G70-D General Permit Application

Pritt South Natural Gas Production Site

Bridgeport, West Virginia

Prepared By:

Environmental Resources Management, Inc.
Hurricane, West Virginia

November 2017

People Powered. Asset Strong.

November 15, 2017

Mr. William F. Durham, Director
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, West Virginia, 25304

RE: G70-D General Permit Registration Application
Arsenal Resources, LLC
Pritt South Natural Gas Production Site

Dear Director Durham:

Enclosed are one (1) original hard copy and two (2) complete PDFs included on CD-ROM of a G70-D General Permit Registration Application for the authority to construct the Pritt South natural gas production site located in Harrison County, West Virginia.

A legal advertisement will be published in the next few days and proof of publication will be forwarded as soon as it is received. Please contact me for payment of the application fee by credit card.

If you have any questions concerning this permit application, please contact me at (724) 940-1112 or by email at myingling@arsenalresources.com.

Sincerely,

Meghan M.B. Yingling
Environmental Compliance Manager
Arsenal Resources

Enclosures

Cc: Bill Veigel, Sr. Director of Production, Arsenal Resources
Stacey Lucas, V.P. HSE, Arsenal Resources
Grant Morgan, ERM

6031 Wallace Road Ext. Suite 300
Wexford, PA 15090
P: 724-940-1100
F: 800-428-0981
www.arsenalresources.com

1.0 INTRODUCTION NARRATIVE

Arsenal Resource, LLC (Arsenal) submits this G70-D Class II General Permit application to the West Virginia Department of Environmental Protection's Division of Air Quality (WVDAQ) for the Pritt South Wellpad located in Harrison County, West Virginia. This application addresses the operational activities associated with the production of natural gas and produced water at the Pritt South pad.

Arsenal would like to submit a G70-D Class II General permit to reflect the following at the Pritt South site:

- Fourteen (14) Natural Gas Wells;
- Fourteen (14) Gas Production Units/Heaters each rated 1.00 MMBtu/hr input;
- Two (2) 210 bbl Blowdown Tanks;
- Fourteen (14) 400 bbl Produced Water Tanks;
- One (1) Produced Water Loadout; and
- Two (2) 0.0007 MMBtu/hr Thermoelectric Generators.

Statement of Aggregation

The Pritt South natural gas production site is located in Harrison County, WV and operated by Arsenal. Stationary sources of air pollutants may require aggregation of total emission levels if these sources share the same industrial grouping, are operating under common control, and are classified as contiguous or adjacent properties. Arsenal operates Pritt South with the same industrial grouping as nearby facilities, and some of these facilities are under common control. However, the Pritt South site is not subject to the aggregation of stationary emissions sources because these sites do not meet the definition of contiguous or adjacent facilities.

The Pritt South site operates under SIC code 1311 (Crude Petroleum and Natural Gas Extraction). There are surrounding sites operated by Arsenal that share the same two digit major SIC code of 13 for Crude Petroleum and Natural Gas Extraction. Therefore, the South Pritt Site does share the same SIC codes as the surrounding wells and compressor stations.

Arsenal is the sole operator of the Pritt South site. Arsenal is also the sole operator of other production sites and compressor stations in the area. Therefore, Arsenal does qualify as having nearby operations under common control.

Based on the EPA's Source Determination Guidance for Certain Emission Units in the Oil and Natural Gas Sector, effective on August 2, 2016, the term "adjacent" is defined as follows:

> *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 near each other – specifically, if they are located on the same site or on sites that share equipment and are within ¼ mile of each other.*

The Pritt South Wellpad does not share equipment with the surrounding wells and compressor stations. Additionally, EPA's Source Determination Guidance recommends that the facilities must be located within ¼ mile of each other to be considered as adjacent facilities. Pritt South does not fall within the ¼ mile rule and therefore, does not meet definition of contiguous or adjacent. Based on the above reasoning, Arsenal is not subject to the aggregation of stationary emission sources since the stationary sources are not considered contiguous or adjacent facilities.

2.0 REGULATORY DISCUSSION

This section outlines the State air quality regulations that could be reasonably expected to apply to the Pritt South site and makes an applicability determination for each regulation based on activities conducted at the site and the emissions of regulated air pollutants. This review is presented to supplement and/or add clarification to the information provided in the WVDEP G70-D permit application forms. The West Virginia State Regulations address federal regulations, including Prevention of Significant Deterioration permitting, Title V permitting, New Source Performance Standards, and National Emission Standards for Hazardous Air Pollutants.

The regulatory requirements in reference to Pritt South are described in detail in the below section.

West Virginia State Air Regulations

45 CSR 02 – To Prevent and Control Particulate Air Pollution From Combustion of Fuel in Indirect Heat Exchangers

The line heaters associated with gas production units are indirect heat exchangers that combust natural gas but are exempt from this regulation since the heat input capacities are less than 10 MMBtu/hr.

45 CSR 04 – To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

Operations conducted at the Pritt South well pad are subject to this requirement. Based on the nature of the process at the well pad, the presence of objectionable odors is unlikely.

45 CSR 06 – Control of Air Pollution from the Combustion of Refuse

The Pritt South Site does not have a refuse combustion device and is therefore not subject to this rule.

45 CSR 10 – To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

The line heaters are indirect heat exchangers that combust natural gas but are exempt from this regulation since the heat input capacities are less than 10 MMBtu/hr.

45 CSR 13 – Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants

This G70-D permit application is being submitted for the operational activities associated with Arsenal's production of natural gas.

45 CSR 14 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration (PSD). The G70-D applicability criterion excludes facilities that meet the definition of a major source as defined in 45 CSR 19 for being eligible for the general permit.

Operation of equipment at the Pritt South site will not exceed emission thresholds established by this permitting program. Arsenal will monitor future construction and modification activities at the site closely and will compare any future increase in emissions with the PSD thresholds to ensure these activities will not trigger this program.

45 CSR 16 - Standards of Performance for New Stationary Sources (NSPS)

45 CSR 16 applies to all registrants that are subject to any of the NSPS requirements described in more detail in the Federal Regulations section.

45 CSR 19 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contributed to Non-attainment

Federal construction permitting programs regulate new and modified sources of nonattainment pollutants under Non-Attainment New Source Review (NNSR). The G70-D applicability criterion excludes facilities that meet the definition of a major source as defined in 45 CSR 19 for being eligible for the general permit.

Harrison County, WV is in attainment for all pollutants with a National Ambient Air Quality Standard (NAAQS). Therefore, this regulation would not apply to the Pritt South site.

45 CSR 25 – Control of Air Pollution from Hazardous Waste Treatment, Storage, and Disposal Facilities

No hazardous waste will be burned at this well site; therefore, it is not subject to this hazardous waste rule.

45 CSR 30 – Requirements for Operating Permits

45 CSR 30 applies to the requirements of the federal Title V operating permit program (40 CFR 70). The major source thresholds for the Title V operating permit program regulations are 10 tons per year (tpy) of a single hazardous air pollutant (HAP), 25 tpy of any combination of HAPs, or 100 tpy of all other regulated pollutants.

The potential emissions of all regulated pollutants at the proposed facility are below the corresponding major source threshold(s). Therefore, the Pritt South site will not be a major source under the Title V program.

45 CSR 34 – National Emission Standards for Hazardous Air Pollutants (NESHAP)

45 CSR 34 applies to all registrants that are subject to any of the NESHAP requirements. The NESHAP Rules are discussed further in the Federal Regulation section of this document.

Federal Regulations

New Source Performance Standards

40 CFR 60, Subpart OOOO (Standards of Performance for Crude oil and Natural Gas Production, Transmission and Distribution)

Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO_2) emissions from affected facilities that commence construction, modification or reconstruction between August 23, 2011 and September 18, 2015. The applicable provisions and requirements of Subpart OOOO are included under the G70-D permit.

The Pritt South wellpad will commence construction after September 18, 2015, and there does not qualify as an affected facility under OOOO.

Subpart OOOOa (Standards Of Performance For Crude Oil And Natural Gas Facilities For Which Construction, Modification, Or Reconstruction Commenced After September 18, 2015)

The Pritt South facility commenced construction after September 18, 2015 and, therefore, will qualify as an affected facility under OOOOa. The Pritt South site will qualify as a collection of fugitive components affected facility. As a fugitive component affected facility, in order to comply, LDAR monitoring at the Pritt South site must be performed within 60 days of startup of production and then semi-annually thereafter. The Pritt South site will also qualify as a gas well affected facility for all production wells.

There are several equipment types that have been installed at Pritt South that do not meet the affected facility definitions as specified by EPA. These include:

- Storage vessels: Emissions from each storage vessel were determined to be below 6 tons per year (tpy) of VOC. Therefore, the produced water tanks are not affected storage vessels.
- Pneumatic devices: All pneumatic devices installed at the Pritt South facility are either low-continuous bleed or intermittent bleed and do not qualify as affected sources

40 CFR 60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)

The Pritt South facility does not operate any engines and, therefore, will not be subject to 40 CFR 60 Subpart JJJJ.

No additional NSPS are expected to be applicable to this facility.

National Emissions Standards for Hazardous Air Pollutants

The following NESHAP included in the G70-D permit are not applicable to the Pritt South:

- *40 CFR 63 Subpart HH (National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities).*

- *40CFR63 Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines)*

No additional NESHAP are expected to be applicable to this facility.

General Permit G70-D will establish an emission cap on the following regulated and hazardous air pollutants (consistent with the PTE of the facility):

Regulated Pollutant	Potential Annual Emissions (tpy)	Maximum Annual Emission Limit (tpy)
CO	5.00	80
NOx	5.95	50
PM	0.45	20
PM-10	0.12	20
SO_2	0.04	20
VOC	67.61	80
Total HAPs	4.68	20
Highest Individual HAP (Hexane)	2.46	8

The fugitive emissions of a stationary source shall not be considered in determining whether it is a major stationary source for the purposes of 45CSR30-2.26.b or for eligibility of this General Permit.

west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25 4
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): **Arsenal Resources, LLC**

Federal Employer ID No. (FEIN): **27-5343422**

Applicant's Mailing Address: **65 Professional Place Suite 200**

City: **Bridgeport**	State: **WV**	ZIP Code: **26330**

Facility Name: **Pritt South Natural Gas Production Site**

Operating Site Physical Address: **3460 Green Valley Road, Bridgeport, WV**
If none available, list road, city or town and zip of facility.

City: **Bridgeport**	Zip Code: **26330**	County: **Harrison**

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: **39.24576**
Longitude: **-80.18706**

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

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

I hereby certify that _____ 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:_____
Name and Title: **Meghan M.B. Yingling, Environmental Compliance Manager** Phone: 7**24-940-1112** Fax:
Email: **myingling@arsenalresources.com** Date: 11-15-17

If applicable:
Environmental Contact
Name and Title: **Meghan M.B. Yingling, Environmental Compliance Manager** Phone: **724-940-1112** Fax:
Email: **myingling@arsenalresources.com** Date:

OPERATING SITE INFORMATION
Briefly describe the proposed new operation and/or any change(s) to the facility: **Construction of fourteen (14) wells, fourteen (14) line heaters, fourteen (14) produced water tanks, two (2) sand trap blowdown tanks, one (1) produced water loadout, and two (2) emergency generators at the Pritt South Site.**
Directions to the facility: **(1) From I-79N take exit 117 for State Route 58 toward Anmoore. (2) Turn right onto WV-58E. (3) Turn right onto US-50 E/W Main St/Northwestern Turnpike. (4) Turn right onto WV-76 E. (5) Continue straight onto Oral Lake Rd. (6) Turn right onto Pigtail Run-Green Valley. (7) Arrive at location.**

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): **Meghan Yingling myingling@aresenalresources.com** ☒$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)** – 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/Rail Car 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	

All attachments must be identified by name, divided into sections, and submitted in order.

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: July 6, 2017

ATTN.: Director

Corporation's / other business entity's Federal Employer I.D. Number 27-5343422

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) Zachary Allman, Stacey Lucas, William Veigel, Meghan Yingling (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.

Stephen A. Bishop, President and Chief Financial Officer, Arsenal Resources, LLC
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

Arsenal Resources, LLC
Name of Corporation or business entity

Attachment A

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 ☒

Attachment B
(Not Applicable)

Attachment C

WEST VIRGINIA
STATE TAX DEPARTMENT

BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
ARSENAL RESOURCES LLC
6031 WALLACE ROAD EXT 300
WEXFORD, PA 15090-3430

BUSINESS REGISTRATION ACCOUNT NUMBER: **2247-4512**

This certificate is issued on: **03/8/2017**

This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code

The person or organization identified on this certificate is registered to conduct business in the State of West Virginia at the location above.

This certificate is not transferrable and must be displayed at the location for which issued

