G70-D General Permit Application

UNB Natural Gas Production Site

Taylor County, West Virginia

Prepared By:

Environmental Resources Management, Inc.
Hurricane, West Virginia

June 2017

ARSENAL RESOURCES

People Powered. Asset Strong.

June 2, 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
UNB 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 UNB natural gas production site located in Taylor 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

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

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

- Five (5) Natural Gas Wells;
- Five (5) Gas Production Units/Heaters each rated at 1.00 MMBtu/hr input;
- One (1) 210 bbl Blowdown Tank;
- Five (5) 400 bbl Produced Water Tank;
- One (1) Produced Water Loadout; and
- One (1) Thermoelectric Generator.

Statement of aggregation

The UNB pad will be located in Taylor 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 the UNB with the same industrial grouping as nearby facilities, and some of these facilities are under common control. However, the UNB site is not subject to the aggregation of stationary emission sources because these sites do not meet the definition of contiguous or adjacent facilities.

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

Arsenal is the sole operator of the UNB pad. 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.

On August 18, 2016 the EPA Administrator signed the *Source Determination for Certain Emission Units in the Oil and Natural Gas Sector*. This notice clarified EPA's position regarding how properties in the oil and natural gas sector are determined to be adjacent in order to assist permitting authorities and permit applicants in making consistent source determinations. The following proposed regulatory text defines "adjacent" for the oil and gas sector in terms of proximity.

> *Pollutant emitting activities shall be considered adjacent if they are located on the same surface site, or on surface sites that are located within ¼ mile of one another.*

There are no Arsenal owned or operated sites with a ¼ mile radius of the UNB pad.
Nearby sites do not meet the definition of contiguous or adjacent properties since they are not in contact and do not share a common boundary. The operations conducted at the UNB site do not rely on or interact with other sites. Furthermore, operations separated by this distance do not meet the common sense notion of a "plant."

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 UNB pad 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 UNB 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 UNB 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 UNB Wellpad does not have a 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 UNB pad 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.

Taylor County, WV is in attainment for all pollutants with a National Ambient Air Quality Standard (NAAQS). Therefore, this regulation would not apply to the UNB 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 site are below the corresponding major source threshold(s). Therefore, the UNB wellpad 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 UNB site does not have any affected facilities subject to Subpart 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 UNB site will commence construction after September 18, 2015 and therefore will qualify as an affected facility under OOOOa. The UNB 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 UNB site must be performed within 60 days of startup of production

and then semi-annually thereafter. The UNB site will also qualify as a gas well affected facility for all production wells.

There are several equipment types that have been installed at UNB 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 UNB site 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 UNB site 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 site.

National Emissions Standards for Hazardous Air Pollutants

The following NESHAP included in the G70-D permit are not applicable to the UNB site:

- *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 site.

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

Regulated Pollutant	Potential Annual Emissions (tpy)	Maximum Annual Emission Limit (tpy)
CO	1.80	80
NOx	2.15	50
PM	0.16	20
PM-10	0.01	20
SO_2	<0.01	20
VOC	26.90	80
Total HAPs	0.99	20

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): **47-1919654**

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

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

Facility Name: **UNB Natural Gas Production Site**

Operating Site Physical Address: **8740 Victory Avenue, Grafton, WV 26354**
If none available, list road, city or town and zip of facility.

City: **Grafton**	Zip Code: **26354**	County: **Taylor**

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: **39.43408**
Longitude: **-79.94391**

SIC Code: **1331** NAICS Code: **211111**	DAQ Facility ID No. (For existing facilities) **N/A**

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: 6-2-17

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 new facility with five (5) natural gas production wells and associated equipment.**
Directions to the facility: **From I79 N take Exit 124 for WV-279 toward US 50E/Jerry Dove Dr. (125 mi) Take US-50 E/Northwestern Turnpike to US-119 N/Victory Ave. in Eastern (24.3 mi) - Turn right onto WV-279 (2.6 mi) - Turn left onto US-50 E/Northwsestern Turnpike (7.8 mi) - Keep left to stay on US-50E/Northwestern Turnpike (5.2 mi) - Turn left onto US-119 N/Victory Ave. (8.7 mi)**

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 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
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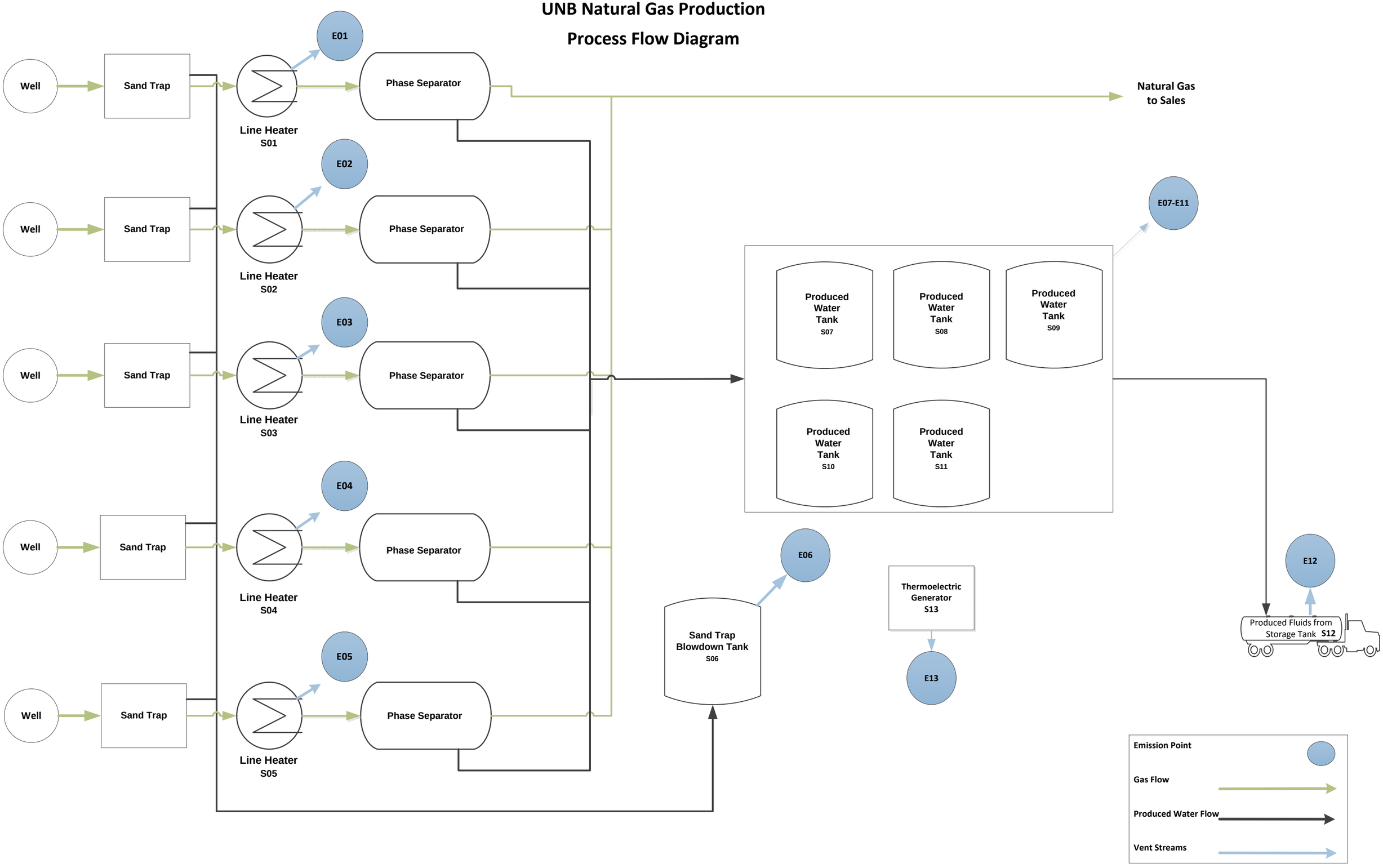
Attachment D

Attachment D

UNB Natural Gas Production

Process Flow Diagram



Attachment E

Attachment E – Process Description

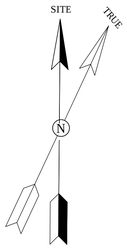
This permit application is being filed for Arsenal Resources, LLC and addresses operational activities associated with the UNB Wellpad natural gas production site. Natural gas and produced water will flow from the five (5) wellheads that will be drilled and completed on the UNB pad. The raw gas and produced water are first routed through the sand traps to remove any sediment. Fluids from these sand traps are manually blown down to the sand trap blowdown tank (S06), as needed. From the sand traps, raw gas and produced water are routed through line heaters (S01-S05) to assist with the phase separation process in the downstream separators. In the separator, produced water are removed from the raw gas before being dumped to produced water tanks (S07-S11). The separated gas is then sent off site via a sales pipeline. The produced water are pumped into a tank truck (S12) on an as needed basis and are disposed of off-site.

