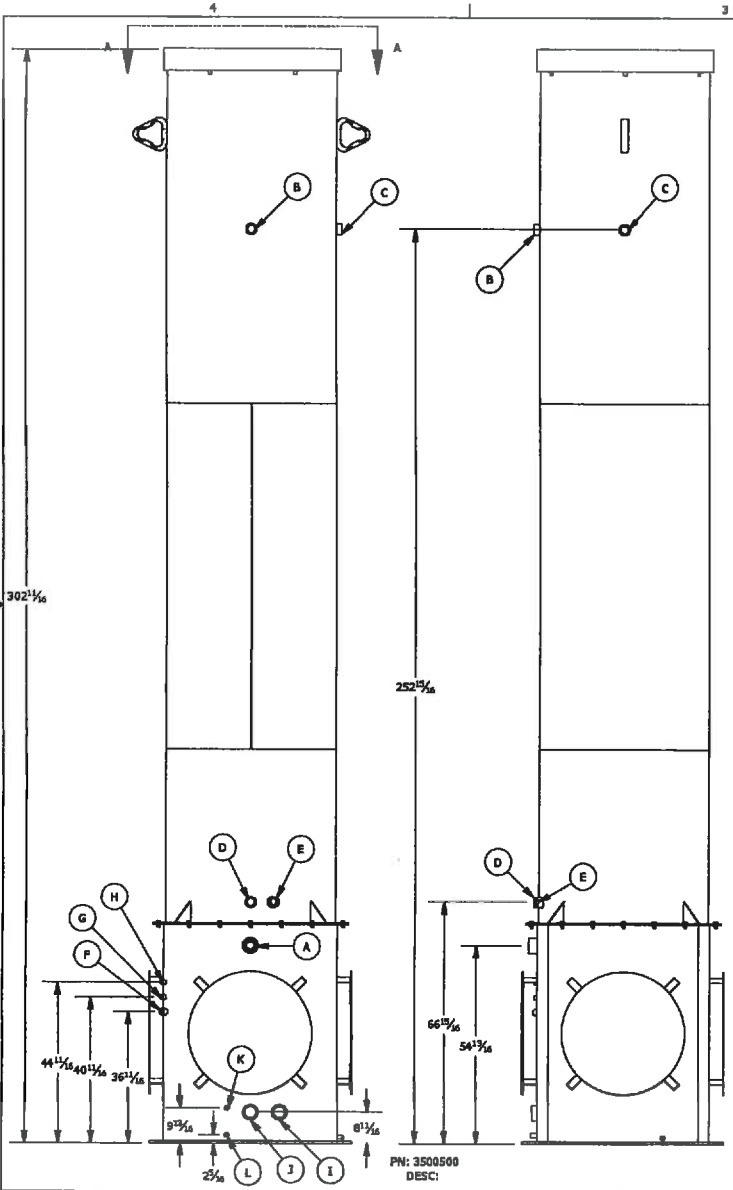
If automatic re-ignition is used, please describe the method. Flame Rectification, a thermocouple equivalent

Is pilot flame equipped with a monitor to detect the presence of the flame?	If Yes, What type?
☑ Yes ☐ No	☐ Thermocouple ☐ Infrared ☐ Ultraviolet ☐ Camera ☑ Other: Flame Ionization Rod

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

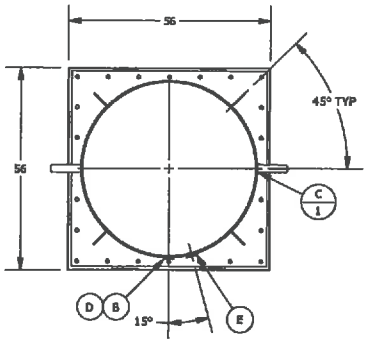
Additional information attached? ☑ Yes ☐ No Manufacturer's specs sheet

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
Alexander 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	Alexander Well Pad
Nearest City/Town	West Union
API Number/SIC Code	1311
Latitude/Longitude	39.335875, -80.775574
County	Doddridge County

Technical Information	
Max Condensate Site Throughput (bbl/day):	1,360
Max Produced Water Site Throughput (bbl/day):	6,000
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	10
IC Engines	4
Gas Production Unit Heaters	10
Line Heaters	10
Condensate Tanks	8
Produced Water Tanks	4
Loading Jobs	2
Vapor Recovery Towers	4
Enclosed Combustors	3

Table 2

Uncontrolled/Controlled Emissions Summary
Alexander 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 Heaters)																										
Fugitive Emissions (Component Count, PCV and Hauling)[1]	3.4258	15.0052			3.9803	17.4338	99.510	435.85							2.7766	15.2223			0.3061	1.3405	0.0028	0.0121	6.46E-02	2.83E-01		
Flashing, Working and Breathing (F/W/B) Losses[2]	41.4991	181.7659			20.4036	89.3676	511.1688	2238.9192											4.3616	19.1038	0.0206	0.0903	0.0930	0.4074		
VRU Engine Emissions[3]	0.0743	0.3256	0.2501	1.0953	0.5776	2.5298	290.6782	1273.1704	1.6505	7.2293	0.0015	0.0065	0.0239	0.1045	0.0239	0.1045			0.0576	0.2525	0.0040	0.0174	0.0005	0.0021	0.0515	0.2255
Gas Production Unit Heater Emissions[4]	0.0689	0.3018	1.2529	5.4878	0.0672	0.2945	1,503.50	6,585.34	1.0525	4.6097	0.0075	0.0329	0.0952	0.4171	0.0952	0.4171	6.26E-06	2.74E-05	0.024	0.103	2.63E-05	1.15E-04			0.0009	0.0041
Line Heater Emissions[4]	0.0919	0.4024	1.6706	7.3170			2,004.67	8,780.45	1.4033	6.1463	0.0100	0.0439	0.1270	0.5561	0.1270	0.5561	8.35E-06	3.66E-05	0.031	0.138	3.51E-05	1.54E-04			0.0013	0.0055
TOTALS:	**45.1600**	**197.8010**	**3.1736**	**13.9002**	**25.0287**	**109.6257**	**4409.5263**	**19313.7253**	**4.1062**	**17.9853**	**0.0190**	**0.0833**	**0.2460**	**1.0777**	**3.0227**	**16.3000**	**1.46E-05**	**6.40E-05**	**4.7803**	**20.9378**	**0.0274**	**0.1201**	**0.1581**	**0.6925**	**0.0537**	**0.2351**
UNCONTROLLED (Truck Loading Emissions)																										
Truck Loading Emissions[5]	13.9130	14.3922			0.2896	0.4309	7.3385	11.0392											1.4248	1.4735	0.0029	3.02E-03	0.0134	0.0139		
CONTROLLED EMISSIONS																										
Enclosed Combustor Emissions (from F/W/B losses)[6]	0.8303	3.6365	2.4531	10.7446	0.4437	1.9436	306.3501	1341.8136	11.1643	48.8996	3.06E-05	0.0001	0.0077	0.0339	0.0103	0.0452	6.79E-07	2.97E-06	0.0873	0.3825	0.0004	0.0018	0.0019	0.0081	3.83E-06	1.68E-05
Controlled Fugitive Emissions from Hauling															1.3883	7.6112										
TOTALS:	**0.830**	**3.637**	**2.453**	**10.745**	**0.444**	**1.944**	**306.350**	**1341.814**	**11.164**	**48.900**	**3.06E-05**	**1.34E-04**	**0.008**	**0.034**	**1.399**	**7.656**	**6.79E-07**	**2.97E-06**	**0.087**	**0.382**	**4.12E-04**	**1.81E-03**	**1.86E-03**	**0.008**	**3.83E-06**	**1.68E-05**
POTENTIAL TO EMIT[7]	**4.4912**	**34.0637**	**5.6267**	**24.6447**	**5.0689**	**22.6326**	**4204.7077**	**18427.6589**	**15.2705**	**66.8849**	**0.0190**	**0.0834**	**0.2538**	**1.1116**	**1.6447**	**8.7340**	**1.53E-05**	**6.70E-05**	**0.5061**	**3.6901**	**0.0072**	**0.0346**	**0.0670**	**0.3072**	**0.0537**	**0.2351**
POTENTIAL TO EMIT (Excluding Fugitives)	**1.0654**	**19.0586**	**5.6267**	**24.6447**	**1.0886**	**5.1988**	**4105.1977**	**17991.8049**	**15.2705**	**66.8849**	**0.0190**	**0.0834**	**0.2538**	**1.1116**	**0.2564**	**1.1229**	**1.53E-05**	**6.70E-05**	**0.2000**	**2.3495**	**0.0044**	**0.0225**	**0.0023**	**0.0242**	**0.0537**	**0.2351**

Enter any notes here:	1 - See Tables 4 and 5 for fugitive emission calculations; Table 12 for PM emissions from hauling. 2 - See Tables 6 and 7 for tanks emission calculations 3 - See Table 13 for engine emissions 4 - See Table 9 for gas production unit heater and line heater emission calculations 5 - The maximum emission was calculated based on tank truck capacity of 180 barrels and actual fill rate of 45 minutes per tank truck. At a production rate of 1360 barrels per day, VOC emissions would be 13.913 pounds per hour when there are truck loading activities. Average hourly VOC emissions from truck loading is 3.2859 pound per hour. 6- See Table 10 and 11 for enclosed combustion emission calculations. 7 - The hourly potential to emit is the sum of emissions from gas production unit heaters, line heaters, engine, storage tanks, enclosed combustors, and fugitives. Does not include emissions from loading (see footnote 5). The total TPY PTE is the sum of all emissions. PM 10 TPY is the sum of uncontrolled hauling and other PM10 sources.

Table 3

Permits Summary

Alexander Well Pad

Doddridge County, West Virginia

Antero Resources Corporation

Pollutant		Emissions		Threshold Exceeded?		
		Uncontrolled	Controlled	Threshold	Uncontrolled	Controlled
VOC	lbs/hr	45.1600	4.4912	6	**Yes**	
	tons/yr	212.1931	34.0637	10	**Yes**	**Yes**
NO_X	lbs/hr	3.1736	5.6267	6		
	tons/yr	13.9002	24.6447	10	**Yes**	**Yes**
CH_4	lbs/hr	25.0287	5.0689			
	tons/yr	110.0566	22.6326			
CO	lbs/hr	4.1062	15.2705	6		**Yes**
	tons/yr	17.9853	66.8849	10	**Yes**	**Yes**
SO_2	lbs/hr	0.0190	0.0190	6		
	tons/yr	0.0833	0.0834	10		
$PM_{2.5}$	lbs/hr	0.2460	0.2538	6		
	tons/yr	1.0777	1.1116	10		
PM_{10}	lbs/hr	3.0227	1.6447	6		
	tons/yr	16.3000	8.7340	10	**Yes**	
Lead	lbs/hr	1.46E-05	1.53E-05	6		
	tons/yr	6.40E-05	6.70E-05	10		
Total HAPs	lbs/hr	4.7803	0.5061	2	**Yes**	
	tons/yr	22.4113	3.6901	5	**Yes**	
Total TAPs	lbs/hr	0.0811	0.0609	1.14		
n-Hexane	lbs/hr	4.3731	0.3289			
	tons/yr	20.5915	2.8778			
Toluene	lbs/hr	0.1005	0.0230			
	tons/yr	0.4523	0.1128			
Ethylbenzene	lbs/hr	0.0673	0.0261			
	tons/yr	0.3017	0.1213			
Xylenes	lbs/hr	0.1581	0.0670			
	tons/yr	0.7064	0.3072			
Benzene	lbs/hr	0.0274	0.0072			
	tons/yr	0.1231	0.0346			

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
Alexander 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	0.108
	Benzene frac	0.000
	Toluene	0.000
	Ethylbenzene	0.000
	Xylenes	0.000
	n-Hexane	0.014
	HAPs	0.014
	Methane	0.673

Gas					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
500	Valves	Gas VOC	0.004500	0.24	4,666.14
		Non VOC	0.004500	2.01	38,695.86
		HAPs	0.004500	0.03	587.54
		CO2e	0.004500	37.84	729,224.12
590	Connectors	VOC	0.000200	0.01	244.71
		Non-VOC	0.000200	0.11	2,029.38
		HAPs	0.000200	0.00	30.81
		CO2e	0.000200	1.98	38,243.75
130	Flanges	VOC	0.000390	0.01	105.14
		Non-VOC	0.000390	0.05	871.95
		HAPs	0.000390	0.00	13.24
		CO2e	0.000390	0.852628	16431.850069
			Total VOCs:	0.26	5016.00
			Total THC:	2.42	46613.19
			Total CH4:	1.63	31355.99

Light Liquid Weight Fraction From Analysis:	VOC frac	0.976
	Benzene frac	0.001
	Toluene	0.007
	Ethylbenzene	0.009
	Xylenes	0.023
	n-hexane	0.040
	HAPs	0.079
	Methane	0.008

Light Liquid					
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr
520	Valves	Light Liquid VOC	0.002500	1.27	24,464.32
		Light Liquid Non-VOC	0.002500	0.03	589.28
		Light Liquid HAPs	0.002500	0.10	1,982.74
		CO2e	0.002500	0.26	4958.49
			Total VOC:	1.27	24,464.32
			Total THC:	1.30	25,053.60
			Total CH4:	0.01	198.34

Fugitive Total Emissions			
	Annual Emissions (lb/yr)	Annual Emissions (lb/hr)	Annual Emissions (tpy)
VOC	29,480.32	3.37	14.74
Ethylbenzene		0.03	0.11
Toluene		0.02	0.09
Xylenes		0.06	0.28
n-Hexane		0.19	0.81
TAPs (Benzene)		0.00	0.01
HAPs		0.30	1.31
CH_4 [3]		3.60	15.78
CO_{2e}	788,858.21	90.05	394.43

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
Alexander Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Number of PCVs	40
Bleed Rate (scf/day/PCV)	6.6
Total Bleed Rate (scf/day)	264

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	0.4126	14.01	1.089264	2.87E-03	0.04	1.68E-03	0.01
Carbon Dioxide	0.1804	44.01	0.476256	1.26E-03	0.06	2.30E-03	1.01E-02
Methane	81.3454	16.04	214.751856	0.57	9.08	0.38	1.66
Ethane	14.1721	30.07	37.414344	0.10	2.96	0.12	0.54
Propane	2.1503	44.1	5.676792	0.01	0.66	0.03	0.12
Isobutane	0.415	58.12	1.0956	2.89E-03	0.17	0.01	0.03
n-Butane	0.6863	58.12	1.811832	4.77E-03	0.28	0.01	0.05
Isopentane	0.1795	72.15	0.47388	1.25E-03	0.09	3.75E-03	0.02
n-Pentane	0.1478	72.15	0.390192	1.03E-03	0.07	3.09E-03	0.01
2-Methylpentane	0.00E+00	86.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3-Methylpentane	0.00E+00	86.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
n-Hexane	0.305	86.18	0.8052	2.12E-03	0.18	0.01	0.03
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	0.0605	0.2650
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	0.0076	0.0334
HAPs Emissions	0.0076	0.0334
TAPs Emissions	0.00E+00	0.00E+00
CH_4 Emissions	0.3782	1.6566
CO_{2e} emissions	9.4577	41.4249

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
Alexander 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	0.3658	0.1825	0.7992	2.4461	0.7465	3.2695
H2S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0023	0.0012	0.0051	0.2697	0.0823	0.3604
Carbon Dioxide	0.2579	0.1286	0.5634	2.9466	0.8992	3.9385
Methane	4.9672	2.4776	10.8518	58.0805	17.7241	77.6314
Ethane	38.6441	19.2753	84.4257	26.1924	7.9930	35.0092
Propane	20.9313	10.4403	45.7286	4.0853	1.2467	5.4604
Isobutane	6.4477	3.2160	14.0862	3.3373	1.0184	4.4607
n-Butane	11.3668	5.6696	24.8329	1.5046	0.4591	2.0110
Isopentane	3.9630	1.9767	8.6580	0.3580	0.1093	0.4785
n-Pentane	3.4097	1.7007	7.4492	0.1197	0.0365	0.1599
2-Methylpentane	0.4043	0.2017	0.8833	0.0194	0.0059	0.0259
3-Methylpentane	0.2685	0.1339	0.5866	0.0308	0.0094	0.0412
n-Hexane	6.0605	3.0229	13.2403	0.1431	0.0437	0.1913
Methylcyclopentane	0.1205	0.0601	0.2633	0.0223	0.0068	0.0298
Benzene	0.0188	0.0094	0.0411	0.0296	0.0090	0.0395
2-Methylhexane	0.3711	0.1851	0.8106	0.0128	0.0039	0.0171
3-Methylhexane	0.2974	0.1483	0.6497	0.0123	0.0038	0.0165
Heptane	0.5893	0.2939	1.2874	0.0104	0.0032	0.0139
Methylcyclohexane	0.3912	0.1951	0.8546	0.0720	0.0220	0.0963
Toluene	0.0731	0.0365	0.1597	0.1101	0.0336	0.1471
Octane	0.7247	0.3615	1.5832	0.0053	0.0016	0.0071
Ethylbenzene	0.0388	0.0193	0.0847	0.0573	0.0175	0.0766
m & p-Xylene	0.0375	0.0187	0.0819	0.0523	0.0160	0.0699
o-Xylene	0.0497	0.0248	0.1087	0.0763	0.0233	0.1020
Nonane	0.1820	0.0908	0.3976	0.0015	0.0004	0.0019
C10+	0.0169	0.0084	0.0369	0.0043	0.0013	0.0058
Total VOCs	55.763	27.81	121.8	10.065	3.0714	13.4526
Total CO_{2e}		62.07	271.9		444.00	1,944.7
CH_4		2.48	10.85		17.72	77.63
Total TAPs (Benzene)		0.0094	0.0411		0.0090	0.0395
Toluene		0.0365	0.1597		0.0336	0.1471
Ethylbenzene		0.0193	0.0847		0.0175	0.0766
Xylenes		0.0435	0.1906		0.0392	0.1719
n-Hexane		3.023	13.240		0.0437	0.1913
Total HAPs		3.132	13.716		0.1430	0.6264
Total	100.00	49.88	218.5	100.00	30.516	133.66

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

Table 7

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

Condensate Tank Information	
Number of Tanks	8
Maximum Working Losses (lbs/hr)	9.5857
Maximum Breathing Losses (lbs/hr)	10.3501
# 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	0.0001	7.26E-06	3.18E-05	0.0000	0.0000	0.0000	0.0001
Carbon Dioxide	0.2022	0.0194	0.0849	0.0209	0.0917	0.0403	0.1766
Methane	0.9656	0.0926	0.4054	0.0999	0.4377	0.1925	0.8431
Ethane	45.5927	4.3704	19.1422	4.7189	20.6687	9.0892	39.8109
Propane	21.4229	2.0535	8.9944	2.2173	9.7117	4.2708	18.7062
Isobutane	6.2783	0.6018	2.6359	0.6498	2.8461	1.2516	5.4821
n-Butane	10.9948	1.0539	4.6162	1.1380	4.9843	2.1919	9.6005
Isopentane	3.5195	0.3374	1.4777	0.3643	1.5955	0.7016	3.0732
n-Pentane	2.9935	0.2869	1.2568	0.3098	1.3570	0.5968	2.6138
2-Methylpentane	0.3444	0.0330	0.1446	0.0356	0.1561	0.0687	0.3007
3-Methylpentane	0.2286	0.0219	0.0960	0.0237	0.1036	0.0456	0.1996
n-Hexane	5.3186	0.5098	2.2330	0.5505	2.4111	1.0603	4.6441
Methylcyclopentane	0.0942	0.0090	0.0395	0.0097	0.0427	0.0188	0.0822
Benzene	0.0111	1.06E-03	0.0046	0.0011	0.0050	0.0022	0.0097
2-Methylhexane	0.0875	8.39E-03	0.0368	0.0091	0.0397	0.0175	0.0764
3-Methylhexane	0.2570	0.0246	0.1079	0.0266	0.1165	0.0512	0.2244
Heptane	0.4892	0.0469	0.2054	0.0506	0.2218	0.0975	0.4272
Methylcyclohexane	0.3290	0.0315	0.1381	0.0340	0.1491	0.0656	0.2873
Toluene	0.0454	4.35E-03	1.91E-02	0.0047	0.0206	0.0090	0.0396
Octane	0.5930	0.0568	0.2490	0.0614	0.2688	0.1182	0.5178
Ethylbenzene	0.0261	2.50E-03	1.10E-02	0.0027	0.0118	0.0052	0.0228
m & p-Xylene	0.0235	2.25E-03	9.86E-03	0.0024	0.0106	0.0047	0.0205
o-Xylene	0.0279	2.68E-03	0.0117	0.0029	0.0127	0.0056	0.0244
Nonane	0.1456	0.0140	0.0611	0.0151	0.0660	0.0290	0.1271
C10+	0.0094	9.02E-04	0.0040	0.0010	0.0043	0.0019	0.0082
Total VOCs	53.239	5.1033	22.353	5.5103	24.1351	10.6136	46.488
Total CO_{2e}		2.3333	10.2200	2.5194	11.0350	4.8527	21.255
CH_4		0.0926	0.4054	0.0999	0.4377	0.1925	0.8431
Total TAPs (Benzene)		1.06E-03	4.65E-03	0.0011	0.0050	0.0022	0.0097
Toluene		4.35E-03	1.91E-02	0.0047	0.0206	0.0090	0.0396
Ethylbenzene		2.50E-03	1.10E-02	0.0027	0.0118	0.0052	0.0228
Xylenes		4.93E-03	0.0216	0.0053	0.0233	0.0102	0.0449
n-Hexane		0.5098	2.2330	0.5505	2.4111	1.0603	4.6441
Total HAPs		0.5227	2.2893	0.5643	2.4718	1.0870	4.7611
Total	100.00	9.5857	41.9852	10.3501	45.3334	19.9358	87.319