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

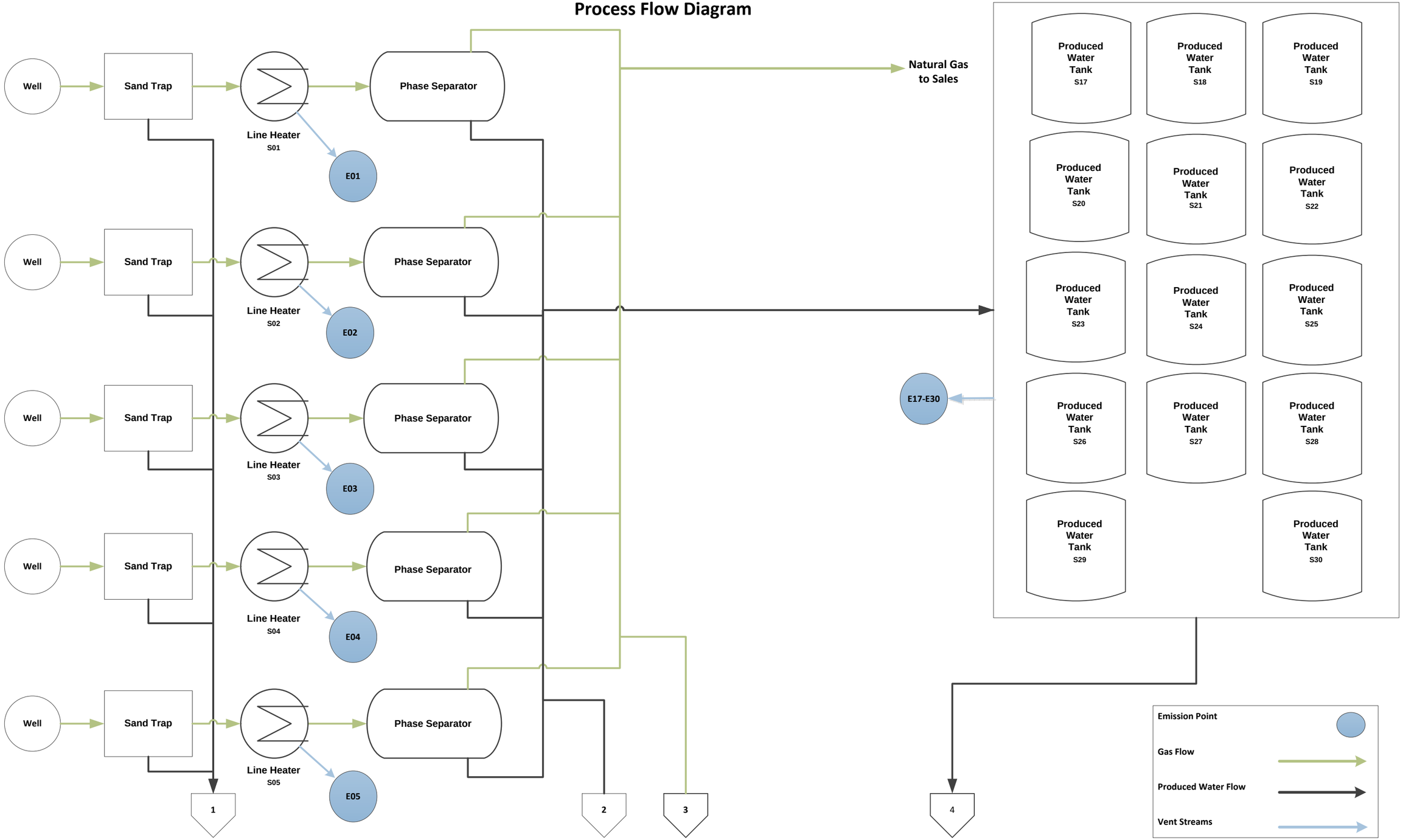
atL006 v.4
L1096398016

Attachment D

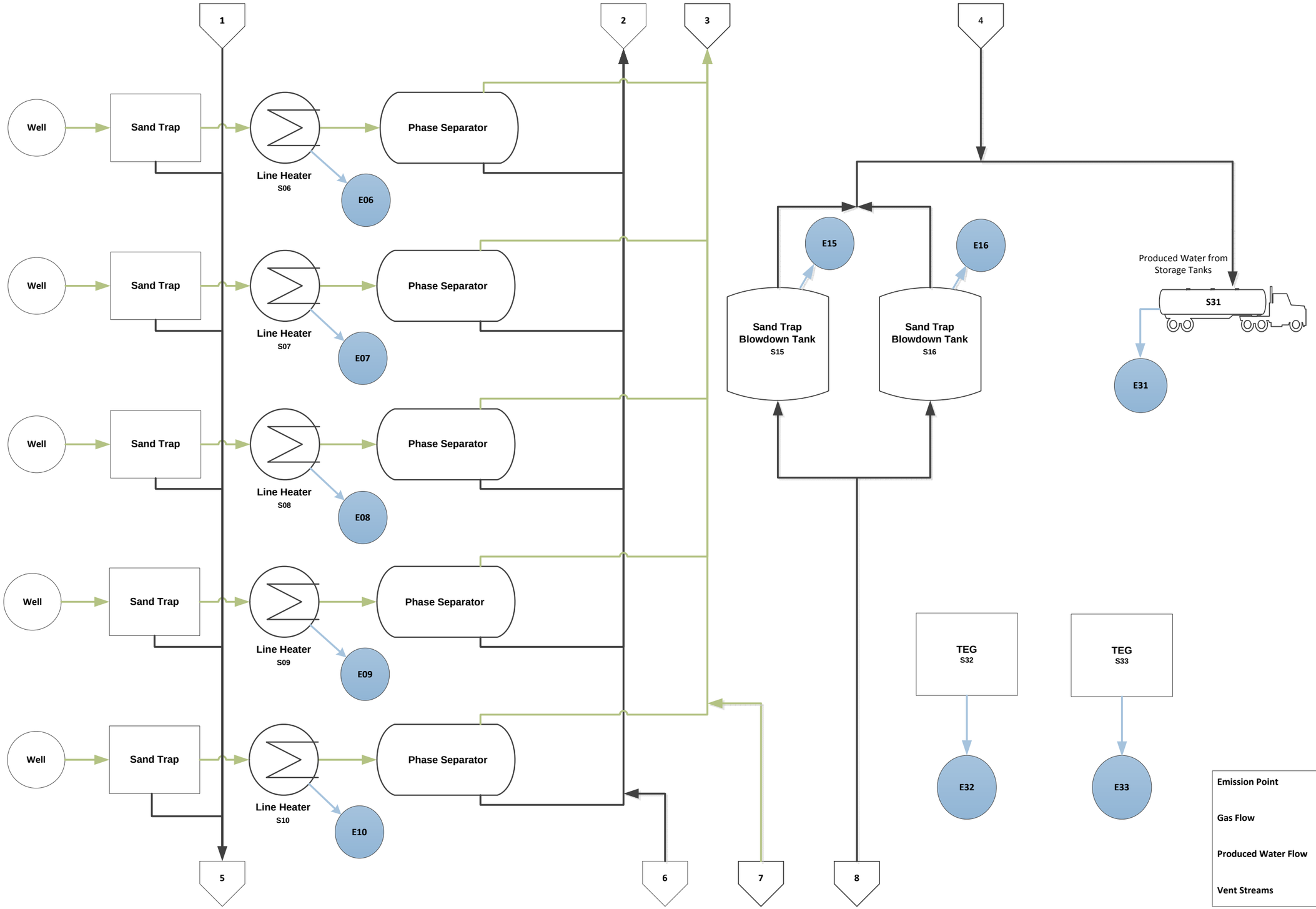
Attachment D-1

Pritt South Natural Gas Production Site

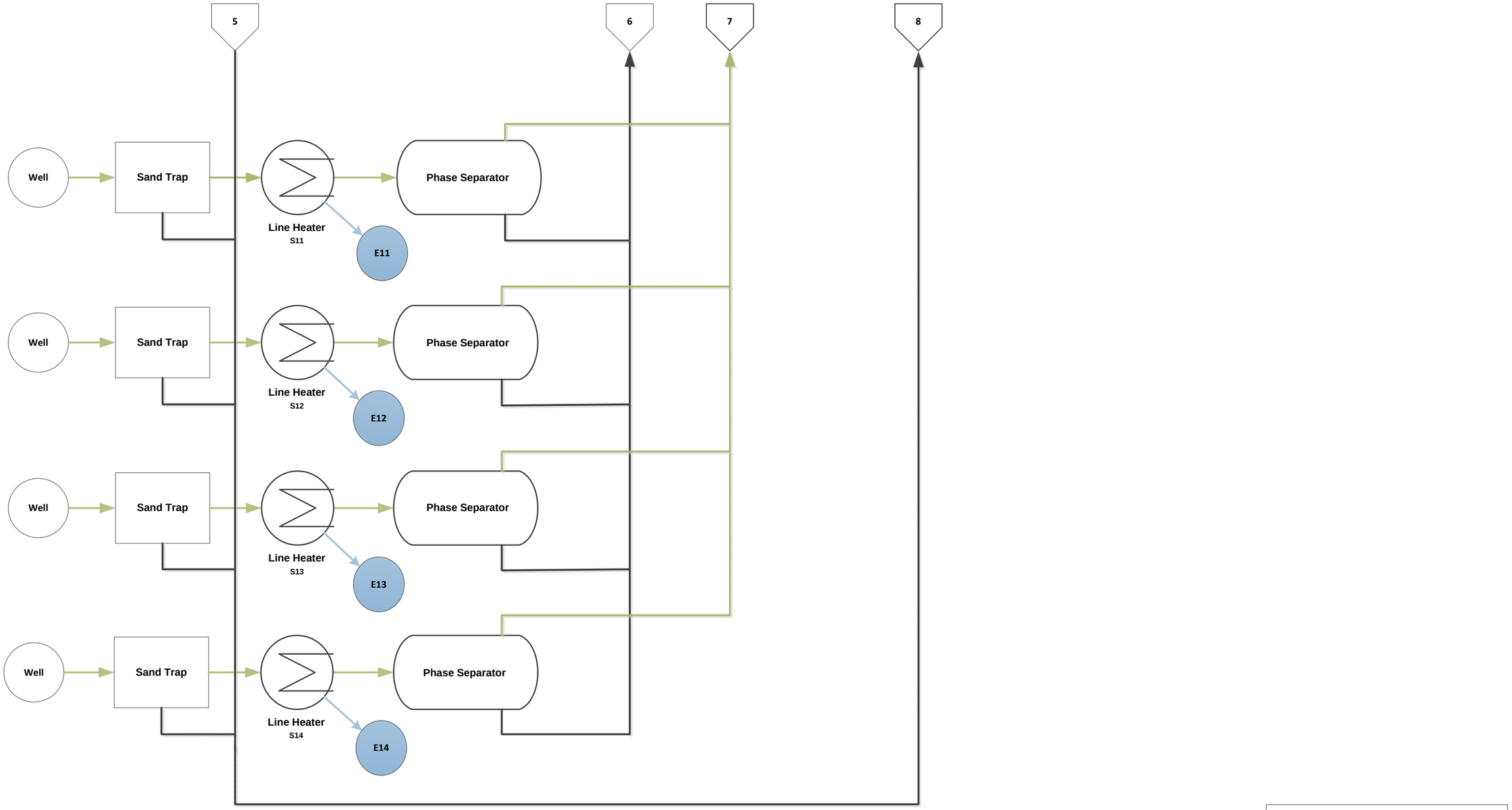
Process Flow Diagram

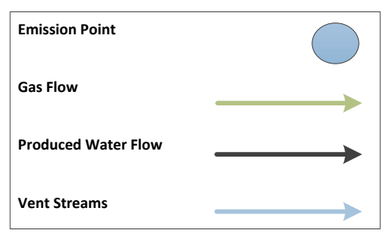


Attachment D-2



Attachment D-3





Attachment E

Attachment E – Process Description

This permit application is being filed for Arsenal Resources, LLC and addresses operational activities associated with the Pritt South natural gas production site. Natural gas flows from the fourteen (14) wellheads that will be drilled and completed on the Pritt South pad. The raw gas is first routed through the sand traps to remove any sediment. Fluids from these sand traps are manually blown down to the sand trap blowdown tanks (S15-S16), as needed. From the sand traps, raw gas is routed through line heaters (S01-S14) to assist with the phase separation process in the downstream separators. In the separator, produced water is removed from the raw gas before being dumped to produced water tanks (S17-S30). The separated gas is then sent off site via a sales pipeline. The produced water is pumped into a tank truck (S31) on an as needed basis and is disposed of off-site.

Power to the site is provided by two (2) thermoelectric generators (S32-S33).

Attachment F

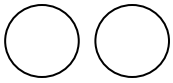
ATTACHMENT F – PLOT PLAN

Pritt South
Natural Gas Production Site

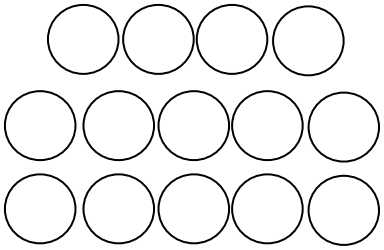
LAT: 39.24576
LON: -80.18706

Haul Road

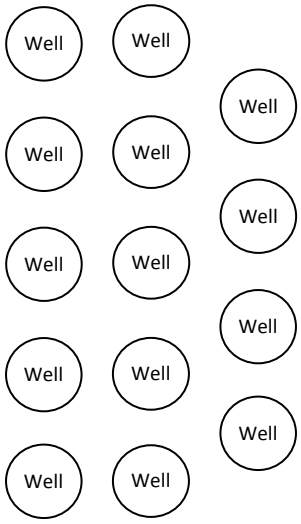
Truck
Entrance



Sand Trap
Blowdown Tanks
S15-S16



Produced Water
Tanks
S17-S30

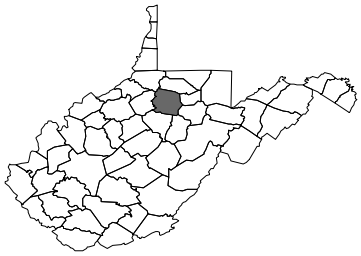


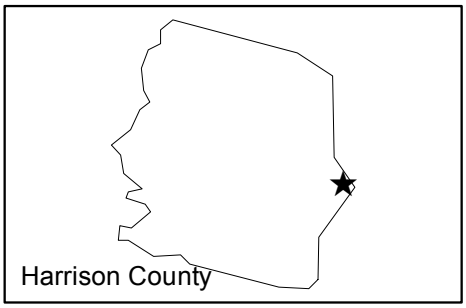
LH S07
LH S14
LH S06
LH S13
LH S05
LH S12
LH S04
LH S11
LH S03
LH S10
LH S02
LH S09
LH S01
LH S08

TEG S32

TEG S33

Attachment G

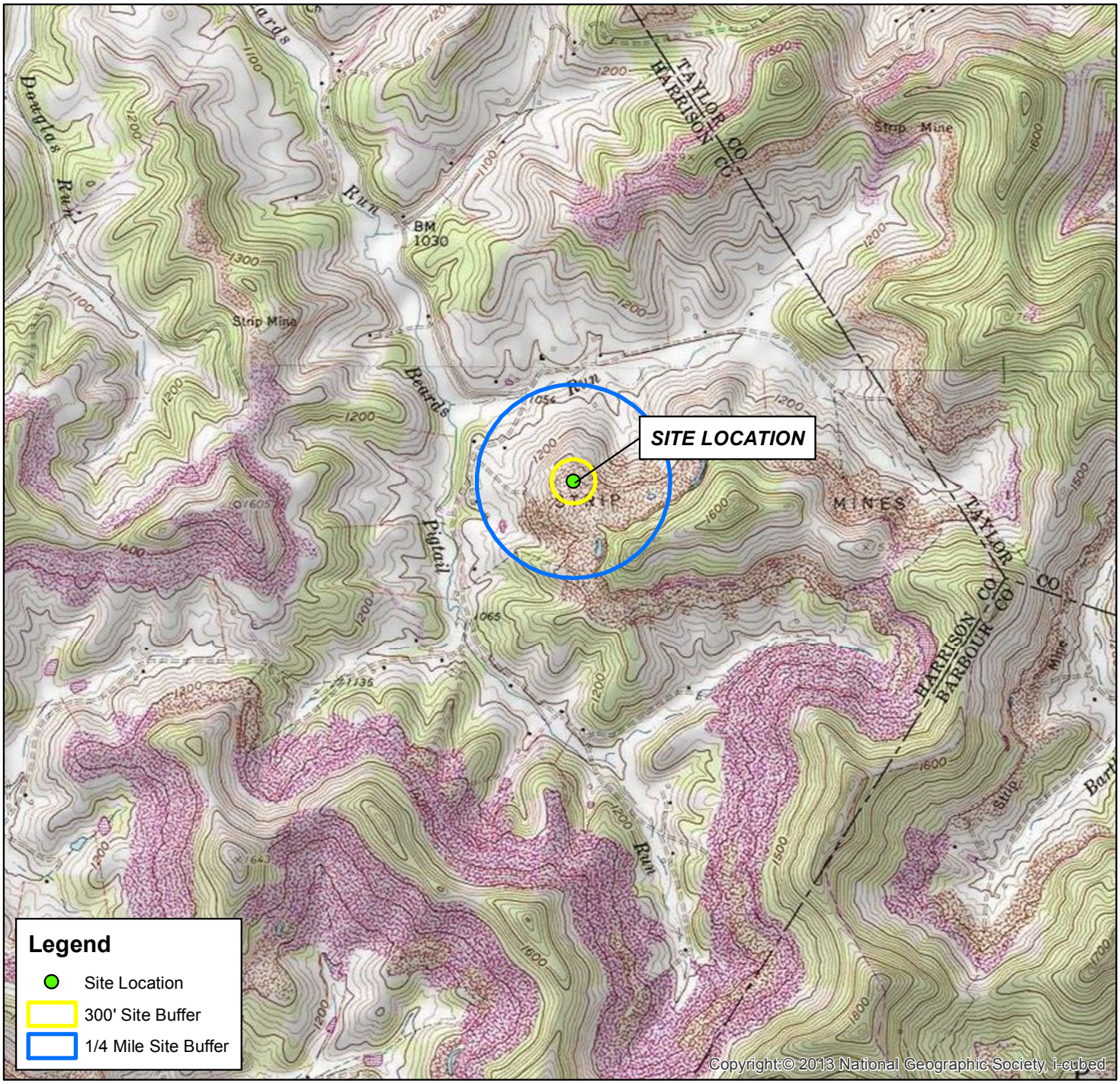




0 1,000 2,000 4,000 Feet

N

LAT. 39.24576 LON. -80.18706
HARRISON COUNTY
WEST VIRGINIA



USGS 1:24K 7.5' Quadrangle:
Browntown, WV

SITE LOCATION MAP

ERM	**Arsenal Resources** Arsenal Pritt South Well Pad Birdgeport Harrison County, West Virginia	GIS Review: GM CHK'D: GM 0419542
Drawn By: SRV-9/18/17	**Environmental Resources Management**	ATTACHMENT G

J:\Projects\SiteLocationMaps\Arsenal Resources_MXD\AttachmentG-SiteLocationMap_PrittSouth_20170918.mxd - 9/18/2017|SRV

Attachment H

ATTACHMENT H – G70-D SECTION APPLICABILITY FORM

General Permit G70-D Registration
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, pneumatic pumps, reciprocating internal combustion engines (RICEs), tank truck/rail car 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 and Oil Well Affected Facility (NSPS, Subpart OOOO/OOOOa)
☒ Section 6.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☐ Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)
☐ Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa and/or NESHAP Subpart HH
☒ Section 9.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
☐ Section 10.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO/OOOOa)
☐ Section 11.0	Pneumatic Pump Affected Facility (NSPS, Subpart OOOOa)
☒ Section 12.0	Fugitive Emissions GHG and VOC Standards (NSPS, Subpart OOOOa)
☐ Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines
☒ Section 14.0	Tanker Truck/Rail Car Loading[2]
☐ Section 15.0	Glycol Dehydration Units[3]

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

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

3 *Applicants that are subject to Section 15 may also be subject to the requirements of Section 9 (reboilers). Applicants that are subject to Section 15 may also be subject to control device and emission reduction device requirements of Section 8.*

Attachment I

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. Do not include fugitive emission sources in this table. Deminimis storage tanks shall be listed in the Attachment L table. 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]
S01	E01	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S02	E02	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S03	E03	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S04	E04	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S05	E05	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S06	E06	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S07	E07	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S08	E08	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S09	E09	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S10	E10	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S11	E11	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S12	E12	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S13	E13	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S14	E14	Line Heater	2018	2018	1.0 MMBtu/hr	New	N/A	N/A
S15	E15	Blowdown Sand Trap Tank	2018	2018	210 bbl	New	N/A	N/A
S16	E16	Blowdown Sand Trap Tank	2018	2018	210 bbl	New	N/A	N/A
S17	E17	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S18	E18	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S19	E19	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S20	E20	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S21	E21	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S22	E22	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S23	E23	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S24	E24	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S25	E25	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S26	E26	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S27	E27	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A

S28	E28	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S29	E29	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S30	E30	Produced Water Tank	2018	2018	400 bbl	New	N/A	N/A
S31	E31	Liquids Unloading	2018	2018	2604 bbl/day	New	N/A	N/A
S32	E32	Thermoelectric Generator	2018	2018	0.0007 MMBtu/hr	New	N/A	N/A
S33	E33	Thermoelectric Generator	2018	2018	0.0007 MMBtu/hr	New	N/A	N/A

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

Attachment J

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: **Pritt South site 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, CO_2e)
Pumps	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Valves	☐ Yes ☒ No	**382**	**EPA**	☒ Gas ☐ Liquid ☐ Both	**0.01**	**<0.01**	**1.82, 45.51**
Safety Relief Valves	☐ Yes ☒ No	**14**	**EPA**	☒ Gas ☐ Liquid ☐ Both	**<0.01**	**<0.01**	**0.10, 2.47**
Open Ended Lines	☐ Yes ☒ No	**35**	**EPA**	☒ Gas ☐ Liquid ☐ Both	**<0.01**	**<0.01**	**0.38, 9.42**
Sampling Connections	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Connections (Not sampling)	☐ Yes ☒ No	**1751**	**EPA**	☒ Gas ☐ Liquid ☐ Both	**<0.01**	**<0.01**	**0.93, 23.18**
Compressors	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Flanges	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Other[1]	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			

[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.): **N/A**

Please indicate if there are any closed vent bypasses (include component): **N/A**

Specify all equipment used in the closed vent system (e.g. VRU, ERD, thief hatches, tanker truck/rail car loading, etc.) **N/A**

Attachment K

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?
201: **47-033-05900**	Approx 7/21/18	7/21/18	Green Completion	OOOOa
202: **47-033-05901**	Approx 7/28/18	7/28/18	Green Completion	OOOOa
203: **47-033-05889**	Approx 8/5/18	8/5/18	Green Completion	OOOOa
204: **47-033-05902**	Approx 8/10/18	8/10/18	Green Completion	OOOOa
205: **47-033-05904**	Approx 8/15/18	8/15/18	Green Completion	OOOOa
206: **47-033-05909**	Approx 8/22/18	8/22/18	Green Completion	OOOOa
207: **47-033-05911**	Approx 8/28/18	8/28/18	Green Completion	OOOOa
211: **47-033-05903**	Approx 5/28/18	5/28/18	Green Completion	OOOOa
212: **47-033-05905**	Approx 6/2/18	6/2/18	Green Completion	OOOOa
213: **47-033-05906**	Approx 6/8/18	6/8/18	Green Completion	OOOOa
214: **47-033-05910**	Approx 6/13/18	6/13/18	Green Completion	OOOOa
215: **47-033-05907**	Approx 6/19/18	6/19/18	Green Completion	OOOOa
216: **47-033-05908**	Approx 6/25/18	6/25/18	Green Completion	OOOOa
217: **47-033-05912**	Approx 7/1/18	7/1/18	Green Completion	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 may be provided on the application without the state code (047).

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

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

Where,

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

Attachment L

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 **Blowdown Storage Vessel**	2. Tank Name **Sand Trap Blowdown**
3. Emission Unit ID number **S15-S16**	4. Emission Point ID number **E15-E16**
5. Date Installed , Modified or Relocated *(for existing tanks)* 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)* **N/A**	
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. **210 bbl**	
9A. Tank Internal Diameter (ft.) **10**	9B. Tank Internal Height (ft.) **15**
10A. Maximum Liquid Height (ft.) **15**	10B. Average Liquid Height (ft.) **7.5**
11A. Maximum Vapor Space Height (ft.) **14**	11B. Average Vapor Space Height (ft.)
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume". **210 bbl**	
13A. Maximum annual throughput (gal/yr) **1,596,926**	13B. Maximum daily throughput (gal/day) **4,375.14**
14. Number of tank turnovers per year **181.06**	15. Maximum tank fill rate (gal/min) **3.04**
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 (describe)	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket of _____ ☐ Carbon Adsorption[1]

☐ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors)

☐ Conservation Vent (psig) ☐ Condenser[1]

Vacuum Setting Pressure Setting

☐ Emergency Relief Valve (psig)

Vacuum Setting Pressure Setting

☐ Thief Hatch Weighted ☐ Yes ☐ No

[1] 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 Emissions Loss		Estimation Method[1]
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
See Attachment U									

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

TANK CONSTRUCTION AND OPERATION INFORMATION			
21. Tank Shell Construction: ☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☒ Other (describe) **Welded**			
21A. Shell Color: **Olive Vine**	21B. Roof Color: **Olive Vine**	21C. Year Last Painted:	
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** **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):	24B. If yes, for cone roof, provide slop (ft/ft): **0.06**	
25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☒			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type *(check one):* ☐ 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. Continuous sheet construction: ☐ 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, # of columns:	26G. For column supported tanks, diameter of column:
27. Closed Vent System with VRU? ☐ Yes ☒ No			
28. Closed Vent System with Enclosed Combustor? ☒ Yes ☐ No			
SITE INFORMATION			
29. Provide the city and state on which the data in this section are based:			
30. Daily Avg. Ambient Temperature (°F):	31. Annual Avg. Maximum Temperature (°F):		
32. Annual Avg. Minimum Temperature (°F):	33. Avg. Wind Speed (mph):		
34. Annual Avg. Solar Insulation Factor (BTU/ft^2-day):	35. Atmospheric Pressure (psia):		
LIQUID INFORMATION			
36. Avg. daily temperature range of bulk liquid (°F):	36A. Minimum (°F):	36B. Maximum (°F):	
37. Avg. operating pressure range of tank (psig): **0.0**	37A. Minimum (psig): **0.0**	37B. Maximum (psig): **0.0**	
38A. Minimum liquid surface temperature (°F):	38B. Corresponding vapor pressure (psia):		
39A. Avg. liquid surface temperature (°F):	39B. Corresponding vapor pressure (psia):		
40A. Maximum liquid surface temperature (°F):	40B. Corresponding vapor pressure (psia):		
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:			
41B. CAS number:			
41C. Liquid density (lb/gal):			
41D. Liquid molecular weight (lb/lb-mole):			
41E. Vapor molecular weight (lb/lb-mole):			
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year. From: To:			
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.			

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 **Produced Water Storage Battery**	2. Tank Name **Produced Water Tank**
3. Emission Unit ID number **S17-S30**	4. Emission Point ID number **E17-E30**
5. Date Installed , Modified or Relocated *(for existing tanks)* 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. **400 bbl**	
9A. Tank Internal Diameter (ft.) **12**	9B. Tank Internal Height (ft.) **20**
10A. Maximum Liquid Height (ft.) **18**	10B. Average Liquid Height (ft.) **10**
11A. Maximum Vapor Space Height (ft.) **20**	11B. Average Vapor Space Height (ft.) 10
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume". **400 bbl**	
13A. Maximum annual throughput (gal/yr) **38,325,000**	13B. Maximum daily throughput (gal/day) **105,000**
14. Number of tank turnovers per year **2,281.25**	15. Maximum tank fill rate (gal/min) **72.92**
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 (describe)	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☒ Does Not Apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket of _____ ☐ Carbon Adsorption[1]

☐ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors)

☐ Conservation Vent (psig) ☐ Condenser[1]

Vacuum Setting Pressure Setting

☐ Emergency Relief Valve (psig)

Vacuum Setting Pressure Setting

☐ Thief Hatch Weighted ☐ Yes ☐ No

[1] 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 Emissions Loss**		**Estimation Method[1]**
	lb/hr	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	
See Attachment U									

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

TANK CONSTRUCTION AND OPERATION INFORMATION			
21. Tank Shell Construction: ☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☒ Other (describe) **Welded**			
21A. Shell Color: **Olive Vine**	21B. Roof Color: **Olive Vine**	21C. Year Last Painted:	
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** **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):	24B. If yes, for cone roof, provide slop (ft/ft): **0.06**	
25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☒			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type *(check one):* ☐ 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. Continuous sheet construction: ☐ 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, # of columns:	26G. For column supported tanks, diameter of column:
27. Closed Vent System with VRU? ☐ Yes ☒ No			
28. Closed Vent System with Enclosed Combustor? ☐ Yes ☒ No			
SITE INFORMATION			
29. Provide the city and state on which the data in this section are based:			
30. Daily Avg. Ambient Temperature (°F):	31. Annual Avg. Maximum Temperature (°F):		
32. Annual Avg. Minimum Temperature (°F):	33. Avg. Wind Speed (mph):		
34. Annual Avg. Solar Insulation Factor (BTU/ft^2-day):	35. Atmospheric Pressure (psia):		
LIQUID INFORMATION			
36. Avg. daily temperature range of bulk liquid (°F):	36A. Minimum (°F):	36B. Maximum (°F):	
37. Avg. operating pressure range of tank (psig): **0.0**	37A. Minimum (psig): **0.0**	37B. Maximum (psig): **0.0**	
38A. Minimum liquid surface temperature (°F):	38B. Corresponding vapor pressure (psia):		
39A. Avg. liquid surface temperature (°F):	39B. Corresponding vapor pressure (psia):		
40A. Maximum liquid surface temperature (°F):	40B. Corresponding vapor pressure (psia):		
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:			
41B. CAS number:			
41C. Liquid density (lb/gal):			
41D. Liquid molecular weight (lb/lb-mole):			
41E. Vapor molecular weight (lb/lb-mole):			
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year. From: To:			
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.			