Power to the site is provided by a thermoelectric generator (S13)

A Process Flow Diagram is included as Attachment D.

Attachment F

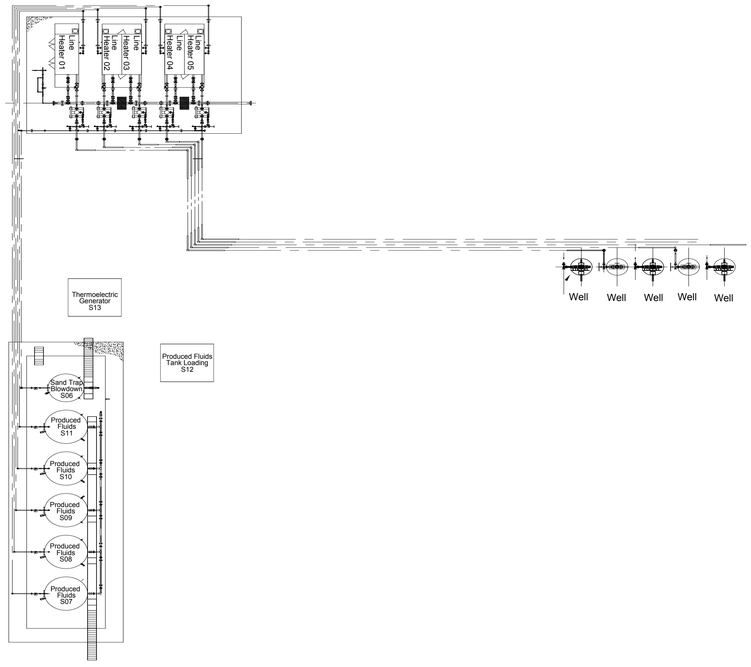
ATTACHMENT F - UNB WELL PAD PLOT PLAN



Public Road

ACCESS ROAD

Impondment



SCALE 1"=20'

Vavco LLC
Issued for Construction / Fabrication
Issued By: Mark Hadley
Issued on: May 09, 2017 @ 08:43:07

REV	DESCRIPTION	DATE	DWN	CHK	APRV
0	ISSUED FOR CONSTRUCTION	5/4/2017	HJC	ACM	MWH

LETTERED REVISIONS (i.e. 'A', 'B', etc.) INDICATE DRAWINGS FOR REVIEW/APPROVAL, NO WORK SHALL BE DONE BASED ON THESE DRAWINGS. AFTER APPROVAL DRAWINGS SHALL MARKED AS REVISION # 0. ALL SUBSEQUENT CHANGES TO THE DRAWING SHALL BE SEQUENTIALLY NUMBERED AND LISTED HERE. AFTER APPROVAL REFERENCES TO LETTERED REVISIONS SHALL BE REMOVED. UPON RECEIPT OF REVISED DRAWING ALL PAPER COPIES OF PREVIOUS REVISIONS MUST BE DESTROYED

ARSENAL RESOURCES

TAYLOR COUNTY, WV

UNB WELL PAD PHASE II SITE
MECHANICAL LAYOUT

SCALE: 1"=20'

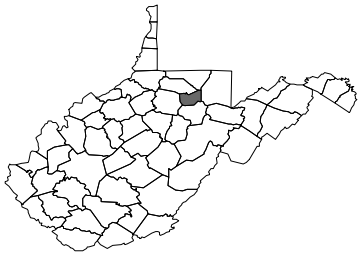
DRAWING NUMBER: ARR-1613-P-100

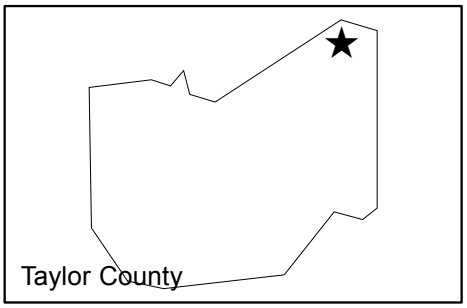
REVISION: 0

ARR-1613-P.dwg

THIS DRAWING IS INTENDED TO BE PRINTED ON ANSI D SIZE PAPER AS A LANDSCAPE

Attachment G





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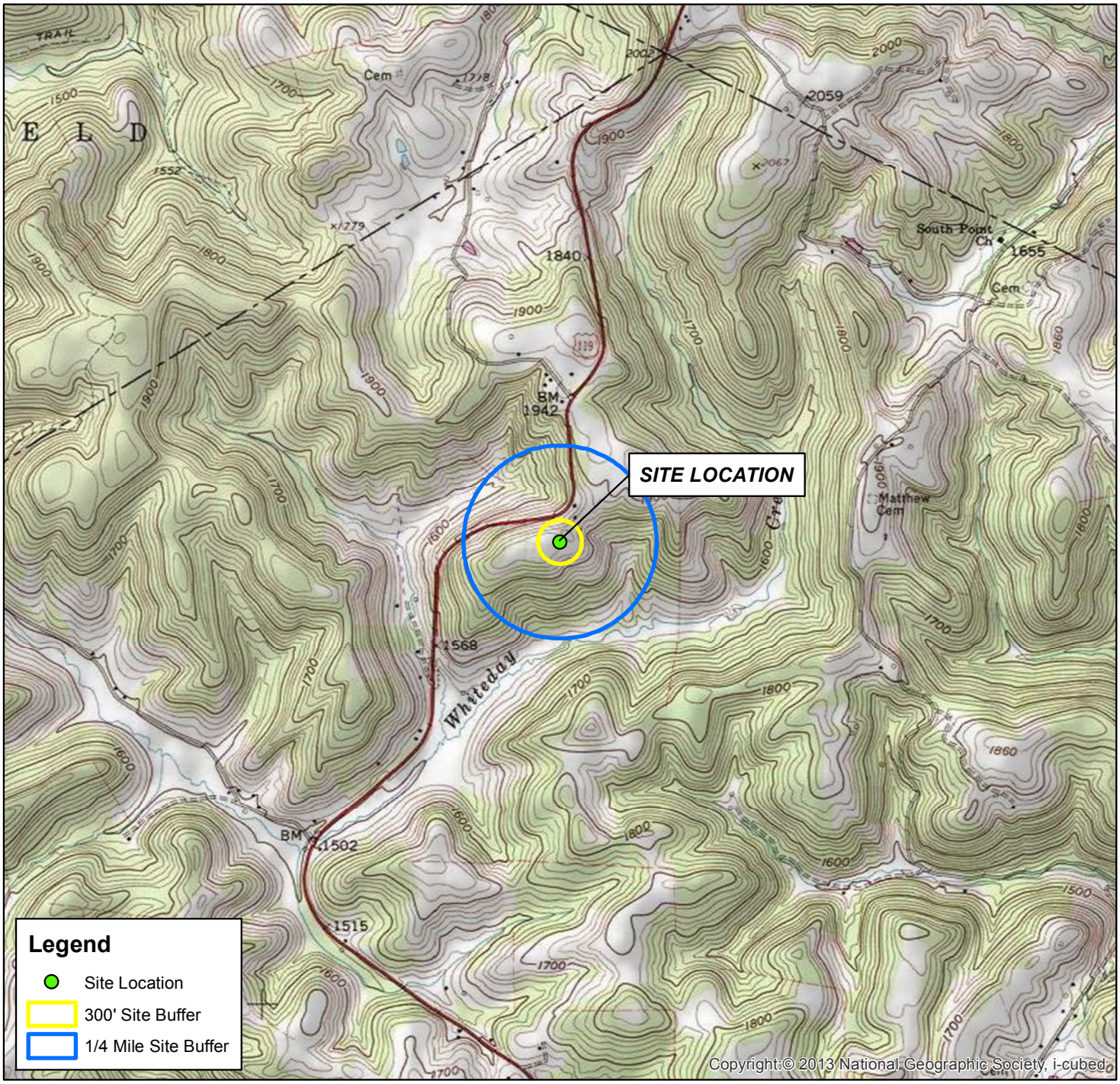
TAYLOR COUNTY
WEST VIRGINIA



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

SITE LOCATION MAP

ERM	**Arsenal Resources** Arsenal UNB Wellpad Grafton Taylor County, West Virginia	GIS Review: GM CHK'D: GM 0405216
Drawn By: SRV-5/24/17	**Environmental Resources Management**	ATTACHMENT G