Table 7

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

Produced Water Tank Information	
Number of Tanks	4
Maximum Working Losses (lbs/hr)	0.2827
Maximum Breathing Losses (lbs/hr)	0.0167

	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	91.1628	0.2577	1.1287	0.0152	0.0667	0.2729	1.1954
H2S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.0052	1.48E-05	6.48E-05	8.75E-07	3.83E-06	1.57E-05	6.87E-05
Carbon Dioxide	3.9056	0.0110	0.0484	0.0007	0.0029	0.0117	0.0512
Methane	3.1382	0.0089	0.0389	0.0005	0.0023	0.0094	0.0412
Ethane	1.6969	0.0048	0.0210	0.0003	0.0012	0.0051	0.0223
Propane	0.0414	1.17E-04	0.0005	6.91E-06	3.03E-05	1.24E-04	0.0005
Isobutane	0.0452	1.28E-04	5.60E-04	7.56E-06	3.31E-05	1.35E-04	5.93E-04
n-Butane	0.0034	9.70E-06	4.25E-05	5.73E-07	2.51E-06	1.03E-05	4.50E-05
Isopentane	0.0002	6.06E-07	2.66E-06	3.58E-08	1.57E-07	6.42E-07	2.81E-06
n-Pentane	0.0000	5.79E-08	2.54E-07	3.42E-09	1.50E-08	6.13E-08	2.68E-07
2-Methylpentane	1.85E-06	5.24E-09	2.29E-08	3.09E-10	1.36E-09	5.55E-09	2.43E-08
3-Methylpentane	6.59E-06	1.86E-08	8.16E-08	1.10E-09	4.82E-09	1.97E-08	8.64E-08
n-Hexane	4.78E-06	1.35E-08	5.91E-08	7.98E-10	3.49E-09	1.43E-08	6.26E-08
Methylcyclopentane	5.73E-06	1.62E-08	7.10E-08	9.57E-10	4.19E-09	1.72E-08	7.52E-08
Benzene	4.60E-04	1.30E-06	5.70E-06	7.68E-08	3.37E-07	1.38E-06	6.03E-06
2-Methylhexane	7.34E-08	2.08E-10	9.09E-10	1.23E-11	5.37E-11	2.20E-10	9.63E-10
3-Methylhexane	2.80E-07	7.92E-10	3.47E-09	4.68E-11	2.05E-10	8.38E-10	3.67E-09
Heptane	7.47E-08	2.11E-10	9.25E-10	1.25E-11	5.47E-11	2.24E-10	9.80E-10
Methylcyclohexane	5.98E-06	1.69E-08	7.40E-08	9.99E-10	4.37E-09	1.79E-08	7.84E-08
Toluene	3.70E-04	1.05E-06	4.58E-06	6.18E-08	2.71E-07	1.11E-06	4.85E-06
Octane	4.73E-09	1.34E-11	5.86E-11	7.90E-13	3.46E-12	1.42E-11	6.20E-11
Ethylbenzene	5.84E-05	1.65E-07	7.24E-07	9.76E-09	4.28E-08	1.75E-07	7.66E-07
m & p-Xylene	3.36E-05	9.50E-08	4.16E-07	5.61E-09	2.46E-08	1.01E-07	4.41E-07
o-Xylene	7.60E-05	2.15E-07	9.41E-07	1.27E-08	5.56E-08	2.28E-07	9.97E-07
Nonane	4.12E-10	1.16E-12	5.10E-12	6.88E-14	3.01E-13	1.23E-12	5.40E-12
C10+	6.64E-10	1.88E-12	8.22E-12	1.11E-13	4.86E-13	1.99E-12	8.70E-12
Total VOCs	0.0913	2.58E-04	0.0011	1.52E-05	6.68E-05	2.73E-04	0.0012
Total CO_{2e}		0.2328	1.0198	0.0138	0.0603	0.2466	1.0800
CH_4		0.0089	0.0389	0.0005	0.0023	0.0094	0.0412
Total TAPs (Benzene)		1.30E-06	5.70E-06	7.68E-08	3.37E-07	1.38E-06	6.03E-06
Toluene		1.05E-06	4.58E-06	6.18E-08	2.71E-07	1.11E-06	4.85E-06
Ethylbenzene		1.65E-07	7.24E-07	9.76E-09	4.28E-08	1.75E-07	7.66E-07
Xylenes		3.10E-07	1.36E-06	1.83E-08	8.02E-08	3.28E-07	1.44E-06
n-Hexane		1.35E-08	5.91E-08	7.98E-10	3.49E-09	1.43E-08	6.26E-08
Total HAPs		2.83E-06	1.24E-05	1.68E-07	7.34E-07	3.00E-06	1.31E-05
Total	100.00	0.2827	1.2382	0.0167	0.0732	0.2994	1.3113

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

Table 8

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

Annual Loading	Oil Truck Loading	Water Truck Loading
RVP	6.09	1.0336
Annual Average Temp (F)	72.1	72.1
S (saturation factor)	0.6	0.6
P (true vapor pressure)	4.70	0.45
M (MW of vapor)	39.26	18.51
Collection Efficiency (%)	0.00	0.00
Total Hydrocarbon Loading Loss (lb/10^3 gal)*	2.59	0.12
Maximum Throughput (gallons/hr)**	10,080	10,080
Average Throughput (gallons/yr)	20,848,800	91,980,000
Total Hydrocarbon Loading Emissions (lbs/hr)	26.13	1.19
Total Hydrocarbon Loading Emissions (tpy)	27.02	5.42

	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	0.0001	1.98E-05	2.05E-05	0.0052	6.22E-05	2.84E-04
Carbon Dioxide	0.2022	0.0528	5.46E-02	3.9056	4.64E-02	2.12E-01
Methane	0.9656	0.2523	2.61E-01	3.1382	3.73E-02	1.70E-01
Ethane	45.5927	11.9138	12.3209	1.6969	2.01E-02	9.19E-02
Propane	21.4229	5.5980	5.79E+00	0.0414	4.91E-04	2.24E-03
Isobutane	6.2783	1.6406	1.70E+00	0.0452	5.37E-04	2.45E-03
n-Butane	10.9948	2.8730	2.97E+00	0.0034	4.07E-05	1.86E-04
Isopentane	3.5195	0.9197	9.51E-01	0.0002	2.55E-06	1.16E-05
n-Pentane	2.9935	0.7822	8.09E-01	0.0000	2.43E-07	1.11E-06
2-Methylpentane	0.3444	0.0900	9.31E-02	1.85E-06	2.20E-08	1.00E-07
3-Methylpentane	0.2286	0.0597	6.18E-02	6.59E-06	7.82E-08	3.57E-07
n-Hexane	5.3186	1.3898	1.44E+00	4.78E-06	5.67E-08	2.59E-07
Methylcyclopentane	0.0942	0.0246	2.54E-02	5.73E-06	6.80E-08	3.10E-07
Benzene	0.0111	0.0029	2.99E-03	0.0005	5.46E-06	2.49E-05
2-Methylhexane	0.0875	0.0229	2.37E-02	7.34E-08	8.72E-10	3.98E-09
3-Methylhexane	0.2570	0.0671	6.94E-02	2.80E-07	3.32E-09	1.52E-08
Heptane	0.4892	0.1278	1.32E-01	7.47E-08	8.87E-10	4.05E-09
Methylcyclohexane	0.3290	0.0860	8.89E-02	5.98E-06	7.10E-08	3.24E-07
Toluene	0.0454	0.0119	1.23E-02	0.0004	4.39E-06	2.00E-05
Octane	0.5930	0.1549	1.60E-01	4.73E-09	5.62E-11	2.56E-10
Ethylbenzene	0.0261	0.0068	7.06E-03	5.84E-05	6.94E-07	3.17E-06
m & p-Xylene	0.0235	0.0061	6.34E-03	3.36E-05	3.99E-07	1.82E-06
o-Xylene	0.0279	0.0073	7.54E-03	7.60E-05	9.02E-07	4.12E-06
Nonane	0.1456	0.0380	3.93E-02	4.12E-10	4.89E-12	2.23E-11
C10+	0.0094	0.0025	2.54E-03	6.64E-10	7.88E-12	3.60E-11
Total VOCs	53.2392	13.9119	14.3872	0.0913	1.08E-03	4.94E-03
Total CH_4		0.2523	0.2609		0.0373	0.1700
Total CO_{2e}		6.3608	6.5781		0.9778	4.4611
Total TAPs (Benzene)		0.0029	2.99E-03		5.46E-06	2.49E-05
Toluene		0.0119	1.23E-02		4.39E-06	2.00E-05
Ethylbenzene		0.0068	7.06E-03		6.94E-07	3.17E-06
Xylenes		0.0134	1.39E-02		1.30E-06	5.94E-06
n-Hexane		1.3898	1.44E+00		5.67E-08	2.59E-07
Total HAPs		1.4248	1.47E+00		1.19E-05	5.43E-05
Total	100.0000	26.1310	27.0238	100.0000	1.1872	5.4165

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 180 barrels condensate in 45 minutes and 110 barrels produced water in 27.5 minutes. (10,080 gal/hr = 180 bbl / 45 min x 42 gal/bbl x 60 min/hr; 10,080 gal/hr = 110 bbl /27.5 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
Alexander Well Pad
Doddridge County, West Virginia
Antero Resources Corporation

Gas Production Unit Heater Emissions

Number of Units	10
GPU Heater Rating (MMBtu/hr)	1.50
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,197.2056

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.253	5.488
CO	84	1.052	4.610
CO_2	120,000	1503.501	6585.335
Lead	0.0005	6.26E-06	2.74E-05
N_2O	2.2	0.028	0.121
PM (Total)	7.6	0.095	0.417
SO_2	0.6	0.008	0.033
TOC	11	0.138	0.604
Methane	2.3	0.029	0.126
VOC	5.5	0.069	0.302
HAPS			
2-Methylnaphthalene	2.40E-05	3.01E-07	1.32E-06
Benzene	2.10E-03	2.63E-05	1.15E-04
Dichlorobenzene	1.20E-03	1.50E-05	6.59E-05
Fluoranthene	3.00E-06	3.76E-08	1.65E-07
Fluorene	2.80E-06	3.51E-08	1.54E-07
Formaldehyde	7.50E-02	9.40E-04	4.12E-03
Hexane	1.80E+00	2.26E-02	9.88E-02
Naphthalene	6.10E-04	7.64E-06	3.35E-05
Phenanathrene	1.70E-05	2.13E-07	9.33E-07
Toluene	3.40E-03	4.26E-05	1.87E-04

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.161	0.704
TOTAL Uncontrolled HAPs	0.055	0.241
TOTAL Uncontrolled TAPs (Benzene)	6.14E-05	2.69E-04
TOTAL Uncontrolled Toluene	9.94E-05	4.35E-04
TOTAL Uncontrolled Hexane	0.053	0.230
TOTAL Uncontrolled TAPs (Formaldehyde)	0.002	0.010
TOTAL CH_4	0.067	0.295
TOTAL CO_{2e} Emissions	3,529.02	15,457.09

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

Line Heater Emissions

Number of Units	10
Line Heater Rating (MMBtu/hr)	2.00
Operating hours/year	8760
Fuel Heat Value (Btu/scf)	1,197.2056

Pollutant	Emission Factors (lb/MMscf)	lb/hr	tpy
NOx	100	1.671	7.317
CO	84	1.403	6.146
CO_2	120,000	2004.668	8780.447
Lead	0.0005	8.35E-06	3.66E-05
N_2O	2.2	0.037	0.161
PM (Total)	7.6	0.127	0.556
SO_2	0.6	0.010	0.044
TOC	11	0.184	0.805
Methane	2.3	0.038	0.168
VOC	5.5	0.092	0.402
HAPS			
2-Methylnaphthalene	2.40E-05	4.01E-07	1.76E-06
Benzene	2.10E-03	3.51E-05	1.54E-04
Dichlorobenzene	1.20E-03	2.00E-05	8.78E-05
Fluoranthene	3.00E-06	5.01E-08	2.20E-07
Fluorene	2.80E-06	4.68E-08	2.05E-07
Formaldehyde	7.50E-02	1.25E-03	5.49E-03
Hexane	1.80E+00	3.01E-02	1.32E-01
Naphthalene	6.10E-04	1.02E-05	4.46E-05
Phenanathrene	1.70E-05	2.84E-07	1.24E-06
Toluene	3.40E-03	5.68E-05	2.49E-04

Table 10

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

General Information	
Unit Name:	EC001, EC002, EC003

Pollutant	Emission Factor (lb/MMscf)
NOx	100
CO	84
PM10	7.6
PM2.5	5.7
SO_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	--	482.13	625.70	192.70	6.14	1,357.66
Maximum Expected Annual Volumetric Flow Rate of Stream (scf/yr)	446,760.00	--	4,223,416.73	5,481,150.83	1,688,028.19	53,774.55	11,893,130.30
Heating Content (Btu/ft3)	1,197		2,184.04	1,177.67	2,248.99	103.11	1,638.01

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	-	-	27.814	3.071	10.614	0.000	41.50
Benzene	-	-	0.009	0.009	0.002	0.000	0.021
Toluene	-	-	0.036	0.034	0.009	0.000	0.079
Ethylbenzene	-	-	0.019	0.017	0.005	0.000	0.042
Xylenes	-	-	0.044	0.039	0.010	0.000	0.093
n-Hexane	-	-	3.023	0.044	1.060	0.000	4.127
HAPs	-	-	3.132	0.143	1.087	0.000	4.362
Total Mass Flow	-	-	49.879	30.516	19.936	0.299	100.630
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	-	-	121.824	13.453	46.488	0.001	181.766
Benzene	-	-	0.041	0.040	0.010	0.000	0.090
Toluene	-	-	0.160	0.147	0.040	0.000	0.346
Ethylbenzene	-	-	0.085	0.077	0.023	0.000	0.184
Xylenes	-	-	0.191	0.172	0.045	0.000	0.407
n-Hexane	-	-	13.240	0.191	4.644	0.000	18.076
HAP	-	-	13.716	0.626	4.761	0.000	19.104
Total Mass Flow	-	-	218.470	133.662	87.319	1.311	440.761

Table 10

Enclosed Combustor Emissions
Alexander 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	-	0.003	0.004	0.001	0.000	0.01
PM10	0.000	-	0.004	0.005	0.001	0.000	0.01
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	-	0.556	0.061	0.212	0.000	0.83
Benzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Toluene	0.000	-	0.001	0.001	0.000	0.000	0.00
Ethylbenzene	0.000	-	0.000	0.000	0.000	0.000	0.00
Xylenes	0.000	-	0.001	0.001	0.000	0.000	0.00
n-Hexane	0.000	-	0.060	0.001	0.021	0.000	0.08
HAP	0.000	-	0.063	0.003	0.022	0.000	0.09
N_2O	0.000	-	0.001	0.001	0.000	0.000	0.00
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00
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	-	0.012	0.016	0.005	0.000	0.03
PM10	0.002	-	0.016	0.021	0.006	0.000	0.05
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	-	2.436	0.269	0.930	0.000	3.64
Benzene	0.000	-	0.001	0.001	0.000	0.000	0.00
Toluene	0.000	-	0.003	0.003	0.001	0.000	0.01
Ethylbenzene	0.000	-	0.002	0.002	0.000	0.000	0.00
Xylenes	0.000	-	0.004	0.003	0.001	0.000	0.01
n-Hexane	0.000	-	0.265	0.004	0.093	0.000	0.36
HAP	0.000	-	0.274	0.013	0.095	0.000	0.38
N_2O	0.000	-	0.005	0.006	0.002	0.000	0.01
Lead	0.000	-	0.000	0.000	0.000	0.000	0.00
Formaldehyde	0.000	-	-	-	-	-	0.00

Enclosed Combustor/Vapor Combustor Total Emissions		
	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Total VOC	0.83	3.64
NOx	2.453	10.745
CO	11.164	48.900
PM2.5	0.008	0.034
PM10	0.010	0.045
H_2S	1.63E-05	7.13E-05
SO_2	3.06E-05	1.34E-04
Benzene (TAPs)	4.12E-04	1.81E-03
Toluene	1.58E-03	6.93E-03
Ethylbenzene	8.41E-04	3.68E-03
Xylenes	1.86E-03	0.008
Hexanes	0.083	0.362
Formaldehyde (TAPs)	3.83E-06	1.68E-05
HAPs	0.09	0.38
CH_4	0.44	1.94
CO_2e	306.35	1341.81
N_2O	0.003	0.013
Lead	6.79E-07	2.97E-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
Alexander 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	0.002	4,223,417	0.0137	5,481,151	0.0018	1,688,028	0.016	53,775	88,253	1	0	--	88,253	21,774,747
Methane	0.119	4,223,417	0.7384	5,481,151	0.0237	1,688,028	0.036	53,775	4,590,390	1	0.98	4,498,582	91,808	91,808
Ethane	0.492	4,223,417	0.1776	5,481,151	0.5962	1,688,028	0.010	53,775	4,059,621	2	0.98	7,956,856	--	
Propane	0.182	4,223,417	0.0189	5,481,151	0.1910	1,688,028	0.000	53,775	1,193,860	3	0.98	3,509,947	--	
i-Butane	0.042	4,223,417	0.0117	5,481,151	0.0425	1,688,028	0.000	53,775	315,358	4	0.98	1,236,203	--	
n-Butane	0.075	4,223,417	0.0053	5,481,151	0.0744	1,688,028	0.000	53,775	470,885	4	0.98	1,845,869	--	
Pentane	0.039	4,223,417	0.0014	5,481,151	0.0355	1,688,028	0.000	53,775	232,629	5	0.98	1,139,881	--	
Hexane	0.030	4,223,417	0.0005	5,481,151	0.0269	1,688,028	0.000	53,775	174,283	6	0.98	1,024,784	--	
Benzene	0.000	4,223,417	0.0001	5,481,151	0.0001	1,688,028	0.000	53,775	907	6	0.98	5,332	--	
Heptanes	0.005	4,223,417	0.0001	5,481,151	0.0037	1,688,028	0.000	53,775	29,580	7	0.98	202,921	--	
Toluene	0.000	4,223,417	0.0002	5,481,151	0.0002	1,688,028	0.000	53,775	2,945	7	0.98	20,204	--	
Octane	0.004	4,223,417	0.0002	5,481,151	0.0034	1,688,028	0.000	53,775	23,249	8	0.98	182,275	--	
Ethyl benzene	0.000	4,223,417	0.0001	5,481,151	0.0001	1,688,028	0.000	53,775	1,357	8	0.98	10,640	--	
Xylenes	0.000	4,223,417	0.0002	5,481,151	0.0002	1,688,028	0.000	53,775	3,005	8	0.98	23,558	--	
Nonane	0.001	4,223,417	0.0000	5,481,151	0.0004	1,688,028	0.000	53,775	3,063	9	0.98	27,014	--	
Decane plus	0.000	4,223,417	0.0000	5,481,151	0.0000	1,688,028	0.000	53,775	248	10	0.98	2,427	--	
											Subtotal	**21,686,494**	--	

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	21,774,747	0.12	2000	1	288.25	1,262.53
CH_4	91,808	0.04	2000	25	0.44	1.94
				CO_2e Emissions	**299.3**	**1311.11**

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
Alexander 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)	1,360
PW Production (bbl/day)	6,000
Condensate Truck Capacity (bbl)	180
PW Truck Capacity (bbl)	110

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	0.7800	1	2758	0.7800	2151.2400	3.8175	1.7179
Tanker Trucks PW	10	40	10	0.7800	1	19910	0.7800	15529.8000	3.8175	1.7179
Pick Up Truck	4	3	10	0.6200	1	730	0.6200	452.6000	0.3467	0.1560

	Uncontrolled Emissions						Controlled Emissions					
	PM			PM10			PM			PM10		
	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)
Tanker Trucks Condensate	2.9777	8212.4219	4.1062	1.3400	3695.5899	1.8478	1.4888	4106.2110	2.0531	0.6700	1847.7949	0.9239
Tanker Trucks PW	2.9777	59285.4679	29.6427	1.3400	26678.4606	13.3392	1.4888	29642.7340	14.8214	0.6700	13339.2303	6.6696
Pick Up Truck	0.2149	156.9072	0.0785	0.0967	70.6083	0.0353	0.1075	78.4536	0.0392	0.0484	35.3041	0.0177
Total Emissions	6.1703	67,654.7971	33.8274	2.7766	30,444.6587	15.2223	3.0851	33,827.3985	16.9137	1.3883	15,222.3293	7.6112

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
Alexander 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)	1197.2056
Density of NG (lb/scf)	0.056
Operating Hours/year	8760
No. of Engines	4

Pollutant	Emission Factors (g/hp-hr)	Emission Factors (lb/MMBtu)	lb/hr	tpy
NOx[2]	0.3731		0.2501	1.0953
CO[2]	2.4627		1.6505	7.2293
CO_2		110.000	276.2384	1,209.92
$PM_{2.5}$		9.500E-03	0.0239	0.1045
PM_{10}		9.500E-03	0.0239	0.1045
PM (Total)		9.910E-03	0.0249	0.1090
SO_2		5.880E-04	0.0015	0.0065
TOC		0.358	0.8990	3.9378
Methane		0.230	0.5776	2.5298
VOC[3]		0.0296	0.0743	0.3256
HAPS				
Benzene		0.0016	0.0040	0.0174
Ethylbenzene		2.48E-05	6.23E-05	2.73E-04
Formaldehyde		0.0205	0.0515	0.2255
Naphthalene		9.71E-05	2.44E-04	0.0011
Toluene		5.58E-04	0.0014	0.0061
Xylene		1.95E-04	4.90E-04	0.0021

	lb/hr	tpy
TOTAL Uncontrolled VOC	0.0743	0.3256
TOTAL Uncontrolled NOx	0.2501	1.0953
TOTAL Uncontrolled HAPs	0.0576	0.2525
TOTAL Uncontrolled TAPs (Benzene)	0.0040	0.0174
TOTAL Uncontrolled Toluene	0.0014	0.0061
TOTAL Uncontrolled Ethylbenzene	0.0001	0.0003
TOTAL Uncontrolled Xylene	0.0005	0.0021
TOTAL Uncontrolled TAPs (Formaldehyde)	0.0515	0.2255
TOTAL CH_4 Emissions	0.5776	2.5298
TOTAL CO_{2e} Emissions	290.6782	1273.1704

Enter Any Notes Here:

1. Engines were manufactured in 2015 for MSG-425. Engine ratings were taken from manufacturer engine specifications. Please see copies of manufacturer engine specifications in Appendix N.