Attachment M

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#[1]	Emission Point ID#[2]	Emission Unit Description (manufacturer, model #) Coal Train (Existing)	Year Installed/ Modified	Type[3] and Date of Change	Maximum Design Heat Input (MMBTU/hr)[4]	Fuel Heating Value (BTU/scf)[5]
S01	E01	Line Heater	2018	New	1.00	1,030
S02	E02	Line Heater	2018	New	1.00	1,030
S03	E03	Line Heater	2018	New	1.00	1,030
S04	E04	Line Heater	2018	New	1.00	1,030
S05	E05	Line Heater	2018	New	1.00	1,030
S06	E06	Line Heater	2018	New	1.00	1,030
S07	E07	Line Heater	2018	New	1.00	1,030
S08	E08	Line Heater	2018	New	1.00	1,030
S09	E09	Line Heater	2018	New	1.00	1,030
S10	E10	Line Heater	2018	New	1.00	1,030
S11	E11	Line Heater	2018	New	1.00	1,030
S12	E12	Line Heater	2018	New	1.00	1,030
S13	E13	Line Heater	2018	New	1.00	1,030
S14	E14	Line Heater	2018	New	1.00	1,030
S32	E32	Thermoelectric Generator	2018	New	0.0007	1,030
S33	E33	Thermoelectric Generator	2018	New	0.0007	1,030

[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
(Not Applicable)

Attachment O

ATTACHMENT O – TANKER TRUCK/RAIL CAR LOADING DATA SHEET

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

Truck/Rail Car Loadout Collection Efficiencies

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

- For tanker trucks/rail cars passing the MACT level annual leak test – 99.2%
- For tanker trucks/rail cars passing the NSPS level annual leak test – 98.7%
- For tanker trucks/rail cars 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/rail car 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#: **S31**	Emission Point ID#: **E31**	Year Installed/Modified: **2018**
Emission Unit Description:		
Loading Area Data		
Number of Pumps: **On truck**	Number of Liquids Loaded: **1**	Max number of trucks/rail cars loading at one (1) time: **1**
Are tanker trucks/rail cars pressure tested for leaks at this or any other location? ☐ Yes ☒ No ☐ Not Required If Yes, Please describe:		
Provide description of closed vent system and any bypasses. N/A		
Are any of the following truck/rail car loadout systems utilized? ☐ Closed System to tanker truck/rail car passing a MACT level annual leak test? ☐ Closed System to tanker truck/rail car passing a NSPS level annual leak test? ☐ Closed System to tanker truck/rail car 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	24	24	24	24
Days/week	7	7	7	7

Bulk Liquid Data (use extra pages as necessary)

Liquid Name	**Produced Water***		
Max. Daily Throughput (1000 gal/day)	**109.38**		
Max. Annual Throughput (1000 gal/yr)	**39,921.93**		
Loading Method[1]	**SF**		
Max. Fill Rate (gal/min)	**75.95**		
Average Fill Time (min/loading)	**55.30**		
Max. Bulk Liquid Temperature (°F)	**60**		
True Vapor Pressure[2]	**0.29**		
Cargo Vessel Condition[3]	**U**		
Control Equipment or Method[4]	**None**		
Max. Collection Efficiency (%)	**NA**		

Max. Control Efficiency (%)		**NA**		
Max.VOC Emission Rate	Loading (lb/hr)	**<0.01**		
	Annual (ton/yr)	**<0.01**		
Max.HAP Emission Rate	Loading (lb/hr)	**<0.01**		
	Annual (ton/yr)	**<0.01**		
Estimation Method[5]		O - ProMax		

Attachment P

(Not Applicable)

Attachment Q

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

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
(Not Applicable)

Attachment T

Attachment T - Emission Calculations
Line Heaters S01 - S14

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Boiler Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions. (lb/hr)	Max. Annual Emissions. (tpy)
VOC's	5.5	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	<0.01	0.02
Hexane	1.8	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	<0.01	<0.01
Formaldehyde	0.075	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	<0.01	<0.01
Benzene	0.0021	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	<0.01	<0.01
Toluene	0.0034	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	<0.01	<0.01
Pb	0.0005	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	<0.01	<0.01
CO	84	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	0.08	0.36
NOx	100	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	0.10	0.43
$PM_{Filterable}$	1.9	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	<0.01	<0.01
$PM_{Condensable}$	5.7	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	<0.01	0.02
PM_{Total}	7.6	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	<0.01	0.03
SO_2	0.6	$lb/10^6$ scf	AP-42 Chapter 1.4	1.00	1,030	8,760	<0.01	<0.01
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	1.00	1,030	8,760	116.98	512.36
CH_4	0.001	kg CO_2 / MMBtu	40 CFR Subpart C	1.00	1,030	8,760	<0.01	<0.01
N_2O	0.0001	kg CO_2 / MMBtu	40 CFR Subpart C	1.00	1,030	8,760	<0.01	<0.01
Total HAPs							<0.01	<0.01
Total CO_2e							117.10	512.89

Notes:

-Emission rates displayed above represent the max. hourly and max. annual emissions for one line heater. Cumulative emission rates for all 14 line heaters are diplayed in the Total Site Emissions Table.

-Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.

-AP-42, Chapter 1.4 references are from the July 1998 revision.

-Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **($lb/10^6$ scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating (**MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr)** = Emission Factor **(kg CO_2/MMBtu)** x Boiler Rating **(MMBtu/hr)** x 2.20462 **(lb/kg)**

Attachment T - Emission Calculations
Sand Trap Blowdown Tank S15-S16

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Annual Emissions using ProMax (tons/yr)
VOCs	0.45	0.08
Total HAPs	0.03	<0.01
Hexane	0.02	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
Xylene	<0.01	<0.01
CO_2	<0.01	<0.01
CH_4	28.12	5.13
Total CO_2e	703.02	128.30

Notes:

-Blowdown operations are conducted on the Pritt South pad daily to allow for the removal of fluids from the sand traps. Based on available operational information, blowdowns are assummed to occur for one hour per day.

-Emission rates for the Sand Trap Blowdown Tank were calculated using ProMax software. ProMax output sheets for the Pritt South Pad are attached.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1. GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Attachment T - Emission Calculations
Produced Water Tanks S17 - S30

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Annual Emissions using ProMax (tons/yr)
VOCs	15.34	67.20
Total HAPs	1.04	4.56
Hexane	0.54	2.35
Benzene	0.03	0.15
Toluene	0.26	1.12
Ethylbenzene	0.09	0.38
Xylene	0.13	0.55
CO_2	<0.01	<0.01
CH_4	614.37	2,690.95
Total CO_2e	15359.30	67,273.72

Notes:

-Emission rates for Produced Water Tanks S17-S30 were calculated using ProMax software. ProMax output sheets for the Pritt South Pad are attached.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

-For emission calculation purposes, the total throughput for tanks S17 - S30 is modeled as being received through a single tank. The throughput value represents the total throughput for all fourteen (14) 400-barrel. Therefore, emission rates represent a total from all produced water tanks located on the well pad. Actual throughput for each tank will vary based on operations.

-Arsenal Resources will operate the Pritt South Site in Harrison County where the produced hydrocarbon condensate is expected to be minimal. A representative analysis was used in order to find a conservative estimate of emissions from condensate. In order to comply with the permit, Arsenal will collect and analyze a pressurized tank liquid sample within 30 days of production start up.

Attachment T - Emission Calculations
Liquids Unloading S31

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Annual Emissions using ProMax (tons/yr)
VOCs	<0.01	<0.01
Total HAPs	<0.01	<0.01
Hexane	<0.01	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
Xylene	<0.01	<0.01
CO_2	<0.01	<0.01
CH_4	0.04	0.19
Total CO_2e	1.10	4.81

Notes:
-Emission rates for Liquids Unloading was calculated using ProMax software. ProMax output sheets for the Pritt South Pad are attached.
-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Attachment T - Emission Calculations
TEG S32-S33

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Boiler Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions. (lb/hr)	Max. Annual Emissions. (tpy)
VOC's	5.5	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
Hexane	1.8	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
Formaldehyde	0.075	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
Benzene	0.0021	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
Toluene	0.0034	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
Pb	0.0005	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
CO	84	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
NOx	100	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
$PM_{Filterable}$	1.9	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
$PM_{Condensable}$	5.7	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
PM_{Total}	7.6	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
SO_2	0.6	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,030	8,760	<0.01	<0.01
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	0.0007	1,030	8,760	0.08	0.36
CH_4	0.001	kg CO_2 / MMBtu	40 CFR Subpart C	0.0007	1,030	8,760	<0.01	<0.01
N_2O	0.0001	kg CO_2 / MMBtu	40 CFR Subpart C	0.0007	1,030	8,760	<0.01	<0.01
Total HAPs							<0.01	<0.01
Total CO_2e							0.08	0.36

Notes:

-Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.

-AP-42, Chapter 1.4 references are from the July 1998 revision.

-Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **($lb/10^6$ scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating (**MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr)** = Emission Factor **(kg CO_2/MMBtu)** x Boiler Rating **(MMBtu/hr)** x 2.20462 **(lb/kg)**

Attachment T - Emission Calculations
Fugitive Leaks

Default Average Component Counts for Major Onshore Natural Gas Production Equipment				
Facility Equipment Type	**Valves**	**Connectors**	**Open-ended Lines**	**Pressure Relief Valves**
Wellheads	8	38	0.5	0
Separators	1	6	0	0
Meters/Piping	12	45	0	0
Compressors	12	57	0	0
In-line Heaters	14	65	2	1
Dehydrators	24	90	2	2

- Table W-1B to 40CFR98 Subpart W

Well Specific Equipment Counts	
Facility Equipment Type	**Count on Site**
Wellheads	14
Separators	14
Meters/Piping	5
Compressors	0
In-line Heaters	14
Dehydrators	0

Gas Composition														
	Propane	**Butane**	**Pentanes**	**Heptane**	**Octanes**	**Nonanes**	**Decanes**	**Hexane**	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylene**	**CO_2**	**CH_4**
Mole %	0.09	0.02	0.004	<0.01	<0.001	<0.001	<0.001	0.0020	<0.001	<0.001	<0.001	<0.001	0.00	97.09
MW	44	58	72	100	114	128	142	86.00	78.00	92.00	106.00	106.00	44.00	16.00

Fugitive Emissions													
Facility Equipment Type	**Total Count**	**Emission Rate (scf/hr/component)[2]**	**Hours of Operation**	**VOCs (lbs/hr)**	**VOCs (tons/yr)**	**HAPs (lbs/hr)**	**HAPs (tons/yr)**	**CO_2 (lbs/hr)**	**CO_2 (tons/yr)**	**CH_4 (lbs/hr)**	**CH_4 (tons/yr)**	**Total CO_2e (lbs/hr)**	**Total CO_2e (tons/yr)**
Valves	382	0.027	8760	0.002	0.01	<0.001	<0.001	<0.001	<0.001	0.42	1.82	10.39	45.51
Connectors	1751	0.003	8760	<0.001	0.00	<0.001	<0.001	<0.001	<0.001	0.21	0.93	5.29	23.18
Open-ended Lines	35	0.06	8760	<0.001	0.00	<0.001	<0.001	<0.001	<0.001	0.09	0.38	2.15	9.42
Pressure Relief Valves	14	0.04	8760	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.02	0.10	0.56	2.47
			Total Emissions:	**<0.01**	**0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.74**	**3.22**	**18.40**	**80.58**

- Table W-1A to 40CFR98 Subpart W

Example Equations:

Fugitive Emissions (lb/hr) = Count x Emission Rate x Hours of Operation ÷ 385.5 scf/lbmol x mol VOC's

Attachment T - Emission Calculations
Fugitive Emissions from Unpaved Haul Roads

Constant	Industrial Roads		
	PM	PM-10	PM-2.5
k (lb/VMT)	4.9	1.5	0.15
a	0.7	0.9	0.9
b	0.45	0.45	0.45

where

k		Patricle size multiplier[1]
s	4.8	Silt content of road surface material (%)
p	150	Number of days per year with precipitation

Item Number	Description	Number of Wheels	W Mean Vehicle Weight (tons)	Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)	PM-2.5 Emissions (tons/yr)
1	Liquids Hauling	14	30	10	0.30	1	9,505	NA	NA	1.29	6.11	0.33	1.56	0.03	0.16
2	Employee Vehicles	4	3	10	0.30	1	200	NA	NA	0.46	0.05	0.12	0.01	0.01	0.001
									Totals:	**1.74**	**6.15**	**0.44**	**1.57**	**0.04**	**0.16**

Notes:

[1] - Particle Size Multiplier used from AP-42 13.2.2 - Final Version 11/2006

[2] - Silt Content of Road Surface uses Sand and Gravel Processing Plant Road from AP-42 13.2.2 - Final Version 11/2006

[3] - Number of days per year with precipitation >0.01 in3 found using AP-42 13.2.2 Figure 13.2.2-1 - Final Version 11/2006

Example Calculations:

Emissions (lb/Vehicle Mile Traveled) - $E = k \times (s/12)^a \times (W/3)^b$ Equation 1a from AP-42 13.2.2 - Final Version 11/2006

Size Specific Emissions (lb/VMT) - $E_{ext} = E[(365-p)/365]$ Equation 2 from AP-42 13.2.2 - Final Version 11/2006

Attachment T - Emission Calculations

Pritt South Site Emission Levels

	VOCs		HAPs		CO		NO_x		PM - Total		PM - Filt		PM - CON		SO_2		CO_2		CH_4		N_2O		CO_2e	
Emission Sources	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
Line Heater (E01)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E02)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E03)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E04)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E05)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E06)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E07)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E08)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E09)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E10)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E11)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E12)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E13)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E14)	<0.01	0.02	<0.01	<0.01	0.08	0.36	0.10	0.43	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	116.98	512.36	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Blowdown Tank (E15-E16)	0.45	0.08	0.03	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	28.12	5.13	--	--	703.02	128.30
Produced Water Tank (E17-E30)	15.34	67.20	1.04	4.56	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	614.37	2690.95	--	--	15359.30	67273.72
Tank Truck Loading Activities (E31)	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	0.04	0.19	--	--	1.10	4.81
TEG (E32)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	0.36	<0.01	<0.01	<0.01	<0.01	0.08	0.36
TEG (E33)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	0.36	<0.01	<0.01	<0.01	<0.01	0.08	0.36
Haul Roads	--	--	--	--	--	--	--	--	1.74	6.15	0.49	1.72	--	--	--	--	--	--	--	--	--	--	--	--
Fugitives Leaks	<0.01	0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	0.74	3.22	--	--	18.40	80.58
Totals	**15.87**	**67.63**	**1.10**	**4.68**	**1.14**	**5.00**	**1.36**	**5.95**	**1.84**	**6.61**	**0.51**	**1.84**	**0.08**	**0.34**	**<0.01**	**0.04**	**1637.84**	**7173.76**	**643.30**	**2699.63**	**<0.01**	**0.01**	**17721.35**	**74668.58**

Attachment T - Emission Calculations
Pritt South Emission Levels - HAP Speciation

	Total HAPs		Formaldehyde		Hexane		Benzene		Toluene		Ethylbenzene		Xylene	
Emission Sources	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
Line Heater (E01)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E02)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E03)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E04)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E05)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E06)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E07)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E08)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E09)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E10)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E11)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E12)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E13)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Line Heater (E14)	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Blowdown Tank (E15-E16)	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Produced Water Tanks (E17-E30)	1.04	4.56	<0.01	<0.01	0.54	2.35	0.03	0.15	0.26	1.12	0.09	0.38	0.13	0.55
Tank Truck Loading Activities (E31)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TEG (E32)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TEG (E33)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Haul Roads	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fugitives Leaks	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Totals	**1.10**	**4.68**	**<0.01**	**<0.01**	**0.58**	**2.46**	**0.04**	**0.15**	**0.26**	**1.12**	**0.09**	**0.38**	**0.13**	**0.55**

RYAN ENVIRONMENTAL

Air Emission Analysis

Company: Arsenal
Project #: 17420-L

SAMPLE COLLECTION INFORMATION			
Sample ID:	Well # 212	Date Received:	8/3/2017
Location:	Tony's Bridge	Pressure:	648
Collection Source:	GPU CONDENSATE LEG	Temperature:	103.0
Sample Date:	8/3/17	Container:	CP cylinder
Sample Time:	11:15 AM	Container ID:	CP-1
Collected By:	Michael Michalski	Remarks:	Produced Water

ANALYTICAL RESULTS					
COMPOUND	**Mol %**	**Wt %**	**COMPOUND**	**Mol %**	**Wt %**
hydrogen sulfide	<0.001	<0.001	benzene	<0.001	<0.001
oxygen	<0.001	<0.001	2.8	<0.001	<0.001
nitrogen	<0.001	<0.001	2,2,4-trimethylpentane	<0.001	<0.001
carbon dioxide	<0.001	<0.001	heptane	0.002	0.014
methane	97.094	94.556	toluene	<0.001	<0.001
ethane	2.794	5.099	octane	0.001	0.008
propane	0.085	0.228	ethylbenzene	<0.001	<0.001
isobutane	0.005	0.016	m & p xylene	<0.001	<0.001
butane	0.013	0.045	o xylene	<0.001	<0.001
isopentane	0.002	0.010	nonane	<0.001	0.002
pentane	0.002	0.010	C10+	<0.001	<0.001
hexane	0.002	0.012	**TOTAL**	**100.000**	**100.000**

CALCULATED RESULTS			
Real Values @ 14.696 PSI and 60°F			
BTU/SCF (DRY):	1035.474	REAL ETHANE+ GPM:	0.780
BTU/SCF (SAT):	1017.382	REAL GRAVITY:	0.5697
Z FACTOR (DRY):	0.9979	MOLECULAR WEIGHT:	16.4730
Z FACTOR (WET):	0.9980		

ANALYTICAL METHODS
(1) Extended analysis and reporting performed following procedures outlined in GPA 2286 and 2261
(2) Physical properties and values used in calculations were acquired from GPA 2145

RYAN ENVIRONMENTAL
5793 W. Veterans Memorial Highway
Suite 101
Bridgeport, WV 26330
304-842-5578

GWR Analysis

Company: Arsenal
Project #: 17420-L

SAMPLE COLLECTION INFORMATION

Sample ID:	Well # 212	Sample Pressure (psi):	648
Sample Location:	Tony's Bridge	Sample Temp. (°F):	103.0
Collection Source:	GPU CONDENSATE LEG	Sample Container Type:	CP cylinder
Sample Date:	8/3/2017	Container ID:	CP-1
Sample Time:	11:15 AM	Comments:	Produced Water
Collected By:	Michael Michalski		
Date Received at Lab:	8/3/2017		

ANALYTICAL RESULTS

COMPONENTS	UNITS	RESULTS
Gas-Water Ratio	**scf/bbl**	**2.8**

Certificate of Analysis

Number: 2030-14100210-001A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

Gary Vermillion
Gas Analytical Services
PO Box 1028
Bridgeport, WV 26330

Oct. 27, 2014

Field:
Station N
Station Number:
Sample Point:
Analyzed: 10/23/2014 14:04:51 by GR

Sampled By: GR-SPL
Sample Of: Condensate Spot
Sample Date: 10/08/2014 15:00
Sample Conditions: 630 psig
Method: GPA-2186M/GPA-2103

Analytical Data

Components	Mol. %	MW	Wt. %	Sp. Gravity	L.V. %
Nitrogen	NIL	28.013	NIL	0.807	NIL
Methane	10.674	16.043	1.735	0.300	4.055
Carbon Dioxide	0.065	44.010	0.029	0.817	0.025
Ethane	5.377	30.069	1.638	0.356	3.224
Propane	3.736	44.096	1.669	0.507	2.308
Iso-Butane	1.359	58.122	0.800	0.563	0.997
n-Butane	2.754	58.122	1.622	0.584	1.947
Iso-Pentane	2.508	72.149	1.833	0.625	2.056
n-Pentane	2.250	72.149	1.645	0.631	1.829
i-Hexanes	4.742	85.172	4.092	0.667	4.303
n-Hexane	2.718	86.175	2.373	0.664	2.506
2,2,4-Trimethylpentane	0.018	114.231	0.021	0.697	0.021
Benzene	0.109	78.114	0.086	0.885	0.068
Heptanes	13.220	98.287	13.166	0.700	13.187
Toluene	1.097	92.141	1.024	0.872	0.823
Octanes	15.626	110.146	17.442	0.732	16.710
Ethylbenzene	0.200	106.167	0.215	0.872	0.173
Xylenes	0.368	106.167	0.396	0.885	0.314
Nonanes	11.599	124.568	14.638	0.744	13.792
Decanes Plus	21.580	162.726	35.576	0.788	31.662
	100.000		100.000		100.000

Physical Properties	Total	C10+
Specific Gravity at 60°F	0.7012	0.7879
API Gravity at 60°F	70.284	48.091
Molecular Weight	98.699	162.726
Pounds per Gallon (in Vacuum)	5.846	6.569
Pounds per Gallon (in Air)	5.840	6.562
Cu. Ft. Vapor per Gallon @ 14.73 psia	22.427	15.283

Patti L. Perro

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Certificate of Analysis

Number: 2030-14100210-001A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

Gary Vermillion
Gas Analytical Services
PO Box 1028
Bridgeport, WV 26330

Oct. 27, 2014

Field:
Station Name:
Station Number:
Sample Point:

Sampled By: GR-SPL
Sample Of: Condensate Spot
Sample Date: 10/08/2014 15:00
Sample Conditions: 630 psig