J:\Projects\SiteLocationMaps\Arsenal Resources_MXD\AttachmentG-SiteLocationMap_UNB_20170524.mxd - 5/24/2017|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	2017	2017	1.0 MMBtu/hr	New	N/A	N/A
S02	E02	Line Heater	2017	2017	1.0 MMBtu/hr	New	N/A	N/A
S03	E03	Line Heater	2017	2017	1.0 MMBtu/hr	New	N/A	N/A
S04	E04	Line Heater	2017	2017	1.0 MMBtu/hr	New	N/A	N/A
S05	E05	Line Heater	2017	2017	1.0 MMBtu/hr	New	N/A	N/A
S06	E06	Sand Trap Blowdown Tank	2017	2017	210 bbl	New	N/A	N/A
S07	E07	Produced Water Tank	2017	2017	400 bbl	New	N/A	N/A
S08	E08	Produced Water Tank	2017	2017	400 bbl	New	N/A	N/A
S09	E09	Produced Water Tank	2017	2017	400 bbl	New	N/A	N/A
S10	E10	Produced Water Tank	2017	2017	400 bbl	New	N/A	N/A
S11	E11	Produced Water Tank	2017	2017	400 bbl	New	N/A	N/A
S12	E12	Produced Water Loading	2017	2017	574,600 bbl/yr	New	N/A	N/A
S13	E13	Thermoelectric Generator	2017	2017	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: **UNB 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	**187**	**EPA**	☒ Gas ☐ Liquid ☐ Both	**0.01**	**<0.01**	**0.88, 22.06**
Safety Relief Valves	☒ Yes ☐ No	**5**	**EPA**	☒ Gas ☐ Liquid ☐ Both	**<0.01**	**<0.01**	**0.03, 0.87**
Open Ended Lines	☒ Yes ☐ No	**13**	**EPA**	☒ Gas ☐ Liquid ☐ Both	**<0.01**	**<0.01**	**0.13, 3.33**
Sampling Connections	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Connections (Not sampling)	☐ Yes ☒ No	**815**	**EPA**	☒ Gas ☐ Liquid ☐ Both	**<0.01**	**<0.01**	**0.43, 10.68**
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?
047-091-01325	9/11/17	9/20/17	Green Completion	OOOOa
047-091-01328	9/11/17	9/20/17	Green Completion	OOOOa
047-091-01329	9/11/17	9/20/17	Green Completion	OOOOa
047-091-01330	9/11/17	9/20/17	Green Completion	OOOOa
047-091-01331	9/11/17	9/20/17	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 **Produced Water Storage Battery**	2. Tank Name **Produced Water Tank (S07-S011)**
3. Emission Unit ID number **S07-S11**	4. Emission Point ID number **E07-E11**
5. Date Installed , Modified or Relocated *(for existing tanks)* **NA** 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.) **20**	10B. Average Liquid Height (ft.) **10**
11A. Maximum Vapor Space Height (ft.) **19**	11B. Average Vapor Space Height (ft.)
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume". **400 bbl**	
13A. Maximum annual throughput (gal/yr) **21,840,000**	13B. Maximum daily throughput (gal/day) **59,835**
14. Number of tank turnovers per year **1,300**	15. Maximum tank fill rate (gal/min) **41.55**
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: **Green**	21B. Roof Color: **Green**	21C. Year Last Painted: **2017**
22. Shell Condition (if metal and unlined): ☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable		
22A. Is the tank heated? ☐ Yes ☒ No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?
23. Operating Pressure Range (psig): **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 – PROMAX Simulation Included		
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 **Blowdown Storage Vessel**	2. Tank Name **Sand Trap Blowdown Tank**
3. Emission Unit ID number **S06**	4. Emission Point ID number **E06**
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) **2,293,200**	13B. Maximum daily throughput (gal/day) **6,283**
14. Number of tank turnovers per year **260**	15. Maximum tank fill rate (gal/min) **4.36**
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: **Green**	21B. Roof Color: **Green**	21C. Year Last Painted: **2017**	
22. Shell Condition (if metal and unlined): ☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable			
22A. Is the tank heated? ☐ Yes ☒ No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?	
23. Operating Pressure Range (psig): **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 – PROMAX Simulation Included			
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.			

STORAGE TANK DATA TABLE

List all deminimis storage tanks (i.e. lube oil, glycol, diesel etc.)

Source ID #[1]	Status[2]	Content[3]	Volume[4]
None	None	None	None

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the well site. Tanks should be designated T01, T02, T03, etc.
2. Enter storage tank Status using the following:
   - EXIST Existing Equipment
   - NEW Installation of New Equipment
   - REM Equipment Removed
3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, diesel, mercaptan etc.
4. Enter the maximum design storage tank volume in gallons.

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 #)	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	2017	New	1.00	1,020
S02	E02	Line Heater	2017	New	1.00	1,020
S03	E03	Line Heater	2017	New	1.00	1,020
S04	E04	Line Heater	2017	New	1.00	1,020
S05	E05	Line Heater	2017	New	1.00	1,020
S13	E13	TEG	2017	New	0.0007	1,020

[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#: **S12**	Emission Point ID#: **E12**	Year Installed/Modified: **2017**
Emission Unit Description: **Tanker Truck Loading for Produced Water Tanks**		
Loading Area Data		
Number of Pumps: **2**	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 Fluids ***		
Max. Daily Throughput (1000 gal/day)	**66.12**		
Max. Annual Throughput (1000 gal/yr)	**24,133.2**		
Loading Method[1]	**SP**		
Max. Fill Rate (gal/min)	**45.92**		
Average Fill Time (min/loading)	**NA**		
Max. Bulk Liquid Temperature (°F)	**60**		
True Vapor Pressure[2]	**NA**		
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)	**0.05**		
Max.HAP Emission Rate	Loading (lb/hr)	**<0.01**		
	Annual (ton/yr)	**<0.01**		
Estimation Method[5]		O - ProMax		

***Arsenal Resources is providing estimates of fluid throughputs from tank unloading activities based upon expected operations. The types of fluids are identified between loading racks, so it is requested that a single permit limitation is placed on total fluid throughputs for the site.**

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill

2 At maximum bulk liquid temperature

3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)
O Other (describe)

4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration

5 EPA EPA Emission Factor in AP-42 MB Material Balance
TM Test Measurement based upon test data submittal O Other (describe)

Attachment 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 - S05

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	1,020	8,760	<0.01	0.02
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,020	8,760	<0.01	<0.01
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,020	8,760	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,020	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,020	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,020	8,760	<0.01	<0.01
CO	84	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,020	8,760	0.08	0.36
NOx	100	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,020	8,760	0.10	0.43
$PM_{Filterable}$	1.9	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,020	8,760	<0.01	<0.01
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,020	8,760	<0.01	0.02
PM_{Total}	7.6	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,020	8,760	<0.01	0.03
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,020	8,760	<0.01	<0.01
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	1.00	1,020	8,760	116.98	512.36
CH_4	0.001	kg CO_2 / MMBtu	40 CFR Subpart C	1.00	1,020	8,760	<0.01	<0.01
N_2O	0.0001	kg CO_2 / MMBtu	40 CFR Subpart C	1.00	1,020	8,760	<0.01	<0.01
Total HAPs							<0.01	<0.01
Total CO_2e							117.03	512.33

Notes:

-Emission rates displayed above represent the max. hourly and max. annual emissions for one line heater. Cumulative emission rates for all 8 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)**

Attachment T - Emission Calculations
Sand Trap Blowdown Tank S06

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Annual Emissions using ProMax (tons/yr)
VOCs	0.24	1.07
Total HAPs	<0.01	0.04
Hexane	<0.01	0.03
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	0.13	0.55
Total CO_2e	3.13	13.72

Notes:

-Blowdown operations are conducted on the UNB 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 UNB 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 S07 - S11

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Annual Emissions using ProMax (tons/yr)
VOCs	5.86	25.67
Total HAPs	0.21	0.92
Hexane	0.18	0.79
Benzene	<0.01	0.02
Toluene	0.02	0.09
Ethylbenzene	<0.01	<0.01
Xylene	<0.01	<0.01
CO_2	0.02	0.09
CH_4	3.01	13.18
Total CO_2e	75.22	329.47

Notes:

-Emission rates for Produced Fluid Tanks S07 - S11 were calculated using ProMax software. ProMax output sheets for the UNB 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 S07 - S11 is modeled as being received through a single tank. The throughput value represents the total throughput for all five (5) 400-barrel tanks. Therefore, emission rates represent a total from all produced fluids tanks located on the well pad. Actual throughput for each tank will vary based on operations.

-Arsenal Resources will operate the UNB Site in Taylor County where the produced hydrocarbon condensate is expected to be minimal. A representative analysis was used in order to establish a conservative esitmate of emissions from prduced tank operations. As requiredby the G70-D permit, Arsenal will collect and analyze a pressurized tank liquid sample within 30 days of production start up. The site specific sample will allow for the gathering of actual tank emissions.