2. 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.

3. Emission factors for all other contaminants including VOCs were obtained from AP-42, Section 3.2 "Natural Gas-fired Reciprocating Engines", Table 3.2-3.

4. Hours of operation was calculated based on the 100% operation of the VRU.

Table 14

Change in Regulated Air Pollutants Emissions
Alexander 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**
$PM_{2.5}$	0.2538	1.1116	9.58E-02	0.4194	1.58E-01	0.6922
PM_{10}	1.6447	8.7340	0.7928	1.7311	0.8519	7.0029
VOC (uncontrolled)	45.1600	212.1931	307.8024	1350.5352	-262.6424	-1138.3421
CO	15.2705	66.8849	6.7599	29.6083	8.5106	37.2766
NOx	5.6267	24.6447	1.6436	7.1992	3.9831	17.4455
SO2	0.0190	0.0834	0.0057	0.0250	1.33E-02	5.84E-02
Pb	1.53E-05	6.70E-05	6.64E-06	2.91E-05	8.66E-06	3.79E-05
HAPs	0.5061	3.6901	1.4859	6.5405	-0.9798	-2.8504
TAPs	0.0609	0.2697	0.0135	0.0590	4.74E-02	0.2107

Notes:
1. Change in emissions due to the increased condensate and PW production and the addition of two wells, two GPU Heaters, two produced water tanks, three enclosed combustors, ten Line Heaters, three HP Ford VRU engines, one LP Ford VRU engine, four VRTs; Removal of Kubota Engine, Aubtec combustor and two condensate water tanks.

Bryan Research & Engineering, Inc.

ProMax® 3.2

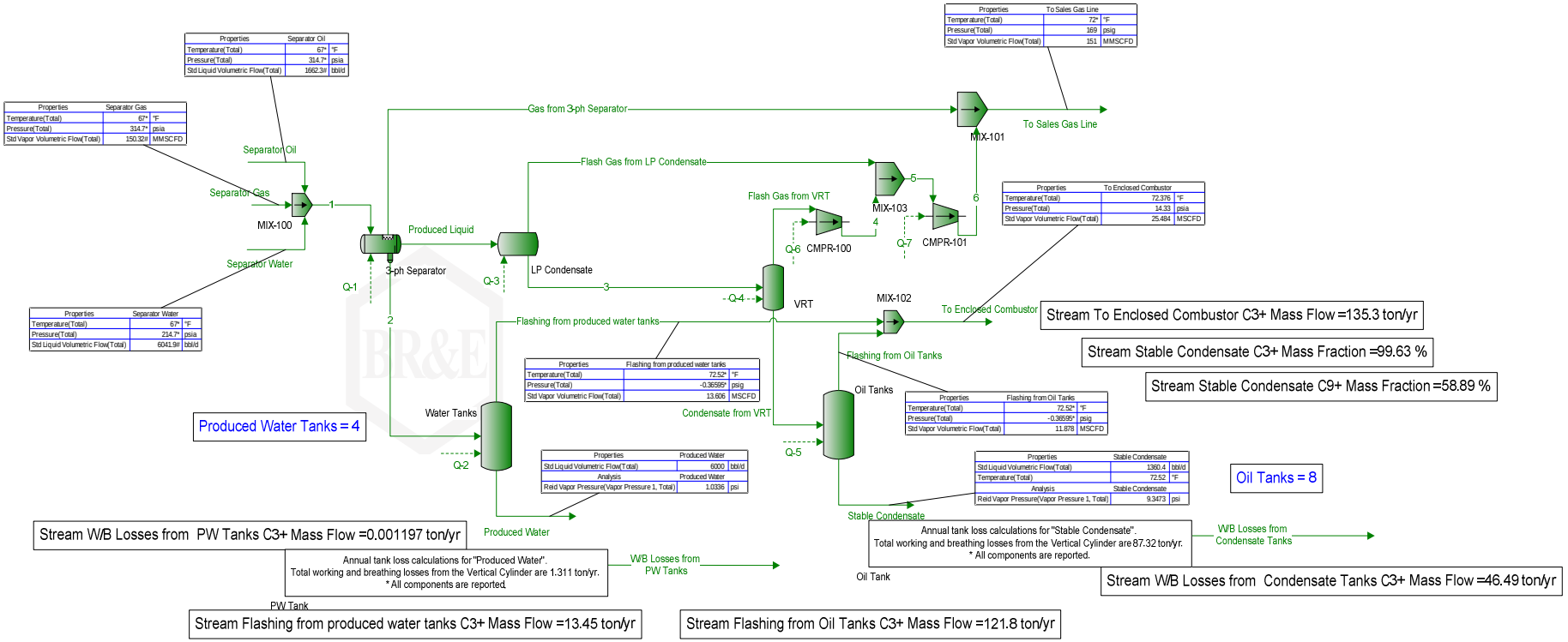
with

TSWEET® & PROSIM®

Simulation Report	
Client Name:	Antero Resources
Location:	DoddridgeCounty, WV
Job:	Alexander Well 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:	5/2/2017 12:52


Properties | Separator Oil
Temperature(Total) | 67* | °F
Pressure(Total) | 314.7* | psia
Std Liquid Volumetric Flow(Total) | 1662.3# | bbl/d
Properties | Separator Gas
Temperature(Total) | 67* | °F
Pressure(Total) | 314.7* | psia
Std Vapor Volumetric Flow(Total) | 150.32# | MMSCFD
Properties | Separator Water
Temperature(Total) | 67* | °F
Pressure(Total) | 214.7* | psia
Std Liquid Volumetric Flow(Total) | 6041.9# | bbl/d
Properties | To Sales Gas Line
Temperature(Total) | 72* | °F
Pressure(Total) | 169 | psig
Std Vapor Volumetric Flow(Total) | 151 | MMSCFD
Properties | To Enclosed Combustor
Temperature(Total) | 72.376 | °F
Pressure(Total) | 14.33 | psia
Std Vapor Volumetric Flow(Total) | 25.484 | MSCFD
Properties | Flashing from produced water tanks
Temperature(Total) | 72.52* | °F
Pressure(Total) | -0.36595* | psig
Std Vapor Volumetric Flow(Total) | 13.606 | MSCFD
Properties | Flashing from Oil Tanks
Temperature(Total) | 72.52* | °F
Pressure(Total) | -0.36595* | psig
Std Vapor Volumetric Flow(Total) | 11.878 | MSCFD
Properties | Produced Water
Std Liquid Volumetric Flow(Total) | 6000 | bbl/d
Analysis | Produced Water
Reid Vapor Pressure(Vapor Pressure 1, Total) | 1.0336 | psi
Properties | Stable Condensate
Std Liquid Volumetric Flow(Total) | 1360.4 | bbl/d
Temperature(Total) | 72.52 | °F
Analysis | Stable Condensate
Reid Vapor Pressure(Vapor Pressure 1, Total) | 9.3473 | psi
Separator Oil
Separator Gas
Separator Water
MIX-100
1
2
3-ph Separator
Produced Liquid
Gas from 3-ph Separator
MIX-101
To Sales Gas Line
Flash Gas from LP Condensate
MIX-103
5
6
Flash Gas from VRT
4
Q-6
CMPR-100
Q-7
CMPR-101
Q-1
Q-3
LP Condensate
3
Q-4
VRT
MIX-102
To Enclosed Combustor
Flashing from produced water tanks
Flashing from Oil Tanks
Oil Tanks
Condensate from VRT
Water Tanks
Q-2
Q-5
Produced Water
Stable Condensate
Oil Tank
PW Tank
Produced Water Tanks = 4
Oil Tanks = 8
Stream To Enclosed Combustor C3+ Mass Flow =135.3 ton/yr
Stream Stable Condensate C3+ Mass Fraction =99.63 %
Stream Stable Condensate C9+ Mass Fraction =58.89 %
Stream W/B Losses from PW Tanks C3+ Mass Flow =0.001197 ton/yr
Annual tank loss calculations for "Produced Water".
Total working and breathing losses from the Vertical Cylinder are 1.311 ton/yr.
* All components are reported.
W/B Losses from PW Tanks
Annual tank loss calculations for "Stable Condensate".
Total working and breathing losses from the Vertical Cylinder are 87.32 ton/yr.
* All components are reported.
W/B Losses from Condensate Tanks
Stream W/B Losses from Condensate Tanks C3+ Mass Flow =46.49 ton/yr
Stream Flashing from produced water tanks C3+ Mass Flow =13.45 ton/yr
Stream Flashing from Oil Tanks C3+ Mass Flow =121.8 ton/yr

Process Streams	Status	Separator Gas	Separator Water	Separator Oil	1	as from 3-ph Separat	Produced Liquid	2	Produced Water	3	Gas from LP Conder
Phase: Total		Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction		%	%	%	%	%	%	%	%	%	%
Water		0	100	0	22.6963	0.207603	0.0793781	99.9666	99.9965	0.0540128	0.446591
H2S		0	0	0	0	0	0	0	0	0	0
Nitrogen		0.412623	0	0.0219998	0.316059	0.411217	0.00790099	6.27378E-05	2.29618E-06	0.000642181	0.112986
CO2		0.180410	0	0.0139999	0.138222	0.179313	0.0301599	0.00109232	0.000672139	0.0139350	0.265046
Methane		81.3500	0	4.97995	62.3169	81.0499	4.76461	0.0245078	0.00177676	1.04861	58.5611
Ethane		14.1729	0	5.23595	10.8895	14.1290	5.03058	0.00611728	0.000648260	3.35401	29.3023
Propane		2.15042	0	5.28795	1.68576	2.17109	2.81994	0.000630514	4.88336E-05	2.60227	5.97115
Isobutene		0.415023	0	1.72798	0.330622	0.417398	1.59503	0.000509359	0.000135930	1.62088	1.22068
n-Butane		0.686338	0	4.22196	0.556937	0.698490	3.29268	0.000175031	1.25033E-05	3.37893	2.04401
Isopentane		0.179510	0	3.18197	0.161163	0.192454	2.16799	3.28776E-05	1.72130E-06	2.27948	0.553859
n-Pentane		0.147808	0	3.73996	0.141055	0.163856	2.47401	1.06362E-05	2.23054E-07	2.61226	0.472526
2-Methylpentane		0	0	2.17098	0.0161935	0.0164197	0.584316	1.45313E-06	4.22725E-08	0.621469	0.0464609
3-Methylpentane		0	0	1.47799	0.0110244	0.0109058	0.431980	2.41417E-06	1.67669E-07	0.459689	0.0308330
n-Hexane		0.305017	0	4.66295	0.268296	0.248055	12.6940	1.05803E-05	1.54015E-07	13.5229	0.694365
Methylcyclopentane		0	0	0.718993	0.00536301	0.00496487	0.252872	1.87393E-06	2.07890E-07	0.269364	0.0141164
Benzene		0	0	0.124999	0.000932373	0.000827977	0.0473254	2.89551E-05	2.65858E-05	0.0504308	0.00236791
2-Methylhexane		0	0	2.61697	0.0195202	0.0135012	1.49449	8.18823E-07	1.70258E-08	1.59519	0.0366951
3-Methylhexane		0	0	2.20698	0.0164620	0.0108137	1.33222	7.92708E-07	1.97282E-08	1.42222	0.0293714
n-Heptane		0	0	5.08495	0.0379290	0.0217239	3.47027	6.59616E-07	7.20939E-09	3.70595	0.0582930
Methylcyclohexane		0	0	3.39797	0.0253456	0.0143945	2.33416	5.18389E-06	5.76960E-07	2.49267	0.0393188
Toluene		0	0	0.760992	0.00567629	0.00284273	0.568036	7.05008E-05	6.30204E-05	0.606733	0.00781602
n-Octane		0	0	12.7579	0.0951618	0.0245329	12.4705	2.93454E-07	1.35586E-09	13.3276	0.0632023
Ethylbenzene		0	0	0.836992	0.00624317	0.00137543	0.846461	2.91916E-05	2.58106E-05	0.904681	0.00361578
p-Xylene		0	0	0.835992	0.00623571	0.00133727	0.850384	1.96813E-05	1.65923E-05	0.908882	0.00350429
o-Xylene		0	0	1.31099	0.00977873	0.00177328	1.37331	5.54728E-05	5.09770E-05	1.46786	0.00464123
n-Nonane		0	0	8.14292	0.0607385	0.00575345	9.20340	7.16623E-08	3.55105E-10	9.83814	0.0141909
C10+		0	0	24.4798	0.182596	0.000445540	29.7839	1.79963E-07	2.86496E-08	31.8412	0.000962183
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Water		0	4893.17	0	4893.17	34.3938	0.104720	4858.68	4858.63	0.0666526	0.0380674
H2S		0	0	0	0	0	0	0	0	0	0
Nitrogen		68.1049	0	0.0353784	68.1402	68.1268	0.0104234	0.00304924	0.000111567	0.000792461	0.00963097
CO2		29.7773	0	0.0225135	29.7998	29.7069	0.0397886	0.0530900	0.0326579	0.0171960	0.0225926
Methane		13427.1	0	8.00838	13435.1	13427.6	6.28574	1.19115	0.0863291	1.29400	4.99175
Ethane		2339.28	0	8.42005	2347.70	2340.77	6.63663	0.297318	0.0314977	4.13890	2.49773
Propane		354.934	0	8.50367	363.438	359.687	3.72022	0.0306448	0.00237273	3.21124	0.508981
Isobutene		68.5010	0	2.77881	71.2798	69.1508	2.10425	0.0247564	0.00660457	2.00020	0.104051
n-Butane		113.282	0	6.78943	120.072	115.720	4.34389	0.00850704	0.000607508	4.16966	0.174232
Isopentane		29.6287	0	5.11700	34.7457	31.8840	2.86013	0.00159795	8.36348E-05	2.81292	0.0472110
n-Pentane		24.3963	0	6.01432	30.4106	27.1462	3.26385	0.000516952	1.08378E-05	3.22357	0.0402782
2-Methylpentane		0	0	3.49120	3.49120	2.72027	0.770862	7.06263E-05	2.05394E-06	0.766902	0.00396033
3-Methylpentane		0	0	2.37678	2.37678	1.80677	0.569892	0.000117336	8.14672E-06	0.567264	0.00262820
n-Hexane		50.3441	0	7.49861	57.8427	41.0956	16.7466	0.000514235	7.48327E-06	16.6875	0.0591877
Methylcyclopentane		0	0	1.15623	1.15623	0.822536	0.333602	9.10786E-05	1.01010E-05	0.332399	0.00120328
Benzene		0	0	0.201013	0.201013	0.137172	0.0624343	0.00140731	0.00129175	0.0622324	0.000201841
2-Methylhexane		0	0	4.20842	4.20842	2.23676	1.97162	3.97972E-05	8.27250E-07	1.96849	0.00312789
3-Methylhexane		0	0	3.54909	3.54909	1.79151	1.75754	3.85280E-05	9.58554E-07	1.75504	0.00250362
n-Heptane		0	0	8.17723	8.17723	3.59902	4.57818	3.20593E-05	3.50290E-07	4.57321	0.00496890
Methylcyclohexane		0	0	5.46435	5.46435	2.38475	3.07935	0.000251953	2.80334E-05	3.07600	0.00335154
Toluene		0	0	1.22377	1.22377	0.470958	0.749385	0.00342655	0.00306204	0.748719	0.000666238
n-Octane		0	0	20.5162	20.5162	4.06439	16.4518	1.42628E-05	6.58783E-08	16.4464	0.00538736
Ethylbenzene		0	0	1.34599	1.34599	0.227869	1.11670	0.00141880	0.00125409	1.11639	0.000308209
p-Xylene		0	0	1.34438	1.34438	0.221548	1.12187	0.000956572	0.000806187	1.12157	0.000298705
o-Xylene		0	0	2.10823	2.10823	0.293780	1.81175	0.00269614	0.00247687	1.81136	0.000395618
n-Nonane		0	0	13.0948	13.0948	0.953180	12.1416	3.48300E-06	1.72538E-08	12.1404	0.00120964
C10+		0	0	39.3665	39.3665	0.0738131	39.2927	8.74672E-06	1.39203E-06	39.2926	8.20165E-05
Mass Fraction		%	%	%	%	%	%	%	%	%	%
Water		0	100	0	20.5657	0.190014	0.0125939	99.9601	99.9941	0.00812975	0.326593
H2S		0	0	0	0	0	0	0	0	0	0
Nitrogen		0.590159	0	0.00575998	0.445330	0.585257	0.00194924	9.75497E-05	3.57043E-06	0.000150301	0.128484
CO2		0.405375	0	0.00575847	0.305966	0.400929	0.0116894	0.00266825	0.00164193	0.00512382	0.473505
Methane		66.6313	0	0.746678	50.2834	66.0592	0.673156	0.0218226	0.00158215	0.140547	38.1361
Ethane		21.7585	0	1.47147	16.4693	21.5845	1.33216	0.0102096	0.00108197	0.842603	35.7666
Propane		4.84138	0	2.17931	3.73885	4.86389	1.09510	0.00154319	0.000119526	0.958709	10.6883
Isobutene		1.18887	0	0.906125	0.933020	1.18980	0.788127	0.00158623	0.000423327	0.759807	2.78016
n-Butane		2.03672	0	2.29347	1.62816	2.06259	1.68542	0.000564661	4.03379E-05	1.64082	4.82261
Isopentane		0.661253	0	2.14567	0.584848	0.705449	1.37754	0.000131662	6.89343E-06	1.37406	1.62213
n-Pentane		0.544475	0	2.52193	0.511878	0.600623	1.57198	4.25939E-05	8.93282E-07	1.57465	1.38392
2-Methylpentane		0	0	1.74854	0.0701893	0.0718883	0.443453	6.95052E-06	2.02204E-07	0.447447	0.162528
3-Methylpentane		0	0	1.19039	0.0477843	0.0477474	0.327841	1.15473E-05	8.02020E-07	0.330969	0.107859
n-Hexane		1.34201	0	3.75562	1.16291	1.08603	9.63383	5.06072E-05	7.36706E-07	9.73626	2.42900
Methylcyclopentane		0	0	0.565542	0.0227018	0.0212286	0.187422	8.75361E-06	9.71149E-07	0.189401	0.0482263
Benzene		0	0	0.0912556	0.00366315	0.00328583	0.0325558	0.000125537	0.000115270	0.0329119	0.00750824
2-Methylhexane		0	0	2.45083	0.0983802	0.0687319	1.31883	4.55404E-06	9.46961E-08	1.33545	0.149259
3-Methylhexane		0	0	2.06686	0.0829671	0.0550503	1.17563	4.40880E-06	1.09727E-07	1.19064	0.119469
n-Heptane		0	0	4.76211	0.191159	0.110592	3.06236	3.66858E-06	4.00980E-08	3.10253	0.237110
Methylcyclohexane		0	0	3.11821	0.125170	0.0718052	2.01835	2.82512E-05	3.14445E-06	2.04482	0.156714
Toluene		0	0	0.655327	0.0263059	0.0133072	0.460929	0.000360550	0.000322308	0.467066	0.0292336
n-Octane		0	0	13.6204	0.546745	0.142375	12.5452	1.86057E-06	8.59679E-09	12.7194	0.293065
Ethylbenzene		0	0	0.830500	0.0333376	0.00741873	0.791417	0.000172016	0.000152100	0.802447	0.0155826
p-Xylene		0	0	0.829508	0.0332978	0.00721293	0.795085	0.000115976	9.77769E-05	0.806174	0.0151021
o-Xylene		0	0	1.30082	0.0522170	0.00956461	1.28401	0.000326883	0.000300403	1.30198	0.0200019
n-Nonane		0	0	9.76094	0.391820	0.0374898	10.3954	5.10148E-07	2.52801E-09	10.5421	0.0738826
C10+		0	0	40.9770	1.64488	0.00405408	46.9780	1.78899E-06	2.84815E-07	47.6458	0.00699536
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water		0	88151.9	0	88151.9	619.614	1.88656	87530.4	87529.7	1.20077	0.685795
H2S		0	0	0	0	0	0	0	0	0	0
Nitrogen		1907.85	0	0.991068	1908.84	1908.46	0.291996	0.0854197	0.00312537	0.0221995	0.269796
CO2		1310.48	0	0.990808	1311.48	1307.39	1.75108	2.33647	1.43726	0.756789	0.994288
Methane		215404	0	128.474	215532	215412	100.839	19.1090	1.38493	20.7589	80.0799
Ethane		70340.0	0	253.183	70593.2	70384.7	199.557	8.94007	0.947104	124.453	75.1043
Propane		15651.0	0	374.975	16026.0	15860.6	164.045	1.35130	0.104627	141.602	22.4438
Isobutene		3843.34	0	155.909	3999.25	3879.80	118.062	1.38899	0.370558	112.224	5.83790
n-Butane		6584.23	0	394.617	6978.84	6725.87	252.476	0.494448	0.0353097	242.350	10.1267
Isopentane		2137.68	0	369.185	2506.86	2300.39	206.355	0.115290	0.00603415	202.949	3.40621
n-Pentane		1760.16	0	433.926	2194.09	1958.57	235.482	0.0372974	0.000781933	232.576	2.90602
2-Methylpentane		0	0	300.856	300.856	234.420	66.4293	0.00608625	0.000176999	66.0881	0.341283
3-Methylpentane		0	0	204.820	204.820	155.699	49.1107	0.0101115	0.000702047	48.8842	0.226486
n-Hexane		4338.42	0	646.195	4984.62	3541.42	1443.15	0.0443144	0.000644874	1438.05	5.10052
Methylcyclopentane		0	0	97.3077	97.3077	69.2242	28.0758	0.00766513	0.000850094	27.9745	0.101268
Benzene		0	0	15.7015	15.7015	10.7147	4.87686	0.109927	0.100901	4.86109	0.0157661
2-Methylhexane		0	0	421.692	421.692	224.127	197.560	0.00398776	8.28921E-05	197.247	0.313420
3-Methylhexane		0	0	355.626	355.626	179.513	176.109	0.00386058	9.60489E-05	175.858	0.250867
n-Heptane		0	0	819.374	819.374	360.629	458.742	0.00321240	3.50997E-05	458.244	0.497893
Methylcyclohexane		0	0	536.523	536.523	234.149	302.349	0.0247382	0.00275249	302.020	0.329074