Analytical Data

Test	Method	Result	Units	Detection Limit	Lab Tech.	Analysis Date
Color Visual	Proprietary	Straw			CM	10/23/2014
API Gravity @ 60° F	ASTM D-5002	60.59	°		CM	10/23/2014
Specific Gravity @ 60/60° F	ASTM D-5002	0.7366			CM	10/23/2014
Density @ 60° F	ASTM D-5002	0.7359	g/ml		CM	10/23/2014
Shrinkage Factor	Proprietary	0.9173			CM	10/23/2014
Flash Factor	Proprietary	198.5929	Cu. Ft./S.T. Bbl		CM	10/23/2014

Patti L. Peters

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Certificate of Analysis

Number: 2030-14100210-001A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

Gary Vermillion
Gas Analytical Services
PO Box 1028
Bridgeport, WV 26330

Oct. 27, 2014

Field:
Station Name:
Station Number:
Sample Point:
Analyzed: 10/23/2014 14:04:51 by GR

Sampled By: GR-SPL
Sample Of: Condensate Spot
Sample Date: 10/08/2014 15:00
Sample Conditions: 630 psig
Method: GPA-2186M/GPA-2103

Analytical Data

Components	Mol. %	MW	Wt. %	Sp. Gravity	L.V. %
Nitrogen	NIL	28.013	NIL	0.807	NIL
Carbon Dioxide	0.065	44.010	0.029	0.817	0.025
Methane	10.674	16.043	1.735	0.300	4.055
Ethane	5.377	30.069	1.638	0.356	3.224
Propane	3.736	44.096	1.669	0.507	2.308
Iso-butane	1.359	58.122	0.800	0.563	0.997
n-Butane	2.754	58.122	1.622	0.584	1.947
Iso-pentane	2.508	72.149	1.833	0.625	2.056
n-Pentane	2.250	72.149	1.645	0.631	1.829
Hexanes	7.460	85.537	6.465	0.666	6.809
Heptanes Plus	63.817	127.692	82.564	0.754	76.750
	100.000		100.000		100.000

Physical Properties	Total	C7+
Specific Gravity at 60°F	0.7012	0.7543
API Gravity at 60°F	70.284	56.084
Molecular Weight	98.699	127.692
Pounds per Gallon (in Vacuum)	5.846	6.289
Pounds per Gallon (in Air)	5.840	6.282
Cu. Ft. Vapor per Gallon @ 14.73 psia	22.427	18.647

Patti L. Pitre

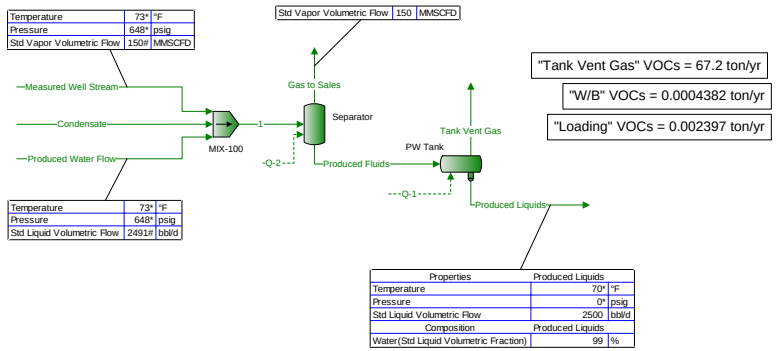
Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Flowsheet1
Plant Schematic

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Arsenal – Pritt South
Produced Water Tank



Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Connections

	Condensate	Gas to Sales	Loading	Measured Well Stream	Produced Fluids
From Block	--	Separator	--	--	Separator
To Block	MIX-100	--	--	MIX-100	PW Tank

Stream Composition

Mole Fraction	Condensate %	Gas to Sales %	Loading %	Measured Well Stream %	Produced Fluids %
Nitrogen	0 *	0	0	0 *	0
Methane	10.6741 *	96.9821	6.04371	97.0936 *	1.87358
Carbon Dioxide	0.0650007 *	3.93859E-05	9.26129E-05	0 *	1.42766E-06
Ethane	5.37705 *	2.7935	0.307173	2.79399 *	0.0568652
Propane	3.73604 *	0.0871327	0.00474561	0.0849997 *	0.00194334
Isobutane	1.35901 *	0.00581413	0.000293056	0.00499998 *	0.00015245
n-Butane	2.75403 *	0.014638	0.000815247	0.0129999 *	0.000431532
Isopentane	2.50803 *	0.00351133	0.000223929	0.00199999 *	0.000141324
n-Pentane	2.25002 *	0.00335198	0.00024383	0.00199999 *	0.000159968
i-Hexane	4.74205 *	0.00285713	0.000317148	0 *	0.000234707
n-Hexane	2.71803 *	0.00360944	0.000498633	0.00199999 *	0.000380362
2,2,4-Trimethylpentane	0.0170002 *	1.00486E-05	2.18364E-06	0 *	2.40348E-06
Benzene	0.109001 *	0.000162513	4.20635E-05	9.99996E-05 *	3.1776E-05
Heptane	13.2201 *	0.00972367	0.00232639	0.00199999 *	0.00261714
Toluene	1.09701 *	0.000728985	0.000206933	9.99996E-05 *	0.000312512
Octane	15.6262 *	0.00970108	0.00272019	0.000999996 *	0.00652642
Ethylbenzene	0.200002 *	0.000196987	6.31442E-05	9.99996E-05 *	0.000200061
o-Xylene	0.368004 *	0.000279702	7.77991E-05	9.99996E-05 *	0.000357285
Nonane	11.5991 *	0.00578037	0.00155784	0 *	0.0102953
Decane	0 *	0	0	0 *	0
Water	0 *	0.0727681	93.6342	0 *	97.9728
Oxygen	0 *	0	0	0 *	0
Decanes Plus	21.5802 *	0.00407148	0.000644479	0 *	0.0729255

Molar Flow	Condensate lbmol/h	Gas to Sales lbmol/h	Loading lbmol/h	Measured Well Stream lbmol/h	Produced Fluids lbmol/h
Nitrogen	0 *	0	0	0 *	0
Methane	1.07002 *	15972.7	0.0026175	16010 *	38.3511
Carbon Dioxide	0.00651598 *	0.00648675	4.01102E-08	0 *	2.92234E-05
Ethane	0.539022 *	460.082	0.000133035	460.707 *	1.164
Propane	0.374518 *	14.3505	2.0553E-06	14.0158 *	0.0397789
Isobutane	0.136234 *	0.957571	1.26921E-07	0.824457 *	0.00312056
n-Butane	0.276077 *	2.41083	3.5308E-07	2.14359 *	0.00883321
Isopentane	0.251416 *	0.578307	9.69826E-08	0.329783 *	0.00289281
n-Pentane	0.225553 *	0.552062	1.05602E-07	0.329783 *	0.00327445
i-Hexane	0.475366 *	0.470561	1.37356E-07	0 *	0.00480431
n-Hexane	0.272468 *	0.594465	2.15956E-07	0.329783 *	0.00778578
2,2,4-Trimethylpentane	0.00170418 *	0.00165498	9.45724E-10	0 *	4.91979E-05
Benzene	0.0109268 *	0.0267655	1.82175E-08	0.0164891 *	0.000650436
Heptane	1.32525 *	1.60146	1.00755E-06	0.329783 *	0.0535714
Toluene	0.10997 *	0.120062	8.96219E-08	0.0164891 *	0.00639694
Octane	1.56644 *	1.59774	1.1781E-06	0.164891 *	0.133592
Ethylbenzene	0.0200492 *	0.0324432	2.73475E-08	0.0164891 *	0.00409514
o-Xylene	0.0368905 *	0.0460662	3.36944E-08	0.0164891 *	0.00731341
Nonane	1.16275 *	0.952012	6.74695E-07	0 *	0.210739
Decane	0 *	0	0	0 *	0
Water	0 *	11.9847	0.0405526	0 *	2005.45
Oxygen	0 *	0	0	0 *	0
Decanes Plus	2.1633 *	0.670561	2.79121E-07	0 *	1.49274

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Mass Fraction	Condensate %	Gas to Sales %	Loading %	Measured Well Stream %	Produced Fluids %
Nitrogen	0 *	0	0	0 *	0
Methane	1.71127 *	94.2446	5.40353	94.5593 *	1.65945
Carbon Dioxide	0.0285878 *	0.000104998	0.000227154	0 *	3.46891E-06
Ethane	1.61577 *	5.08818	0.514761	5.1002 *	0.0944031
Propane	1.64635 *	0.23274	0.0116625	0.227539 *	0.00473112
Isobutane	0.789374 *	0.0204701	0.000949283	0.0176422 *	0.000489203
n-Butane	1.59966 *	0.0515367	0.00264079	0.0458698 *	0.00138476
Isopentane	1.80833 *	0.015346	0.000900415	0.00875992 *	0.000562943
n-Pentane	1.62231 *	0.0146495	0.000980437	0.00875992 *	0.00063721
i-Hexane	4.08381 *	0.0149144	0.00152317	0 *	0.00111668
n-Hexane	2.34074 *	0.0188416	0.00239479	0.010463 *	0.00180967
2,2,4-Trimethylpentane	0.0194064 *	6.95305E-05	1.39014E-05	0 *	1.51578E-05
Benzene	0.0850873 *	0.000768953	0.000183116	0.000474196 *	0.000137037
Heptane	13.2382 *	0.0590201	0.0129916	0.012166 *	0.0144785
Toluene	1.01011 *	0.00406868	0.00106261	0.000559348 *	0.00158975
Octane	17.8379 *	0.0671256	0.0173171	0.00693451 *	0.0411595
Ethylbenzene	0.212194 *	0.00126681	0.00037361	0.000644499 *	0.00117264
o-Xylene	0.390436 *	0.00179875	0.000460319	0.000644499 *	0.00209419
Nonane	14.8668 *	0.0449081	0.0111353	0 *	0.0729013
Decane	0 *	0	0	0 *	0
Water	0 *	0.0794102	94.011	0 *	97.4467
Oxygen	0 *	0	0	0 *	0
Decanes Plus	35.0937 *	0.0401331	0.00584479	0 *	0.655174

Mass Flow	Condensate lb/h	Gas to Sales lb/h	Loading lb/h	Measured Well Stream lb/h	Produced Fluids lb/h
Nitrogen	0 *	0	0	0 *	0
Methane	17.1658 *	256241	0.0419912	256839 *	615.246
Carbon Dioxide	0.286765 *	0.285479	1.76523E-06	0 *	0.00128611
Ethane	16.2079 *	13834.2	0.00400024	13853 *	35.0002
Propane	16.5146 *	632.795	9.06299E-05	618.034 *	1.75408
Isobutane	7.91822 *	55.6561	7.37694E-06	47.9193 *	0.181374
n-Butane	16.0462 *	140.123	2.05218E-05	124.59 *	0.513406
Isopentane	18.1394 *	41.7241	6.99718E-06	23.7934 *	0.208713
n-Pentane	16.2734 *	39.8306	7.61903E-06	23.7934 *	0.236248
i-Hexane	40.9648 *	40.5508	1.18367E-05	0 *	0.414013
n-Hexane	23.48 *	51.2283	1.86101E-05	28.4192 *	0.670942
2,2,4-Trimethylpentane	0.194666 *	0.189046	1.08029E-07	0 *	0.0056198
Benzene	0.853512 *	2.0907	1.423E-06	1.288 *	0.0508067
Heptane	132.793 *	160.47	0.000100958	33.0449 *	5.36796
Toluene	10.1324 *	11.0623	8.25762E-06	1.51928 *	0.589404
Octane	178.932 *	182.508	0.000134573	18.8353 *	15.26
Ethylbenzene	2.12852 *	3.44433	2.90334E-06	1.75057 *	0.43476
o-Xylene	3.91648 *	4.89062	3.57717E-06	1.75057 *	0.776428
Nonane	149.129 *	122.1	8.65331E-05	0 *	27.0284
Decane	0 *	0	0	0 *	0
Water	0 *	215.908	0.730566	0 *	36128.7
Oxygen	0 *	0	0	0 *	0
Decanes Plus	352.026 *	109.118	4.54202E-05	0 *	242.908

Stream Properties

Property	Units	Condensate	Gas to Sales	Loading	Measured Well Stream	Produced Fluids
Temperature	°F	73 *	73 *	72.1381	73 *	73
Pressure	psia	662.696 *	662.696 *	0.41741	662.696 *	662.696
Mole Fraction Vapor	%	0	100	100	100	1.81692
Mole Fraction Light Liquid	%	100	0	0	0	0.116756
Mole Fraction Heavy Liquid	%	0	0	0	0	98.0663

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Condensate	Gas to Sales	Loading	Measured Well Stream	Produced Fluids
Molecular Weight	lb/lbmol	100.065	16.5084	17.9431	16.4724	18.1126
Mass Density	lb/ft^3	44.1015	2.1181	0.00131285	2.11243	42.2517
Molar Flow	lbmol/h	10.0245	16469.7	0.0433095	16489.2	2046.94
Mass Flow	lb/h	1003.1	271889	0.777106	271617	37075.3
Vapor Volumetric Flow	ft^3/h	22.7453	128365	591.925	128580	877.488
Liquid Volumetric Flow	gpm	2.83578	16003.9	73.7984	16030.8	109.401
Std Vapor Volumetric Flow	MMSCFD	0.0912991	150	0.000394447	150.177 *	18.6427
Std Liquid Volumetric Flow	sgpm	2.89617 *	1791.69	0.0017645	1793.42	77.2899
Compressibility		0.26304	0.903551	0.999602	0.903997	0.0496968
Specific Gravity		0.707106	0.569993	0.619528	0.56875	
API Gravity		66.7975				
Enthalpy	Btu/h	-902500	-5.38653E+08	-4307.06	-5.381E+08	-2.48043E+08
Mass Enthalpy	Btu/lb	-899.709	-1981.15	-5542.43	-1981.1	-6690.25
Mass Cp	Btu/(lb*°F)	0.502865	0.607137	0.45293	0.607381	0.971291
Ideal Gas CpCv Ratio		1.05473	1.29875	1.32351	1.2993	1.32275
Dynamic Viscosity	cP	0.438779	0.0119296	0.0101308	0.0119281	
Kinematic Viscosity	cSt	0.621114	0.351607	481.736	0.352507	
Thermal Conductivity	Btu/(h*ft*°F)	0.0690788	0.0214852	0.0125448	0.0214933	
Surface Tension	lbf/ft	0.00108347				
Net Ideal Gas Heating Value	Btu/ft^3	5056.65	932.177	60.5781	931.127	25.1793
Net Liquid Heating Value	Btu/lb	19022.2	21418.7	284.003	21442.6	-506.541
Gross Ideal Gas Heating Value	Btu/ft^3	5439.12	1034.4	114.279	1033.26	76.9441
Gross Liquid Heating Value	Btu/lb	20472.7	23768.5	1419.75	23795.7	578.008

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Connections

	Produced Liquids	Produced Water Flow	Tank Vent Gas	W/B	1
From Block	PW Tank	--	PW Tank	--	MIX-100
To Block	--	MIX-100	--	--	Separator

Stream Composition

Mole Fraction	Produced Liquids %	Produced Water Flow %	Tank Vent Gas %	W/B %	1 %
Nitrogen	0	0 *	0	0	0
Methane	0.00274099	0 *	94.2512	6.04371	86.4683
Carbon Dioxide	3.72019E-08	0 *	7.00853E-05	9.26129E-05	3.51898E-05
Ethane	0.000186508	0 *	2.85552	0.307173	2.49098
Propane	1.32938E-05	0 *	0.0972442	0.00474561	0.0777153
Isobutane	2.31868E-06	0 *	0.00756557	0.000293056	0.00518825
n-Butane	9.47698E-06	0 *	0.0212716	0.000815247	0.0130675
Isopentane	7.21535E-06	0 *	0.00676327	0.000223929	0.00313879
n-Pentane	1.07212E-05	0 *	0.00752941	0.00024383	0.00299911
i-Hexane	3.51347E-05	0 *	0.0100891	0.000317148	0.00256723
n-Hexane	7.82325E-05	0 *	0.0152988	0.000498633	0.00325248
2,2,4-Trimethylpentane	1.07521E-06	0 *	6.79907E-05	2.18364E-06	9.20349E-06
Benzene	1.06234E-05	0 *	0.00107624	4.20635E-05	0.000148061
Heptane	0.00126009	0 *	0.069625	0.00232639	0.00893807
Toluene	0.000180752	0 *	0.00681853	0.000206933	0.000682946
Octane	0.00492695	0 *	0.0855044	0.00272019	0.00935013
Ethylbenzene	0.000163194	0 *	0.00202048	6.31442E-05	0.000197327
o-Xylene	0.000305337	0 *	0.00292237	7.77991E-05	0.000288279
Nonane	0.00949949	0 *	0.0495923	0.00155784	0.00627948
Decane	0	0 *	0	0	0
Water	99.9067	100 *	2.48378	93.6342	10.8952
Oxygen	0	0 *	0	0	0
Decanes Plus	0.073876	0 *	0.0259924	0.000644479	0.011683

Molar Flow	Produced Liquids lbmol/h	Produced Water Flow lbmol/h	Tank Vent Gas lbmol/h	W/B lbmol/h	1 lbmol/h
Nitrogen	0	0 *	0	0	0
Methane	0.0549926	0 *	38.2961	0.000478424	16011
Carbon Dioxide	7.46384E-07	0 *	2.8477E-05	7.3313E-09	0.00651598
Ethane	0.00374193	0 *	1.16025	2.4316E-05	461.246
Propane	0.000266714	0 *	0.0395122	3.75666E-07	14.3903
Isobutane	4.65199E-05	0 *	0.00307404	2.31985E-08	0.960691
n-Butane	0.000190137	0 *	0.00864308	6.45355E-08	2.41967
Isopentane	0.000144762	0 *	0.00274805	1.77264E-08	0.581199
n-Pentane	0.000215101	0 *	0.00305935	1.93018E-08	0.555336
i-Hexane	0.000704911	0 *	0.0040994	2.51057E-08	0.475366
n-Hexane	0.00156959	0 *	0.00621619	3.94721E-08	0.602251
2,2,4-Trimethylpentane	2.1572E-05	0 *	2.76259E-05	1.72858E-10	0.00170418
Benzene	0.000213137	0 *	0.000437298	3.32977E-09	0.0274159
Heptane	0.0252814	0 *	0.02829	1.84158E-07	1.65503
Toluene	0.00362644	0 *	0.0027705	1.6381E-08	0.126459
Octane	0.0988498	0 *	0.0347421	2.15332E-07	1.73133
Ethylbenzene	0.00327418	0 *	0.000820963	4.99854E-09	0.0365383
o-Xylene	0.00612599	0 *	0.00118742	6.15863E-09	0.0533796
Nonane	0.190589	0 *	0.0201503	1.2332E-07	1.16275
Decane	0	0 *	0	0	0
Water	2004.44	2017.43 *	1.00921	0.00741215	2017.43
Oxygen	0	0 *	0	0	0
Decanes Plus	1.48218	0 *	0.0105612	5.10174E-08	2.1633

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Mass Fraction	Produced Liquids %	Produced Water Flow %	Tank Vent Gas %	W/B %	1 %
Nitrogen	0	0 *	0	0	0
Methane	0.00242417	0 *	89.9801	5.40353	83.1346
Carbon Dioxide	9.02603E-08	0 *	0.000183553	0.000227154	9.28148E-05
Ethane	0.000309174	0 *	5.10968	0.514761	4.48893
Propane	3.23169E-05	0 *	0.255181	0.0116625	0.205379
Isobutane	7.42965E-06	0 *	0.0261681	0.000949283	0.0180724
n-Butane	3.03667E-05	0 *	0.0735751	0.00264079	0.0455186
Isopentane	2.86993E-05	0 *	0.0290385	0.000900415	0.013572
n-Pentane	4.26441E-05	0 *	0.032328	0.000980437	0.0129681
i-Hexane	0.000166919	0 *	0.0517397	0.00152317	0.0132587
n-Hexane	0.000371669	0 *	0.0784563	0.00239479	0.0167978
2,2,4-Trimethylpentane	6.77098E-06	0 *	0.000462181	1.39014E-05	6.30058E-05
Benzene	4.57471E-05	0 *	0.00500283	0.000183116	0.000693124
Heptane	0.00696089	0 *	0.415173	0.0129916	0.0536752
Toluene	0.00091814	0 *	0.037387	0.00106261	0.00377121
Octane	0.0310269	0 *	0.581234	0.0173171	0.0640097
Ethylbenzene	0.000955149	0 *	0.0127651	0.00037361	0.00125551
o-Xylene	0.00178709	0 *	0.0184631	0.000460319	0.0018342
Nonane	0.0671677	0 *	0.37851	0.0111353	0.0482672
Decane	0	0 *	0	0	0
Water	99.225	100 *	2.66283	94.011	11.7633
Oxygen	0	0 *	0	0	0
Decanes Plus	0.662744	0 *	0.251705	0.00584479	0.113937