Attachment T - Emission Calculations
Liquids Unloading S12

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Annual Emissions using ProMax (tons/yr)
VOCs	0.01	0.05
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	<0.01	0.03
Total CO_2e	0.20	0.86

Notes:
-Emission rates for Liquids Unloading was calculated using ProMax software. ProMax output sheets for the UNB 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
Liquids Unloading S12

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Annual Emissions using ProMax (tons/yr)
VOCs	0.01	0.05
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	<0.01	0.03
Total CO_2e	0.20	0.86

Notes:
-Emission rates for Liquids Unloading was calculated using ProMax software. ProMax output sheets for the UNB 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 (S13)

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	1,020	8,760	<0.01	<0.01
Hexane	1.8	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,020	8,760	<0.01	<0.01
Formaldehyde	0.075	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,020	8,760	<0.01	<0.01
Benzene	0.0021	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,020	8,760	<0.01	<0.01
Toluene	0.0034	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,020	8,760	<0.01	<0.01
Pb	0.0005	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,020	8,760	<0.01	<0.01
CO	84	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,020	8,760	<0.01	<0.01
NOx	100	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,020	8,760	<0.01	<0.01
$PM_{Filterable}$	1.9	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,020	8,760	<0.01	<0.01
$PM_{Condensable}$	5.7	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,020	8,760	<0.01	<0.01
PM_{Total}	7.6	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,020	8,760	<0.01	<0.01
SO_2	0.6	$lb/10^6$ scf	AP-42 Chapter 1.4	0.0007	1,020	8,760	<0.01	<0.01
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	0.0007	1,020	8,760	0.08	0.36
CH_4	0.001	kg CO_2 / MMBtu	40 CFR Subpart C	0.0007	1,020	8,760	<0.01	<0.01
N_2O	0.0001	kg CO_2 / MMBtu	40 CFR Subpart C	0.0007	1,020	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)**

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	5
Separators	5
Meters/Piping	6
Compressors	0
In-line Heaters	5
Dehydrators	0

Gas Composition														
	Propane	**Butane**	**Pentanes**	**Heptane**	**Octanes**	**Nonanes**	**Decanes**	**Hexane**	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylene**	**CO_2**	**CH_4**
Mole %	0.20	0.02	0.002	<0.01	<0.001	<0.001	<0.001	0.0046	<0.001	<0.001	<0.001	<0.001	0.11	96.12
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	187	0.027	8760	0.00	0.01	<0.001	<0.001	0.001	0.004	0.20	0.88	5.04	22.06
Connectors	815	0.003	8760	<0.001	0.00	<0.001	<0.001	<0.001	0.002	0.10	0.43	2.44	10.68
Open-ended Lines	13	0.06	8760	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.03	0.13	0.76	3.33
Pressure Relief Valves	5	0.04	8760	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	0.03	0.20	0.87
			Total Emissions:	**<0.01**	**0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.34**	**1.48**	**8.44**	**36.95**

- 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)	Miles per Trip	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	1.17	7,183	NA	NA	5.01	18.00	1.28	4.59	0.13	0.46
2	Employee Vehicles	4	3	1.17	200	NA	NA	1.78	0.18	0.45	0.05	0.05	0.005
							Totals:	**6.79**	**18.18**	**1.73**	**4.63**	**0.17**	**0.46**

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

UNB Site Emission Levels

	VOCs		HAPs		CO		NO_x		PM - Total		PM - 10/2.5		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	0.0824	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	0.0824	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	0.0824	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	0.0824	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	0.0824	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 (E06)	0.24	1.07	<0.01	0.04	---	---	---	---	---	---	---	---	---	---	---	---	<0.01	<0.01	0.13	0.55	---	---	3.13	13.72
Fluids Tank (E07-E11)	5.86	25.67	0.21	0.92	---	---	---	---	---	---	---	---	---	---	---	---	0.02	0.09	3.01	13.18	---	---	75.22	329.47
Tank Truck Loading Activities (E12)	0.01	0.05	<0.01	<0.01	---	---	---	---	---	---	---	---	---	---	---	---	<0.01	<0.01	<0.01	0.03	---	---	0.20	0.86
TEG (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	<0.01	<0.01	0.08	0.36	<0.01	<0.01	<0.01	<0.01	0.08	0.36
Haul Roads	--	--	--	--	--	--	--	--	6.79	18.18	6.79	18.18	--	--	--	--	--	--	--	--	--	--	--	--
Fugitives Leaks	<0.01	0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	0.34	1.48	--	--	8.44	36.95
Totals	**6.14**	**26.91**	**0.23**	**0.99**	**0.41**	**1.80**	**0.49**	**2.15**	**6.83**	**18.34**	**6.80**	**18.22**	**0.03**	**0.12**	**<0.01**	**0.01**	**584.99**	**2562.26**	**3.49**	**15.28**	**<0.01**	**<0.01**	**672.56**	**2945.81**

Attachment T - Emission Calculations
UNB Site 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
Blowdown Tank (E06)	<0.01	0.04	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluids Tanks (E07-E11)	0.21	0.92	<0.01	<0.01	0.18	0.79	<0.01	0.02	0.02	0.09	<0.01	<0.01	<0.01	<0.01
Tank Truck Loading Activities (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
TEG (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
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	**0.23**	**0.99**	**<0.01**	**<0.01**	**0.20**	**0.86**	**<0.01**	**0.02**	**0.02**	**0.09**	**<0.01**	**0.01**	**<0.01**	**0.01**

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:
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. Pecoro

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

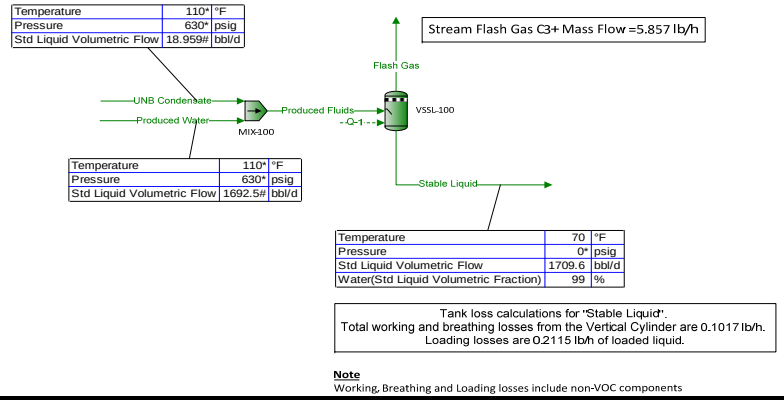
Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Flowsheet1
Plant Schematic

Client Name:	Arsenal	Job: Produced WaterTanks, 1% Condensate
Location:	UNB Wellpad	
Flowsheet:	Flowsheet1	

Arsenal UNB Wellpad

1% Condensate



Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal	Job: Produced Water Tanks 1% Condensate
Location:	UNB Wellpad	
Flowsheet:	Flowsheet1	

Connections

	Flash Gas	Produced Fluids	Produced Water	Stable Liquid	UNB Condensate
From Block	VSSL-100	MIX-100	--	VSSL-100	--
To Block	--	VSSL-100	MIX-100	--	MIX-100

Stream Composition

Mole Fraction	Flash Gas %	Produced Fluids %	Produced Water %	Stable Liquid %	UNB Condensate %
Nitrogen	0	0	0 *	0	0 *
Methane	49.2641	0.0151737	0 *	0.00152941	10.674 *
Carbon Dioxide	0.113732	9.24015E-05	0 *	6.09179E-05	0.065 *
Ethane	21.6728	0.00764374	0 *	0.00164144	5.377 *
Propane	11.8694	0.00531095	0 *	0.00202402	3.736 *
Isobutane	2.95582	0.0019319	0 *	0.00111353	1.359 *
n-Butane	4.76991	0.00391498	0 *	0.00259457	2.754 *
Isopentane	2.10843	0.00356528	0 *	0.00298213	2.508 *
n-Pentane	1.50518	0.00319851	0 *	0.00278239	2.25 *
Isohexane	1.36244	0.00674104	0 *	0.00636545	4.742 *
n-Hexane	0.552193	0.0038638	0 *	0.00371189	2.718 *
2,2,4-Trimethylpentane	0.0012559	2.55881E-05	0 *	2.52472E-05	0.018 *
Benzene	0.0143537	0.00015495	0 *	0.000151016	0.109 *
Heptane	0.850347	0.018793	0 *	0.0185627	13.22 *
Toluene	0.0569277	0.00155945	0 *	0.00154411	1.097 *
Octane	0.307588	0.0222133	0 *	0.0221343	15.626 *
Ethylbenzene	0.00333332	0.000284312	0 *	0.000283468	0.2 *
o-Xylene	0.00486371	0.000523135	0 *	0.000521932	0.368 *
Nonane	0.0691174	0.0164887	0 *	0.0164741	11.599 *
Decane	0.0402866	0.0306773	0 *	0.0306746	21.58 *
Water	2.47794	99.8578	100 *	99.8848	0 *