Process Streams	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	sses from Condensate Ta
Phase: Total	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Mole Fraction	%	%	%	%	%	%	%	%	%	%	%	%
Water	0.207842	0.0329721	2.77354	0.776603	1.84280	0.706251	0.0247703	0.706251	0.527473	0.527473	93.6555	0.000581104
H2S	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen	0.410973	3.95865E-05	0.196641	0.00319961	0.106481	0.0193220	4.73326E-06	0.0193220	0.0838106	0.0838106	0.00345905	0.000106073
CO2	0.179379	0.00549071	1.36768	0.224132	0.834690	0.275700	0.00307923	0.275700	0.268365	0.268365	1.64246	0.180397
Methane	81.0259	0.183924	73.9542	11.8423	45.0049	27.8528	0.0553380	27.8528	48.9957	48.9957	3.62045	2.36303
Ethane	14.1441	1.99816	17.7934	49.1541	32.4101	45.3839	1.47805	45.3839	34.3116	34.3116	1.04447	59.5284
Propane	2.17558	2.26491	1.89247	18.1550	9.47219	13.0600	2.08965	13.0600	8.17928	8.17928	0.0173571	19.0735
Isobutene	0.418391	1.57934	1.21504	4.39529	2.69730	2.90878	1.54828	2.90878	1.74651	1.74651	0.0149200	4.39315
n-Butane	0.700157	3.33008	0.528775	7.47982	3.76854	4.89343	3.28431	4.89343	2.93159	2.93159	0.00109300	7.42665
Isopentane	0.192904	2.31013	0.101365	2.10084	1.03329	1.32936	2.31244	1.32936	0.795423	0.795423	5.50241E-05	1.91515
n-Pentane	0.164240	2.66002	0.0338781	1.80752	0.860543	1.13171	2.66942	1.13171	0.677858	0.677858	5.25209E-06	1.62889
2-Methylpentane	0.0164569	0.637968	0.00459007	0.179451	0.0860900	0.110000	0.643025	0.110000	0.0662530	0.0662530	3.97800E-07	0.156888
3-Methylpentane	0.0109305	0.472165	0.00730887	0.119170	0.0594457	0.0729601	0.476058	0.0729601	0.0439553	0.0439553	1.41459E-06	0.104137
n-Hexane	0.248605	13.9066	0.0339207	2.68979	1.27178	1.62671	14.0304	1.62671	0.984784	0.984784	1.02578E-06	2.42303
Methylcyclopentane	0.00497619	0.276976	0.00542045	0.0547752	0.0284239	0.0333850	0.279427	0.0333850	0.0201184	0.0201184	1.26047E-06	0.0439302
Benzene	0.000829876	0.0518775	0.00773495	0.00920613	0.00842064	0.00558507	0.0523481	0.00558507	0.00337003	0.00337003	0.000109006	0.00556558
2-Methylhexane	0.0135296	1.64393	0.00260856	0.141630	0.0674040	0.0844127	1.66050	0.0844127	0.0515588	0.0515588	1.35622E-08	0.0343017
3-Methylhexane	0.0108364	1.46592	0.00251481	0.113512	0.0542486	0.0673619	1.48084	0.0673619	0.0412052	0.0412052	5.17210E-08	0.100681
n-Heptane	0.0217685	3.82123	0.00212252	0.224927	0.105968	0.132604	3.86089	0.132604	0.0814405	0.0814405	1.38003E-08	0.191667
Methylcyclohexane	0.0144249	2.57018	0.0149886	0.152370	0.0790200	0.0901733	2.59684	0.0901733	0.0551597	0.0551597	1.12691E-06	0.131539
Toluene	0.00284879	0.625729	0.0243996	0.0303365	0.0271667	0.0178915	0.632296	0.0178915	0.0109545	0.0109545	7.43032E-05	0.0193339
n-Octane	0.0245795	13.7530	0.000950305	0.242640	0.113598	0.139373	13.9020	0.139373	0.0869289	0.0869289	7.66393E-10	0.203801
Ethylbenzene	0.00137813	0.933606	0.0110254	0.0139619	0.0123941	0.00802138	0.943749	0.00802138	0.00498809	0.00498809	1.01897E-05	0.00966294
p-Xylene	0.00133989	0.937951	0.0100664	0.0135118	0.0116723	0.00777673	0.948147	0.00777673	0.00483512	0.00483512	5.85703E-06	0.00868037
o-Xylene	0.00177672	1.51488	0.0146775	0.0179179	0.0161878	0.0102573	1.53139	0.0102573	0.00639059	0.00639059	1.32487E-05	0.0103223
n-Nonane	0.00576350	10.1545	0.000231989	0.0542778	0.0254219	0.0303174	10.2659	0.0303174	0.0192142	0.0192142	5.94305E-11	0.0445602
C10+	0.000446135	32.8683	0.000492306	0.00360256	0.00194195	0.00186078	33.2308	0.00186078	0.00124209	0.00124209	6.85930E-11	0.00206348
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
Water	34.4591	0.0394166	0.0414347	0.0101279	0.0515626	0.0272361	0.0292887	0.0272361	0.0653035	0.0653035	0.0151501	2.95079E-06
H2S	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen	68.1371	4.73238E-05	0.00293768	4.17271E-05	0.00297940	0.000745137	5.59666E-06	0.000745137	0.0103761	0.0103761	5.59549E-07	5.38631E-07
CO2	29.7402	0.00656388	0.0204322	0.00292297	0.0233551	0.0106322	0.00364091	0.0106322	0.0332247	0.0332247	0.000265691	0.000916039
Methane	13433.7	0.219872	1.10482	0.154440	1.25926	1.07412	0.0654322	1.07412	6.06587	6.06587	0.000585659	0.0119992
Ethane	2345.02	2.38870	0.265821	0.641034	0.906854	1.75020	1.74766	1.75020	4.24793	4.24793	0.000168958	0.302279
Propane	360.700	2.70759	0.0282721	0.236765	0.265038	0.503649	2.47082	0.503649	1.01263	1.01263	2.80775E-06	0.0968535
Isobutene	69.3670	1.88802	0.0181518	0.0573203	0.0754721	0.112175	1.83070	0.112175	0.216226	0.216226	2.41351E-06	0.0223080
n-Butane	116.082	3.98095	0.00789953	0.0975466	0.105446	0.188711	3.88340	0.188711	0.362943	0.362943	1.76808E-07	0.0377118
Isopentane	31.9825	2.76165	0.00151432	0.0273977	0.0289120	0.0512657	2.73425	0.0512657	0.0984767	0.0984767	8.90092E-09	0.00972496
n-Pentane	27.2301	3.17992	0.000506114	0.0235724	0.0240785	0.0436435	3.15635	0.0436435	0.0839217	0.0839217	8.49598E-10	0.00827135
2-Methylpentane	2.72847	0.762660	6.85724E-05	0.00234028	0.00240885	0.00424208	0.760320	0.00424208	0.00820241	0.00820241	6.43497E-11	0.000796664
3-Methylpentane	1.81222	0.564450	0.000109189	0.00155414	0.00166333	0.00281365	0.562896	0.00281365	0.00544186	0.00544186	2.28829E-10	0.000528800
n-Hexane	41.2175	16.6247	0.000506752	0.0350784	0.0355851	0.0627328	16.5896	0.0627328	0.121920	0.121920	1.65934E-10	0.0123039
Methylcyclopentane	0.825027	0.331112	8.09776E-05	0.000714341	0.000795318	0.00128747	0.330397	0.00128747	0.00249075	0.00249075	2.03898E-10	0.000223073
Benzene	0.137589	0.0620170	0.000115555	0.000120060	0.000235615	0.000215384	0.0618970	0.000215384	0.000417225	0.000417225	1.76333E-08	2.82615E-05
2-Methylhexane	2.24314	1.96524	3.89700E-05	0.00184703	0.00188600	0.00325532	1.96339	0.00325532	0.00638320	0.00638320	2.19387E-12	0.000174181
3-Methylhexane	1.79661	1.75244	3.75694E-05	0.00148034	0.00151791	0.00259776	1.75096	0.00259776	0.00510138	0.00510138	8.36659E-12	0.000511247
n-Heptane	3.60910	4.56809	3.17090E-05	0.00293334	0.00296505	0.00511379	4.56516	0.00511379	0.0100827	0.0100827	2.23239E-12	0.000973265
Methylcyclohexane	2.39158	3.07252	0.000223919	0.00198711	0.00221103	0.00347747	3.07053	0.00347747	0.00682901	0.00682901	1.82293E-10	0.000667944
Toluene	0.472315	0.748029	0.000364513	0.000395628	0.000760141	0.000689971	0.747633	0.000689971	0.00135621	0.00135621	1.20196E-08	9.81759E-05
n-Octane	4.07515	16.4411	1.41969E-05	0.00316434	0.00317854	0.00537480	16.4379	0.00537480	0.0107622	0.0107622	1.23975E-13	0.00103488
Ethylbenzene	0.228486	1.11608	0.000164711	0.000182082	0.000346793	0.000309339	1.11590	0.000309339	0.000617548	0.000617548	1.64832E-09	4.90675E-05
p-Xylene	0.222146	1.12128	0.000150385	0.000176211	0.000326597	0.000299904	1.12110	0.000299904	0.000598609	0.000598609	9.47456E-10	4.40781E-05
o-Xylene	0.294572	1.81096	0.000219271	0.000233673	0.000452944	0.000395564	1.81073	0.000395564	0.000791182	0.000791182	2.14316E-09	5.24156E-05
n-Nonane	0.955559	12.1393	3.46575E-06	0.000707853	0.000711319	0.00116917	12.1385	0.00116917	0.00237881	0.00237881	9.61370E-15	0.000226273
C10+	0.0739669	39.2925	7.35469E-06	4.69821E-05	5.43368E-05	7.17597E-05	39.2924	7.17597E-05	0.000153776	0.000153776	1.10959E-14	1.04782E-05
Mass Fraction	%	%	%	%	%	%	%	%	%	%	%	%
Water	0.190179	0.00484898	2.44609	0.365800	1.15544	0.390400	0.00361537	0.390400	0.350484	0.350484	91.1628	0.000266653
H2S	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen	0.584745	9.05264E-06	0.269673	0.00234351	0.103816	0.0166083	1.07425E-06	0.0166083	0.0865947	0.0865947	0.00523559	7.56875E-05
CO2	0.400965	0.00197259	2.94664	0.257901	1.27849	0.372299	0.00109791	0.372299	0.435611	0.435611	3.90558	0.202222
Methane	66.0211	0.0240863	58.0805	4.96721	25.1279	13.7104	0.00719241	13.7104	28.9905	28.9905	3.13818	0.965587
Ethane	21.6014	0.490469	26.1924	38.6441	33.9177	41.8727	0.360072	41.8727	38.0529	38.0529	1.69692	45.5927
Propane	4.87257	0.815283	4.08527	20.9313	14.5369	17.6704	0.746533	17.6704	13.3026	13.3026	0.0413538	21.4229
Isobutene	1.19229	0.723351	3.33733	6.44767	5.26705	5.00763	0.703787	5.00763	3.61418	3.61418	0.0452297	6.27826
n-Butane	2.06693	1.58001	1.50456	11.3668	7.62328	8.72699	1.54656	8.72699	6.28452	6.28452	0.00343246	10.9948
Isopentane	0.706900	1.36059	0.358024	3.96301	2.59463	2.94293	1.35170	2.94293	2.11667	2.11667	0.000214499	3.51952
n-Pentane	0.601860	1.56666	0.119659	3.40970	2.16087	2.50538	1.56037	2.50538	1.80382	1.80382	2.04741E-05	2.99345
2-Methylpentane	0.0720309	0.448791	0.0193642	0.404328	0.258203	0.290861	0.448943	0.290861	0.210579	0.210579	1.85222E-06	0.344370
3-Methylpentane	0.0478420	0.332154	0.0308340	0.268507	0.178291	0.192920	0.332371	0.192920	0.139708	0.139708	6.58653E-06	0.228582
n-Hexane	1.08813	9.78290	0.143102	6.06046	3.81436	4.30132	9.79562	4.30132	3.13005	3.13005	4.77617E-06	5.31856
Methylcyclopentane	0.0212710	0.190286	0.0223324	0.120529	0.0832556	0.0862111	0.190525	0.0862111	0.0624488	0.0624488	5.73163E-06	0.0941711
Benzene	0.00329244	0.0330794	0.0295782	0.0188017	0.0228922	0.0133861	0.0331282	0.0133861	0.00970908	0.00970908	0.000460057	0.0110734
2-Methylhexane	0.0688571	1.34469	0.0127960	0.371051	0.235065	0.259534	1.34802	0.259534	0.190549	0.190549	7.34260E-08	0.0875474
3-Methylhexane	0.0551502	1.19908	0.0123361	0.297386	0.189187	0.207110	1.20217	0.207110	0.152284	0.152284	2.80018E-07	0.256965
n-Heptane	0.110788	3.12566	0.0104118	0.589280	0.369554	0.407702	3.13433	0.407702	0.300984	0.300984	7.47151E-08	0.489186
Methylcyclohexane	0.0719367	2.06004	0.0720457	0.391160	0.270031	0.271667	2.06574	0.271667	0.199755	0.199755	5.97835E-06	0.328971
Toluene	0.0133318	0.470640	0.110058	0.0730821	0.0871173	0.0505820	0.471999	0.0505820	0.0372270	0.0372270	0.000369906	0.0453746
n-Octane	0.142605	12.8243	0.00531415	0.724672	0.451618	0.488496	12.8657	0.488496	0.366240	0.366240	4.73009E-09	0.592969
Ethylbenzene	0.00743118	0.809109	0.0573023	0.0387552	0.0457953	0.0261300	0.811742	0.0261300	0.0195318	0.0195318	5.84500E-05	0.0261302
p-Xylene	0.00722498	0.812875	0.0523183	0.0375058	0.0431283	0.0253331	0.815525	0.0253331	0.0189328	0.0189328	3.35971E-05	0.0234731
o-Xylene	0.00958051	1.31287	0.0762833	0.0497362	0.0598130	0.0334135	1.31718	0.0334135	0.0250236	0.0250236	7.59972E-05	0.0279132
n-Nonane	0.0375447	10.6316	0.00145659	0.182012	0.113477	0.119310	10.6673	0.119310	0.0908918	0.0908918	4.11839E-10	0.145571
C10+	0.00405835	48.0547	0.00431645	0.0168698	0.0121048	0.0102259	48.2188	0.0102259	0.00820495	0.00820495	6.63772E-10	0.00941343
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
Water	620.791	0.710101	0.746458	0.182457	0.928915	0.490665	0.527644	0.490665	1.17646	1.17646	0.272933	5.31593E-05
H2S	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen	1908.75	0.00132570	0.0822943	0.00116892	0.0834633	0.0208738	0.000156781	0.0208738	0.290670	0.290670	1.56749E-05	1.50889E-05
CO2	1308.85	0.288873	0.899209	0.128638	1.02785	0.467916	0.160235	0.467916	1.46220	1.46220	0.0116929	0.0403144
Methane	215509	3.52728	17.7241	2.47759	20.2017	17.2316	1.04969	17.2316	97.3115	97.3115	0.00939541	0.192497
Ethane	70512.5	71.8259	7.99297	19.2753	27.2682	52.6268	52.5506	52.6268	127.731	127.731	0.00508041	9.08925
Propane	15905.3	119.393	1.24668	10.4403	11.6870	22.2087	108.953	22.2087	44.6525	44.6525	0.000123809	4.27082
Isobutene	3891.93	105.930	1.01843	3.21603	4.23446	6.29373	102.714	6.29373	12.1316	12.1316	0.000135413	1.25162
n-Butane	6746.97	231.381	0.459138	5.66962	6.12876	10.9683	225.712	10.9683	21.0951	21.0951	1.02765E-05	2.19189
Isopentane	2307.50	199.250	0.109256	1.97671	2.08596	3.69876	197.273	3.69876	7.10498	7.10498	6.42190E-07	0.701644
n-Pentane	1964.62	229.428	0.0365155	1.70072	1.73723	3.14883	227.727	3.14883	6.05485	6.05485	6.12975E-08	0.596767
2-Methylpentane	235.127	65.7225	0.00590925	0.201674	0.207583	0.365563	65.5208	0.365563	0.706846	0.706846	5.54536E-09	0.0686528
3-Methylpentane	156.168	48.6417	0.00940942	0.133928	0.143338	0.242468	48.5078	0.242468	0.468954	0.468954	1.97194E-08	0.0455695
n-Hexane	3551.93	1432.64	0.0436695	3.02289	3.06656	5.40602	1429.62	5.40602	10.5065	10.5065	1.42994E-08	1.06029
Methylcyclopentane	69.4338	27.8662	0.00681503	0.0601185	0.0669336	0.108353	27.8061	0.108353	0.209620	0.209620	1.71599E-08	0.0187737
Benzene	10.7473	4.84426	0.00902618	0.00937810	0.0184043	0.0168241	4.83489	0.0168241	0.0325902	0.0325902	1.37737E-06	0.00220756
2-Methylhexane	224.767	196.921	0.00390487	0.185076	0.188981	0.326189	196.736	0.326189	0.639609	0.639609	2.19830E-10	0.0174532
3-Methylhexane	180.024	175.598	0.00376453	0.148333	0.152097	0.260301	175.450	0.260301	0.511168	0.511168	8.38348E-10	0.0512280
n-Heptane	361.639	457.732	0.00317730	0.293926	0.297104	0.512412	457.438	0.512412	1.01030	1.01030	2.23690E-10	0.0975230
Methylcyclohexane	234.820	301.679	0.0219857	0.195106	0.217092	0.341439	301.484	0.341439	0.670513	0.670513	1.78986E-08	0.0655828