Mass Flow	Produced Liquids lb/h	Produced Water Flow lb/h	Tank Vent Gas lb/h	W/B lb/h	1 lb/h
Nitrogen	0	0 *	0	0	0
Methane	0.882217	0 *	614.364	0.0076751	256856
Carbon Dioxide	3.2848E-05	0 *	0.00125326	3.22647E-07	0.286765
Ethane	0.112516	0 *	34.8877	0.000731159	13869.2
Propane	0.0117609	0 *	1.74232	1.65652E-05	634.549
Isobutane	0.00270384	0 *	0.17867	1.34835E-06	55.8375
n-Butane	0.0110512	0 *	0.502355	3.75095E-06	140.636
Isopentane	0.0104444	0 *	0.198269	1.27894E-06	41.9328
n-Pentane	0.0155193	0 *	0.220728	1.3926E-06	40.0668
i-Hexane	0.0607459	0 *	0.353267	2.16349E-06	40.9648
n-Hexane	0.13526	0 *	0.535682	3.40153E-06	51.8992
2,2,4-Trimethylpentane	0.00246413	0 *	0.00315567	1.97454E-08	0.194666
Benzene	0.0166485	0 *	0.0341582	2.60095E-07	2.14151
Heptane	2.53324	0 *	2.83471	1.8453E-05	165.837
Toluene	0.334135	0 *	0.25527	1.50932E-06	11.6517
Octane	11.2915	0 *	3.96854	2.4597E-05	197.768
Ethylbenzene	0.347603	0 *	0.0871575	5.3067E-07	3.87909
o-Xylene	0.650366	0 *	0.126062	6.53831E-07	5.66705
Nonane	24.444	0 *	2.58438	1.58164E-05	149.129
Decane	0	0 *	0	0	0
Water	36110.5	36344.6 *	18.1812	0.133532	36344.6
Oxygen	0	0 *	0	0	0
Decanes Plus	241.189	0 *	1.71858	8.30186E-06	352.026

Stream Properties

Property	Units	Produced Liquids	Produced Water Flow	Tank Vent Gas	W/B	1
Temperature	°F	70 *	73 *	70	72.1381	71.5794
Pressure	psia	14.6959 *	662.696 *	14.6959	0.41741	662.696
Mole Fraction Vapor	%	0	0	100	100	89.1428
Mole Fraction Light Liquid	%	0.0908538	100	0	0	0.0133411
Mole Fraction Heavy Liquid	%	99.9091	0	0	0	10.8439

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Produced Liquids	Produced Water Flow	Tank Vent Gas	W/B	1
Molecular Weight	lb/lbmol	18.1391	18.0153	16.804	17.9431	16.6858
Mass Density	lb/ft^3	62.1403	62.2888	0.0435531	0.00131285	2.39968
Molar Flow	lbmol/h	2006.31	2017.43	40.632	0.00791607	18516.7
Mass Flow	lb/h	36392.5	36344.6	682.778	0.142039	308965
Vapor Volumetric Flow	ft^3/h	585.651	583.485	15676.9	108.191	128753
Liquid Volumetric Flow	gpm	73.0162	72.7462	1954.52	13.4888	16052.3
Std Vapor Volumetric Flow	MMSCFD	18.2727	18.374	0.37006	7.20965E-05	168.643
Std Liquid Volumetric Flow	sgpm	72.9167	72.6554 *	4.37323	0.000322514	1868.97
Compressibility		0.000754692	0.0335293	0.997519	0.999602	0.80825
Specific Gravity		0.996333	0.998714	0.580197	0.619528	
API Gravity		10.3163	9.92043			
Enthalpy	Btu/h	-2.46785E+08	-2.47991E+08	-1.38978E+06	-787.239	-7.86993E+08
Mass Enthalpy	Btu/lb	-6781.19	-6823.34	-2035.48	-5542.43	-2547.19
Mass Cp	Btu/(lb*°F)	0.978192	0.980809	0.519	0.45293	0.651055
Ideal Gas CpCv Ratio		1.32351	1.3257	1.296	1.32351	1.30155
Dynamic Viscosity	cP	0.997461	0.967174	0.0109917	0.0101308	
Kinematic Viscosity	cSt	1.00208	0.969335	15.7553	481.736	
Thermal Conductivity	Btu/(h*ft*°F)	0.344297	0.348491	0.0187122	0.0125448	
Surface Tension	lbf/ft	0.00500012 ?	0.00500981			
Net Ideal Gas Heating Value	Btu/ft^3	7.00618	0	922.525	60.5781	831.912
Net Liquid Heating Value	Btu/lb	-906.167	-1059.76	20793.8	284.003	18787.7
Gross Ideal Gas Heating Value	Btu/ft^3	57.7564	50.31	1024.38	114.279	928.553
Gross Liquid Heating Value	Btu/lb	155.57	0	23094.2	1419.75	20985.7

Remarks

Energy Stream Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Energy Streams

Energy Stream	Energy Rate	Power	From Block	To Block
Q-1	-131626 Btu/h	-51.7309 hp	--	PW Tank
Q-2	296945 Btu/h	116.704 hp	--	Separator

Remarks

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank	
Location:		Modified: 8:49 AM, 9/1/2017	
Flowsheet:	Flowsheet1	Status: Solved 8:44 AM, 9/22/2017	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Water Flow	Inlet		Measured Well Stream	Inlet	
Condensate	Inlet		1	Outlet	Separator

Block Parameters

Pressure Drop	0 psi	Fraction to PStream 1	100 %

Remarks

Blocks
PW Tank
Separator Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank	
Location:		Modified: 11:02 AM, 7/26/2017	
Flowsheet:	Flowsheet1	Status: Solved 8:44 AM, 9/22/2017	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Fluids	Inlet	Separator	Tank Vent Gas	Vapor Outlet	
Produced Liquids	Heavy Liquid Outlet		Q-1	Energy	

Block Parameters

Pressure Drop	648	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	1.98501	%	Heat Duty	-131626	Btu/h
Mole Fraction Light Liquid	0.0890504	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	97.9259	%	Heat Release Curve Increments	10	

Remarks

Blocks
Separator
Separator Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		Modified: 2:55 PM, 8/28/2017
Flowsheet:	Flowsheet1	Status: Solved 8:44 AM, 9/22/2017

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
1	Inlet	MIX-100	Gas to Sales	Vapor Outlet	
Produced Fluids	Light Liquid Outlet	PW Tank	Q-2	Energy	

Block Parameters

Pressure Drop	0	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	89.1463	%	Heat Duty	296945	Btu/h
Mole Fraction Light Liquid	0.0129069	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	10.8408	%	Heat Release Curve Increments	10	

Entrainments

Entrainment Entrainment 1

* From Phase (Numerator)	Vapor		* Numerator Value	2.8	ft^3
* To Phase (Denominator)	Heavy Liquid		* Denominator Value	42	gal
* Numerator Basis	Volume		Entrainment Value	49.8701	%
Denominator Basis	per Volume		* Active	True	

Remarks

Flowsheet Environment
Environment1

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Nitrogen	False	False	Benzene	False	False
Methane	False	False	Heptane	False	False
Carbon Dioxide	False	False	Toluene	False	False
Ethane	False	False	Octane	False	False
Propane	False	False	Ethylbenzene	False	False
Isobutane	False	False	o-Xylene	False	False
n-Butane	False	False	Nonane	False	False
Isopentane	False	False	Decane	False	False
n-Pentane	False	False	Water	False	True
i-Hexane	False	False	Oxygen	False	False
n-Hexane	False	False	Decanes Plus	False	False
2,2,4-Trimethylpentane	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

Environments Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Project-Wide Constants

Atmospheric Pressure	14.6959 psia	Ideal Gas Reference Pressure	14.6959 psia
Ideal Gas Reference Temperature	60 °F	Ideal Gas Reference Volume	379.484 ft^3/lbmol
Liquid Reference Temperature	60 °F		

Environment [Environment1]

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Nitrogen	False	False	Benzene	False	False
Methane	False	False	Heptane	False	False
Carbon Dioxide	False	False	Toluene	False	False
Ethane	False	False	Octane	False	False
Propane	False	False	Ethylbenzene	False	False
Isobutane	False	False	o-Xylene	False	False
n-Butane	False	False	Nonane	False	False
Isopentane	False	False	Decane	False	False
n-Pentane	False	False	Water	False	True
i-Hexane	False	False	Oxygen	False	False
n-Hexane	False	False	Decanes Plus	False	False
2,2,4-Trimethylpentane	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

Single Oil Report
Decanes Plus

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Properties

	Volume Average Boiling Point	399.878 °F	Low Temperature Viscosity	1.05288	cP
*	Molecular Weight	162.726 lb/lbmol	Temperature of High T Viscosity	210	°F
*	Specific Gravity	0.788	High Temperature Viscosity	0.503332	cP
	API Gravity	48.0685	Watson K	12.066	
	Critical Temperature	720.653 °F	ASTM D86 10-90% Slope	0	°F/%
	Critical Pressure	307.278 psia	ASTM D93 Flash Point	157.716	°F
	Critical Volume	10.2876 ft^3/lbmol	? Pour Point	-12.6777	°F
	Acentric Factor	0.527304	Paraffinic Fraction	51.9393	%
	Carbon to Hydrogen Ratio	6.00643	Naphthenic Fraction	27.7089	%
	Refractive Index	1.43922	Aromatic Fraction	20.3518	%
	Temperature of Low T Viscosity	100 °F	Ideal Gas Heat Capacity	57.9027	Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Decanes Plus!Properties!Pour Point
Warning: Pour Point calculation: The value of 0.788 for Specific Gravity should be between 0.8 and 1.

Remarks

Single Oil Report
Hexanes+

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Properties

	Volume Average Boiling Point	-173.182 °F		Low Temperature Viscosity	3.0532E+30 cP
*	Molecular Weight	16.662 lb/lbmol		Temperature of High T Viscosity	210 °F
*	Specific Gravity	0.5763		High Temperature Viscosity	1370.85 cP
	API Gravity	114.032		Watson K	11.439
	Critical Temperature	-2.89417 °F		ASTM D86 10-90% Slope	0 °F/%
	Critical Pressure	1116.36 psia	?	ASTM D93 Flash Point	-237.696 °F
	Critical Volume	1.64547 ft^3/lbmol	?	Pour Point	2.40106E+29 °F
	Acentric Factor	0.333018	?	Paraffinic Fraction	100 %
?	Carbon to Hydrogen Ratio	8.6229	?	Naphthenic Fraction	0 %
?	Refractive Index	1.31682	?	Aromatic Fraction	0 %
	Temperature of Low T Viscosity	100 °F	?	Ideal Gas Heat Capacity	5.55252 Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Hexanes+!Properties!Carbon to Hydrogen Ratio
Warning: Carbon to Hydrogen Ratio calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 80 °F and 650 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Refractive Index
Warning: Refractive Index calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 80 °F and 1500 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!ASTM D93 Flash Point
Warning: ASTM D93 Flash Point calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 150 °F and 850 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Pour Point
Warning: Pour Point calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 340.33 °F and 1040.33 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Paraffinic Fraction
Warning: Paraffinic Fraction calculation: The value of 16.662 lb/lbmol for Molecular Weight should be between 70 lb/lbmol and 600 lb/lbmol.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Naphthenic Fraction
Warning: Naphthenic Fraction calculation: The value of 16.662 lb/lbmol for Molecular Weight should be between 70 lb/lbmol and 600 lb/lbmol.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Aromatic Fraction
Warning: Aromatic Fraction calculation: The value of 16.662 lb/lbmol for Molecular Weight should be between 70 lb/lbmol and 600 lb/lbmol.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Ideal Gas Heat Capacity
Warning: Ideal Gas Heat Capacity calculation: The value of 0.5763 for Specific Gravity should be between 0.662763 and 1.07605.
ProMax:ProMax!Project!Oils!Hexanes+
Warning: The value of 0.5763 for Specific Gravity should be between 0.662763 and 1.07605.

Remarks

Calculator Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Produced Water

Source Code

Residual Error (for CV1) = Water_flow - 2500

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Water Flow!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	2491.04
Unit	

Measured Variable [Water_flow]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Liquids!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	2500
Unit	

Solver Properties

Status: Solved

Error	-0.000494398		Algorithm	Default
Calculated Value	72.6554	sgpm	Iterations	21
Lower Bound		sgpm	Max Iterations	20
Upper Bound		sgpm	Weighting	1
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		* Skip Dependency Check	True

Remarks

SG Flow

Source Code

Residual Error (for CV1) = SGflow - 150

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Measured Well Stream!Phases!Total!Properties!Std Vapor Volumetric Flow
Value	150177
Unit	

Measured Variable [SGflow]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Gas to Sales!Phases!Total!Properties!Std Vapor Volumetric Flow
Value	150
Unit	

Solver Properties

Status: Solved

Error	-8.68632E-05		Iterations	1
Calculated Value	150.177	MMSCFD	Max Iterations	20
Lower Bound		MMSCFD	Weighting	1
Upper Bound		MMSCFD	Priority	0
Step Size		MMSCFD	Solver Active	Active
Is Minimizer	False		Group	
Algorithm	Default		Skip Dependency Check	False

Remarks

Calculator Report

Client Name:	Arsenal - Pritt South Well Pad
Location:	

Job: Produced Water Tank

Water %

Source Code

Residual Error (for CV1) = Water - 99

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Condensate!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	99.2972
Unit	

Measured Variable [Water]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Liquids!Phases!Total!Composition!Std Liquid Volumetric Fraction!Water
Value	99
Unit	

Solver Properties

Status: Solved

Error	-7.60767E-06		Algorithm	Default
Calculated Value	2.89617	sgpm	Iterations	21
Lower Bound		sgpm	Max Iterations	20
Upper Bound		sgpm	Weighting	1
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		* Skip Dependency Check	True

Remarks

User Value Sets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Tank-1

User Value [BlockReady]

* Parameter	1		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [ShellLength]

* Parameter	20	ft	Upper Bound	ft
Lower Bound		ft	* Enforce Bounds	False

User Value [ShellDiam]

* Parameter	12	ft	Upper Bound	ft
Lower Bound		ft	* Enforce Bounds	False

User Value [BreatherVP]

* Parameter	0.03	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

User Value [BreatherVacP]

* Parameter	-0.03	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

User Value [DomeRadius]

* Parameter	0	ft	Upper Bound	ft
Lower Bound		ft	* Enforce Bounds	False

User Value [OpPress]

* Parameter	0	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

User Value [AvgPercentLiq]

* Parameter	50	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [MaxPercentLiq]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [AnnNetTP]

* Parameter	2499.93	bbl/day	Upper Bound	bbl/day
Lower Bound		bbl/day	* Enforce Bounds	False

User Value [OREff]

* Parameter	0	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [MaxAvgT]

* Parameter	59.8833	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [MinAvgT]

* Parameter	40.7333	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [BulkLiqT]

* Parameter	54.6483	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value Sets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

User Value [AvgP]

* Parameter	14.1085	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [Therml]

* Parameter	1202.96	Btu/ft^2/day	Upper Bound	Btu/ft^2/day
Lower Bound		Btu/ft^2/day	* Enforce Bounds	False

User Value [AvgWindSpeed]

* Parameter	9.075	mi/h	Upper Bound	mi/h
Lower Bound		mi/h	* Enforce Bounds	False

User Value [MaxHourlyLoadingRate]

* Parameter	16.62	gpm	Upper Bound	gpm
Lower Bound		gpm	* Enforce Bounds	False

User Value [EntrainedOilFrac]

* Parameter	1	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [TurnoverRate]

* Parameter	452.94		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [LLossSatFactor]

* Parameter	1.45		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [AtmPressure]

* Parameter	14.1085	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [TVP]

* Parameter	0.285403	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [MaxVP]

* Parameter	0.408697	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [MinVP]

* Parameter	0.197602	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

* Parameter	61.1967	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [MaxLiqSurfaceT]

* Parameter	72.1381	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [TotalLosses]

* Parameter	0.622129	ton/yr	Upper Bound	ton/yr

User Value Sets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

User Value [TotalLosses]

Lower Bound	ton/yr	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	0.108829 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	0.0155964 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [WithdrawalLoss]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [LoadingLosses]

* Parameter	3.40372 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [MaxHourlyLoadingLoss]

* Parameter	0.177132 lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	* Enforce Bounds	False

User Value [PStar]

Parameter		Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [AllCTotalLosses]

* Parameter	0.622129 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [AllCLoadingLosses]

* Parameter	3.40372 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [AllCMaxHLoadingLoss]

* Parameter	0.177132 lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	* Enforce Bounds	False

User Value [AllCFlashingLosses]

* Parameter	3005.54 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [DeckFittingLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [DeckSeamLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value Sets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

User Value [FlashingLosses]

* Parameter	3005.54	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [TotalResidual]

* Parameter	159384	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [GasMoleWeight]

* Parameter	0.0179431	kg/mol	Upper Bound	kg/mol
Lower Bound		kg/mol	* Enforce Bounds	False

User Value [VapReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [LiqReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [FlashReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={8F6700DA-E196-4418-8000-F476C212C378}

Sum Component Flow/Frac

User Value [CompSum]

* Parameter	67.2037	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={FEAC603C-B09D-4960-AAA0-97F1EC6AE424}

Sum Component Flow/Frac.56

User Value [CompSum]

* Parameter	0.000438189	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={440444EB-DACC-4026-AD9A-7CBD6B0E000B}

Sum Component Flow/Frac.57

User Value [CompSum]

* Parameter	0.00239737	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={D778DCDF-C7EF-4086-9F85-E2D6691FFCBC}

User Value Sets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Component Recoveries - Project Inlets

Status: Solved

Recovery Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	False	* Atomic Basis	False

Tabulated Data

Index	Flowsheet1:Condensate lbmol/h	Flowsheet1:Measured Well Stream lbmol/h	Flowsheet1:Produced Water Flow lbmol/h	Summary Table lbmol/h
Nitrogen	0	0	0	0
Methane	1.07002	16010	0	16011
Carbon Dioxide	0.00651598	0	0	0.00651598
Ethane	0.539022	460.707	0	461.246
Propane	0.374518	14.0158	0	14.3903
Isobutane	0.136234	0.824457	0	0.960691
n-Butane	0.276077	2.14359	0	2.41967
Isopentane	0.251416	0.329783	0	0.581199
n-Pentane	0.225553	0.329783	0	0.555336
i-Hexane	0.475366	0	0	0.475366
n-Hexane	0.272468	0.329783	0	0.602251
2,2,4-Trimethylpentane	0.00170418	0	0	0.00170418
Benzene	0.0109268	0.0164891	0	0.0274159
Heptane	1.32525	0.329783	0	1.65503
Toluene	0.10997	0.0164891	0	0.126459
Octane	1.56644	0.164891	0	1.73133
Ethylbenzene	0.0200492	0.0164891	0	0.0365383
o-Xylene	0.0368905	0.0164891	0	0.0533796
Nonane	1.16275	0	0	1.16275
Decane	0	0	0	0
Water	0	0	2017.43	2017.43
Oxygen	0	0	0	0
Decanes Plus	2.1633	0	0	2.1633
Total	10.0245	16489.2	2017.43	18516.7

Remarks

Component Recoveries - Project Outlets

Status: Solved

Recovery Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	False	* Atomic Basis	False

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Tabulated Data

Index	Flowsheet1:Gas to Sales lbmol/h	Flowsheet1:Produced Liquids lbmol/h	Flowsheet1:Tank Vent Gas lbmol/h	Summary Table lbmol/h
Nitrogen	0	0	0	0
Methane	15972.7	0.0549926	38.2961	16011
Carbon Dioxide	0.00648675	7.46384E-07	2.8477E-05	0.00651598
Ethane	460.082	0.00374193	1.16025	461.246
Propane	14.3505	0.000266714	0.0395122	14.3903
Isobutane	0.957571	4.65199E-05	0.00307404	0.960691
n-Butane	2.41083	0.000190137	0.00864308	2.41967
Isopentane	0.578307	0.000144762	0.00274805	0.581199
n-Pentane	0.552062	0.000215101	0.00305935	0.555336
i-Hexane	0.470561	0.000704911	0.0040994	0.475366
n-Hexane	0.594465	0.00156959	0.00621619	0.602251
2,2,4-Trimethylpentane	0.00165498	2.1572E-05	2.76259E-05	0.00170418
Benzene	0.0267655	0.000213137	0.000437298	0.0274159
Heptane	1.60146	0.0252814	0.02829	1.65503
Toluene	0.120062	0.00362644	0.0027705	0.126459
Octane	1.59774	0.0988498	0.0347421	1.73133
Ethylbenzene	0.0324432	0.00327418	0.000820963	0.0365383
o-Xylene	0.0460662	0.00612599	0.00118742	0.0533796
Nonane	0.952012	0.190589	0.0201503	1.16275
Decane	0	0	0	0
Water	11.9847	2004.44	1.00921	2017.43
Oxygen	0	0	0	0
Decanes Plus	0.670561	1.48218	0.0105612	2.1633
Total	16469.7	2006.31	40.632	18516.7

Remarks

Component Recoveries - Project Losses

Status: Solved

Reference Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Recovery Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Summation Only
* Calculate Ratios	False	* Atomic Basis	False

Tabulated Data

Index	Summary Table lbmol/h			
Nitrogen	0			
Methane	7.21833E-12			
Carbon Dioxide	2.58148E-18			
Ethane	1.6918E-13			
Propane	5.28687E-15			
Isobutane	3.30429E-16			
n-Butane	4.40572E-16			

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Tabulated Data

Index	Summary Table lbmol/h			
Isopentane	2.20286E-16			
n-Pentane	4.40572E-16			
i-Hexane	4.40572E-16			
n-Hexane	7.71001E-16			
2,2,4-Trimethylpentane	5.37808E-18			
Benzene	4.47456E-17			
Heptane	5.72744E-15			
Toluene	6.60858E-16			
Octane	1.76229E-14			
Ethylbenzene	5.43831E-16			
o-Xylene	9.91287E-16			
Nonane	3.084E-14			
Decane	0			
Water	-2.25573E-13			
Oxygen	0			
Decanes Plus	2.30419E-13			
Total	7.21833E-12			