Molar Flow	Flash Gas lbmol/h	Produced Fluids lbmol/h	Produced Water lbmol/h	Stable Liquid lbmol/h	UNB Condensate lbmol/h
Nitrogen	0	0	0 *	0	0 *
Methane	0.187297	0.208285	0 *	0.0209879	0.208285 *
Carbon Dioxide	0.000432396	0.00126836	0 *	0.000835967	0.00126836 *
Ethane	0.0823976	0.104923	0 *	0.0225253	0.104923 *
Propane	0.0451262	0.0729016	0 *	0.0277754	0.0729016 *
Isobutane	0.0112377	0.0265185	0 *	0.0152808	0.0265185 *
n-Butane	0.0181347	0.0537396	0 *	0.0356049	0.0537396 *
Isopentane	0.00801601	0.0489393	0 *	0.0409233	0.0489393 *
n-Pentane	0.00572255	0.0439049	0 *	0.0381823	0.0439049 *
Isohexane	0.00517985	0.092532	0 *	0.0873521	0.092532 *
n-Hexane	0.00209938	0.0530371	0 *	0.0509377	0.0530371 *
2,2,4-Trimethylpentane	4.77479E-06	0.000351239	0 *	0.000346464	0.000351239 *
Benzene	5.45712E-05	0.00212695	0 *	0.00207238	0.00212695 *
Heptane	0.00323293	0.257966	0 *	0.254733	0.257966 *
Toluene	0.000216433	0.0214061	0 *	0.0211896	0.0214061 *
Octane	0.00116942	0.304914	0 *	0.303745	0.304914 *
Ethylbenzene	1.26729E-05	0.00390266	0 *	0.00388998	0.00390266 *
o-Xylene	1.84913E-05	0.00718089	0 *	0.00716239	0.00718089 *
Nonane	0.000262777	0.226334	0 *	0.226072	0.226334 *
Decane	0.000153165	0.421097	0 *	0.420943	0.421097 *
Water	0.00942087	1370.71	1370.71 *	1370.7	0 *

Mass Fraction	Flash Gas %	Produced Fluids %	Produced Water %	Stable Liquid %	UNB Condensate %
Nitrogen	0	0	0 *	0	0 *

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal	Job: Produced Water Tanks 1% Condensate
Location:	UNB Wellpad	
Flowsheet:	Flowsheet1	

Mass Fraction	Flash Gas %	Produced Fluids %	Produced Water %	Stable Liquid %	UNB Condensate %
Methane	26.065	0.0134298	0 *	0.00135389	1.79018 *
Carbon Dioxide	0.165076	0.000224353	0 *	0.000147938	0.029906 *
Ethane	21.4927	0.0126804	0 *	0.00272354	1.69028 *
Propane	17.2616	0.0129204	0 *	0.00492491	1.72227 *
Isobutane	5.66601	0.00619489	0 *	0.00357134	0.825773 *
n-Butane	9.14343	0.0125539	0 *	0.00832136	1.67342 *
Isopentane	5.017	0.0141915	0 *	0.0118725	1.89171 *
n-Pentane	3.58158	0.0127316	0 *	0.0110773	1.69711 *
Isohexane	3.87219	0.0320492	0 *	0.0302691	4.27212 *
n-Hexane	1.56939	0.0183698	0 *	0.0176509	2.44868 *
2,2,4-Trimethylpentane	0.00473136	0.000161257	0 *	0.000159139	0.0214954 *
Benzene	0.0369774	0.000667752	0 *	0.000650921	0.0890107 *
Heptane	2.81015	0.103891	0 *	0.102637	13.8486 *
Toluene	0.17299	0.00792719	0 *	0.00785068	1.05669 *
Octane	1.15878	0.139989	0 *	0.139517	18.6604 *
Ethylbenzene	0.0116712	0.00166527	0 *	0.00166063	0.221978 *
o-Xylene	0.0170297	0.00306409	0 *	0.00305761	0.40844 *
Nonane	0.29236	0.116672	0 *	0.116591	15.5523 *
Decane	0.189046	0.240809	0 *	0.240833	32.0996 *
Water	1.47227	99.2498	100 *	99.2951	0 *

Mass Flow	Flash Gas lb/h	Produced Fluids lb/h	Produced Water lb/h	Stable Liquid lb/h	UNB Condensate lb/h
Nitrogen	0	0	0 *	0	0 *
Methane	3.0047	3.3414	0 *	0.336697	3.3414 *
Carbon Dioxide	0.0190296	0.05582	0 *	0.0367905	0.05582 *
Ethane	2.47762	3.15493	0 *	0.677314	3.15493 *
Propane	1.98987	3.21464	0 *	1.22477	3.21464 *
Isobutane	0.653162	1.54132	0 *	0.888154	1.54132 *
n-Butane	1.05403	3.12346	0 *	2.06943	3.12346 *
Isopentane	0.578346	3.53091	0 *	2.95256	3.53091 *
n-Pentane	0.412875	3.16768	0 *	2.75481	3.16768 *
Isohexane	0.446376	7.97397	0 *	7.5276	7.97397 *
n-Hexane	0.180915	4.57049	0 *	4.38958	4.57049 *
2,2,4-Trimethylpentane	0.000545417	0.0401215	0 *	0.0395761	0.0401215 *
Benzene	0.00426266	0.16614	0 *	0.161877	0.16614 *
Heptane	0.323946	25.8486	0 *	25.5247	25.8486 *
Toluene	0.0199418	1.97232	0 *	1.95238	1.97232 *
Octane	0.133581	34.8299	0 *	34.6963	34.8299 *
Ethylbenzene	0.00134542	0.414325	0 *	0.41298	0.414325 *
o-Xylene	0.00196313	0.762359	0 *	0.760396	0.762359 *
Nonane	0.0337025	29.0286	0 *	28.9949	29.0286 *
Decane	0.0217926	59.9143	0 *	59.8925	59.9143 *
Water	0.16972	24693.8	24693.8 *	24693.6	0 *

Stream Properties

Property	Units	Flash Gas	Produced Fluids	Produced Water	Stable Liquid	UNB Condensate
Temperature	°F	69.9831	110.005	110 *	69.9831	110 *
Pressure	psia	14.6959	644.696	644.696 *	14.6959 *	644.696 *
Mole Fraction Vapor	%	100	0	0	0	0
Mole Fraction Light Liquid	%	0	0.125337	100	0.112296	100
Mole Fraction Heavy Liquid	%	0	99.8747	0	99.8877	0
Molecular Weight	lb/lbmol	30.321	18.1256	18.0153	18.1223	95.6535
Mass Density	lb/ft^3	0.0790312	61.6398	61.8554	62.0998	41.7451
Molar Flow	lbmol/h	0.380189	1372.67	1370.71	1372.28	1.95133
Mass Flow	lb/h	11.5277	24880.4	24693.8	24868.9	186.651

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal	Job: Produced Water Tanks 1% Condensate
Location:	UNB Wellpad	
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Flash Gas	Produced Fluids	Produced Water	Stable Liquid	UNB Condensate
Vapor Volumetric Flow	ft^3/h	145.863	403.643	399.218	400.467	4.47122
Liquid Volumetric Flow	gpm	18.1855	50.3243	49.7726	49.9283	0.557451
Std Vapor Volumetric Flow	MMSCFD	0.00346262	12.5017	12.4839	12.4982	0.0177719
Std Liquid Volumetric Flow	sgpm	0.0546835	49.9177	49.3647 *	49.863	0.552974 *
Compressibility		0.991945	0.0310097	0.0307136	0.00075451	0.241637
Specific Gravity		1.0469	0.988308	0.991765	0.995684	0.669324
API Gravity			10.3891	9.9226	10.4085	72.1924
Enthalpy	Btu/h	-15575.4	-1.67775E+08	-1.676E+08	-1.68775E+08	-175503
Mass Enthalpy	Btu/lb	-1351.12	-6743.26	-6787.13	-6786.58	-940.27
Mass Cp	Btu/(lb*°F)	0.43574	0.976624	0.979728	0.978871	0.541859
Ideal Gas CpCv Ratio		1.17801	1.3216	1.32394	1.32371	1.05294
Dynamic Viscosity	cP	0.00947686	0.632637	0.636007	0.991313	0.324899
Kinematic Viscosity	cSt	7.48591	0.640727	0.641894	0.996551	0.485873
Thermal Conductivity	Btu/(h*ft*°F)	0.0140829	0.360555	0.363956	0.344335	0.0683226
Surface Tension	lbf/ft		0.00469477	0.00473609	0.00499675 ?	0.000915441
Net Ideal Gas Heating Value	Btu/ft^3	1595.96	6.91343	0	6.47318	4863.26
Net Liquid Heating Value	Btu/lb	19845.6	-908.234	-1059.76	-917.854	19138.5
Gross Ideal Gas Heating Value	Btu/ft^3	1745.93	57.6963	50.3101	57.2286	5246.17
Gross Liquid Heating Value	Btu/lb	21722.6	154.972	0	144.974	20657.6