Toluene		0	0	112.756	112.756	43.3934	69.0471	0.315717	0.282131	68.9858	0.0613861	43.5183	68.9222	0.0335856	0.0364526	0.0700382	0.0635728	68.8857	0.0635728	0.124959	0.124959	1.10746E-06	0.00904577
n-Octane		0	0	2343.54	2343.54	464.269	1879.27	0.00162921	7.52518E-06	1878.65	0.615391	465.498	1878.04	0.00162169	0.361458	0.363080	0.613956	1877.68	0.613956	1.22935	1.22935	1.41614E-11	0.118213
Ethylbenzene		0	0	142.897	142.897	24.1917	118.554	0.150627	0.133140	118.522	0.0327210	24.2573	118.489	0.0174866	0.0193307	0.0368173	0.0328409	118.469	0.0328409	0.0655619	0.0655619	1.74994E-07	0.00520925
p-Xylene		0	0	142.726	142.726	23.5206	119.104	0.101554	0.0855888	119.072	0.0371121	23.5842	119.040	0.0159657	0.0187075	0.0346731	0.0318393	119.021	0.0318393	0.0635514	0.0635514	1.00587E-07	0.00467955
o-Xylene		0	0	223.820	223.820	31.1892	192.345	0.286236	0.262957	192.303	0.0420008	31.2732	192.261	0.0232789	0.0248079	0.0480868	0.0419951	192.236	0.0419951	0.0839959	0.0839959	2.27526E-07	0.00556471
n-Nonane		0	0	1679.48	1679.48	122.250	1557.23	0.000446713	2.21289E-06	1557.07	0.155142	122.555	1556.92	0.000444500	0.0907858	0.0912303	0.149952	1556.83	0.149952	0.305094	0.305094	1.23301E-12	0.0290206
C10+		0	0	7050.54	7050.54	13.2199	7037.31	0.00156654	0.000245313	7037.30	0.0146892	13.2475	7037.29	0.00131723	0.00841450	0.00973172	0.0128522	7037.28	0.0128522	0.0275413	0.0275413	1.98727E-12	0.00187664

Process Streams		Separator Gas	Separator Water	Separator Oil	1	as from 3-ph Separat	Produced Liquid	2	Produced Water	3	Gas from LP Conde	To Sales Gas Line	Condensate from VRT	from produced wate	lashing from Oil Tank	Enclosed Combust	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW T	ases from Condensate Ta
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	60.1	70.0	70.0	70.0	72.5	70.0	70.0	72	65	72.52	72.52	72.3761	65	72.52	74.3018	70	1381.09	75.9425	75.9425
Pressure	psig	300	200	300	200	169	169	169	-0.365949	40	40	169	5	-0.365949	-0.365949	-0.365949	5	-0.365949	40	40	250	-14.2219	6.90120
Mole Fraction Vapor	%	100	0	0	76.6465	100	0	0	0	0	100	100	0	100	100	100	100	0	99.5189	99.9873	100	100	100
Mole Fraction Light Liquid	%	0	100	100	0.745589	0	100	100	100	100	0	0	100	0	0	0	0	100	0.481082	0.0126618	0	0	0
Mole Fraction Heavy Liquid	%	0	0	0	22.6079	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Molecular Weight	lb/lbmol	19.6	18.0	107.0	19.9	19.7	113.5	18.0	18.0	119.7	24.6	19.6885	122.500	20.4269	38.2469	28.7325	32.5905	123.430	32.5905	27.1127	27.1127	18.5079	39.2598
Mass Density	lb/ft^3	1.2	62.3	45.1	1.0	0.7	45.5	62.3	62.3	45.8	0.2	0.661617	46.0759	0.0514330	0.0971884	0.0726230	0.115528	45.9082	0.323803	0.267550	0.361309	0.00152712	0.150512
Molar Flow	lbmol/h	16505.3	4893.2	160.8	21559.3	16567.1	131.9	4860.3	4858.8	123.4	8.5	16579.5	119.545	1.49393	1.30413	2.79806	3.85643	118.241	3.85643	12.3804	12.3804	0.0161764	0.507790
Mass Flow	lb/h	323276.8	88151.9	17206.1	428634.8	326089.4	14980.0	87565.3	87534.8	14770.0	210.0	326425	14644.3	30.5164	49.8789	80.3953	125.683	14594.5	125.683	335.667	335.667	0.299391	19.9358
Vapor Volumetric Flow	MCFH	274.8	1.4	0.4	408.6	490.9	0.3	1.4	1.4	0.3	0.9	493.374	0.317831	0.593323	0.513219	1.10702	1.08790	0.317905	0.388145	1.25460	0.929030	0.196049	0.132453
Liquid Volumetric Flow	Mbbl/d	1174.7	6.0	1.6	1746.6	2098.3	1.4	6.0	6.0	1.4	3.7	2108.97	1.35860	2.53621	2.19380	4.73206	4.65030	1.35891	1.65916	5.36288	3.97121	0.838028	0.566180
Std Vapor Volumetric Flow	MMSCFD	150.3	44.6	1.5	196.4	150.9	1.2	44.3	44.3	1.1	0.1	151.000	1.08877	0.0136081	0.0118775	0.0254836	0.0351228	1.07689	0.0351228	0.112756	0.112756	0.000147328	0.00462476
Std Liquid Volumetric Flow	Mbbl/d	67.2	6.0	1.7	74.9	67.5	1.4	6.0	6.0	1.4	0.0	67.5683	1.36806	0.00609474	0.00762660	0.0137213	0.0207502	1.36043	0.0207502	0.0600505	0.0600505	2.28474E-05	0.00307647
Compressibility		0.927	0.011	0.132	0.730	0.958	0.081	0.009	0.001	0.025	0.980	0.958075	0.00930019	0.996500	0.987411	0.992963	0.986801	0.00674599	0.960688	0.975114	1.00550	0.999551	0.980073
Specific Gravity		0.676	0.999	0.723		0.680	0.729	0.998	0.998	0.734	0.851	0.679790	0.738762	0.705287	1.32056	0.992056	1.12526	0.736074			0.936129	0.639027	1.35554
API Gravity			10.0	63.4		61.3	10.0	10.0	60.0				59.4415					59.2443					
Enthalpy	MMBtu/h	-555.7	-602.1	-14.8	-1172.6	-558.7	-12.7	-597.7	-597.5	-12.4	-0.3	-558.811	-12.2263	-0.0549082	-0.0532662	-0.108174	-0.149697	-12.1117	-0.149710	-0.454228	-0.123996	-0.00164525	-0.0205050
Mass Enthalpy	Btu/lb	-1719.0	-6830.5	-858.8	-2735.7	-1713.3	-847.0	-6825.7	-6825.4	-836.7	-1450.2	-1711.91	-834.884	-1799.30	-1067.91	-1345.53	-1191.07	-829.884	-1191.17	-1353.21	-369.401	-5495.32	-1028.55
Mass Cp	Btu/(lb**F)	0.5	1.0	0.5	0.6	0.5	0.5	1.0	1.0	0.5	0.5	0.509332	0.484942	0.474073	0.410238	0.434218	0.419594	0.489074	0.432283	0.447149	0.998226	0.441273	0.409821
Ideal Gas CpCv Ratio		1.264	1.326	1.052	1.269	1.262	1.049	1.326	1.326	1.046	1.218	1.26185	1.04563	1.25912	1.14602	1.19042	1.17153	1.04471	1.16922	1.20041	1.07937	1.32143	1.14249
Dynamic Viscosity	cP	0.0	1.0	0.5		0.0	0.6	1.0	1.0	0.6	0.0	0.0108624	0.687280	0.0107079	0.00879651	0.00971295	0.00915554	0.660875			0.0263806	0.0102870	0.00875644
Kinematic Viscosity	cSt	0.6	1.0	0.7		1.0	0.8	1.0	1.0	0.9	2.6	1.02494	0.931193	12.9969	5.65035	8.34941	4.94737	0.898685			4.55810	420.528	3.63190
Thermal Conductivity	Btu/(h*ft*°F)	0.0	0.3	0.1		0.0	0.1	0.3	0.3	0.1	0.0	0.0181182	0.0703768	0.0170570	0.0114646	0.0142127	0.0126267	0.0699246			0.0874049	0.0122495	0.0111091
Surface Tension	lbf/ft		0.005	0.001		0.001	0.005	0.005	0.002				0.00162719					0.00159956					
Net I.G. Heating Value	Btu/ft^3	1077.1	0.0	5382.6	864.8	1079.8	5703.9	0.4	0.0	6006.1	1328.1	1080.11	6144.23	1066.65	2006.98	1504.92	1724.49	6189.86	1724.49	1451.61	1451.61	50.7070	2067.71
Net Liquid Heating Value	Btu/lb	20819.4	-1059.8	18917.9	16243.5	20765.9	18897.2	-1051.6	-1058.9	18876.4	20360.6	20765.3	18867.3	19732.1	19758.7	19748.6	19940.7	18864.2	19940.7	20203.4	20203.4	67.9787	19830.7
Gross I.G. Heating Value	Btu/ft^3	1189.3	50.3	5780.6	965.0	1192.2	6122.0	50.7	50.4	6444.2	1458.0	1192.48	6591.37	1177.67	2184.04	1646.72	1881.94	6639.98	1881.94	1590.02	1590.02	103.110	2248.99
Gross Liquid Heating Value	Btu/lb	22992.2	0.0	20328.0	18156.7	22931.9	20294.0	8.5	0.9	20264.6	22360.1	22931.1	20251.6	21794.5	21515.3	21621.3	21773.9	20247.3	21773.9	22140.6	22140.6	1142.4	21582.9

Process Streams		Separator Gas	Separator Water	Separator Oil	1	as from 3-ph Separat	Produced Liquid	2	Produced Water	3	Gas from LP Conde	To Sales Gas Line	Condensate from VRT	from produced wate	lashing from Oil Tank	Enclosed Combust	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW T	ases from Condensate Ta
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			0.127120	0.207603	0.207603	0.207603	2.77354	0.446591	0.446591	0.207842	0.706251	2.77354	0.776603	1.84280	0.706251	0.776603	0.709463	0.527535	0.527473	93.6555	0.000581104
H2S		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		0.412623			0.412245	0.411217	0.411217	0.411217	0.196641	0.112986	0.112986	0.410973	0.0193220	0.196641	0.00319961	0.106481	0.0193220	0.00319961	0.0194149	0.0838211	0.0838106	0.00345905	0.000106073
CO2		0.180410			0.179551	0.179313	0.179313	0.179313	1.36768	0.265046	0.265046	0.179379	0.275700	1.36768	0.224132	0.834690	0.275700	0.224132	0.276961	0.268397	0.268365	1.64246	0.180397
Methane		81.3500			81.2384	81.0499	81.0499	81.0499	73.9542	58.5611	58.5611	81.0259	27.8528	73.9542	11.8423	45.0049	27.8528	11.8423	27.9849	49.0017	48.9957	3.62045	2.36303
Ethane		14.1729			14.1430	14.1290	14.1290	14.1290	17.7934	29.3023	29.3023	14.1441	45.3839	17.7934	49.1541	32.4101	45.3839	49.1541	45.5765	34.3155	34.3116	1.04447	59.5284
Propane		2.15042			2.16393	2.17109	2.17109	2.17109	1.89247	5.97115	5.97115	2.17558	13.0600	1.89247	18.1550	13.0965	13.0600	18.1550	13.0965	8.17985	8.17928	0.0173571	19.0735
Isobutene		0.415023			0.411075	0.417398	0.417398	0.417398	1.21504	1.22068	1.22068	0.418391	2.90878	1.21504	4.39529	2.69730	2.90878	4.39529	2.90516	1.74644	1.74651	0.0149200	4.39315
n-Butane		0.686338			0.684954	0.698490	0.698490	0.698490	0.528775	2.04401	2.04401	0.700157	4.89343	0.528775	7.47982	3.76854	4.89343	7.47982	4.87988	2.93134	2.93159	0.00109300	7.42665
Isopentane		0.179510			0.183424	0.192454	0.192454	0.192454	0.101365	0.553859	0.553859	0.192904	1.32936	0.101365	2.10084	1.03329	1.32936	2.10084	1.31210	0.795106	0.795423	5.50241E-05	1.91515
n-Pentane		0.147808			0.153642	0.163856	0.163856	0.163856	0.0338781	0.472526	0.472526	0.164240	1.13171	0.0338781	1.80752	0.860543	1.13171	1.80752	1.11049	0.677467	0.677858	5.25209E-06	1.62889
2-Methylpentane		0			0.0143136	0.0164197	0.0164197	0.0164197	0.00459007	0.0464609	0.0464609	0.0164569	0.110000	0.00459007	0.179451	0.0860900	0.110000	0.179451	0.104264	0.0661462	0.0662530	3.97800E-07	0.156888
3-Methylpentane		0			0.00939923	0.0109058	0.0109058	0.0109058	0.00730887	0.0308330	0.0308330	0.0109305	0.0729601	0.00730887	0.119170	0.0594457	0.0729601	0.119170	0.0687143	0.0438757	0.0439553	1.41459E-06	0.104137
n-Hexane		0.305017			0.206688	0.248055	0.248055	0.248055	0.0339207	0.694365	0.694365	0.248605	1.62671	0.0339207	2.68979	1.27178	1.62671	2.68979	1.50438	0.982421	0.984784	1.02578E-06	2.42303
Methylcyclopentane		0			0.00415371	0.00496487	0.00496487	0.00496487	0.00542045	0.0141164	0.0141164	0.00497619	0.0333850	0.00542045	0.0547752	0.0284239	0.0333850	0.0547752	0.0309380	0.0200710	0.0201184	1.26047E-06	0.0439302
Benzene		0			0.000685020	0.000827977	0.000827977	0.000827977	0.00773495	0.00236791	0.00236791	0.000829876	0.00558507	0.00773495	0.00920613	0.00842064	0.00558507	0.00920613	0.00517308	0.00336165	0.00337003	0.000109006	0.00556558
2-Methylhexane		0			0.0101335	0.0135012	0.0135012	0.0135012	0.00260856	0.0366951	0.0366951	0.0135296	0.0844127	0.00260856	0.141630	0.0674040	0.0844127	0.141630	0.0714153	0.0512818	0.0515588	1.35622E-08	0.0343017
3-Methylhexane		0			0.00797595	0.0108137	0.0108137	0.0108137	0.00251481	0.0293714	0.0293714	0.0108364	0.0673619	0.00251481	0.113512	0.0542486	0.0673619	0.113512	0.0560097	0.0409581	0.0412052	5.17210E-08	0.100681
n-Heptane		0			0.0154758	0.0217239	0.0217239	0.0217239	0.00212252	0.0582930	0.0582930	0.0217685	0.132604	0.00212252	0.224927	0.105968	0.132604	0.224927	0.105344	0.0808047	0.0814405	1.38003E-08	0.191667
Methylcyclohexane		0			0.0102172	0.0143945	0.0143945	0.0143945	0.0149886	0.0393188	0.0393188	0.0144249	0.0901733	0.0149886	0.152370	0.0790200	0.0901733	0.152370	0.0712114	0.0547226	0.0551597	1.12691E-06	0.131539
Toluene		0			0.00199525	0.00284273	0.00284273	0.00284273	0.0243996	0.00781602	0.00781602	0.00284879	0.0178915	0.0243996	0.0303365	0.0271667	0.0178915	0.0303365	0.0140231	0.0108556	0.0109545	7.43032E-05	0.0193339
n-Octane		0			0.0152587	0.0245329	0.0245329	0.0245329	0.000950305	0.0632023	0.0632023	0.0245795	0.139373	0.000950305	0.242640	0.113598	0.139373	0.242640	0.0756735	0.0847030	0.0869289	7.66393E-10	0.203801
Ethylbenzene		0			0.000857093	0.00137543	0.00137543	0.00137543	0.0110254	0.00361578	0.00361578	0.00137813	0.00802138	0.0110254	0.0139619	0.0123941	0.00802138	0.0139619	0.00430439	0.00484633	0.00498809	1.01897E-05	0.00966294
p-Xylene		0			0.000834092	0.00133727	0.00133727	0.00133727	0.0100664	0.00350429	0.00350429	0.00133989	0.00777673	0.0100664	0.0135118	0.0116723	0.00777673	0.0135118	0.00413221	0.00469533	0.00483512	5.85703E-06	0.00868037
o-Xylene		0			0.00108563	0.00177328	0.00177328	0.00177328	0.0146775	0.00464123	0.00464123	0.00177672	0.0102573	0.0146775	0.0179179	0.0161878	0.0102573	0.0179179	0.00491094	0.00616368	0.00639059	1.32487E-05	0.0103223
n-Nonane		0			0.00329113	0.00575345	0.00575345	0.00575345	0.000231989	0.0141909	0.0141909	0.00576350	0.0303174	0.000231989	0.0542778	0.0254219	0.0303174	0.0542778	0.00811232	0.0176807	0.0192142	5.94305E-11	0.0445602
C10+		0			0.000235345	0.000445540	0.000445540	0.000445540	0.000492306	0.000962183	0.000962183	0.000446135	0.00186078	0.000492306	0.00360256	0.00194195	0.00186078	0.00360256	1.72007E-05	0.000255986	0.00124209	6.85930E-11	0.00206348
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			21.0060	34.3938	0	0	0	0	0.0380674	34.4591	0	0.0414347	0.0101279	0.0515626	0.0272361	0	0.0272283	0.0653028	0.0653035	0.0151501	2.95079E-06
H2S		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen		68.1049			68.1213	68.1268	0	0	0	0	0.00963097	68.1371	0	0.00293768	4.17271E-05	0.00297940	0.000745137	0	0.000745118	0.0103761	0.0103761	5.59549E-07	5.38631E-07
CO2		29.7773			29.6699	29.7069	0	0	0	0	0.0225926	29.7402	0	0.0204322	0.00292297	0.0233551	0.0106322	0	0.0106294	0.0332245	0.0332247	0.000265691	0.000916039
Methane		13427.1			13424.2	13427.6	0	0	0	0	4.99175	13433.7	0	1.10482	0.154440	1.25926	1.07412	0	1.07402	6.06586	6.06587	0.000585659	0.0119992
Ethane		2339.28			2337.06	2340.77	0	0	0	0	2.49773	2345.02	0	0.265821	0.641034	0.906854	1.75020	0	1.74917	4.24786	4.24793	0.000168958	0.302279
Propane		354.934			357.577	359.687	0	0	0	0	0.508981	360.700	0	0.0282721	0.236765	0.265038	0.503649	0	0.502626	1.01257	1.01263	2.80775E-06	0.0968535
Isobutene		68.5010			67.9280	69.1508	0	0	0	0	0.104051	69.3670	0	0.0181518	0.0573203	0.0754721	0.112175	0	0.111496	0.216189	0.216226	2.41351E-06	0.0223080
n-Butane		113.282			113.185	115.720	0	0	0	0	0.174232	116.082	0	0.00789953	0.0975466	0.105446	0.188711	0	0.187284	0.362866	0.362943	1.76808E-07	0.0377118
Isopentane		29.6287			30.3098	31.8840	0	0	0	0	0.0472110	31.9825	0	0.00151432	0.0273977	0.0289120	0.0512657	0	0.0503567	0.0984251	0.0984767	8.90092E-09	0.00972496
n-Pentane		24.3963			25.3885	27.1462	0	0	0	0	0.0402782	27.2301	0	0.000506114	0.0235724	0.0240785	0.0436435	0	0.0426194	0.0838627	0.0839217	8.49598E-10	0.00827135
2-Methylpentane		0			2.36524	2.72027	0	0	0	0	0.00396033	2.72847	0	6.85724E-05	0.00234028	0.00240885	0.00424208	0	0.00400153	0.00818815	0.00820241	6.43497E-11	0.000796664
3-Methylpentane		0			1.55317	1.80677	0	0	0	0	0.00262820	1.81222	0	0.000109189	0.00155414	0.00166333	0.00281365	0	0.00263717	0.00543131	0.00544186	2.28829E-10	0.000528800
n-Hexane		50.3441			34.1541	41.0956	0	0	0	0	0.0591877	41.2175	0	0.000506752	0.0350784	0.0355851	0.0627328	0	0.0577364	0.121613	0.121920	1.65934E-10	0.0123039
Methylcyclopentane		0			0.686379	0.822536	0	0	0	0	0.00120328	0.825027	0	8.09776E-05	0.000714341	0.000795318	0.00128747	0	0.00118736	0.00248456	0.00249075	2.03898E-10	0.000223073
Benzene		0			0.113196	0.137172	0	0	0	0	0.000201841	0.137589	0	0.000115555	0.000120060	0.000235615	0.000215384	0	0.000198536	0.000416135	0.000417225	1.76333E-08	2.82615E-05
2-Methylhexane		0			1.67450	2.23676	0	0	0	0	0.00312789	2.24314	0	3.89700E-05	0.00184703	0.00188600	0.00325532	0	0.00274083	0.00634810	0.00638320	2.19387E-12	0.000174181
3-Methylhexane		0			1.31798	1.79151	0	0	0	0	0.00250362	1.79661	0	3.75694E-05	0.00148034	0.00151791	0.00259776	0	0.00214958	0.00507014	0.00510138	8.36659E-12	0.000511247
n-Heptane		0			2.55730	3.59902	0	0	0	0	0.00496890	3.60910	0	3.17090E-05	0.00293334	0.00296505	0.00511379	0	0.00404297	0.0100027	0.0100827	2.23239E-12	0.000973265
Methylcyclohexane		0			1.68833	2.38475	0	0	0	0	0.00335154	2.39158	0	0.000223919	0.00198711	0.00221103	0.00347747	0	0.00273301	0.00677403	0.00682901	1.82293E-10	0.000667944
Toluene		0			0.329705	0.470958	0	0	0	0	0.000666238	0.472315	0	0.000364513	0.000395628	0.000760141	0.000689971	0	0.000538189	0.00134380	0.00135621	1.20196E-08	9.81759E-05
n-Octane		0			2.52142	4.06439	0	0	0	0	0.00538736	4.07515	0	1.41969E-05	0.00316434	0.00317854	0.00537480	0	0.00290425	0.0104853	0.0107622	1.23975E-13	0.00103488
Ethylbenzene		0			0.141630	0.227869	0	0	0	0	0.000308209	0.228486	0	0.000164711	0.000182082	0.000346793	0.000309339	0	0.000165197	0.000599921	0.000617548	1.64832E-09	4.90675E-05