Remarks

Component Recoveries - Project Recoveries

Status: Solved

Reference Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Recovery Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	True	* Atomic Basis	False

Tabulated Data

Index	Flowsheet1:Gas to Sales %	Flowsheet1:Produced Liquids %	Flowsheet1:Tank Vent Gas %	Summary Table %
Nitrogen				
Methane	99.7605	0.000343467	0.239186	100
Carbon Dioxide	99.5515	0.0114547	0.437034	100
Ethane	99.7476	0.000811265	0.251548	100
Propane	99.7236	0.00185343	0.274576	100
Isobutane	99.6752	0.00484234	0.319982	100
n-Butane	99.6349	0.007858	0.357201	100
Isopentane	99.5023	0.0249075	0.472824	100
n-Pentane	99.4104	0.0387335	0.5509	100
i-Hexane	98.9893	0.148288	0.862367	100
n-Hexane	98.7072	0.26062	1.03216	100
2,2,4-Trimethylpentane	97.1131	1.26583	1.62107	100
Benzene	97.6275	0.777421	1.59505	100

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Tabulated Data

Index	Flowsheet1:Gas to Sales %	Flowsheet1:Produced Liquids %	Flowsheet1:Tank Vent Gas %	Summary Table %
Heptane	96.7631	1.52755	1.70933	100
Toluene	94.9415	2.86769	2.19083	100
Octane	92.2839	5.70947	2.00667	100
Ethylbenzene	88.7922	8.96094	2.24685	100
o-Xylene	86.2992	11.4763	2.22447	100
Nonane	81.8758	16.3912	1.73299	100
Decane				
Water	0.594058	99.3559	0.0500245	100
Oxygen				
Decanes Plus	30.9971	68.5147	0.488198	100
Total	88.9454	10.8352	0.219435	100

Remarks

Component Recoveries - Flowsheet1 Inlets

Status: Solved

Recovery Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	False	* Atomic Basis	False

Tabulated Data

Index	Flowsheet1:Condensate lbmol/h	Flowsheet1:Measured Well Stream lbmol/h	Flowsheet1:Produced Water Flow lbmol/h	Summary Table lbmol/h
Nitrogen	0	0	0	0
Methane	1.07002	16010	0	16011
Carbon Dioxide	0.00651598	0	0	0.00651598
Ethane	0.539022	460.707	0	461.246
Propane	0.374518	14.0158	0	14.3903
Isobutane	0.136234	0.824457	0	0.960691
n-Butane	0.276077	2.14359	0	2.41967
Isopentane	0.251416	0.329783	0	0.581199
n-Pentane	0.225553	0.329783	0	0.555336
i-Hexane	0.475366	0	0	0.475366
n-Hexane	0.272468	0.329783	0	0.602251
2,2,4-Trimethylpentane	0.00170418	0	0	0.00170418
Benzene	0.0109268	0.0164891	0	0.0274159
Heptane	1.32525	0.329783	0	1.65503
Toluene	0.10997	0.0164891	0	0.126459
Octane	1.56644	0.164891	0	1.73133
Ethylbenzene	0.0200492	0.0164891	0	0.0365383
o-Xylene	0.0368905	0.0164891	0	0.0533796
Nonane	1.16275	0	0	1.16275
Decane	0	0	0	0
Water	0	0	2017.43	2017.43
Oxygen	0	0	0	0
Decanes Plus	2.1633	0	0	2.1633
Total	10.0245	16489.2	2017.43	18516.7

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Remarks

Component Recoveries - Flowsheet1 Outlets

Status: Solved

Recovery Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	False	* Atomic Basis	False

Tabulated Data

Index	Flowsheet1:Gas to Sales lbmol/h	Flowsheet1:Produced Liquids lbmol/h	Flowsheet1:Tank Vent Gas lbmol/h	Summary Table lbmol/h
Nitrogen	0	0	0	0
Methane	15972.7	0.0549926	38.2961	16011
Carbon Dioxide	0.00648675	7.46384E-07	2.8477E-05	0.00651598
Ethane	460.082	0.00374193	1.16025	461.246
Propane	14.3505	0.000266714	0.0395122	14.3903
Isobutane	0.957571	4.65199E-05	0.00307404	0.960691
n-Butane	2.41083	0.000190137	0.00864308	2.41967
Isopentane	0.578307	0.000144762	0.00274805	0.581199
n-Pentane	0.552062	0.000215101	0.00305935	0.555336
i-Hexane	0.470561	0.000704911	0.0040994	0.475366
n-Hexane	0.594465	0.00156959	0.00621619	0.602251
2,2,4-Trimethylpentane	0.00165498	2.1572E-05	2.76259E-05	0.00170418
Benzene	0.0267655	0.000213137	0.000437298	0.0274159
Heptane	1.60146	0.0252814	0.02829	1.65503
Toluene	0.120062	0.00362644	0.0027705	0.126459
Octane	1.59774	0.0988498	0.0347421	1.73133
Ethylbenzene	0.0324432	0.00327418	0.000820963	0.0365383
o-Xylene	0.0460662	0.00612599	0.00118742	0.0533796
Nonane	0.952012	0.190589	0.0201503	1.16275
Decane	0	0	0	0
Water	11.9847	2004.44	1.00921	2017.43
Oxygen	0	0	0	0
Decanes Plus	0.670561	1.48218	0.0105612	2.1633
Total	16469.7	2006.31	40.632	18516.7

Remarks

Component Recoveries - Flowsheet1 Losses

Status: Solved

Reference Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Recovery Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Summation Only
* Calculate Ratios	False	* Atomic Basis	False

Tabulated Data

Index	Summary Table lbmol/h			
Nitrogen	0			
Methane	7.21833E-12			
Carbon Dioxide	2.58148E-18			
Ethane	1.6918E-13			
Propane	5.28687E-15			
Isobutane	3.30429E-16			
n-Butane	4.40572E-16			
Isopentane	2.20286E-16			
n-Pentane	4.40572E-16			
i-Hexane	4.40572E-16			
n-Hexane	7.71001E-16			
2,2,4-Trimethylpentane	5.37808E-18			
Benzene	4.47456E-17			
Heptane	5.72744E-15			
Toluene	6.60858E-16			
Octane	1.76229E-14			
Ethylbenzene	5.43831E-16			
o-Xylene	9.91287E-16			
Nonane	3.084E-14			
Decane	0			
Water	-2.25573E-13			
Oxygen	0			
Decanes Plus	2.30419E-13			
Total	7.21833E-12			

Remarks

Component Recoveries - Flowsheet1 Recoveries

Status: Solved

Reference Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Recovery Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	True	* Atomic Basis	False

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Tabulated Data

Index	Flowsheet1:Gas to Sales %	Flowsheet1:Produced Liquids %	Flowsheet1:Tank Vent Gas %	Summary Table %
Nitrogen				
Methane	99.7605	0.000343467	0.239186	100
Carbon Dioxide	99.5515	0.0114547	0.437034	100
Ethane	99.7476	0.000811265	0.251548	100
Propane	99.7236	0.00185343	0.274576	100
Isobutane	99.6752	0.00484234	0.319982	100
n-Butane	99.6349	0.007858	0.357201	100
Isopentane	99.5023	0.0249075	0.472824	100
n-Pentane	99.4104	0.0387335	0.5509	100
i-Hexane	98.9893	0.148288	0.862367	100
n-Hexane	98.7072	0.26062	1.03216	100
2,2,4-Trimethylpentane	97.1131	1.26583	1.62107	100
Benzene	97.6275	0.777421	1.59505	100
Heptane	96.7631	1.52755	1.70933	100
Toluene	94.9415	2.86769	2.19083	100
Octane	92.2839	5.70947	2.00667	100
Ethylbenzene	88.7922	8.96094	2.24685	100
o-Xylene	86.2992	11.4763	2.22447	100
Nonane	81.8758	16.3912	1.73299	100
Decane				
Water	0.594058	99.3559	0.0500245	100
Oxygen				
Decanes Plus	30.9971	68.5147	0.488198	100
Total	88.9454	10.8352	0.219435	100

Remarks

Energy Budgets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Power Budget - Project Power Budget

Status: Solved

Parameters

Net Power	hp	Total Power Required	hp
Total Power Supplied	hp	External Energy Only	True

Remarks

Heat Budget - Project Heat Budget

Status: Solved

Heat Budget Data Source - All Exchangers in Project

Flowsheet	Block	Flowsheet	Block
Flowsheet1	PW Tank	Flowsheet1	Separator

Parameters

Net Duty	165319 Btu/h	Total Duty Required	296945 Btu/h
Total Duty Supplied	131626 Btu/h	External Energy Only	True

Tabulated Data

Index	Block Duty Btu/h	Block Highest Temperature °F	Block Lowest Temperature °F	
Flowsheet1:PW Tank	-131626	73	70	
Flowsheet1:Separator	296945	73	71.5794	

Remarks

Power Budget - Flowsheet1 Power Budget

Status: Solved

Parameters

Net Power	hp	Total Power Required	hp
Total Power Supplied	hp	External Energy Only	True

Remarks

Heat Budget - Flowsheet1 Heat Budget

Status: Solved

Heat Budget Data Source - All Exchangers in Flowsheet

Flowsheet	Block	Flowsheet	Block
Flowsheet1	PW Tank	Flowsheet1	Separator

Parameters

Net Duty	165319 Btu/h	Total Duty Required	296945 Btu/h
Total Duty Supplied	131626 Btu/h	External Energy Only	True

Tabulated Data

Index	Block Duty Btu/h	Block Highest Temperature °F	Block Lowest Temperature °F	
Flowsheet1:PW Tank	-131626	73	70	
Flowsheet1:Separator	296945	73	71.5794	

Energy Budgets Report

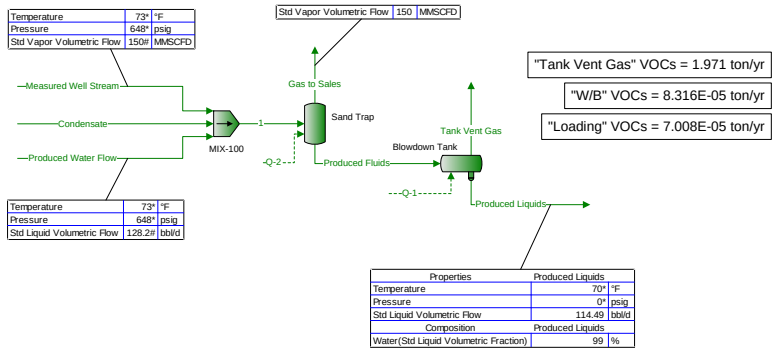
Client Name:	Arsenal - Pritt South Well Pad	Job: Produced Water Tank
Location:		

Remarks

Flowsheet1
Plant Schematic

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		
Flowsheet:	Flowsheet1	

Arsenal - Pritt South
Blowdown Tank



Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		
Flowsheet:	Flowsheet1	

Connections

	Condensate	Gas to Sales	Loading	Measured Well Stream	Produced Fluids
From Block	--	Sand Trap	--	--	Sand Trap
To Block	MIX-100	--	--	MIX-100	Blowdown Tank

Stream Composition

Mole Fraction	Condensate %	Gas to Sales %	Loading %	Measured Well Stream %	Produced Fluids %
Nitrogen	0 *	0	0	0 *	0
Methane	10.6741 *	97.0031	6.03074	97.0936 *	1.87256
Carbon Dioxide	0.0650007 *	1.53517E-05	3.6126E-05	0 *	5.55996E-07
Ethane	5.37705 *	2.79256	0.303842	2.79399 *	0.0566832
Propane	3.73604 *	0.0857993	0.00453576	0.0849997 *	0.00189686
Isobutane	1.35901 *	0.00531599	0.000260059	0.00499998 *	0.000137474
n-Butane	2.75403 *	0.0136372	0.000735578	0.0129999 *	0.000395329
Isopentane	2.50803 *	0.00259018	0.00015669	0.00199999 *	0.000101185
n-Pentane	2.25002 *	0.00252915	0.000173851	0.00199999 *	0.000116709
i-Hexane	4.74205 *	0.0011197	0.000116873	0 *	8.82582E-05
n-Hexane	2.71803 *	0.00263885	0.00034278	0.00199999 *	0.000266348
2,2,4-Trimethylpentane	0.0170002 *	4.01067E-06	8.24275E-07	0 *	9.17635E-07
Benzene	0.109001 *	0.000125527	3.17168E-05	9.99996E-05 *	2.40366E-05
Heptane	13.2201 *	0.00511371	0.00116711	0.00199999 *	0.00132319
Toluene	1.09701 *	0.000358209	9.83818E-05	9.99996E-05 *	0.000149116
Octane	15.6262 *	0.00467337	0.00124549	0.000999996 *	0.00300378
Ethylbenzene	0.200002 *	0.00014634	4.54408E-05	9.99996E-05 *	0.000144188
o-Xylene	0.368004 *	0.000185534	5.01859E-05	9.99996E-05 *	0.000230657
Nonane	11.5991 *	0.00271377	0.000696399	0 *	0.00461145
Decane	0 *	0	0	0 *	0
Water	0 *	0.072764	93.655	0 *	97.9782
Oxygen	0 *	0	0	0 *	0
Decanes Plus	21.5802 *	0.0046421	0.000707668	0 *	0.0800708

Molar Flow	Condensate lbmol/h	Gas to Sales lbmol/h	Loading lbmol/h	Measured Well Stream lbmol/h	Produced Fluids lbmol/h
Nitrogen	0 *	0	0	0 *	0
Methane	0.415287 *	15976.2	0.000119592	15977.5 *	1.75528
Carbon Dioxide	0.00252892 *	0.0025284	7.16391E-10	0 *	5.21171E-07
Ethane	0.2092 *	459.929	6.0253E-06	459.773 *	0.0531329
Propane	0.145354 *	14.131	8.99457E-08	13.9874 *	0.00177805
Isobutane	0.0528738 *	0.875532	5.15705E-09	0.822787 *	0.000128863
n-Butane	0.107148 *	2.24602	1.45868E-08	2.13925 *	0.000370567
Isopentane	0.0975773 *	0.426597	3.10722E-09	0.329115 *	9.48472E-05
n-Pentane	0.0875394 *	0.416545	3.44752E-09	0.329115 *	0.000109399
i-Hexane	0.184494 *	0.184411	2.31763E-09	0 *	8.27302E-05
n-Hexane	0.105748 *	0.434613	6.79745E-09	0.329115 *	0.000249666
2,2,4-Trimethylpentane	0.000661409 *	0.000660549	1.63457E-11	0 *	8.60159E-07
Benzene	0.0042408 *	0.020674	6.28955E-10	0.0164557 *	2.25311E-05
Heptane	0.514343 *	0.842217	2.31443E-08	0.329115 *	0.00124032
Toluene	0.0426803 *	0.0589963	1.95095E-09	0.0164557 *	0.000139776
Octane	0.607951 *	0.769693	2.46985E-08	0.164557 *	0.00281564
Ethylbenzene	0.00778128 *	0.0241019	9.01106E-10	0.0164557 *	0.000135157
o-Xylene	0.0143176 *	0.0305571	9.95203E-10	0.0164557 *	0.000216209
Nonane	0.451275 *	0.446953	1.38098E-08	0 *	0.00432261
Decane	0 *	0	0	0 *	0
Water	0 *	11.9841	0.00185721	0 *	91.8413
Oxygen	0 *	0	0	0 *	0
Decanes Plus	0.8396 *	0.764544	1.40333E-08	0 *	0.0750556

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		
Flowsheet:	Flowsheet1	

Mass Fraction	Condensate %	Gas to Sales %	Loading %	Measured Well Stream %	Produced Fluids %
Nitrogen	0 *	0	0	0 *	0
Methane	1.71127 *	94.3558	5.39312	94.5593 *	1.65863
Carbon Dioxide	0.0285878 *	4.09652E-05	8.86267E-05	0 *	1.35102E-06
Ethane	1.61577 *	5.09137	0.509291	5.1002 *	0.0941059
Propane	1.64635 *	0.229399	0.0111492	0.227539 *	0.0046182
Isobutane	0.789374 *	0.0187343	0.000842581	0.0176422 *	0.00044117
n-Butane	1.59966 *	0.0480596	0.00238325	0.0458698 *	0.00126865
Isopentane	1.80833 *	0.0113311	0.000630186	0.00875992 *	0.000403076
n-Pentane	1.62231 *	0.0110641	0.000699204	0.00875992 *	0.000464918
i-Hexane	4.08381 *	0.00585053	0.000561429	0 *	0.000419934
n-Hexane	2.34074 *	0.0137883	0.00164664	0.010463 *	0.00126729
2,2,4-Trimethylpentane	0.0194064 *	2.77782E-05	5.24862E-06	0 *	5.78745E-06
Benzene	0.0850873 *	0.000594519	0.000138104	0.000474196 *	0.000103665
Heptane	13.2382 *	0.0310688	0.0065191	0.012166 *	0.00732053
Toluene	1.01011 *	0.0020012	0.000505306	0.000559348 *	0.000758589
Octane	17.8379 *	0.032368	0.00793075	0.00693451 *	0.0189446
Ethylbenzene	0.212194 *	0.000942011	0.000268922	0.000644499 *	0.000845187
o-Xylene	0.390436 *	0.00119431	0.000297003	0.000644499 *	0.00135204
Nonane	14.8668 *	0.0211038	0.00497887	0 *	0.0326554
Decane	0 *	0	0	0 *	0
Water	0 *	0.0794822	94.0525	0 *	97.457
Oxygen	0 *	0	0	0 *	0
Decanes Plus	35.0937 *	0.0458019	0.00641926	0 *	0.719405

Mass Flow	Condensate lb/h	Gas to Sales lb/h	Loading lb/h	Measured Well Stream lb/h	Produced Fluids lb/h
Nitrogen	0 *	0	0	0 *	0
Methane	6.66222 *	256298	0.00191854	256319 *	28.1589
Carbon Dioxide	0.111296 *	0.111273	3.1528E-08	0 *	2.29365E-05
Ethane	6.29044 *	13829.6	0.000181175	13824.9 *	1.59765
Propane	6.40949 *	623.113	3.96621E-06	616.782 *	0.0784041
Isobutane	3.07314 *	50.8878	2.99739E-07	47.8222 *	0.00748983
n-Butane	6.22769 *	130.544	8.47815E-07	124.338 *	0.0215382
Isopentane	7.04008 *	30.7785	2.24182E-07	23.7452 *	0.00684311
n-Pentane	6.31586 *	30.0532	2.48734E-07	23.7452 *	0.00789301
i-Hexane	15.8989 *	15.8917	1.99722E-07	0 *	0.0071293
n-Hexane	9.11284 *	37.4529	5.85773E-07	28.3616 *	0.021515
2,2,4-Trimethylpentane	0.0755518 *	0.0754535	1.86714E-09	0 *	9.82547E-05
Benzene	0.331257 *	1.61488	4.91289E-08	1.28539 *	0.00175995
Heptane	51.5381 *	84.3918	2.3191E-06	32.9779 *	0.124282
Toluene	3.9325 *	5.43583	1.79757E-07	1.51621 *	0.0128787
Octane	69.4454 *	87.9209	2.82128E-06	18.7971 *	0.321627
Ethylbenzene	0.8261 *	2.55877	9.5666E-08	1.74702 *	0.0143489
o-Xylene	1.52002 *	3.24409	1.05656E-07	1.74702 *	0.0229539
Nonane	57.8784 *	57.324	1.77118E-06	0 *	0.554397
Decane	0 *	0	0	0 *	0
Water	0 *	215.897	0.0334582	0 *	1654.55
Oxygen	0 *	0	0	0 *	0
Decanes Plus	136.625 *	124.411	2.28358E-06	0 *	12.2135

Stream Properties

Property	Units	Condensate	Gas to Sales	Loading	Measured Well Stream	Produced Fluids
Temperature	°F	73 *	73 *	72.1381	73 *	73
Pressure	psia	662.696 *	662.696 *	0.417317	662.696 *	662.696
Mole Fraction Vapor	%	0	100	100	100	1.81663
Mole Fraction Light Liquid	%	100	0	0	0	0.111689
Mole Fraction Heavy Liquid	%	0	0	0	0	98.0717

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Condensate	Gas to Sales	Loading	Measured Well Stream	Produced Fluids
Molecular Weight	lb/lbmol	100.065	16.4926	17.9391	16.4724	18.1116
Mass Density	lb/ft^3	44.1015	2.11561	0.00131227	2.11243	42.2534
Molar Flow	lbmol/h	3.8906	16469.8	0.00198303	16455.8	93.7365
Mass Flow	lb/h	389.314	271629	0.0355739	271067	1697.72
Vapor Volumetric Flow	ft^3/h	8.82767	128393	27.1088	128320	40.1795
Liquid Volumetric Flow	gpm	1.10059	16007.4	3.37979	15998.3	5.00939
Std Vapor Volumetric Flow	MMSCFD	0.0354341	150	1.80607E-05	149.873 *	0.853716
Std Liquid Volumetric Flow	sgpm	1.12403 *	1791.11	8.07421E-05	1789.79	3.5387
Compressibility		0.26304	0.903742	0.999602	0.903997	0.0496922
Specific Gravity		0.707106	0.569445	0.619392	0.56875	
API Gravity		66.7975				
Enthalpy	Btu/h	-350269	-5.38499E+08	-197.234	-5.3701E+08	-1.1359E+07
Mass Enthalpy	Btu/lb	-899.709	-1982.48	-5544.35	-1981.1	-6690.74
Mass Cp	Btu/(lb*°F)	0.502865	0.607216	0.452939	0.607381	0.971306
Ideal Gas CpCv Ratio		1.05473	1.29901	1.3236	1.2993	1.32278
Dynamic Viscosity	cP	0.438779	0.0119302	0.0101304	0.0119281	
Kinematic Viscosity	cSt	0.621114	0.352038	481.927	0.352507	
Thermal Conductivity	Btu/(h*ft*°F)	0.0690788	0.0214885	0.0125442	0.0214933	
Surface Tension	lbf/ft	0.00108347				
Net Ideal Gas Heating Value	Btu/ft^3	5056.65	931.389	60.1745	931.127	25.0721
Net Liquid Heating Value	Btu/lb	19022.2	21421.4	275.356	21442.6	-508.851
Gross Ideal Gas Heating Value	Btu/ft^3	5439.12	1033.55	113.85	1033.26	76.8256
Gross Liquid Heating Value	Btu/lb	20472.7	23772.2	1410.81	23795.7	575.517