Remarks

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	Arsenal	Job: Produced Water Tanks 1% Condensate
Location:	UNB Wellpad	Modified: 5:14 PM, 7/24/2014
Flowsheet:	Flowsheet1	Status: Solved 10:08 AM, 5/16/2017

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Water	Inlet		UNB Condensate	Inlet	
Produced Fluids	Outlet	VSSL-100			

Block Parameters

Pressure Drop	0 psi	Fraction to PStream Produced Fluids	100 %

Remarks

Blocks
VSSL-100
Separator Report

Client Name:	Arsenal	Job: Produced Water Tanks 1% Condensate
Location:	UNB Wellpad	Modified: 11:42 AM, 5/13/2017
Flowsheet:	Flowsheet1	Status: Solved 10:08 AM, 5/16/2017

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Fluids	Inlet	MIX-100	Flash Gas	Vapor Outlet	
Stable Liquid	Light Liquid Outlet		Q-1	Energy	

Block Parameters

Pressure Drop	630	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0.0276972	%	Heat Duty	-1.015E+06	Btu/h
Mole Fraction Light Liquid	0.112265	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	99.86	%	Heat Release Curve Increments	10	

Remarks

Flowsheet Environment
Environment1

Client Name:	Arsenal	Job: Produced Water Tanks 1% Condensate
Location:	UNB Wellpad	
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	2,2,4-Trimethylpentane	False	False
Methane	False	False	Benzene	False	False
Carbon Dioxide	False	False	Heptane	False	False
Ethane	False	False	Toluene	False	False
Propane	False	False	Octane	False	False
Isobutane	False	False	Ethylbenzene	False	False
n-Butane	False	False	o-Xylene	False	False
Isopentane	False	False	Nonane	False	False
n-Pentane	False	False	Decane	False	False
Isohexane	False	False	Water	False	True
n-Hexane	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	Job: Produced Water Tanks 1% Condensate
Location:	UNB Wellpad	

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	2,2,4-Trimethylpentane	False	False
Methane	False	False	Benzene	False	False
Carbon Dioxide	False	False	Heptane	False	False
Ethane	False	False	Toluene	False	False
Propane	False	False	Octane	False	False
Isobutane	False	False	Ethylbenzene	False	False
n-Butane	False	False	o-Xylene	False	False
Isopentane	False	False	Nonane	False	False
n-Pentane	False	False	Decane	False	False
Isohexane	False	False	Water	False	True
n-Hexane	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

Calculator Report

Client Name:	Arsenal	Job: Produced Water Tanks 1% Condensate
Location:	UNB Wellpad	

Simple Solver 1

Source Code

Residual Error (for CV1) = TotalFlow-1709.5875

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!UNB Condensate!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	18.9591
Unit	

Measured Variable [TotalFlow]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Stable Liquid!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	1709.59
Unit	

Solver Properties

Status: Solved

Error	2.00089E-11		Iterations	3
Calculated Value	0.552974	sgpm	Max Iterations	20
Lower Bound		sgpm	Weighting	1
Upper Bound		sgpm	Priority	0
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		Group	
Algorithm	Default		Skip Dependency Check	False

Remarks

Simple Solver 2

Source Code

Residual Error (for CV1) = PercentWater-99

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Water!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	1692.5
Unit	

Measured Variable [PercentWater]

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

Solver Properties

Status: Solved

Error	4.68958E-11		Iterations	3
Calculated Value	49.3647	sgpm	Max Iterations	20
Lower Bound		sgpm	Weighting	1
Upper Bound		sgpm	Priority	0
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		Group	
Algorithm	Default		Skip Dependency Check	False

Remarks

Calculator Report

Client Name:	Arsenal	Job: Produced Water Tanks 1% Condensate
Location:	UNB Wellpad	

User Value Sets Report

Client Name:	Arsenal	Job: Produced Water Tanks 1% Condensate
Location:	UNB Wellpad	

Cn+ Flow/Frac.

User Value [CnPlusSum]

* Parameter	5.85665	lb/h	Upper Bound	
Lower Bound		lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={E867C485-3D3C-49CB-BC24-EA16096DB2B1}

Tank Losses

User Value [ShellLength]

* Parameter	20	ft	Upper Bound	
* Lower Bound	0	ft	* Enforce Bounds	False

User Value [ShellDiam]

* Parameter	12	ft	Upper Bound	
* Lower Bound	0	ft	* Enforce Bounds	False

User Value [BreatherVP]

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

User Value [BreatherVacP]

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

User Value [DomeRadius]

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

User Value [OpPress]

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

User Value [AvgPercentLiq]

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

User Value [MaxPercentLiq]

* Parameter	90	%	Upper Bound	
Lower Bound		%	* Enforce Bounds	False

User Value [AnnNetTP]

* Parameter	1708.82	bbl/day	Upper Bound	
* Lower Bound	0	bbl/day	* Enforce Bounds	False

User Value [OREff]

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

User Value [AtmPressure]

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

User Value Sets Report

Client Name:	Arsenal	Job: Produced Water Tanks 1% Condensate
Location:	UNB Wellpad	

User Value [TVP]

* Parameter	0.258845 psia	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

* Parameter	57.7675 °F	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [MaxLiqSurfaceT]

* Parameter	66.3119 °F	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [TotalLosses]

* Parameter	0.101743 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	0.0775188 ton/yr	Upper Bound	
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	0.0116082 ton/yr	Upper Bound	
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]

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

User Value [WithdrawalLoss]

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

User Value [LoadingLosses]

* Parameter	0.211517 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

User Value [DeckFittingLosses]

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

User Value [DeckSeamLosses]

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

User Value [FlashingLosses]

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

User Value [GasMoleWeight]

* Parameter	0.0189129 kg/mol	Upper Bound	
Lower Bound		* Enforce Bounds	False

Remarks

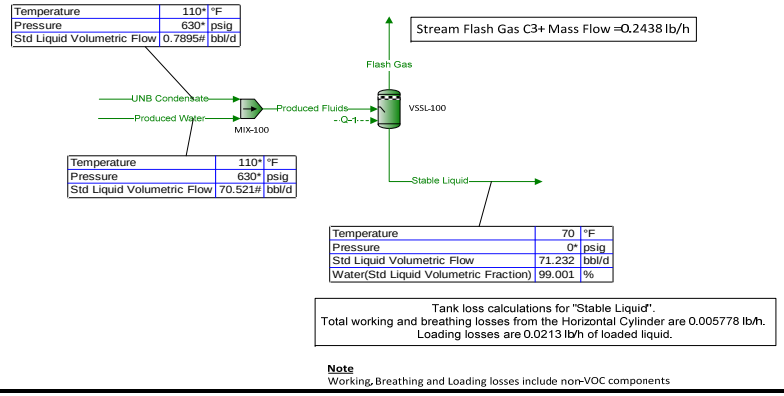
This User Value Set was programmatically generated. GUID={B57AFC7E-AAE8-4873-921B-7B4031991004}

Flowsheet1
Plant Schematic

Client Name:	Arsenal	Job: Blowdown Tank, 1% Condensate
Location:	UNB Wellpad	
Flowsheet:	Flowsheet1	

Arsenal UNB Wellpad
Blowdown Tank

1% Condensate



Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal	Job: Blowdown Tank 1% Condensate
Location:	UNB Wellpad	
Flowsheet:	Flowsheet1	

Connections

	Flash Gas	Produced Fluids	Produced Water	Stable Liquid	UNB Condensate
From Block	VSSL-100	MIX-100	--	VSSL-100	--
To Block	--	VSSL-100	MIX-100	--	MIX-100

Stream Composition

Mole Fraction	Flash Gas %	Produced Fluids %	Produced Water %	Stable Liquid %	UNB Condensate %
Nitrogen	0	0	0 *	0	0 *
Methane	49.2665	0.0151649	0 *	0.0015294	10.674 *
Carbon Dioxide	0.113686	9.23474E-05	0 *	6.08983E-05	0.065 *
Ethane	21.6729	0.00763926	0 *	0.00164113	5.377 *
Propane	11.8693	0.00530784	0 *	0.00202324	3.736 *
Isobutane	2.95568	0.00193077	0 *	0.00111301	1.359 *
n-Butane	4.76955	0.00391269	0 *	0.0025933	2.754 *
Isopentane	2.10815	0.00356319	0 *	0.00298052	2.508 *
n-Pentane	1.50497	0.00319664	0 *	0.00278087	2.25 *
Isohexane	1.36219	0.0067371	0 *	0.00636183	4.742 *
n-Hexane	0.552082	0.00386154	0 *	0.00370976	2.718 *
2,2,4-Trimethylpentane	0.00125561	2.55731E-05	0 *	2.52326E-05	0.018 *
Benzene	0.0143481	0.000154859	0 *	0.00015093	0.109 *
Heptane	0.850145	0.018782	0 *	0.0185519	13.22 *
Toluene	0.0569113	0.00155854	0 *	0.00154322	1.097 *
Octane	0.307505	0.0222003	0 *	0.0221213	15.626 *
Ethylbenzene	0.00333238	0.000284146	0 *	0.000283302	0.2 *
o-Xylene	0.0048623	0.000522828	0 *	0.000521627	0.368 *
Nonane	0.0690964	0.016479	0 *	0.0164645	11.599 *
Decane	0.0402732	0.0306593	0 *	0.0306567	21.58 *
Water	2.47725	99.8579	100 *	99.8849	0 *