p-Xylene		0			0.137829	0.221548	0	0	0	0	0.000298705	0.222146	0	0.000150385	0.000176211	0.000326597	0.000299904	0	0.000158589	0.000581228	0.000598609	9.47456E-10	4.40781E-05		
o-Xylene		0			0.179395	0.293780	0	0	0	0	0.000395618	0.294572	0	0.000219271	0.000233673	0.000452944	0.000395564	0	0.000188476	0.000762993	0.000791182	2.14316E-09	5.24156E-05		
n-Nonane		0			0.543842	0.953180	0	0	0	0	0.00120964	0.955559	0	3.46575E-06	0.000707853	0.000711319	0.00116917	0	0.000311341	0.00218866	0.00237881	9.61370E-15	0.000226273		
C10+		0			0.0388895	0.0738131	0	0	0	0	8.20165E-05	0.0739669	0	7.35469E-06	4.69821E-05	5.43368E-05	7.17597E-05	0	6.60143E-07	3.16881E-05	0.000153776	1.10959E-14	1.04782E-05		
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water		0			0.116830	0.190014	0.190014	0.190014	2.44609	0.326593	0.326593	0.190179	0.390400	2.44609	0.365800	1.15544	0.390400	0.365800	0.395203	0.350642	0.350484	91.1628	0.000266653		
H2S		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Nitrogen		0.590159			0.589144	0.585257	0.585257	0.585257	0.269673	0.128484	0.128484	0.584745	0.0166083	0.269673	0.00234351	0.103816	0.0166083	0.00234351	0.0168170	0.0866345	0.0865947	0.00523559	7.56875E-05		
CO2		0.405375			0.403121	0.400929	0.400929	0.400929	2.94664	0.473505	0.473505	0.400965	0.372299	2.94664	0.257901	1.27849	0.372299	0.257901	0.376889	0.435809	0.435611	3.90558	0.202222		
Methane		66.6313			66.4864	66.0592	66.0592	66.0592	58.0805	38.1361	38.1361	66.0211	13.7104	58.0805	4.96721	25.1279	13.7104	4.96721	13.8817	29.0037	28.9905	3.13818	0.965587		
Ethane		21.7585			21.6951	21.5845	21.5845	21.5845	26.1924	35.7666	35.7666	21.6014	41.8727	26.1924	38.6441	33.9177	41.8727	38.6441	42.3750	38.0698	38.0529	1.69692	45.5927		
Propane		4.84138			4.86786	4.86389	4.86389	4.86389	4.08527	10.6883	10.6883	4.87257	17.6704	4.08527	20.9313	14.5369	17.6704	20.9313	17.8566	13.3080	13.3026	0.0413538	21.4229		
Isobutene		1.18887			1.17661	1.18980	1.18980	1.18980	3.33733	2.78016	2.78016	1.19229	5.00763	3.33733	6.44767	5.26705	5.00763	6.44767	5.04000	3.61523	3.61418	0.0452297	6.27826		
n-Butane		2.03672			2.03097	2.06259	2.06259	2.06259	1.50456	4.82261	4.82261	2.06693	8.72699	1.50456	11.3668	7.62328	8.72699	11.3668	8.77002	6.28608	6.28452	0.00343246	10.9948		
Isopentane		0.661253			0.675127	0.705449	0.705449	0.705449	0.358024	1.62213	1.62213	0.706900	2.94293	0.358024	3.96301	2.59463	2.94293	3.96301	2.92715	2.11654	2.11667	0.000214499	3.51952		
n-Pentane		0.544475			0.565508	0.600623	0.600623	0.600623	0.119659	1.38392	1.38392	0.601860	2.50538	0.119659	3.40970	2.16087	2.50538	3.40970	2.47739	1.80338	1.80382	2.04741E-05	2.99345		
2-Methylpentane		0			0.0629261	0.0718883	0.0718883	0.0718883	0.0193642	0.162528	0.162528	0.0720309	0.290861	0.0193642	0.404328	0.258203	0.290861	0.404328	0.277823	0.210310	0.210579	1.85222E-06	0.344370		
3-Methylpentane		0			0.0413214	0.0477474	0.0477474	0.0477474	0.0308340	0.107859	0.107859	0.0478420	0.192920	0.0308340	0.268507	0.178291	0.192920	0.268507	0.183096	0.139501	0.139708	6.58653E-06	0.228582		
n-Hexane		1.34201			0.908655	1.08603	1.08603	1.08603	0.143102	2.42900	2.42900	1.08813	4.30132	0.143102	6.06046	3.81436	4.30132	6.06046	4.00858	3.12358	3.13005	4.77617E-06	5.31856		
Methylcyclopentane		0			0.0178336	0.0212286	0.0212286	0.0212286	0.0223324	0.0482263	0.0482263	0.0212710	0.0862111	0.0223324	0.120529	0.0832556	0.0862111	0.120529	0.0805090	0.0623222	0.0624488	5.73163E-06	0.0941711		
Benzene		0			0.00272973	0.00328583	0.00328583	0.00328583	0.0295782	0.00750824	0.00750824	0.00329244	0.0133861	0.0295782	0.0188017	0.0228922	0.0133861	0.0188017	0.0124944	0.00968816	0.00970908	0.000460057	0.0110734		
2-Methylhexane		0			0.0518006	0.0687319	0.0687319	0.0687319	0.0127960	0.149259	0.149259	0.0688571	0.259534	0.0127960	0.371051	0.235065	0.259534	0.371051	0.221267	0.189588	0.190549	7.34260E-08	0.0875474		
3-Methylhexane		0			0.0407717	0.0550503	0.0550503	0.0550503	0.0123361	0.119469	0.119469	0.0551502	0.207110	0.0123361	0.297386	0.189187	0.207110	0.297386	0.173536	0.151421	0.152284	2.80018E-07	0.256965		
n-Heptane		0			0.0791098	0.110592	0.110592	0.110592	0.0104118	0.237110	0.237110	0.110788	0.407702	0.0104118	0.589280	0.369554	0.407702	0.589280	0.326389	0.298734	0.300984	7.47151E-08	0.489186		
Methylcyclohexane		0			0.0511777	0.0718052	0.0718052	0.0718052	0.0720457	0.156714	0.156714	0.0719367	0.271667	0.0720457	0.391160	0.270031	0.271667	0.391160	0.216196	0.198238	0.199755	5.97835E-06	0.328971		
Toluene		0			0.00937861	0.0133072	0.0133072	0.0133072	0.110058	0.0292336	0.0292336	0.0133318	0.0505820	0.110058	0.0730821	0.0871173	0.0505820	0.0730821	0.0399515	0.0369034	0.0372270	0.000369906	0.0453746		
n-Octane		0			0.0889187	0.142375	0.142375	0.142375	0.00531415	0.293065	0.293065	0.142605	0.488496	0.00531415	0.724672	0.451618	0.488496	0.724672	0.267281	0.356981	0.366240	4.73009E-09	0.592969		
Ethylbenzene		0			0.00464205	0.00741873	0.00741873	0.00741873	0.0573023	0.0155826	0.0155826	0.00743118	0.0261300	0.0573023	0.0387552	0.0457953	0.0261300	0.0387552	0.0141300	0.0189831	0.0195318	5.84500E-05	0.0261302		
p-Xylene		0			0.00451747	0.00721293	0.00721293	0.00721293	0.0523183	0.0151021	0.0151021	0.00722498	0.0253331	0.0523183	0.0375058	0.0431283	0.0253331	0.0375058	0.0135648	0.0183916	0.0189328	3.35971E-05	0.0234731		
o-Xylene		0			0.00587983	0.00956461	0.00956461	0.00956461	0.0762833	0.0200019	0.0200019	0.00958051	0.0334135	0.0762833	0.0497362	0.0598130	0.0334135	0.0497362	0.0161211	0.0241431	0.0250236	7.59972E-05	0.0279132		
n-Nonane		0			0.0215338	0.0374898	0.0374898	0.0374898	0.00145659	0.0738826	0.0738826	0.0375447	0.119310	0.00145659	0.182012	0.113477	0.119310	0.182012	0.0321713	0.0836651	0.0908918	4.11839E-10	0.145571		
C10+		0			0.00215031	0.00405408	0.00405408	0.00405408	0.00431645	0.00699536	0.00699536	0.00405835	0.0102259	0.00431645	0.0168698	0.0121048	0.0102259	0.0168698	9.52558E-05	0.00169154	0.00820495	6.63772E-10	0.00941343		
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	lb/h	lb/h
Water		0			378.428	619.614	0	0	0	0	0.685795	620.791	0	0.746458	0.182457	0.928915	0.490665	0	0.490525	1.17645	1.17646	0.272933	5.31593E-05		
H2S		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Nitrogen		1907.85			1908.31	1908.46	0	0	0	0	0.269796	1908.75	0	0.0822943	0.00116892	0.0834633	0.0208738	0	0.0208733	0.290670	0.290670	1.56749E-05	1.50889E-05		
CO2		1310.48			1305.76	1307.39	0	0	0	0	0.994288	1308.85	0	0.899209	0.128638	1.02785	0.467916	0	0.467795	1.46219	1.46220	0.0116929	0.0403144		
Methane		215404			215357	215412	0	0	0	0	80.0799	215509	0	17.7241	2.47759	20.2017	17.2316	0	17.2300	97.3113	97.3115	0.00939541	0.192497		
Ethane		70340.0			70273.2	70384.7	0	0	0	0	75.1043	70512.5	0	7.99297	19.2753	27.2682	52.6268	0	52.5959	127.729	127.731	0.00508041	9.08925		
Propane		15651.0			15767.6	15860.6	0	0	0	0	22.4438	15905.3	0	1.24668	10.4403	11.6870	22.2087	0	22.1636	44.6500	44.6525	0.000123809	4.27082		
Isobutene		3843.34			3811.19	3879.80	0	0	0	0	5.83790	3891.93	0	1.01843	3.21603	4.23446	6.29373	0	6.25564	12.1296	12.1316	0.000135413	1.25162		
n-Butane		6584.23			6578.56	6725.87	0	0	0	0	10.1267	6746.97	0	0.459138	5.66962	6.12876	10.9683	0	10.8853	21.0906	21.0951	1.02765E-05	2.19189		
Isopentane		2137.68			2186.82	2300.39	0	0	0	0	3.40621	2307.50	0	0.109256	1.97671	2.08596	3.69876	0	3.63317	7.10125	7.10498	6.42190E-07	0.701644		
n-Pentane		1760.16			1831.75	1958.57	0	0	0	0	2.90602	1964.62	0	0.0365155	1.70072	1.73723	3.14883	0	3.07493	6.05059	6.05485	6.12975E-08	0.596767		
2-Methylpentane		0			203.825	234.420	0	0	0	0	0.341283	235.127	0	0.00590925	0.201674	0.207583	0.365563	0	0.344834	0.705617	0.706846	5.54536E-09	0.0686528		
3-Methylpentane		0			133.845	155.699	0	0	0	0	0.226486	156.168	0	0.00940942	0.133928	0.143338	0.242468	0	0.227259	0.468045	0.468954	1.97194E-08	0.0455695		
n-Hexane		4338.42			2943.24	3541.42	0	0	0	0	5.10052	3551.93	0	0.0436695	3.02289	3.06656	5.40602	0	4.97545	10.4800	10.5065	1.42994E-08	1.06029		
Methylcyclopentane		0			57.7653	69.2242	0	0	0	0	0.101268	69.4338	0	0.00681503	0.0601185	0.0669336	0.108353	0	0.0999278	0.209099	0.209620	1.71599E-08	0.0187737		
Benzene		0			8.84194	10.7147	0	0	0	0	0.0157661	10.7473	0	0.00902618	0.00937810	0.0184043	0.0168241	0	0.0155080	0.0325050	0.0325902	1.37737E-06	0.00220756		
2-Methylhexane		0			167.788	224.127	0	0	0	0	0.313420	224.767	0	0.00390487	0.185076	0.188981	0.326189	0	0.274637	0.636092	0.639609	2.19830E-10	0.0174532		
3-Methylhexane		0			132.064	179.513	0	0	0	0	0.250867	180.024	0	0.00376453	0.148333	0.152097	0.260301	0	0.215392	0.508038	0.511168	8.38348E-10	0.0512280		
n-Heptane		0			256.246	360.629	0	0	0	0	0.497893	361.639	0	0.00317730	0.293926	0.297104	0.512412	0	0.405113	1.00229	1.01030	2.23690E-10	0.0975230		
Methylcyclohexane		0			165.771	234.149	0	0	0	0	0.329074	234.820	0	0.0219857	0.195106	0.217092	0.341439	0	0.268343	0.665116	0.670513	1.78986E-08	0.0655828		
Toluene		0			30.3785	43.3934	0	0	0	0	0.0613861	43.5183	0	0.0335856	0.0364526	0.0700382	0.0635728	0	0.0495879	0.123816	0.124959	1.10746E-06	0.00904577		
n-Octane		0			288.019	464.269	0	0	0	0	0.615391	465.498	0	0.00162169	0.361458	0.363080	0.613956	0	0.331749	1.19772	1.22935	1.41614E-11	0.118213		
Ethylbenzene		0			15.0362	24.1917	0	0	0	0	0.0327210	24.2573	0	0.0174866	0.0193307	0.0368173	0.0328409	0	0.0175381	0.0636906	0.0655619	1.74994E-07	0.00520925		
p-Xylene		0			14.6326	23.5206	0	0	0	0	0.0317121	23.5842	0	0.0159657	0.0187075	0.0346731	0.0318393	0	0.0168366	0.0617061	0.0635514	1.00587E-07	0.00467955		
o-Xylene		0			19.0455	31.1892	0	0	0	0	0.0420008	31.2732	0	0.0232789	0.0248079	0.0480868	0.0419951	0	0.0200095	0.0810032	0.0839959	2.27528E-07	0.00556471		
n-Nonane		0			69.7505	122.250	0	0	0	0	0.155142	122.555	0	0.000444500	0.0907858	0.0912303	0.149952	0	0.0399310	0.280707	0.305094	1.23301E-12	0.0290206		
C10+		0			6.96512	13.2199	0	0	0	0	0.0146892	13.2475	0	0.00131723	0.00841450	0.00973172	0.0128522	0	0.000118232	0.00567534	0.0275413	1.98727E-12	0.00187664		

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 watelashing from Oil Tanko**	**Enclosed Combust**	**Flash Gas from VRT**	**Stable Condensate**	**4**	**5**	**6**	**Losses from**	**PW Tasses from**	**Condensate Ta**
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			60.1	70.0	70.0	70.0	72.5	70.0	70.0	72	65	72.52	72.52	72.3761	65	72.52	74.3018	70	1381.09	75.9425	75.9425		
Pressure	psig	300			200	169	169	169	-0.365949	40	40	169	5	-0.365949	-0.365949	-0.365949	5	-0.365949	40	40	250	-14.2219	6.90120		
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	19.6			19.6	19.7	19.7	19.7	20.4	24.6	24.6	19.6885	32.5905	20.4269	38.2469	28.7325	32.5905	38.2469	32.3408	27.1037	27.1127	18.5079	39.2598		
Mass Density	lb/ft^3	1.2			0.8	0.7	0.7	0.7	0.1	0.2	0.2	0.661617	0.115528	0.0514330	0.0971884	0.0726230	0.115528	0.0971884	0.319808	0.267427	0.361309	0.00152712	0.150512		
Molar Flow	lbmol/h	16505.3			16524.5	16567.1	0.0	0.0	0.0	0.0	8.5	16579.5	0	1.49393	1.30413	2.79806	3.85643	0	3.83787	12.3789	12.3804	0.0161764	0.507790		
Mass Flow	lb/h	323276.8			323912.2	326089.4	0.0	0.0	0.0	0.0	210.0	326425	0	30.5164	49.8789	80.3953	125.683	0	124.120	335.513	335.667	0.299391	19.9358		
Vapor Volumetric Flow	MCFH	274.8			406.8	490.9	0.0	0.0	0.0	0.0	0.9	493.374	0	0.593323	0.513219	1.10702	1.08790	0	0.388108	1.25459	0.929030	0.196049	0.132453		
Liquid Volumetric Flow	Mbbl/d	1174.7			1739.0	2098.3	0.0	0.0	0.0	0.0	3.7	2108.97	0	2.53621	2.19380	4.73206	4.65030	0	1.65900	5.36287	3.97121	0.838028	0.566180		
Std Vapor Volumetric Flow	MMSCFD	150.3			150.5	150.9	0.0	0.0	0.0	0.0	0.1	151.000	0	0.0136061	0.0118775	0.0254836	0.0351228	0	0.0349539	0.112742	0.112756	0.000147328	0.00462476		
Std Liquid Volumetric Flow	Mbbl/d	67.2			67.3	67.5	0.0	0.0	0.0	0.0	0.0	67.5683	0	0.00609474	0.00762660	0.0137213	0.0207502	0	0.0205887	0.0600352	0.0600505	2.28474E-05	0.00307647		
Compressibility		0.927			0.948	0.958	0.958	0.958	0.996	0.980	0.980	0.958075	0.966801	0.996500	0.987411	0.992963	0.966801	0.987411	0.965239	0.975234	1.00550	0.999551	0.980073		
Specific Gravity		0.676			0.677	0.680	0.680	0.680	0.705	0.851	0.851	0.679790	1.12526	0.705287	1.32056	0.992056	1.12526	1.32056	1.11664	0.935817	0.936129	0.639027	1.35554		
API Gravity																									
Enthalpy	MMBtu/h	-555.7			-557.7	-558.7	0.0	0.0	0.0	0.0	-0.3	-558.811	0	-0.0549082	-0.0532662	-0.108174	-0.149697	0	-0.148250	-0.454091	-0.123996	-0.00164525	-0.0205050		
Mass Enthalpy	Btu/lb	-1719.0			-1721.7	-1713.3	-1713.3	-1713.3	-1799.3	-1450.2	-1450.2	-1711.91	-1191.07	-1799.30	-1067.91	-1345.53	-1191.07	-1067.91	-1194.41	-1353.42	-369.401	-5495.32	-1028.55		
Mass Cp	Btu/(lb*°F)	0.5			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.509332	0.419594	0.474073	0.410238	0.434218	0.419594	0.410238	0.431105	0.447121	0.998226	0.441273	0.409821		
Ideal Gas CpCv Ratio		1.264			1.266	1.262	1.262	1.262	1.259	1.218	1.218	1.26185	1.17153	1.25912	1.14602	1.19042	1.17153	1.14602	1.17053	1.20048	1.07937	1.32143	1.14249		
Dynamic Viscosity	cP	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0108624	0.00915554	0.0107079	0.00879651	0.00971295	0.00915554	0.00879651	0.00939946	0.00982699	0.0263806	0.0102870	0.00875644		
Kinematic Viscosity	cSt	0.6			0.8	1.0	1.0	1.0	13.0	2.6	2.6	1.02494	4.94737	12.9969	5.65035	8.34941	4.94737	5.65035	1.83482	2.29400	4.55810	420.528	3.63190		