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank	
Location:			
Flowsheet:	Flowsheet1		

Connections

	Produced Liquids	Produced Water Flow	Tank Vent Gas	W/B	1
From Block	Blowdown Tank	--	Blowdown Tank	--	MIX-100
To Block	--	MIX-100	--	--	Sand Trap

Stream Composition

Mole Fraction	Produced Liquids %	Produced Water Flow %	Tank Vent Gas %	W/B %	1 %
Nitrogen	0	0 *	0	0	0
Methane	0.00273349	0 *	94.3829	6.03074	96.4647
Carbon Dioxide	1.45065E-08	0 *	2.73464E-05	3.6126E-05	1.5268E-05
Ethane	0.000184267	0 *	2.85199	0.303842	2.77708
Propane	1.26798E-05	0 *	0.0951171	0.00453576	0.0853244
Isobutane	2.05309E-06	0 *	0.00683747	0.000260059	0.00528668
n-Butane	8.53211E-06	0 *	0.0195322	0.000735578	0.0135623
Isopentane	5.03717E-06	0 *	0.00485812	0.00015669	0.0025761
n-Pentane	7.62686E-06	0 *	0.00551359	0.000173851	0.00251549
i-Hexane	1.29223E-05	0 *	0.00381553	0.000116873	0.00111386
n-Hexane	5.36881E-05	0 *	0.0107878	0.00034278	0.00262542
2,2,4-Trimethylpentane	4.0547E-07	0 *	2.62572E-05	8.24275E-07	3.99317E-06
Benzene	8.00214E-06	0 *	0.000817349	3.17168E-05	0.000124953
Heptane	0.000631561	0 *	0.035542	0.00116711	0.00509226
Toluene	8.58654E-05	0 *	0.00327844	9.83818E-05	0.000357026
Octane	0.00225508	0 *	0.0400464	0.00124549	0.00466392
Ethylbenzene	0.000117387	0 *	0.00147016	4.54408E-05	0.000146328
o-Xylene	0.000196882	0 *	0.00190169	5.01859E-05	0.00018579
Nonane	0.00424569	0 *	0.0227073	0.000696399	0.00272451
Decane	0	0 *	0	0	0
Water	99.9083	100 *	2.48376	93.655	0.626832
Oxygen	0	0 *	0	0	0
Decanes Plus	0.0811025	0 *	0.0290251	0.000707668	0.00506897

Molar Flow	Produced Liquids lbmol/h	Produced Water Flow lbmol/h	Tank Vent Gas lbmol/h	W/B lbmol/h	1 lbmol/h
Nitrogen	0	0 *	0	0	0
Methane	0.00251151	0 *	1.75276	0.00014192	15978
Carbon Dioxide	1.33285E-08	0 *	5.07843E-07	8.50141E-10	0.00252892
Ethane	0.000169304	0 *	0.0529636	7.15023E-06	459.983
Propane	1.16501E-05	0 *	0.0017664	1.06739E-07	14.1327
Isobutane	1.88637E-06	0 *	0.000126977	6.11988E-09	0.875661
n-Butane	7.83925E-06	0 *	0.000362728	1.73101E-08	2.24639
Isopentane	4.62812E-06	0 *	9.02191E-05	3.68734E-09	0.426692
n-Pentane	7.00751E-06	0 *	0.000102392	4.09118E-09	0.416654
i-Hexane	1.18729E-05	0 *	7.08572E-05	2.75033E-09	0.184494
n-Hexane	4.93283E-05	0 *	0.000200337	8.06655E-09	0.434862
2,2,4-Trimethylpentane	3.72543E-07	0 *	4.87615E-07	1.93974E-11	0.000661409
Benzene	7.35232E-06	0 *	1.51788E-05	7.46382E-10	0.0206965
Heptane	0.000580274	0 *	0.000660042	2.74653E-08	0.843458
Toluene	7.88926E-05	0 *	6.08831E-05	2.31519E-09	0.0591361
Octane	0.00207195	0 *	0.000743692	2.93098E-08	0.772509
Ethylbenzene	0.000107855	0 *	2.7302E-05	1.06934E-09	0.024237
o-Xylene	0.000180894	0 *	3.53158E-05	1.18101E-09	0.0307733
Nonane	0.00390092	0 *	0.000421692	1.63881E-08	0.451275
Decane	0	0 *	0	0	0
Water	91.7952	103.825 *	0.0461254	0.00220395	103.825
Oxygen	0	0 *	0	0	0
Decanes Plus	0.0745165	0 *	0.000539018	1.66533E-08	0.8396

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		
Flowsheet:	Flowsheet1	

Mass Fraction	Produced Liquids %	Produced Water Flow %	Tank Vent Gas %	W/B %	1 %
Nitrogen	0	0 *	0	0	0
Methane	0.00241736	0 *	90.7281	5.39312	93.78
Carbon Dioxide	3.51934E-08	0 *	7.21146E-05	8.86267E-05	4.07192E-05
Ethane	0.000305437	0 *	5.1386	0.509291	5.06033
Propane	3.08221E-05	0 *	0.251323	0.0111492	0.228003
Isobutane	6.57815E-06	0 *	0.0238131	0.000842581	0.0186207
n-Butane	2.73371E-05	0 *	0.0680254	0.00238325	0.047769
Isopentane	2.00341E-05	0 *	0.0210027	0.000630186	0.0112632
n-Pentane	3.03339E-05	0 *	0.0238364	0.000699204	0.0109982
i-Hexane	6.1387E-05	0 *	0.0197022	0.000561429	0.0058168
n-Hexane	0.000255044	0 *	0.0557048	0.00164664	0.0137105
2,2,4-Trimethylpentane	2.55321E-06	0 *	0.000179721	5.24862E-06	2.76416E-05
Benzene	3.44569E-05	0 *	0.00382562	0.000138104	0.00059147
Heptane	0.00348855	0 *	0.2134	0.0065191	0.0309213
Toluene	0.000436126	0 *	0.0181003	0.000505306	0.00199348
Octane	0.0142	0 *	0.274104	0.00793075	0.0322847
Ethylbenzene	0.000686999	0 *	0.00935239	0.000268922	0.00094141
o-Xylene	0.00115223	0 *	0.0120976	0.000297003	0.00119529
Nonane	0.0300176	0 *	0.174509	0.00497887	0.0211755
Decane	0	0 *	0	0	0
Water	99.2193	100 *	2.6812	94.0525	0.684326
Oxygen	0	0 *	0	0	0
Decanes Plus	0.72752	0 *	0.283014	0.00641926	0.0499859

Mass Flow	Produced Liquids lb/h	Produced Water Flow lb/h	Tank Vent Gas lb/h	W/B lb/h	1 lb/h
Nitrogen	0	0 *	0	0	0
Methane	0.0402909	0 *	28.1186	0.00227674	256326
Carbon Dioxide	5.86579E-07	0 *	2.23499E-05	3.74143E-08	0.111296
Ethane	0.0050908	0 *	1.59256	0.000215	13831.2
Propane	0.00051372	0 *	0.0778904	4.70671E-06	623.192
Isobutane	0.00010964	0 *	0.00738019	3.55701E-07	50.8953
n-Butane	0.000455635	0 *	0.0210825	1.0061E-06	130.565
Isopentane	0.000333913	0 *	0.0065092	2.66037E-07	30.7853
n-Pentane	0.000505583	0 *	0.00738742	2.95173E-07	30.0611
i-Hexane	0.00102316	0 *	0.00610615	2.37011E-07	15.8989
n-Hexane	0.00425089	0 *	0.0172641	6.95137E-07	37.4744
2,2,4-Trimethylpentane	4.25551E-05	0 *	5.56996E-05	2.21574E-09	0.0755518
Benzene	0.000574303	0 *	0.00118564	5.83013E-08	1.61664
Heptane	0.0581446	0 *	0.0661375	2.75208E-06	84.5161
Toluene	0.00726904	0 *	0.00560967	2.13318E-07	5.4487
Octane	0.236676	0 *	0.0849508	3.34801E-06	88.2425
Ethylbenzene	0.0114504	0 *	0.00289851	1.13527E-07	2.57312
o-Xylene	0.0192046	0 *	0.0037493	1.25382E-07	3.26705
Nonane	0.500313	0 *	0.0540842	2.10186E-06	57.8784
Decane	0	0 *	0	0	0
Water	1653.72	1870.44 *	0.830962	0.0397049	1870.44
Oxygen	0	0 *	0	0	0
Decanes Plus	12.1258	0 *	0.0877122	2.70993E-06	136.625

Stream Properties

Property	Units	Produced Liquids	Produced Water Flow	Tank Vent Gas	W/B	1
Temperature	°F	70 *	73 *	70	72.1381	71.4837
Pressure	psia	14.6959 *	662.696 *	14.6959	0.417317	662.696
Mole Fraction Vapor	%	0	0	100	100	99.4405
Mole Fraction Light Liquid	%	0.0892243	100	0	0	0.000975493
Mole Fraction Heavy Liquid	%	99.9108	0	0	0	0.558544

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Produced Liquids	Produced Water Flow	Tank Vent Gas	W/B	1
Molecular Weight	lb/lbmol	18.1404	18.0153	16.6887	17.9391	16.5017
Mass Density	lb/ft^3	62.1437	62.2888	0.043253	0.00131227	2.13684
Molar Flow	lbmol/h	91.8794	103.825	1.85708	0.00235327	16563.5
Mass Flow	lb/h	1666.73	1870.44	30.9922	0.0422156	273327
Vapor Volumetric Flow	ft^3/h	26.8206	30.0286	716.533	32.17	127911
Liquid Volumetric Flow	gpm	3.34386	3.74382	89.3339	4.01081	15947.4
Std Vapor Volumetric Flow	MMSCFD	0.836802	0.945602	0.0169135	2.14327E-05	150.854
Std Liquid Volumetric Flow	sgpm	3.33929	3.73915 *	0.19941	9.58168E-05	1794.65
Compressibility		0.000754707	0.0335293	0.997551	0.999602	0.897816
Specific Gravity		0.996387	0.998714	0.576217	0.619392	
API Gravity		10.3088	9.92043			
Enthalpy	Btu/h	-1.13017E+07	-1.27627E+07	-63402.5	-234.058	-5.50123E+08
Mass Enthalpy	Btu/lb	-6780.75	-6823.34	-2045.76	-5544.35	-2012.69
Mass Cp	Btu/(lb*°F)	0.978135	0.980809	0.520086	0.452939	0.609727
Ideal Gas CpCv Ratio		1.3235	1.3257	1.29784	1.3236	1.2995
Dynamic Viscosity	cP	0.998374	0.967174	0.0110048	0.0101304	
Kinematic Viscosity	cSt	1.00294	0.969335	15.8835	481.927	
Thermal Conductivity	Btu/(h*ft*°F)	0.34429	0.348491	0.0187404	0.0125442	
Surface Tension	lbf/ft	0.00500043 ?	0.00500981			
Net Ideal Gas Heating Value	Btu/ft^3	7.04825	0	916.808	60.1745	926.26
Net Liquid Heating Value	Btu/lb	-905.244	-1059.76	20808.8	275.356	21285.2
Gross Ideal Gas Heating Value	Btu/ft^3	57.7973	50.31	1018.26	113.85	1028.14
Gross Liquid Heating Value	Btu/lb	156.389	0	23115.8	1410.81	23628.1

Remarks

Energy Stream Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		
Flowsheet:	Flowsheet1	

Energy Streams

Energy Stream	Energy Rate	Power	From Block	To Block
Q-1	-6067.15 Btu/h	-2.38448 hp	--	Blowdown Tank
Q-2	264263 Btu/h	103.859 hp	--	Sand Trap

Remarks

Blocks
Blowdown Tank
Separator Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank	
Location:		Modified: 11:02 AM, 7/26/2017	
Flowsheet:	Flowsheet1	Status: Solved 5:49 PM, 11/9/2017	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Fluids	Inlet	Sand Trap	Tank Vent Gas	Vapor Outlet	
Produced Liquids	Heavy Liquid Outlet		Q-1	Energy	

Block Parameters

Pressure Drop	648	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	1.98117	%	Heat Duty	-6067.15	Btu/h
Mole Fraction Light Liquid	0.0874566	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	97.9314	%	Heat Release Curve Increments	10	

Remarks

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank	
Location:		Modified: 8:49 AM, 9/1/2017	
Flowsheet:	Flowsheet1	Status: Solved 5:49 PM, 11/9/2017	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Water Flow	Inlet		Measured Well Stream	Inlet	
Condensate	Inlet		1	Outlet	Sand Trap

Block Parameters

Pressure Drop	0 psi	Fraction to PStream 1	100 %

Remarks

Blocks
Sand Trap
Separator Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank	
Location:		Modified: 2:55 PM, 8/28/2017	
Flowsheet:	Flowsheet1	Status: Solved 5:49 PM, 11/9/2017	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
1	Inlet	MIX-100	Gas to Sales	Vapor Outlet	
Produced Fluids	Light Liquid Outlet	Blowdown Tank	Q-2	Energy	

Block Parameters

Pressure Drop	0	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	99.4444	%	Heat Duty	264263	Btu/h
Mole Fraction Light Liquid	0.000632069	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	0.555008	%	Heat Release Curve Increments	10	

Entrainments

Entrainment Entrainment 1

* From Phase (Numerator)	Vapor		* Numerator Value	2.8	ft^3
* To Phase (Denominator)	Heavy Liquid		* Denominator Value	42	gal
* Numerator Basis	Volume		Entrainment Value	49.8701	%
Denominator Basis	per Volume		* Active	True	

Remarks

Flowsheet Environment
Environment1

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		
Flowsheet:	Flowsheet1	

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Nitrogen	False	False	Benzene	False	False
Methane	False	False	Heptane	False	False
Carbon Dioxide	False	False	Toluene	False	False
Ethane	False	False	Octane	False	False
Propane	False	False	Ethylbenzene	False	False
Isobutane	False	False	o-Xylene	False	False
n-Butane	False	False	Nonane	False	False
Isopentane	False	False	Decane	False	False
n-Pentane	False	False	Water	False	True
i-Hexane	False	False	Oxygen	False	False
n-Hexane	False	False	Decanes Plus	False	False
2,2,4-Trimethylpentane	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

Environments Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Project-Wide Constants

Atmospheric Pressure	14.6959 psia	Ideal Gas Reference Pressure	14.6959 psia
Ideal Gas Reference Temperature	60 °F	Ideal Gas Reference Volume	379.484 ft^3/lbmol
Liquid Reference Temperature	60 °F		

Environment [Environment1]

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Nitrogen	False	False	Benzene	False	False
Methane	False	False	Heptane	False	False
Carbon Dioxide	False	False	Toluene	False	False
Ethane	False	False	Octane	False	False
Propane	False	False	Ethylbenzene	False	False
Isobutane	False	False	o-Xylene	False	False
n-Butane	False	False	Nonane	False	False
Isopentane	False	False	Decane	False	False
n-Pentane	False	False	Water	False	True
i-Hexane	False	False	Oxygen	False	False
n-Hexane	False	False	Decanes Plus	False	False
2,2,4-Trimethylpentane	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

Single Oil Report
Decanes Plus

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Properties

	Volume Average Boiling Point	399.878 °F		Low Temperature Viscosity	1.05288 cP
*	Molecular Weight	162.726 lb/lbmol		Temperature of High T Viscosity	210 °F
*	Specific Gravity	0.788		High Temperature Viscosity	0.503332 cP
	API Gravity	48.0685		Watson K	12.066
	Critical Temperature	720.653 °F		ASTM D86 10-90% Slope	0 °F/%
	Critical Pressure	307.278 psia		ASTM D93 Flash Point	157.716 °F
	Critical Volume	10.2876 ft^3/lbmol	?	Pour Point	-12.6777 °F
	Acentric Factor	0.527304		Paraffinic Fraction	51.9393 %
	Carbon to Hydrogen Ratio	6.00643		Naphthenic Fraction	27.7089 %
	Refractive Index	1.43922		Aromatic Fraction	20.3518 %
	Temperature of Low T Viscosity	100 °F		Ideal Gas Heat Capacity	57.9027 Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Decanes Plus!Properties!Pour Point

Warning: Pour Point calculation: The value of 0.788 for Specific Gravity should be between 0.8 and 1.

Remarks

Single Oil Report
Hexanes+

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Properties

	Volume Average Boiling Point	-173.182 °F		Low Temperature Viscosity	3.0532E+30 cP
*	Molecular Weight	16.662 lb/lbmol		Temperature of High T Viscosity	210 °F
*	Specific Gravity	0.5763		High Temperature Viscosity	1370.85 cP
	API Gravity	114.032		Watson K	11.439
	Critical Temperature	-2.89417 °F		ASTM D86 10-90% Slope	0 °F/%
	Critical Pressure	1116.36 psia	?	ASTM D93 Flash Point	-237.696 °F
	Critical Volume	1.64547 ft^3/lbmol	?	Pour Point	2.40106E+29 °F
	Acentric Factor	0.333018	?	Paraffinic Fraction	100 %
?	Carbon to Hydrogen Ratio	8.6229	?	Naphthenic Fraction	0 %
?	Refractive Index	1.31682	?	Aromatic Fraction	0 %
	Temperature of Low T Viscosity	100 °F	?	Ideal Gas Heat Capacity	5.55252 Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Hexanes+!Properties!Carbon to Hydrogen Ratio
Warning: Carbon to Hydrogen Ratio calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 80 °F and 650 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Refractive Index
Warning: Refractive Index calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 80 °F and 1500 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!ASTM D93 Flash Point
Warning: ASTM D93 Flash Point calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 150 °F and 850 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Pour Point
Warning: Pour Point calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 340.33 °F and 1040.33 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Paraffinic Fraction
Warning: Paraffinic Fraction calculation: The value of 16.662 lb/lbmol for Molecular Weight should be between 70 lb/lbmol and 600 lb/lbmol.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Naphthenic Fraction
Warning: Naphthenic Fraction calculation: The value of 16.662 lb/lbmol for Molecular Weight should be between 70 lb/lbmol and 600 lb/lbmol.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Aromatic Fraction
Warning: Aromatic Fraction calculation: The value of 16.662 lb/lbmol for Molecular Weight should be between 70 lb/lbmol and 600 lb/lbmol.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Ideal Gas Heat Capacity
Warning: Ideal Gas Heat Capacity calculation: The value of 0.5763 for Specific Gravity should be between 0.662763 and 1.07605.
ProMax:ProMax!Project!Oils!Hexanes+
Warning: The value of 0.5763 for Specific Gravity should be between 0.662763 and 1.07605.