Molar Flow	Flash Gas lbmol/h	Produced Fluids lbmol/h	Produced Water lbmol/h	Stable Liquid lbmol/h	UNB Condensate lbmol/h
Nitrogen	0	0	0 *	0	0 *
Methane	0.00779896	0.00867345	0 *	0.000874487	0.00867345 *
Carbon Dioxide	1.79967E-05	5.28175E-05	0 *	3.48208E-05	5.28175E-05 *
Ethane	0.00343086	0.00436923	0 *	0.000938373	0.00436923 *
Propane	0.00187893	0.00303579	0 *	0.00115686	0.00303579 *
Isobutane	0.000467888	0.00110429	0 *	0.000636404	0.00110429 *
n-Butane	0.000755028	0.00223784	0 *	0.00148281	0.00223784 *
Isopentane	0.000333724	0.00203794	0 *	0.00170422	0.00203794 *
n-Pentane	0.000238239	0.0018283	0 *	0.00159006	0.0018283 *
Isohexane	0.000215637	0.00385324	0 *	0.0036376	0.00385324 *
n-Hexane	8.73954E-05	0.00220859	0 *	0.00212119	0.00220859 *
2,2,4-Trimethylpentane	1.98765E-07	1.46264E-05	0 *	1.44276E-05	1.46264E-05 *
Benzene	2.27132E-06	8.85709E-05	0 *	8.62996E-05	8.85709E-05 *
Heptane	0.000134579	0.0107423	0 *	0.0106077	0.0107423 *
Toluene	9.00915E-06	0.000891397	0 *	0.000882388	0.000891397 *
Octane	4.86785E-05	0.0126973	0 *	0.0126487	0.0126973 *
Ethylbenzene	5.27521E-07	0.000162515	0 *	0.000161988	0.000162515 *
o-Xylene	7.6971E-07	0.000299028	0 *	0.000298259	0.000299028 *
Nonane	1.09381E-05	0.00942508	0 *	0.00941415	0.00942508 *
Decane	6.37532E-06	0.0175354	0 *	0.017529	0.0175354 *
Water	0.000392152	57.1131	57.1131 *	57.1127	0 *

Mass Fraction	Flash Gas %	Produced Fluids %	Produced Water %	Stable Liquid %	UNB Condensate %
Nitrogen	0	0	0 *	0	0 *

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal	Job: Blowdown Tank, 1% Condensate
Location:	UNB Wellpad	
Flowsheet:	Flowsheet1	

Mass Fraction	Flash Gas %	Produced Fluids %	Produced Water %	Stable Liquid %	UNB Condensate %
Methane	26.0672	0.013422	0 *	0.00135388	1.79018 *
Carbon Dioxide	0.165017	0.000224222	0 *	0.000147891	0.029906 *
Ethane	21.4936	0.012673	0 *	0.00272302	1.69028 *
Propane	17.2621	0.0129128	0 *	0.00492302	1.72227 *
Isobutane	5.66593	0.00619128	0 *	0.00356969	0.825773 *
n-Butane	9.14307	0.0125466	0 *	0.00831732	1.67342 *
Isopentane	5.01653	0.0141833	0 *	0.0118662	1.89171 *
n-Pentane	3.5812	0.0127242	0 *	0.0110713	1.69711 *
Isohexane	3.87162	0.0320305	0 *	0.030252	4.27212 *
n-Hexane	1.56913	0.0183591	0 *	0.0176408	2.44868 *
2,2,4-Trimethylpentane	0.00473044	0.000161163	0 *	0.000159047	0.0214954 *
Benzene	0.0369643	0.000667364	0 *	0.000650551	0.0890107 *
Heptane	2.80958	0.103831	0 *	0.102578	13.8486 *
Toluene	0.172946	0.00792258	0 *	0.00784614	1.05669 *
Octane	1.15851	0.139908	0 *	0.139436	18.6604 *
Ethylbenzene	0.0116683	0.0016643	0 *	0.00165966	0.221978 *
o-Xylene	0.0170253	0.00306231	0 *	0.00305584	0.40844 *
Nonane	0.292282	0.116604	0 *	0.116523	15.5523 *
Decane	0.18899	0.240669	0 *	0.240693	32.0996 *
Water	1.47191	99.2502	100 *	99.2955	0 *

Mass Flow	Flash Gas lb/h	Produced Fluids lb/h	Produced Water lb/h	Stable Liquid lb/h	UNB Condensate lb/h
Nitrogen	0	0	0 *	0	0 *
Methane	0.125115	0.139143	0 *	0.0140289	0.139143 *
Carbon Dioxide	0.000792028	0.00232447	0 *	0.00153245	0.00232447 *
Ethane	0.103163	0.131378	0 *	0.028216	0.131378 *
Propane	0.0828526	0.133865	0 *	0.0510124	0.133865 *
Isobutane	0.0271947	0.0641839	0 *	0.0369892	0.0641839 *
n-Butane	0.0438839	0.130068	0 *	0.0861842	0.130068 *
Isopentane	0.0240778	0.147035	0 *	0.122957	0.147035 *
n-Pentane	0.0171886	0.13191	0 *	0.114721	0.13191 *
Isohexane	0.0185826	0.332054	0 *	0.313472	0.332054 *
n-Hexane	0.00753133	0.190326	0 *	0.182794	0.190326 *
2,2,4-Trimethylpentane	2.27046E-05	0.00167075	0 *	0.00164805	0.00167075 *
Benzene	0.000177417	0.00691844	0 *	0.00674102	0.00691844 *
Heptane	0.0134851	1.0764	0 *	1.06291	1.0764 *
Toluene	0.000830089	0.0821319	0 *	0.0813018	0.0821319 *
Octane	0.00556048	1.4504	0 *	1.44484	1.4504 *
Ethylbenzene	5.60042E-05	0.0172535	0 *	0.0171974	0.0172535 *
o-Xylene	8.17162E-05	0.0317464	0 *	0.0316646	0.0317464 *
Nonane	0.00140286	1.20882	0 *	1.20741	1.20882 *
Decane	0.000907091	2.49497	0 *	2.49406	2.49497 *
Water	0.00706473	1028.91	1028.91 *	1028.9	0 *

Stream Properties

Property	Units	Flash Gas	Produced Fluids	Produced Water	Stable Liquid	UNB Condensate
Temperature	°F	69.9749	110.005	110 *	69.9749	110 *
Pressure	psia	14.6959	644.696	644.696 *	14.6959 *	644.696 *
Mole Fraction Vapor	%	100	0	0	0	0
Mole Fraction Light Liquid	%	0	0.12526	100	0.112231	100
Mole Fraction Heavy Liquid	%	0	99.8747	0	99.8878	0
Molecular Weight	lb/lbmol	30.3199	18.1256	18.0153	18.1222	95.6535
Mass Density	lb/ft^3	0.0790296	61.6399	61.8554	62.1	41.7451
Molar Flow	lbmol/h	0.0158302	57.1944	57.1131	57.1786	0.0812577
Mass Flow	lb/h	0.479969	1036.68	1028.91	1036.2	7.77259

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal	Job: Blowdown Tank, 1% Condensate
Location:	UNB Wellpad	
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Flash Gas	Produced Fluids	Produced Water	Stable Liquid	UNB Condensate
Vapor Volumetric Flow	ft^3/h	6.07328	16.8183	16.6341	16.686	0.186192
Liquid Volumetric Flow	gpm	0.757188	2.09683	2.07386	2.08033	0.0232135
Std Vapor Volumetric Flow	MMSCFD	0.000144175	0.520904	0.520164	0.52076	0.000740064
Std Liquid Volumetric Flow	sgpm	0.00227686	2.07989	2.05686 *	2.07761	0.0230271 *
Compressibility		0.991945	0.0310095	0.0307136	0.000754516	0.241637
Specific Gravity		1.04686	0.98831	0.991765	0.995687	0.669324
API Gravity			10.3888	9.9226	10.4083	72.1924
Enthalpy	Btu/h	-648.504	-6.99065E+06	-6.98334E+06	-7.0323E+06	-7308.33
Mass Enthalpy	Btu/lb	-1351.14	-6743.29	-6787.13	-6786.61	-940.27
Mass Cp	Btu/(lb*°F)	0.435739	0.976625	0.979728	0.978874	0.541859
Ideal Gas CpCv Ratio		1.17801	1.3216	1.32394	1.32372	1.05294
Dynamic Viscosity	cP	0.00947681	0.632639	0.636007	0.991419	0.324899
Kinematic Viscosity	cSt	7.48603	0.640727	0.641894	0.996654	0.485873
Thermal Conductivity	Btu/(h*ft*°F)	0.0140828	0.360557	0.363956	0.344333	0.0683226
Surface Tension	lbf/ft		0.0046948	0.00473609	0.00499683 ?	0.000915441
Net Ideal Gas Heating Value	Btu/ft^3	1595.92	6.90938	0	6.46945	4863.26
Net Liquid Heating Value	Btu/lb	19845.8	-908.322	-1059.76	-917.935	19138.5
Gross Ideal Gas Heating Value	Btu/ft^3	1745.88	57.692	50.3101	57.2246	5246.17
Gross Liquid Heating Value	Btu/lb	21722.7	154.882	0	144.891	20657.6