Thermal Conductivity	Btu/(h*ft**F)	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0181182	0.0126267	0.0170570	0.0114646	0.0142127	0.0126267	0.0114646	0.0131480	0.0147227	0.0874049	0.0122495	0.0111091
Surface Tension	lbf/ft																					
Net I.G. Heating Value	Btu/ft^3	1077.1		1076.6	1079.8	1079.8	1079.8	1066.7	1328.1	1328.1	1080.11	1724.49	1066.65	2006.98	1504.92	1724.49	2006.98	1712.13	1451.16	1451.61	50.7070	2067.71
Net Liquid Heating Value	Btu/lb	20819.4		20791.0	20765.9	20765.9	20765.9	19732.1	20360.6	20360.6	20765.3	19940.7	19732.1	19758.7	19748.6	19940.7	19758.7	19951.2	20203.9	20203.4	67.9787	19830.7
Gross I.G. Heating Value	Btu/ft^3	1189.3		1188.7	1192.2	1192.2	1192.2	1177.7	1458.0	1458.0	1192.48	1881.94	1177.67	2184.04	1646.72	1881.94	2184.04	1868.72	1589.55	1590.02	103.110	2248.99
Gross Liquid Heating Value	Btu/lb	22992.2		22961.4	22931.9	22931.9	22931.9	21794.5	22360.1	22360.1	22931.1	21773.9	21794.5	21515.3	21621.3	21773.9	21515.3	21788.5	22141.4	22140.6	1142.4	21582.9

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 Tanks	Enclosed Combustor	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW	Tasses from Condensate Ta
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		0	100	0	0.0558370	0.0793781	0.0793781	99.9666	99.9965	0.0540128	0.0540128		0.0329721	99.9965	0.0247703		0.0329721	0.0247703	0.0417874	0.0407132		100.0000	2.23861E-05
H2S		0	0	0	0	0	0	0	0	0	0		0	0	0		0	0	0	0		0	0
Nitrogen		0	0.0219998	0.00938693	0.00790099	0.00790099	0.00790099	6.27378E-05	2.29618E-06	0.000642181	0.000642181		3.95865E-05	2.29618E-06	4.73326E-06		3.95865E-05	4.73326E-06	0.000106237	0.000450661		1.30682E-09	2.35435E-07
CO2		0	0.0139999	0.0377397	0.0301599	0.0301599	0.0301599	0.00109232	0.000672139	0.0139350	0.0139350		0.00549071	0.000672139	0.00307923		0.00549071	0.00307923	0.0148411	0.0145753		2.58131E-05	0.00368880
Methane		0	4.97995	5.84364	4.76461	4.76461	4.76461	0.0245078	0.00177676	1.04861	1.04861		0.183924	0.00177676	0.0553380		0.183924	0.0553380	0.533525	0.912420		2.82210E-06	0.0168069
Ethane		0	5.23595	6.38244	5.03058	5.03058	5.03058	0.00611728	0.000648260	3.35401	3.35401		1.99816	0.000648260	1.47805		1.99816	1.47805	5.54079	4.13601		1.22151E-06	2.67353
Propane		0	5.28795	3.62162	2.81994	2.81994	2.81994	0.000630514	4.88336E-05	2.60227	2.60227		2.26491	4.88336E-05	2.08965		2.26491	2.08965	5.51497	3.64949		1.44006E-08	3.18743
Isobutene		0	1.72798	2.06464	1.59503	1.59503	1.59503	0.000509359	0.000135930	1.62088	1.62088		1.57934	0.000135930	1.54828		1.57934	1.54828	3.65896	2.35150		5.27296E-08	2.20298
n-Butane		0	4.22196	4.27784	3.29268	3.29268	3.29268	0.000175031	1.25033E-05	3.37893	3.37893		3.33008	1.25033E-05	3.28431		3.33008	3.28431	7.69559	4.90035		8.35729E-10	4.63132
Isopentane		0	3.18197	2.75837	2.16799	2.16799	2.16799	3.28776E-05	1.72130E-06	2.27948	2.27948		2.31013	1.72130E-06	2.31244		2.31013	2.31244	4.89994	3.29376		2.98987E-11	2.94698
n-Pentane		0	3.73996	3.12392	2.47401	2.47401	2.47401	1.06362E-05	2.23054E-07	2.61226	2.61226		2.66002	2.23054E-07	2.66942		2.66002	2.66942	5.52029	3.76563		1.14098E-12	3.34479
2-Methylpentane		0	2.17098	0.700422	0.584316	0.584316	0.584316	1.45313E-06	4.22725E-08	0.621469	0.621469		0.637968	4.22725E-08	0.643025		0.637968	0.643025	1.29655	0.909697		1.19265E-13	0.779504
3-Methylpentane		0	1.47799	0.512295	0.431980	0.431980	0.431980	2.41417E-06	1.67669E-07	0.459689	0.459689		0.472165	1.67669E-07	0.476058		0.472165	0.476058	0.951261	0.672480		1.04934E-12	0.576395
n-Hexane		0	4.66295	14.7365	12.6940	12.6940	12.6940	1.05803E-05	1.54015E-07	13.5229	13.5229		13.9066	1.54015E-07	14.0304		13.9066	14.0304	26.9312	19.6429		1.52944E-13	17.3941
Methylcyclopentane		0	0.718993	0.292236	0.252872	0.252872	0.252872	1.87393E-06	2.07890E-07	0.269364	0.269364		0.276976	2.07890E-07	0.279427		0.276976	0.279427	0.539573	0.395110		1.55325E-12	0.310945
Benzene		0	0.124999	0.0536371	0.0473254	0.0473254	0.0473254	2.89551E-05	2.65858E-05	0.0504308	0.0504308		0.0518775	2.65858E-05	0.0523481		0.0518775	0.0523481	0.0908109	0.0695462		1.17798E-08	0.0424073
2-Methylhexane		0	2.61697	1.57634	1.49449	1.49449	1.49449	8.18823E-07	1.70258E-08	1.59519	1.59519		1.64393	1.70258E-08	1.66050		1.64393	1.66050	2.77311	2.23918		2.79681E-15	0.545870
3-Methylhexane		0	2.20698	1.38797	1.33222	1.33222	1.33222	7.92708E-07	1.97282E-08	1.42222	1.42222		1.46592	1.97282E-08	1.48084		1.46592	1.48084	2.41574	1.99260		1.27321E-14	1.77879
n-Heptane		0	5.08495	3.49618	3.47027	3.47027	3.47027	6.59616E-07	7.20939E-09	3.70595	3.70595		3.82123	7.20939E-09	3.86089		3.82123	3.86089	5.77181	5.10243		1.52513E-15	4.41031
Methylcyclohexane		0	3.39797	2.34894	2.33416	2.33416	2.33416	5.18389E-06	5.76960E-07	2.49267	2.49267		2.57018	5.76960E-07	2.59684		2.57018	2.59684	4.01270	3.50672		1.38714E-12	3.03383
Toluene		0	0.760992	0.554188	0.568036	0.568036	0.568036	7.05008E-05	6.30204E-05	0.606733	0.606733		0.625729	6.30204E-05	0.632296		0.625729	0.632296	0.818118	0.791484		6.07378E-09	0.525145
n-Octane		0	12.7579	11.1947	12.4705	12.4705	12.4705	2.93454E-07	1.35586E-09	13.3276	13.3276		13.7530	1.35586E-09	13.9020		13.7530	13.9020	13.3165	17.6636		3.62052E-17	15.3247
Ethylbenzene		0	0.836992	0.748478	0.846461	0.846461	0.846461	2.91916E-05	2.58106E-05	0.904681	0.904681		0.933606	2.58106E-05	0.943749		0.933606	0.943749	0.776936	1.12445		7.48778E-10	0.835076
p-Xylene		0	0.835992	0.750109	0.850384	0.850384	0.850384	1.96813E-05	1.65923E-05	0.908882	0.908882		0.937951	1.65923E-05	0.948147		0.937951	0.948147	0.761698	1.10879		3.06951E-10	0.774021
o-Xylene		0	1.31099	1.19854	1.37331	1.37331	1.37331	5.54728E-05	5.09770E-05	1.46786	1.46786		1.51488	5.09770E-05	1.53139		1.51488	1.53139	1.11622	1.79824		1.44863E-09	1.12282
n-Nonane		0	8.14292	7.80805	9.20340	9.20340	9.20340	7.16623E-08	3.55105E-10	9.83814	9.83814		10.1545	3.55105E-10	10.2659		10.1545	10.2659	4.62377	12.1296		2.88506E-18	10.8972
C10+		0	24.4798	24.4660	29.7839	29.7839	29.7839	1.79963E-07	2.86496E-08	31.8412	31.8412		32.8683	2.86496E-08	33.2308		32.8683	33.2308	0.383232	7.78827		1.25157E-16	22.6413
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	4893.17	0	0.0897546	0	0.104720	4858.68	4858.63	0.0666526	0		0.0394166	0	0		0	0.0292887	7.75265E-06	6.38215E-07		0	0
H2S		0	0	0	0	0	0	0	0	0	0		0	0	0		0	0	0	0		0	0
Nitrogen		0	0.0353784	0.0150889	0	0.0104234	0.00304924	0.000111567	0.000792461	0			4.73238E-05	0	0		0	5.59666E-06	1.97097E-08	7.06451E-09		0	0
CO2		0	0.0225135	0.0606642	0	0.0397886	0.0530900	0.0326579	0.0171960	0			0.00656388	0	0		0	0.00364091	2.75342E-06	2.28480E-07		0	0
Methane		0	8.00838	9.39329	0	6.28574	1.19115	0.0863291	1.29400	0			0.219872	0	0		0	0.0654322	9.89827E-05	1.43030E-05		0	0
Ethane		0	8.42005	10.2594	0	6.63663	0.297318	0.0314977	4.13890	0			2.38870	0	0		0	1.74766	0.00102796	6.48356E-05		0	0
Propane		0	8.50367	5.82154	0	3.72022	0.0306448	0.00237273	3.21124	0			2.70759	0	0		0	2.47082	0.00102317	5.72090E-05		0	0
Isobutene		0	2.77881	3.31878	0	2.10425	0.0247564	0.00660457	2.00020	0			1.88802	0	0		0	1.83070	0.000678831	3.68618E-05		0	0
n-Butane		0	6.78943	6.87636	0	4.34389	0.00850704	0.000607508	4.16966	0			3.98095	0	0		0	3.88340	0.00142773	7.68172E-05		0	0
Isopentane		0	5.11700	4.43391	0	2.86013	0.00159795	8.36348E-05	2.81292	0			2.76165	0	0		0	2.73425	0.000909065	5.16327E-05		0	0
n-Pentane		0	6.01432	5.02151	0	3.26385	0.000516952	1.08378E-05	3.22357	0			3.17992	0	0		0	3.15635	0.00102416	5.90296E-05		0	0
2-Methylpentane		0	3.49120	1.12589	0	0.770862	7.06263E-05	2.05394E-06	0.766902	0			0.762660	0	0		0	0.760320	0.000240543	1.42603E-05		0	0
3-Methylpentane		0	2.37678	0.823483	0	0.569892	0.000117336	8.14672E-06	0.567264	0			0.564450	0	0		0	0.562896	0.000176484	1.05417E-05		0	0
n-Hexane		0	7.49861	23.6881	0	16.7466	0.000514235	7.48327E-06	16.6875	0			16.6247	0	0		0	16.5896	0.00499643	0.000307920		0	0
Methylcyclopentane		0	1.15623	0.469752	0	0.333602	9.10786E-05	1.01010E-05	0.332399	0			0.331112	0	0		0	0.330397	0.000100105	6.19369E-06		0	0
Benzene		0	0.201013	0.0862184	0	0.0624343	0.00140731	0.00129175	0.0622324	0			0.0620170	0	0		0	0.0618970	1.68478E-05	1.09020E-06		0	0
2-Methylhexane		0	4.20842	2.53387	0	1.97162	3.97972E-05	8.27250E-07	1.96849	0			1.96524	0	0		0	1.96339	0.000514484	3.51011E-05		0	0
3-Methylhexane		0	3.54909	2.23107	0	1.75754	3.85280E-05	9.58554E-07	1.75504	0			1.75244	0	0		0	1.75096	0.000448182	3.12357E-05		0	0
n-Heptane		0	8.17723	5.61990	0	4.57818	3.20593E-05	3.50290E-07	4.57321	0			4.56809	0	0		0	4.56516	0.00107082	7.99852E-05		0	0
Methylcyclohexane		0	5.46435	3.77578	0	3.07935	0.000251953	2.80334E-05	3.07600	0			3.07252	0	0		0	3.07053	0.000744460	5.49709E-05		0	0
Toluene		0	1.22377	0.890824	0	0.749385	0.00342655	0.00306204	0.748719	0			0.748029	0	0		0	0.747633	0.000151782	1.24072E-05		0	0
n-Octane		0	20.5162	17.9948	0	16.4518	1.42628E-05	6.58783E-08	16.4464	0			16.4411	0	0		0	16.4379	0.00247055	0.000276893		0	0
Ethylbenzene		0	1.34599	1.20313	0	1.11670	0.00141880	0.00125409	1.11639	0			1.11608	0	0		0	1.11590	0.000144142	1.76267E-05		0	0
p-Xylene		0	1.34438	1.20576	0	1.12187	0.000956572	0.000806187	1.12157	0			1.12128	0	0		0	1.12110	0.000141315	1.73813E-05		0	0
o-Xylene		0	2.10823	1.92657	0	1.81175	0.00269614	0.00247687	1.81136	0			1.81096	0	0		0	1.81073	0.000207088	2.81891E-05		0	0
n-Nonane		0	13.0948	12.5510	0	12.1416	3.48300E-06	1.72538E-08	12.1404	0			12.1393	0	0		0	12.1385	0.000857828	0.000190142		0	0
C10+		0	39.3665	39.3276	0	39.2927	8.74672E-06	1.39203E-06	39.2926	0			39.2925	0	0		0	39.2924	7.10995E-05	0.000122088		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 Tanks	Enclosed Combustor	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW	Tasses from Condensate Ta
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	60.1	70.0	70.0	70.0	72.5	70.0	70.0		65	72.52	72.52		65	72.52	74.3018	70		75.9425	75.9425
Pressure	psig		200	300	200	169	169	169	-0.365949	40	40		5	-0.365949	-0.365949		5	-0.365949	40	40		-14.2219	6.90120
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	107.0	105.2	113.5	113.5	18.0	18.0	119.7	119.7		122.500	18.0157	123.430		122.500	123.430	84.2344	98.4396		18.0153	112.277
Mass Density	lb/ft^3		62.3	45.1	45.0	45.5	45.5	62.3	62.3	45.8	45.8		46.0759	62.2561	45.9082		46.0759	45.9082	41.6427	43.6615		62.2234	44.8003
Molar Flow	lbmol/h		4893.2	160.8	160.7	0.0	131.9	4860.3	4858.8	123.4	0.0		119.545	0	0		0	118.241	0.0185526	0.00156759		0	0
Mass Flow	lb/h		88151.9	17206.1	16906.7	0.0	14980.0	87565.3	87534.8	14770.0	0.0		14644.3	0	0		0	14594.5	1.56277	0.154313		0	0
Vapor Volumetric Flow	MCFH		1.4	0.4	0.4	0.0	0.3	1.4	1.4	0.3	0.0		0.317831	0	0		0	0.317905	3.75279E-05	3.53430E-06		0	0
Liquid Volumetric Flow	Mbbl/d		6.0	1.6	1.6	0.0	1.4	6.0	6.0	1.4	0.0		1.35860	0	0		0	1.35891	0.000160416	1.51076E-05		0	0
Std Vapor Volumetric Flow	MMSCFD		44.6	1.5	1.5	0.0	1.2	44.3	44.3	1.1	0.0		1.08877	0	0		0	1.07689	0.000168970	1.42770E-05		0	0
Std Liquid Volumetric Flow	Mbbl/d		6.0	1.7	1.6	0.0	1.4	6.0	6.0	1.4	0.0		1.36806	0	0		0	1.36043	0.000161457	1.52364E-05		0	0
Compressibility			0.011	0.132	0.090	0.081	0.081	0.009	0.001	0.025	0.025		0.00930019	0.000726082	0.00674599		0.00930019	0.00674599	0.0193074	0.0216949		2.38786E-05	0.00941657
Specific Gravity			0.999	0.723	0.722	0.729	0.729	0.998	0.998	0.734	0.734		0.738762	0.998189	0.736074		0.738762	0.736074	0.667683	0.700052		0.997665	0.718311
API Gravity			10.0	63.4	64.5	61.3	61.3	10.0	10.0	60.0	60.0		59.4415	10.0027	59.2443		59.4415	59.2443	78.0500	69.2049		10.0006	63.4301
Enthalpy	MMBtu/h		-602.1	-14.8	-14.7	0.0	-12.7	-597.7	-597.5	-12.4	0.0		-12.2263	0	0		0	-12.1117	-0.00145918	-0.000137463		0	0

Mass Enthalpy	Btu/lb		-6830.5	-858.8	-870.0	-847.0	-847.0	-6825.7	-6825.4	-836.7	-836.7		-834.884	-6825.36	-829.884		-834.884	-829.884	-933.714	-890.807		-6822.32	-857.714
Mass Cp	Btu/(lb**F)		1.0	0.5	0.5	0.5	0.5	1.0	1.0	0.5	0.5		0.484942	0.981992	0.489074		0.484942	0.489074	0.525783	0.506968		0.981771	0.499684
Ideal Gas CpCv Ratio			1.326	1.052	1.054	1.049	1.049	1.326	1.326	1.046	1.046		1.04563	1.32572	1.04471		1.04563	1.04471	1.06526	1.05621		1.32556	1.04873
Dynamic Viscosity	cP		1.0	0.5	0.5	0.6	0.6	1.0	1.0	0.6	0.6		0.687280	0.964474	0.660875		0.687280	0.660875	0.303685	0.418082		0.924434	0.523472
Kinematic Viscosity	cSt		1.0	0.7	0.7	0.8	0.8	1.0	1.0	0.9	0.9		0.931193	0.967137	0.898685		0.931193	0.898685	0.455264	0.597781		0.927474	0.729443
Thermal Conductivity	Btu/(h*ft**F)		0.3	0.1	0.1	0.1	0.1	0.3	0.3	0.1	0.1		0.0703768	0.348209	0.0699246		0.0703768	0.0699246	0.0680192	0.0700623		0.349835	0.0694652
Surface Tension	lbf/ft		0.005	0.001	0.001	0.001	0.001	0.005	0.005	0.002	0.002		0.00162719	0.00501316	0.00159956		0.00162719	0.00159956	0.00121113	0.00138033		0.00498784	0.00149497
Net I.G. Heating Value	Btu/ft^3		0.0	5382.6	5295.9	5703.9	5703.9	0.4	0.0	6006.1	6006.1		6144.23	0.0404581	6189.86		6144.23	6189.86	4281.93	4974.10		4.81153E-05	5651.80
Net Liquid Heating Value	Btu/lb		-1059.8	18917.9	18941.3	18897.2	18897.2	-1051.6	-1058.9	18876.4	18876.4		18867.3	-1058.85	18864.2		18867.3	18864.2	19107.3	19000.0		-1059.76	18937.1
Gross I.G. Heating Value	Btu/ft^3		50.3	5780.6	5688.7	6122.0	6122.0	50.7	50.4	6444.2	6444.2		6591.37	50.3524	6639.98		6591.37	6639.98	4617.03	5352.82		50.3101	6071.33
Gross Liquid Heating Value	Btu/lb		0.0	20328.0	20357.7	20294.0	20294.0	8.5	0.9	20264.6	20264.6		20251.6	0.922023	20247.3		20251.6	20247.3	20615.1	20458.6		0.00106504	20354.4