Remarks

Calculator Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Produced Water

Source Code

Residual Error (for CV1) = Water_flow - 114.49

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Water Flow!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	128.2
Unit	

Measured Variable [Water_flow]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Liquids!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	114.49
Unit	

Solver Properties

Status: Solved

Error	-6.13955E-05		Algorithm	Default
Calculated Value	3.73915	sgpm	Iterations	3
Lower Bound		sgpm	Max Iterations	20
Upper Bound		sgpm	Weighting	1
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		* Skip Dependency Check	True

Remarks

SG Flow

Source Code

Residual Error (for CV1) = SGflow - 150

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Measured Well Stream!Phases!Total!Properties!Std Vapor Volumetric Flow
Value	149873
Unit	

Measured Variable [SGflow]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Gas to Sales!Phases!Total!Properties!Std Vapor Volumetric Flow
Value	150
Unit	

Solver Properties

Status: Solved

Error	0.000473473		Iterations	1
Calculated Value	149.873	MMSCFD	Max Iterations	20
Lower Bound		MMSCFD	Weighting	1
Upper Bound		MMSCFD	Priority	0
Step Size		MMSCFD	Solver Active	Active
Is Minimizer	False		Group	
Algorithm	Default		Skip Dependency Check	False

Remarks

Calculator Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Water %

Source Code

Residual Error (for CV1) = Water - 99

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Condensate!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	38.5382
Unit	

Measured Variable [Water]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Liquids!Phases!Total!Composition!Std Liquid Volumetric Fraction!Water
Value	99
Unit	

Solver Properties

Status: Solved

Error	4.11173E-05		Algorithm	Default
Calculated Value	1.12403	sgpm	Iterations	3
Lower Bound		sgpm	Max Iterations	20
Upper Bound		sgpm	Weighting	1
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		* Skip Dependency Check	True

Remarks

User Value Sets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Tank-1

User Value [BlockReady]

* Parameter	1		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [ShellLength]

* Parameter	20	ft	Upper Bound	ft
Lower Bound		ft	* Enforce Bounds	False

User Value [ShellDiam]

* Parameter	12	ft	Upper Bound	ft
Lower Bound		ft	* Enforce Bounds	False

User Value [BreatherVP]

* Parameter	0.03	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

User Value [BreatherVacP]

* Parameter	-0.03	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

User Value [DomeRadius]

* Parameter	0	ft	Upper Bound	ft
Lower Bound		ft	* Enforce Bounds	False

User Value [OpPress]

* Parameter	0	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

User Value [AvgPercentLiq]

* Parameter	50	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [MaxPercentLiq]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [AnnNetTP]

* Parameter	114.489	bbl/day	Upper Bound	bbl/day
Lower Bound		bbl/day	* Enforce Bounds	False

User Value [OREff]

* Parameter	0	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [MaxAvgT]

* Parameter	59.8833	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [MinAvgT]

* Parameter	40.7333	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [BulkLiqT]

* Parameter	54.6483	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value Sets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

User Value [AvgP]

* Parameter	14.1085	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [Therml]

* Parameter	1202.96	Btu/ft^2/day	Upper Bound	Btu/ft^2/day
Lower Bound		Btu/ft^2/day	* Enforce Bounds	False

User Value [AvgWindSpeed]

* Parameter	9.075	mi/h	Upper Bound	mi/h
Lower Bound		mi/h	* Enforce Bounds	False

User Value [MaxHourlyLoadingRate]

* Parameter	16.62	gpm	Upper Bound	gpm
Lower Bound		gpm	* Enforce Bounds	False

User Value [EntrainedOilFrac]

* Parameter	1	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [TurnoverRate]

* Parameter	20.7433		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [LLossSatFactor]

* Parameter	1.45		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [AtmPressure]

* Parameter	14.1085	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [TVP]

* Parameter	0.285343	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [MaxVP]

* Parameter	0.408633	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [MinVP]

* Parameter	0.197547	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

* Parameter	61.1967	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [MaxLiqSurfaceT]

* Parameter	72.1381	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [TotalLosses]

* Parameter	0.184904	ton/yr	Upper Bound	ton/yr

User Value Sets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

User Value [TotalLosses]

Lower Bound	ton/yr	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	0.0213908 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	0.0155901 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [WithdrawalLoss]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [LoadingLosses]

* Parameter	0.155814 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [MaxHourlyLoadingLoss]

* Parameter	0.177056 lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	* Enforce Bounds	False

User Value [PStar]

Parameter		Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [AllCTotalLosses]

* Parameter	0.184904 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [AllCLoadingLosses]

* Parameter	0.155814 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [AllCMaxHLoadingLoss]

* Parameter	0.177056 lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	* Enforce Bounds	False

User Value [AllCFlashingLosses]

* Parameter	136.343 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [DeckFittingLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [DeckSeamLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value Sets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

User Value [FlashingLosses]

* Parameter	136.343	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [TotalResidual]

* Parameter	7299.49	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [GasMoleWeight]

* Parameter	0.0179391	kg/mol	Upper Bound	kg/mol
Lower Bound		kg/mol	* Enforce Bounds	False

User Value [VapReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [LiqReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [FlashReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={8F6700DA-E196-4418-8000-F476C212C378}

Sum Component Flow/Frac

User Value [CompSum]

* Parameter	1.97102	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={FEAC603C-B09D-4960-AAA0-97F1EC6AE424}

Sum Component Flow/Frac.56

User Value [CompSum]

* Parameter	8.31609E-05	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={440444EB-DACC-4026-AD9A-7CBD6B0E000B}

Sum Component Flow/Frac.57

User Value [CompSum]

* Parameter	7.00774E-05	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={D778DCDF-C7EF-4086-9F85-E2D6691FFCBC}

User Value Sets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Component Recoveries - Project Inlets

Status: Solved

Recovery Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	False	* Atomic Basis	False

Tabulated Data

Index	Flowsheet1:Condensate lbmol/h	Flowsheet1:Measured Well Stream lbmol/h	Flowsheet1:Produced Water Flow lbmol/h	Summary Table lbmol/h
Nitrogen	0	0	0	0
Methane	0.415287	15977.5	0	15978
Carbon Dioxide	0.00252892	0	0	0.00252892
Ethane	0.2092	459.773	0	459.983
Propane	0.145354	13.9874	0	14.1327
Isobutane	0.0528738	0.822787	0	0.875661
n-Butane	0.107148	2.13925	0	2.24639
Isopentane	0.0975773	0.329115	0	0.426692
n-Pentane	0.0875394	0.329115	0	0.416654
i-Hexane	0.184494	0	0	0.184494
n-Hexane	0.105748	0.329115	0	0.434862
2,2,4-Trimethylpentane	0.000661409	0	0	0.000661409
Benzene	0.0042408	0.0164557	0	0.0206965
Heptane	0.514343	0.329115	0	0.843458
Toluene	0.0426803	0.0164557	0	0.0591361
Octane	0.607951	0.164557	0	0.772509
Ethylbenzene	0.00778128	0.0164557	0	0.024237
o-Xylene	0.0143176	0.0164557	0	0.0307733
Nonane	0.451275	0	0	0.451275
Decane	0	0	0	0
Water	0	0	103.825	103.825
Oxygen	0	0	0	0
Decanes Plus	0.8396	0	0	0.8396
Total	3.8906	16455.8	103.825	16563.5

Remarks

Component Recoveries - Project Outlets

Status: Solved

Recovery Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	False	* Atomic Basis	False

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Tabulated Data

Index	Flowsheet1:Gas to Sales lbmol/h	Flowsheet1:Produced Liquids lbmol/h	Flowsheet1:Tank Vent Gas lbmol/h	Summary Table lbmol/h
Nitrogen	0	0	0	0
Methane	15976.2	0.00251151	1.75276	15978
Carbon Dioxide	0.0025284	1.33285E-08	5.07843E-07	0.00252892
Ethane	459.929	0.000169304	0.0529636	459.983
Propane	14.131	1.16501E-05	0.0017664	14.1327
Isobutane	0.875532	1.88637E-06	0.000126977	0.875661
n-Butane	2.24602	7.83925E-06	0.000362728	2.24639
Isopentane	0.426597	4.62812E-06	9.02191E-05	0.426692
n-Pentane	0.416545	7.00751E-06	0.000102392	0.416654
i-Hexane	0.184411	1.18729E-05	7.08572E-05	0.184494
n-Hexane	0.434613	4.93283E-05	0.000200337	0.434862
2,2,4-Trimethylpentane	0.000660549	3.72543E-07	4.87615E-07	0.000661409
Benzene	0.020674	7.35232E-06	1.51788E-05	0.0206965
Heptane	0.842217	0.000580274	0.000660042	0.843458
Toluene	0.0589963	7.88926E-05	6.08831E-05	0.0591361
Octane	0.769693	0.00207195	0.000743692	0.772509
Ethylbenzene	0.0241019	0.000107855	2.7302E-05	0.024237
o-Xylene	0.0305571	0.000180894	3.53158E-05	0.0307733
Nonane	0.446953	0.00390092	0.000421692	0.451275
Decane	0	0	0	0
Water	11.9841	91.7952	0.0461254	103.825
Oxygen	0	0	0	0
Decanes Plus	0.764544	0.0745165	0.000539018	0.8396
Total	16469.8	91.8794	1.85708	16563.5

Remarks

Component Recoveries - Project Losses

Status: Solved

Reference Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Recovery Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Summation Only
* Calculate Ratios	False	* Atomic Basis	False

Tabulated Data

Index	Summary Table lbmol/h			
Nitrogen	0			
Methane	1.80458E-12			
Carbon Dioxide	0			
Ethane	5.63932E-14			
Propane	0			
Isobutane	1.10143E-16			
n-Butane	0			

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Tabulated Data

Index	Summary Table lbmol/h			
Isopentane	5.50715E-17			
n-Pentane	-5.50715E-17			
i-Hexane	-2.75358E-17			
n-Hexane	5.50715E-17			
2,2,4-Trimethylpentane	1.07562E-19			
Benzene	-3.44197E-18			
Heptane	-1.10143E-16			
Toluene	0			
Octane	0			
Ethylbenzene	-3.44197E-18			
o-Xylene	0			
Nonane	0			
Decane	0			
Water	-9.58685E-13			
Oxygen	0			
Decanes Plus	-4.40572E-16			
Total	-3.60917E-12			

Remarks

Component Recoveries - Project Recoveries

Status: Solved

Reference Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Recovery Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	True	* Atomic Basis	False

Tabulated Data

Index	Flowsheet1:Gas to Sales %	Flowsheet1:Produced Liquids %	Flowsheet1:Tank Vent Gas %	Summary Table %
Nitrogen				
Methane	99.989	1.57186E-05	0.0109699	100
Carbon Dioxide	99.9794	0.000527042	0.0200814	100
Ethane	99.9884	3.68066E-05	0.0115143	100
Propane	99.9874	8.24337E-05	0.0124986	100
Isobutane	99.9853	0.000215422	0.0145007	100
n-Butane	99.9835	0.00034897	0.0161471	100
Isopentane	99.9778	0.00108465	0.0211438	100
n-Pentane	99.9737	0.00168185	0.0245747	100
i-Hexane	99.9552	0.0064354	0.0384062	100
n-Hexane	99.9426	0.0113434	0.0460691	100
2,2,4-Trimethylpentane	99.87	0.0563257	0.0737237	100
Benzene	99.8911	0.0355244	0.0733397	100

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Tabulated Data

Index	Flowsheet1:Gas to Sales %	Flowsheet1:Produced Liquids %	Flowsheet1:Tank Vent Gas %	Summary Table %
Heptane	99.8529	0.0687971	0.0782543	100
Toluene	99.7636	0.133409	0.102954	100
Octane	99.6355	0.26821	0.0962697	100
Ethylbenzene	99.4424	0.445	0.112646	100
o-Xylene	99.2974	0.587827	0.114761	100
Nonane	99.0421	0.864421	0.0934445	100
Decane				
Water	11.5425	88.413	0.0444259	100
Oxygen				
Decanes Plus	91.0606	8.87525	0.0641994	100
Total	99.4341	0.554709	0.0112118	100

Remarks

Component Recoveries - Flowsheet1 Inlets

Status: Solved

Recovery Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	False	* Atomic Basis	False

Tabulated Data

Index	Flowsheet1:Condensate lbmol/h	Flowsheet1:Measured Well Stream lbmol/h	Flowsheet1:Produced Water Flow lbmol/h	Summary Table lbmol/h
Nitrogen	0	0	0	0
Methane	0.415287	15977.5	0	15978
Carbon Dioxide	0.00252892	0	0	0.00252892
Ethane	0.2092	459.773	0	459.983
Propane	0.145354	13.9874	0	14.1327
Isobutane	0.0528738	0.822787	0	0.875661
n-Butane	0.107148	2.13925	0	2.24639
Isopentane	0.0975773	0.329115	0	0.426692
n-Pentane	0.0875394	0.329115	0	0.416654
i-Hexane	0.184494	0	0	0.184494
n-Hexane	0.105748	0.329115	0	0.434862
2,2,4-Trimethylpentane	0.000661409	0	0	0.000661409
Benzene	0.0042408	0.0164557	0	0.0206965
Heptane	0.514343	0.329115	0	0.843458
Toluene	0.0426803	0.0164557	0	0.0591361
Octane	0.607951	0.164557	0	0.772509
Ethylbenzene	0.00778128	0.0164557	0	0.024237
o-Xylene	0.0143176	0.0164557	0	0.0307733
Nonane	0.451275	0	0	0.451275
Decane	0	0	0	0
Water	0	0	103.825	103.825
Oxygen	0	0	0	0
Decanes Plus	0.8396	0	0	0.8396
Total	3.8906	16455.8	103.825	16563.5

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Remarks

Component Recoveries - Flowsheet1 Outlets

Status: Solved

Recovery Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	False	* Atomic Basis	False

Tabulated Data

Index	Flowsheet1:Gas to Sales lbmol/h	Flowsheet1:Produced Liquids lbmol/h	Flowsheet1:Tank Vent Gas lbmol/h	Summary Table lbmol/h
Nitrogen	0	0	0	0
Methane	15976.2	0.00251151	1.75276	15978
Carbon Dioxide	0.0025284	1.33285E-08	5.07843E-07	0.00252892
Ethane	459.929	0.000169304	0.0529636	459.983
Propane	14.131	1.16501E-05	0.0017664	14.1327
Isobutane	0.875532	1.88637E-06	0.000126977	0.875661
n-Butane	2.24602	7.83925E-06	0.000362728	2.24639
Isopentane	0.426597	4.62812E-06	9.02191E-05	0.426692
n-Pentane	0.416545	7.00751E-06	0.000102392	0.416654
i-Hexane	0.184411	1.18729E-05	7.08572E-05	0.184494
n-Hexane	0.434613	4.93283E-05	0.000200337	0.434862
2,2,4-Trimethylpentane	0.000660549	3.72543E-07	4.87615E-07	0.000661409
Benzene	0.020674	7.35232E-06	1.51788E-05	0.0206965
Heptane	0.842217	0.000580274	0.000660042	0.843458
Toluene	0.0589963	7.88926E-05	6.08831E-05	0.0591361
Octane	0.769693	0.00207195	0.000743692	0.772509
Ethylbenzene	0.0241019	0.000107855	2.7302E-05	0.024237
o-Xylene	0.0305571	0.000180894	3.53158E-05	0.0307733
Nonane	0.446953	0.00390092	0.000421692	0.451275
Decane	0	0	0	0
Water	11.9841	91.7952	0.0461254	103.825
Oxygen	0	0	0	0
Decanes Plus	0.764544	0.0745165	0.000539018	0.8396
Total	16469.8	91.8794	1.85708	16563.5

Remarks

Component Recoveries - Flowsheet1 Losses

Status: Solved

Reference Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Recovery Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Summation Only
* Calculate Ratios	False	* Atomic Basis	False

Tabulated Data

Index	Summary Table lbmol/h			
Nitrogen	0			
Methane	1.80458E-12			
Carbon Dioxide	0			
Ethane	5.63932E-14			
Propane	0			
Isobutane	1.10143E-16			
n-Butane	0			
Isopentane	5.50715E-17			
n-Pentane	-5.50715E-17			
i-Hexane	-2.75358E-17			
n-Hexane	5.50715E-17			
2,2,4-Trimethylpentane	1.07562E-19			
Benzene	-3.44197E-18			
Heptane	-1.10143E-16			
Toluene	0			
Octane	0			
Ethylbenzene	-3.44197E-18			
o-Xylene	0			
Nonane	0			
Decane	0			
Water	-9.58685E-13			
Oxygen	0			
Decanes Plus	-4.40572E-16			
Total	-3.60917E-12			

Remarks

Component Recoveries - Flowsheet1 Recoveries

Status: Solved

Reference Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Condensate	Flowsheet1	Produced Water Flow
Flowsheet1	Measured Well Stream		

Recovery Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Flowsheet1	Gas to Sales	Flowsheet1	Tank Vent Gas
Flowsheet1	Produced Liquids		

Parameters

* Composition Basis	Molar Flow	* Summation Option	Streams and Summation
* Calculate Ratios	True	* Atomic Basis	False

Recoveries Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Tabulated Data

Index	Flowsheet1:Gas to Sales %	Flowsheet1:Produced Liquids %	Flowsheet1:Tank Vent Gas %	Summary Table %
Nitrogen				
Methane	99.989	1.57186E-05	0.0109699	100
Carbon Dioxide	99.9794	0.000527042	0.0200814	100
Ethane	99.9884	3.68066E-05	0.0115143	100
Propane	99.9874	8.24337E-05	0.0124986	100
Isobutane	99.9853	0.000215422	0.0145007	100
n-Butane	99.9835	0.00034897	0.0161471	100
Isopentane	99.9778	0.00108465	0.0211438	100
n-Pentane	99.9737	0.00168185	0.0245747	100
i-Hexane	99.9552	0.0064354	0.0384062	100
n-Hexane	99.9426	0.0113434	0.0460691	100
2,2,4-Trimethylpentane	99.87	0.0563257	0.0737237	100
Benzene	99.8911	0.0355244	0.0733397	100
Heptane	99.8529	0.0687971	0.0782543	100
Toluene	99.7636	0.133409	0.102954	100
Octane	99.6355	0.26821	0.0962697	100
Ethylbenzene	99.4424	0.445	0.112646	100
o-Xylene	99.2974	0.587827	0.114761	100
Nonane	99.0421	0.864421	0.0934445	100
Decane				
Water	11.5425	88.413	0.0444259	100
Oxygen				
Decanes Plus	91.0606	8.87525	0.0641994	100
Total	99.4341	0.554709	0.0112118	100

Remarks

Energy Budgets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Power Budget - Project Power Budget

Status: Solved

Parameters

Net Power	hp	Total Power Required	hp
Total Power Supplied	hp	External Energy Only	True

Remarks

Heat Budget - Project Heat Budget

Status: Solved

Heat Budget Data Source - All Exchangers in Project

Flowsheet	Block	Flowsheet	Block
Flowsheet1	Blowdown Tank	Flowsheet1	Sand Trap

Parameters

Net Duty	258195 Btu/h	Total Duty Required	264263 Btu/h
Total Duty Supplied	6067.15 Btu/h	External Energy Only	True

Tabulated Data

Index	Block Duty Btu/h	Block Highest Temperature °F	Block Lowest Temperature °F	
Flowsheet1:Blowdown Tank	-6067.15	73	70	
Flowsheet1:Sand Trap	264263	73	71.4837	

Remarks

Power Budget - Flowsheet1 Power Budget

Status: Solved

Parameters

Net Power	hp	Total Power Required	hp
Total Power Supplied	hp	External Energy Only	True

Remarks

Heat Budget - Flowsheet1 Heat Budget

Status: Solved

Heat Budget Data Source - All Exchangers in Flowsheet

Flowsheet	Block	Flowsheet	Block
Flowsheet1	Blowdown Tank	Flowsheet1	Sand Trap

Parameters

Net Duty	258195 Btu/h	Total Duty Required	264263 Btu/h
Total Duty Supplied	6067.15 Btu/h	External Energy Only	True

Tabulated Data

Index	Block Duty Btu/h	Block Highest Temperature °F	Block Lowest Temperature °F	
Flowsheet1:Blowdown Tank	-6067.15	73	70	
Flowsheet1:Sand Trap	264263	73	71.4837	

Energy Budgets Report

Client Name:	Arsenal - Pritt South Well Pad	Job: Blowdown Tank
Location:		

Remarks

Attachment U

ATTACHMENT U – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

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

Emission Point ID#	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		CH_4		GHG (CO_2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Line Heater (E01)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E02)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E03)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E04)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E05)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E06)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E07)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E08)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E09)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E10)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E11)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E12)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E13)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Line Heater (E14)	0.10	0.43	0.08	0.36	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	117.10	512.89
Blowdown Tanks (E15-E16)	--	--	--	--	0.45	0.08	--	--	--	--	--	--	28.12	5.13	703.02	128.30

Produced Fluids Tanks (E17-E30)	--	--	--	--	15.34	67.20	--	--	--	--	--	--	614.37	2,690.95	15,359.30	67,273.72
Tank Truck Loading Activities (E31)	--	--	--	--	<0.01	<0.01	--	--	--	--	--	--	0.04	0.19	1.10	4.81
TEG (E32)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	0.36
TEG (E33)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	0.36
TOTAL	**1.36**	**5.95**	**1.14**	**5.00**	**15.87**	**67.62**	**<0.01**	**0.04**	**0.03**	**0.11**	**0.03**	**0.11**	**642.56**	**2,696.41**	**17,702.95**	**74,588.00**

Annual emissions shall be based on 8,760 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 HAP 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
Line Heater (E01)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E02)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E03)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E04)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E05)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E06)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E07)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E08)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E09)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E10)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E11)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E12)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E13)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Line Heater (E14)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01

Blowdown Tanks (E15-E16)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.03	<0.01
Produced Fluids Tanks (E17-E30)	<0.01	<0.01	0.03	0.15	0.26	1.12	0.09	0.38	0.13	0.55	0.54	2.35	1.04	4.56
Tank Truck Loading Activities (E31)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TEG (E32)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TEG (E33)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TOTAL	**<0.01**	**<0.01**	**0.04**	**0.15**	**0.26**	**1.12**	**0.09**	**0.38**	**0.13**	**0.55**	**0.58**	**2.46**	**1.10**	**4.68**

Annual emissions shall be based on 8,760 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

AIR QUALITY PERMIT NOTICE

Notice of Application

Notice is give that Arsenal Resources, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-D General Permit for a natural gas production operation located in Harrison County, West Virginia. The latitude and longitude coordinates are: 39.24576 and -80.18706.

The applicant estimates the maximum potential to discharge the following regulated air pollutants on a facility-wide basis will be:

Particulate Matter (PM) = 6.61 tpy
Sulfur Dioxide (SO_2) = 0.04 tpy
Volatile Organic Compounds (VOC) = 67.63 tpy
Carbon Monoxide (CO)= 5.00 tpy
Nitrogen Oxides (NO_x) = 5.95 tpy
Total Hazardous Air Pollutants = 4.68 tpy
Formaldehyde (HCHO) = <0.01 tpy
Hexane (C_8H_{14}) = 2.46 tpy
Benzene (C_6H_6) = 0.15 tpy
Toluene ($C_6H_5CH_3$) = 1.12 tpy
Ethylbenzene ($C_6H_5C_2H_5$) = 0.38 tpy
Xylene ($(CH_3)_2(C_6H_4)$) = 0.55 tpy
Carbon Dioxide Equivalents (CO_2e) = 74,668.58 tpy

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 15th day of November 2017.

By: Arsenal Resources
Meghan M.B. Yingling
Environmental Compliance Manager
6031 Wallace Road Ext. Suite 300
Wexford, PA 15090