Remarks

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	Arsenal	Job: Blowdown Tank, 1% Condensate	
Location:	UNB Wellpad	Modified: 5:14 PM, 7/24/2014	
Flowsheet:	Flowsheet1	Status: Solved 10:50 AM, 5/16/2017	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Water	Inlet		UNB Condensate	Inlet	
Produced Fluids	Outlet	VSSL-100			

Block Parameters

Pressure Drop	0 psi	Fraction to PStream Produced Fluids	100 %

Remarks

Blocks
VSSL-100
Separator Report

Client Name:	Arsenal	Job: Blowdown Tank, 1% Condensate
Location:	UNB Wellpad	Modified: 11:42 AM, 5/13/2017
Flowsheet:	Flowsheet1	Status: Solved 10:50 AM, 5/16/2017

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Fluids	Inlet	MIX-100	Flash Gas	Vapor Outlet	
Stable Liquid	Light Liquid Outlet		Q-1	Energy	

Block Parameters

Pressure Drop	630	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0.0276778	%	Heat Duty	-42300	Btu/h
Mole Fraction Light Liquid	0.1122	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	99.8601	%	Heat Release Curve Increments	10	

Remarks

Flowsheet Environment
Environment1

Client Name:	Arsenal	Job: Blowdown Tank, 1% Condensate
Location:	UNB Wellpad	
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	2,2,4-Trimethylpentane	False	False
Methane	False	False	Benzene	False	False
Carbon Dioxide	False	False	Heptane	False	False
Ethane	False	False	Toluene	False	False
Propane	False	False	Octane	False	False
Isobutane	False	False	Ethylbenzene	False	False
n-Butane	False	False	o-Xylene	False	False
Isopentane	False	False	Nonane	False	False
n-Pentane	False	False	Decane	False	False
Isohexane	False	False	Water	False	True
n-Hexane	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	Job: Blowdown Tank, 1% Condensate
Location:	UNB Wellpad	

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	2,2,4-Trimethylpentane	False	False
Methane	False	False	Benzene	False	False
Carbon Dioxide	False	False	Heptane	False	False
Ethane	False	False	Toluene	False	False
Propane	False	False	Octane	False	False
Isobutane	False	False	Ethylbenzene	False	False
n-Butane	False	False	o-Xylene	False	False
Isopentane	False	False	Nonane	False	False
n-Pentane	False	False	Decane	False	False
Isohexane	False	False	Water	False	True
n-Hexane	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

Calculator Report

Client Name:	Arsenal	Job: Blowdown Tank, 1% Condensate
Location:	UNB Wellpad	

Simple Solver 1

Source Code

Residual Error (for CV1) = TotalFlow-71.2329

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!UNB Condensate!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	0.7895
Unit	

Measured Variable [TotalFlow]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Stable Liquid!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	71.2325
Unit	

Solver Properties

Status: Solved

Error	-0.000421525		Iterations	2
Calculated Value	0.0230271	sgpm	Max Iterations	20
Lower Bound		sgpm	Weighting	1
Upper Bound		sgpm	Priority	0
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		Group	
Algorithm	Default		Skip Dependency Check	False

Remarks

Simple Solver 2

Source Code

Residual Error (for CV1) = PercentWater-99

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Water!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	70.521
Unit	

Measured Variable [PercentWater]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Stable Liquid!Phases!Total!Composition!Std Liquid Volumetric Fraction!Water
Value	99.0006
Unit	

Solver Properties

Status: Solved

Error	0.00056712		Iterations	2
Calculated Value	2.05686	sgpm	Max Iterations	20
Lower Bound		sgpm	Weighting	1
Upper Bound		sgpm	Priority	0
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		Group	
Algorithm	Default		Skip Dependency Check	False

Remarks

User Value Sets Report

Client Name:	Arsenal	Job: Blowdown Tank, 1% Condensate
Location:	UNB Wellpad	

Cn+ Flow/Frac.

User Value [CnPlusSum]

* Parameter	0.243835	lb/h	Upper Bound	
Lower Bound		lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={E867C485-3D3C-49CB-BC24-EA16096DB2B1}

Tank Losses

User Value [ShellLength]

* Parameter	10	ft	Upper Bound	
* Lower Bound	0	ft	* Enforce Bounds	False

User Value [ShellDiam]

* Parameter	10	ft	Upper Bound	
* Lower Bound	0	ft	* Enforce Bounds	False

User Value [BreatherVP]

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

User Value [BreatherVacP]

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

User Value [DomeRadius]

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

User Value [OpPress]

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

User Value [AvgPercentLiq]

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

User Value [MaxPercentLiq]

* Parameter	90	%	Upper Bound	
Lower Bound		%	* Enforce Bounds	False

User Value [AnnNetTP]

* Parameter	71.2007	bbl/day	Upper Bound	
* Lower Bound	0	bbl/day	* Enforce Bounds	False

User Value [OREff]

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

User Value [AtmPressure]

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

User Value Sets Report

Client Name:	Arsenal	Job: Blowdown Tank, 1% Condensate
Location:	UNB Wellpad	

User Value [TVP]

* Parameter	0.258842 psia	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

* Parameter	57.7675 °F	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [MaxLiqSurfaceT]

* Parameter	66.3119 °F	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [TotalLosses]

* Parameter	0.00577823 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	0.0198475 ton/yr	Upper Bound	
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	0.00546121 ton/yr	Upper Bound	
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]

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

User Value [WithdrawalLoss]

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

User Value [LoadingLosses]

* Parameter	0.0212978 lb/h	Upper Bound	
Lower Bound	lb/h	* Enforce Bounds	False

User Value [DeckFittingLosses]

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

User Value [DeckSeamLosses]

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

User Value [FlashingLosses]

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

User Value [GasMoleWeight]

* Parameter	0.0189126 kg/mol	Upper Bound	
Lower Bound		* Enforce Bounds	False

Remarks

This User Value Set was programmatically generated. GUID={B57AFC7E-AAE8-4873-921B-7B4031991004}

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
Sand Trap Blowdown Tank (E06)	---	---	---	---	0.24	1.07	---	---	---	---	---	---	0.13	0.55	3.13	13.72
Produced Water Tanks (E07-E11)	---	---	---	---	5.86	25.67	---	---	---	---	---	---	3.01	13.18	75.22	329.47
Produced Water Loading (E12)	---	---	---	---	0.01	0.05	---	---	---	---	---	---	<0.01	0.03	0.20	0.86
Thermoelectric Generator (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	0.08	0.36
TOTAL	0.49	2.15	0.41	1.80	6.14	26.90	<0.01	0.01	0.01	0.04	0.01	0.04	3.15	13.81	664.12	2,906.05

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
Sand Trap Blowdown Tank (E06)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	0.04
Produced Water Tanks (E07-E11)	<0.01	<0.01	<0.01	0.02	0.0	0.09	<0.01	<0.01	<0.01	0.01	0.18	0.79	0.21	0.92
Produced Water Loading (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
Thermoelectric Generator (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
TOTAL	<0.01	<0.01	<0.01	0.02	0.02	0.09	<0.01	0.01	<0.01	0.01	0.20	0.86	0.23	0.99

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 given 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 Taylor County, West Virginia. The latitude and longitude coordinates are: 39.43408 and -79.94391.

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

Particulate Matter (PM) = 0.16 tpy
Sulfur Dioxide (SO_2) = 0.01 tpy
Volatile Organic Compounds (VOC) = 26.90 tpy
Carbon Monoxide (CO) = 1.80 tpy
Nitrogen Oxides (NO_x) = 2.15 tpy
Total Hazardous Air Pollutants (HAPs) = 0.99 tpy
Hexane = 0.86 tpy
Benzene = 0.02 tpy
Toluene = 0.09 tpy
Ethylbenzene = 0.01 tpy
Xylene = 0.01 tpy
Carbon Dioxide Equivalents (CO_2e) = 2,908.86 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 2nd day of June 2017.

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