Process Streams		Separator Gas	Separator Water	Separator Oil	1	as from 3-ph Separat	Produced Liquid	2	Produced Water	3	Gas from LP Conde	To Sales Gas Line	Condensate from VRT	g from produced wate	ashing from Oil Tank	Enclosed Combust	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from PW Ta	sses from Condensate Ta
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	99.9666	99.9666																
H2S					0	0	0																
Nitrogen					7.89998E-05	6.27378E-05	6.27378E-05																
CO2					0.00142122	0.00109232	0.00109232																
Methane					0.0305607	0.0245078	0.0245078																
Ethane					0.00788031	0.00611728	0.00611728																
Propane					0.000805611	0.000630514	0.000630514																
Isobutene					0.000678125	0.000509359	0.000509359																
n-Butane					0.000216327	0.000175031	0.000175031																
Isopentane					4.08055E-05	3.28776E-05	3.28776E-05																
n-Pentane					1.18353E-05	1.06362E-05	1.06362E-05																
2-Methylpentane					1.56756E-06	1.45313E-06	1.45313E-06																
3-Methylpentane					2.62644E-06	2.41417E-06	2.41417E-06																
n-Hexane					1.06321E-05	1.05803E-05	1.05803E-05																
Methylcyclopentane					2.01600E-06	1.87393E-06	1.87393E-06																
Benzene					3.28097E-05	2.89551E-05	2.89551E-05																
2-Methylhexane					8.34263E-07	8.18823E-07	8.18823E-07																
3-Methylhexane					8.10553E-07	7.92708E-07	7.92708E-07																
n-Heptane					5.83322E-07	6.59616E-07	6.59616E-07																
Methylcyclohexane					4.80603E-06	5.18389E-06	5.18389E-06																
Toluene					6.64961E-05	7.05008E-05	7.05008E-05																
n-Octane					2.15056E-07	2.93454E-07	2.93454E-07																
Ethylbenzene					2.50816E-05	2.91916E-05	2.91916E-05																
p-Xylene					1.62762E-05	1.96813E-05	1.96813E-05																
o-Xylene					4.63891E-05	5.54728E-05	5.54728E-05																
n-Nonane					5.51608E-08	7.16623E-08	7.16623E-08																
C10+					1.32549E-07	1.79963E-07	1.79963E-07																
Mass Fraction		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Water					99.9499	99.9601	99.9601																
H2S					0	0	0																
Nitrogen					0.000122833	9.75497E-05	9.75497E-05																
CO2					0.00347161	0.00266825	0.00266825																
Methane					0.0272119	0.0218226	0.0218226																
Ethane					0.0131518	0.0102096	0.0102096																
Propane					0.00197172	0.00154319	0.00154319																
Isobutene					0.00211176	0.00158623	0.00158623																
n-Butane					0.000697874	0.000564661	0.000564661																
Isopentane					0.000163407	0.000131662	0.000131662																
n-Pentane					4.73950E-05	4.25939E-05	4.25939E-05																
2-Methylpentane					7.49773E-06	6.95052E-06	6.95052E-06																
3-Methylpentane					1.25624E-05	1.15473E-05	1.15473E-05																
n-Hexane					5.08542E-05	5.06072E-05	5.06072E-05																
Methylcyclopentane					9.41708E-06	8.75361E-06	8.75361E-06																
Benzene					0.000142247	0.000125537	0.000125537																
2-Methylhexane					4.63984E-06	4.55404E-06	4.55404E-06																
3-Methylhexane					4.50797E-06	4.40880E-06	4.40880E-06																
n-Heptane					3.24420E-06	3.66858E-06	3.66858E-06																
Methylcyclohexane					2.61915E-05	2.82512E-05	2.82512E-05																
Toluene					0.000340064	0.000360550	0.000360550																
n-Octane					1.36348E-06	1.86057E-06	1.86057E-06																
Ethylbenzene					0.000147795	0.000172016	0.000172016																
p-Xylene					9.59087E-05	0.000115976	0.000115976																
o-Xylene					0.000273351	0.000326883	0.000326883																
n-Nonane					3.92671E-07	5.10148E-07	5.10148E-07																
C10+					1.31763E-06	1.78899E-06	1.78899E-06																
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water					87771.9	0	0																
H2S					0	0	0																
Nitrogen					0.107867	0	0																
CO2					3.04863	0	0																
Methane					23.8963	0	0																
Ethane					11.5494	0	0																
Propane					1.73148	0	0																
Isobutene					1.85446	0	0																
n-Butane					0.612844	0	0																
Isopentane					0.143497	0	0																
n-Pentane					0.0416203	0	0																
2-Methylpentane					0.00658419	0	0																
3-Methylpentane					0.0110318	0	0																
n-Hexane					0.0446580	0	0																
Methylcyclopentane					0.00826968	0	0																

Benzene					0.124915	0	0																	
2-Methylhexane					0.00407451	0	0																	
3-Methylhexane					0.00395871	0	0																	
n-Heptane					0.00284892	0	0																	
Methylcyclohexane					0.0230002	0	0																	
Toluene					0.298630	0	0																	
n-Octane					0.00119735	0	0																	
Ethylbenzene					0.129788	0	0																	
p-Xylene					0.0842230	0	0																	
o-Xylene					0.240045	0	0																	
n-Nonane					0.000344827	0	0																	
C10+					0.00115709	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 Conder	To Sales Gas Line	Condensate from VRT	g from produced wate	lashing from Oil Tanks	Enclosed Combust	Flash Gas from VRT	Stable Condensate	4	5	6	Losses from	PW Taxes from	Condensate Ta
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	Solved
Property	Units																							
Temperature	°F				60.1	70.0	70.0																	
Pressure	psig				200	169	169																	
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				62.3	62.3	62.3																	
Molar Flow	lbmol/h				4874.1	0.0	0.0																	
Mass Flow	lb/h				87815.8	0.0	0.0																	
Vapor Volumetric Flow	MCFH				1.4	0.0	0.0																	
Liquid Volumetric Flow	Mbbl/d				6.0	0.0	0.0																	
Std Vapor Volumetric Flow	MMSCFD				44.4	0.0	0.0																	
Std Liquid Volumetric Flow	Mbbl/d				6.0	0.0	0.0																	
Compressibility					0.011	0.009	0.009																	
Specific Gravity					1.000	0.998	0.998																	
API Gravity					10.0	10.0	10.0																	
Enthalpy	MMBtu/h				-600.2	0.0	0.0																	
Mass Enthalpy	Btu/lb				-6834.8	-6825.7	-6825.7																	
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	0.4	0.4																	
Net Liquid Heating Value	Btu/lb				-1049.5	-1051.6	-1051.6																	
Gross I.G. Heating Value	Btu/ft^3				50.8	50.7	50.7																	
Gross Liquid Heating Value	Btu/lb				10.7	8.5	8.5																	

November 5, 2014

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

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

Sample: Gaskins No. 1H
First Stage Separator Hydrocarbon Liquid
Sampled @ 174 psig & 75 °F

Date Sampled: 10/14/14 Job Number: 45834.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.022	0.005	0.006
Carbon Dioxide	0.014	0.005	0.006
Methane	4.980	1.779	0.750
Ethane	5.236	2.952	1.478
Propane	5.288	3.071	2.189
Isobutane	1.728	1.192	0.943
n-Butane	4.222	2.806	2.303
2,2 Dimethylpropane	0.118	0.095	0.080
Isopentane	3.182	2.453	2.155
n-Pentane	3.622	2.768	2.453
2,2 Dimethylbutane	0.207	0.182	0.167
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.334	0.289	0.270
2 Methylpentane	2.171	1.900	1.756
3 Methylpentane	1.478	1.272	1.195
n-Hexane	3.401	2.949	2.751
Heptanes Plus	63.998	76.283	81.498
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

Specific Gravity	0.7603	(Water=1)
°API Gravity	54.61	@ 60°F
Molecular Weight	135.7	
Vapor Volume	17.79	CF/Gal
Weight	6.33	Lbs/Gal

Characteristics of Total Sample:

Specific Gravity	0.7117	(Water=1)
°API Gravity	67.33	@ 60°F
Molecular Weight	106.5	
Vapor Volume	21.20	CF/Gal
Weight	5.93	Lbs/Gal

Base Conditions: 14.850 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: XG
Processor: XGdjv
Cylinder ID: W-1001

David Dannhaus 361-661-7015

TANKS DATA INPUT REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.014	0.005	0.006
Nitrogen	0.022	0.005	0.006
Methane	4.980	1.779	0.750
Ethane	5.236	2.952	1.478
Propane	5.288	3.071	2.189
Isobutane	1.728	1.192	0.943
n-Butane	4.340	2.901	2.383
Isopentane	3.182	2.453	2.155
n-Pentane	3.622	2.768	2.453
Other C-6's	4.190	3.642	3.389
Heptanes	11.349	10.668	10.446
Octanes	16.156	16.097	16.471
Nonanes	8.143	9.394	9.702
Decanes Plus	24.480	37.097	41.155
Benzene	0.125	0.074	0.091
Toluene	0.761	0.537	0.658
E-Benzene	0.837	0.681	0.834
Xylenes	2.148	1.735	2.140
n-Hexane	3.401	2.949	2.751
2,2,4 Trimethylpentane	0.000	0.000	0.000
Totals:	100.000	100.000	100.000

Characteristics of Total Sample:

Specific Gravity	0.7117	(Water=1)
°API Gravity	67.33	@ 60°F
Molecular Weight	106.5	
Vapor Volume	21.20	CF/Gal
Weight	5.93	Lbs/Gal

Characteristics of Decanes (C10) Plus:

Specific Gravity	0.7895	(Water=1)
Molecular Weight	179.1	

Characteristics of Atmospheric Sample:

°API Gravity	60.81	@ 60°F
Reid Vapor Pressure (ASTM D-5191)	6.09	psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
Cylinder Number	------	W-1001*	W-1020
Pressure, PSIG	174	169	167
Temperature, °F	75	70	70

* Sample used for analysis

TOTAL EXTENDED REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.022	0.005	0.006
Carbon Dioxide	0.014	0.005	0.006
Methane	4.980	1.779	0.750
Ethane	5.236	2.952	1.478
Propane	5.288	3.071	2.189
Isobutane	1.728	1.192	0.943
n-Butane	4.222	2.806	2.303
2,2 Dimethylpropane	0.118	0.095	0.080
Isopentane	3.182	2.453	2.155
n-Pentane	3.622	2.768	2.453
2,2 Dimethylbutane	0.207	0.182	0.167
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.334	0.289	0.270
2 Methylpentane	2.171	1.900	1.756
3 Methylpentane	1.478	1.272	1.195
n-Hexane	3.401	2.949	2.751
Methylcyclopentane	0.719	0.536	0.568
Benzene	0.125	0.074	0.091
Cyclohexane	0.721	0.517	0.570
2-Methylhexane	2.617	2.565	2.462
3-Methylhexane	2.207	2.135	2.075
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	1.175	1.111	1.094
n-Heptane	3.910	3.803	3.678
Methylcyclohexane	3.398	2.880	3.132
Toluene	0.761	0.537	0.658
Other C-8's	9.031	9.193	9.343
n-Octane	3.727	4.025	3.996
E-Benzene	0.837	0.681	0.834
M & P Xylenes	0.836	0.684	0.833
O-Xylene	1.311	1.051	1.307
Other C-9's	5.402	6.142	6.401
n-Nonane	2.741	3.252	3.300
Other C-10's	5.326	6.654	7.062
n-decane	1.836	2.375	2.452
Undecanes(11)	4.811	6.168	6.639
Dodecanes(12)	3.141	4.350	4.747
Tridecanes(13)	2.308	3.427	3.792
Tetradecanes(14)	1.592	2.532	2.839
Pentadecanes(15)	1.165	1.986	2.254
Hexadecanes(16)	0.846	1.540	1.762
Heptadecanes(17)	0.634	1.221	1.410
Octadecanes(18)	0.560	1.134	1.318
Nonadecanes(19)	0.448	0.946	1.106
Eicosanes(20)	0.328	0.719	0.845
Heneicosanes(21)	0.269	0.621	0.735
Docosanes(22)	0.225	0.542	0.645
Tricosanes(23)	0.175	0.436	0.522
Tetracosanes(24)	0.146	0.378	0.455
Pentacosanes(25)	0.100	0.269	0.324
Hexacosanes(26)	0.099	0.276	0.334
Heptacosanes(27)	0.089	0.255	0.311
Octacosanes(28)	0.064	0.192	0.235
Nonacosanes(29)	0.061	0.188	0.230
Triacontanes(30)	0.048	0.151	0.186
Hentriacontanes Plus(31+)	0.209	0.737	0.950
Total	100.000	100.000	100.000

October 30, 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: 10/25/14

Sample: Gaskins No. 1H

Job Number: J45834

FLASH LIBERATION OF HYDROCARBON LIQUID		
	First Stage Separator HC Liquid	**Stock Tank**
Pressure, psig	174	0
Temperature, °F	75	70
Gas Oil Ratio (1)	------	136
Gas Specific Gravity (2)	------	1.226
Separator Volume Factor (3)	1.0823	1.000

STOCK TANK FLUID PROPERTIES	
Shrinkage Recovery Factor (4)	0.9240
Oil API Gravity at 60 °F	60.81
Reid Vapor Pressure, psi (5)	6.09

Quality Control Check			
	Sampling Conditions	**Test Samples**	
Cylinder No.	------	W-1001*	W-1020
Pressure, psig	174	169	167
Temperature, °F	75	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: Gaskins No. 1H
Gas Evolved from Hydrocarbon Liquid Flashed
From 174 psig & 75 °F to 0 psig & 70 °F

Date Sampled: 10/14/14 Job Number: 45834.001

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2286

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.065	
Carbon Dioxide	0.114	
Methane	33.358	
Ethane	29.183	7.866
Propane	19.082	5.299
Isobutane	3.640	1.201
n-Butane	6.763	2.149
2-2 Dimethylpropane	0.092	0.035
Isopentane	2.212	0.815
n-Pentane	1.818	0.664
Hexanes	1.906	0.792
Heptanes Plus	1.767	0.789
Totals	100.000	19.609

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.585	(Air=1)
Molecular Weight	102.61	
Gross Heating Value	5482	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.226	(Air=1)
Compressibility (Z)	0.9883	
Molecular Weight	35.09	
Gross Heating Value		
Dry Basis	2069	BTU/CF
Saturated Basis	2034	BTU/CF

*Hydrogen Sulfide tested in laboratory by: Stain Tube Method (GPA 2377)
Results: 0.063 Gr/100 CF, 1.0 PPMV or 0.0001 Mol %

Base Conditions: 14.850 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: MR
Processor: IM
Cylinder ID: FL-11S

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2286
TOTAL REPORT

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.065		0.052
Carbon Dioxide	0.114		0.143
Methane	33.358		15.252
Ethane	29.183	7.866	25.011
Propane	19.082	5.299	23.982
Isobutane	3.640	1.201	6.030
n-Butane	6.763	2.149	11.204
2,2 Dimethylpropane	0.092	0.035	0.189
Isopentane	2.212	0.815	4.549
n-Pentane	1.818	0.664	3.738
2,2 Dimethylbutane	0.090	0.038	0.221
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.134	0.055	0.329
2 Methylpentane	0.608	0.254	1.493
3 Methylpentane	0.376	0.155	0.924
n-Hexane	0.698	0.289	1.714
Methylcyclopentane	0.073	0.025	0.175
Benzene	0.024	0.007	0.053
Cyclohexane	0.092	0.032	0.221
2-Methylhexane	0.188	0.088	0.537
3-Methylhexane	0.185	0.085	0.528
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.199	0.087	0.563
n-Heptane	0.245	0.114	0.700
Methylcyclohexane	0.199	0.081	0.557
Toluene	0.041	0.014	0.108
Other C8's	0.273	0.128	0.858
n-Octane	0.078	0.040	0.254
Ethylbenzene	0.003	0.001	0.009
M & P Xylenes	0.019	0.007	0.057
O-Xylene	0.003	0.001	0.009
Other C9's	0.088	0.045	0.317
n-Nonane	0.020	0.011	0.073
Other C10's	0.028	0.016	0.113
n-Decane	0.006	0.004	0.024
Undecanes (11)	0.003	0.002	0.013
Totals	100.000	19.609	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.226	(Air=1)
Compressibility (Z)	0.9883	
Molecular Weight	35.09	
Gross Heating Value		
Dry Basis	2069	BTU/CF
Saturated Basis	2034	BTU/CF

GAS ANALYTICAL SERVICES

C6+ Gas Analysis Report

Gas Analytical

Report Date: May 11, 2016 7:27a

Client:	Antero Resources	Date Sampled:	May 4, 2016
Site:	Weinhold Unit 1H	Analysis Date:	May 9, 2016 3:38p
Field No:	9998	Collected By:	Jason Swiger
Meter:		Date Effective:	May 4, 2016 12:00a
Source Laboratory	Clarksburg (Bridgeport), WV	Sample Pressure (PSI):	323.0
Lab File No:	**X_CH1-11553.CHR**	Sample Temp (°F):	55
Sample Type:	Spot	Field H2O:	36
Reviewed By:		Field H2S:	No Test
Analysis Status:	good		

Component	Mol %	Gal/MSCF
Methane	81.3454	
Ethane	14.1721	3.7674
Propane	2.1503	0.5911
I-Butane	0.4150	0.1356
N-Butane	0.6863	0.2160
I-Pentane	0.1795	0.0655
N-Pentane	0.1478	0.0535
Nitrogen	0.4126	
Oxygen	0.0056	
Carbon Dioxide	0.1804	
Hexanes+	0.3050	0.1252
TOTAL	100.0000	4.9543

Analytical Results at Base Conditions (Real)		
BTU/SCF (Dry):	1,197.2056	BTU/ft³
BTU/SCF (Saturated):	1,177.2060	BTU/ft³
PSIA:	14.700	PSI
Temperature (°F):	60.00	°F
Z Factor (Dry):	0.99689	
Z Factor (Saturated):	0.99649	

Analytical Results at Contract Conditions (Real)		
BTU/SCF (Dry):	1,197.2133	BTU/ft³
BTU/SCF (Saturated):	1,177.2542	BTU/ft³
PSIA:	14.730	PSI
Temperature (°F):	60.00	°F
Z Factor (Dry):	0.99688	
Z Factor (Saturated):	0.99650	

Calculated Specific Gravities			
Ideal Gravity:	0.6773	Real Gravity:	0.6791
Molecular Wt:	19.6167	lb/lbmol	

Gross Heating Values are Based on:
GPA 2145-09, 2172
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									1.3883	7.6112						
EP-PCV					0.0605	0.2650							0.3782	1.6566	9.4577	41.4249
F001					3.3653	14.7402							3.6021	15.7772	90.0523	394.4291
EP-L001					13.9119	14.3872							0.2523	0.2609	6.3608	6.5781
EP-L002					1.08E-03	4.94E-03							0.0373	0.1700	0.9778	4.4611
EP-ENG001-004(emissions per EPN)	0.0625	0.2738	0.4126	1.8073	0.0186	0.0814	0.0004	0.0016	0.0060	0.0261	0.0060	0.0261	0.1444	0.6325	72.6695	318.2926
GPU001, GPU002, GPU003, GPU004, GPU005, GPU006, GPU007, GPU008, GPU009,GPU010 (emissions per EPN)	0.1253	0.5488	0.1052	0.4610	0.0069	0.0302	0.0008	0.0033	0.0095	0.0417	0.0095	0.0417	0.0029	0.0126	150.3501	658.5335
EP-LH001 -010(emissions per EPN)	0.1671	0.7317	0.1403	0.6146	0.0092	0.0402	0.0010	0.0044	0.0127	0.0556	0.0127	0.0556	0.0038	0.0168	200.4668	878.0447
EP-EC001 -003(emissions per EPN)	0.8177	3.5815	3.7214	16.2999	0.2768	1.2122	0.0000	0.0000	0.0034	0.0151	0.0026	0.0113	0.1479	0.6479	102.1167	447.2712
TOTAL	5.6267	24.6447	15.2705	66.8849	1.0654	19.0586	0.0190	0.0834	0.2564	1.1229	0.2538	1.1116	1.0886	5.1988	4105.1977	17991.8049

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	0.0076	0.0334	0.0076	0.0334
F001			0.0028	0.0121	0.0199	0.0871	0.0252	0.1103	0.0646	0.2830	0.1860	0.8147	0.2984	1.3072
EP-L001			2.89E-03	2.99E-03	1.19E-02	1.23E-02	6.83E-03	7.06E-03	0.013	1.39E-02	1.390	1.437	1.425	1.473
EP-L002			5.46E-06	2.49E-05	4.39E-06	2.00E-05	6.94E-07	3.17E-06	1.30E-06	5.94E-06	5.67E-08	2.59E-07	1.19E-05	5.43E-05
EP-ENG001-004(emissions per EPN)	0.0129	0.0564	0.0010	0.0043	0.0004	0.0015	1.56E-05	6.82E-05	0.0001	0.0005			0.0144	0.0631
GPU001, GPU002, GPU003, GPU004, GPU005, GPU006, GPU007, GPU008, GPU009,GPU010 (emissions per EPN)	0.0001	0.0004	2.63E-06	1.15E-05	4.26E-06	1.87E-05			0.00E+00	0.00E+00	0.0023	0.0099	0.0024	0.0103
EP-LH001 -010(emissions per EPN)	0.0001	0.0005	3.51E-06	1.54E-05	5.68E-06	2.49E-05			0.00E+00	0.00E+00	0.0030	0.0132	0.0031	0.0138
EP-EC001 -003(emissions per EPN)	1.28E-06	5.58E-06	1.37E-04	6.02E-04	5.27E-04	2.31E-03	2.80E-04	1.23E-03	6.20E-04	2.72E-03	2.75E-02	1.21E-01	2.91E-02	1.27E-01
TOTAL	0.0537	0.2351	0.0044	0.0225	0.0031	0.0258	0.0009	0.0110	0.0023	0.0242	0.1353	2.0297	0.2000	2.3495

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
Alexander 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 2115 Nutter Fork , in Doddridge County, West Virginia.

The latitude and longitude coordinates are: 39.335875 and -80.775574

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

Pollutants	TOTALS (tpy):
NO_X	24.6447
CO	66.8849
$PM_{2.5}$	1.1116
PM_{10}	1.1229
VOC	19.0586
SO_2	0.0834
CO_{2e}	17991.8049
CH_4	5.1988
Formaldehyde	0.2351
Benzene	0.0225
Toluene	0.0258
Ethylbenzene	0.0110
Xylenes	0.0242
Hexane	2.0297
Total HAPs	2.3495

Proposed new equipment will be installed by June 01, 2018 and the facility is expected to begin the operations by December 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