SWN Production Company, LLC
P O Box 12359
Spring, Texas 77391-2359
www.swn.com

August 30, 2016

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

Phone: (304) 926-0499
Fax: (304) 926-0479

RE: G70-C Application –OE Burge Pad, Permit # R13-3015C

Mr. Durham:

SWN Production Company, LLC respectfully submits the enclosed G70-C application for the OE Burge Pad located in Marshall County, West Virginia.

If you have any questions regarding the information in this application, please contact me at (501) 548-6728 or at Travis_Lee@swn.com.

Sincerely,

Travis Lee
Sr. HS&E Coordinator

10000 Energy Drive
Spring, TX 77389-4954

The Right People doing the Right Things, wisely investing the cash flow from our underlying Assets, will create Value+®

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Vendor:616193 WEST VIRGINIA DEP

Check Date 8/25/16 N0:0001012688

Invoice Date	Invoice No	Description	Invoice Amount	Amount Withheld	Discount Taken	Amount Paid
8/25/16	616193-25AUG16	O E BURGE PERMITS	1,500.00		0.00	1,500.00
	TOTAL FOR CHECK		1,500.00	0.00	0.00	1,500.00

SOUTHWESTERN ENERGY COMPANY AND SUBSIDIARIES

SWN Production (Arkansas), LLC
SWN Production Company, LLC
SWN Drilling Company, LLC

Southwestern Energy Services Company
SWN Midstream Services Company, LLC
Desoto Gathering Company, LLC

Angelina Gathering Company, LLC
A.W.Realty Company, LLC

Contact the A/P department with questions. Phone: 832-796-7888 E-mail: accountspayable@swn.com

THIS CHECK IS VOID WITHOUT A GRAY COLORED BACKGROUND, MICROPRINTING AND AN AUTHENTIC WATERMARK ON THE BACK — HOLD AT ANGLE TO VIEW WATERMARK.

SWN Southwestern Energy®

PO BOX 12359
SPRING,TX 77391-2359

Wells Fargo
Houston TX

General Fund 56-382 / 412

Check Date	Check No.
8/25/16	0001012688

Net Amount
$**********1,500.00

VOID AFTER 180 DAYS

Pay One Thousand Five Hundred Dollars And Zero Cents

To The Order Of

WEST VIRGINIA DEP
DIVISION OF AIR QUALITY PERMITTING
601 57TH STREET SOUTHEAST
CHARLESTON, WV 25304
US

By _____ Chief Executive Officer

By _____ Senior Vice President

⑈1012688⑈ ⑆041203824⑆ 9600153529⑈

SWN PRODUCTION COMPANY, LLC

O.E. BURGE PAD

GENERAL PERMIT G70-C

SUBMITTED TO WVDEP DIVISION OF AIR QUALITY
AUGUST 2016

TABLE OF CONTENTS

TABLE OF CONTENTS i

INTRODUCTION 1

Proposed Emissions 2

APPLICATION FOR GENERAL PERMIT REGISTRATION 6

ATTACHMENT A: SINGLE SOURCE DETERMINATION 9

ATTACHMENT C: BUSINESS REGISTRATION CERTIFICATE 14

ATTACHMENT D: PROCESS FLOW DIAGRAM 15

ATTACHMENT E: PROCESS DESCRIPTION 16

ATTACHMENT F: PLOT PLAN 17

ATTACHMENT G: AREA MAP 19

ATTACHMENT H: G70-C SECTION APPLICABILITY FORM 22

ATTACHMENT I: EMISSIONS UNITS/ERD TABLE 24

ATTACHMENT J: FUGITIVE EMISSIONS SUMMARY SHEET 26

ATTACHMENT K: GAS WELL AFFECTED FACILITY DATA SHEET 30

ATTACHMENT L: STORAGE VESSELS DATA SHEET 32

ATTACHMENT M: NATURAL GAS FIRED FUEL BURNING UNITS DATA SHEET 45

ATTACHMENT O: TANKER TRUCK LOADING DATA SHEET 50

ATTACHMENT Q: PNEUMATIC CONTROLLERS DATA SHEET 56

ATTACHMENT S: EMISSIONS CALCULATIONS 58

ATTACHMENT T: FACILITY-WIDE EMISSION SUMMARY SHEETS 87

ATTACHMENT U: CLASS I LEGAL ADVERTISEMENT 90

INTRODUCTION

SWN Production Company, LLC (SWN) submits this G70-C General Permit application for the O.E. Burge Pad, a natural gas production facility in Marshall County. The facility currently operates under Permit No. R13-3015C issued on January 23, 2014. With this application, SWN requests authorization to construct and operate under the General Permit G70-C for Oil and Natural Gas Production Facilities. Included with this application are changes in the emission estimates for the emission sources at the facility. The changes are summarized below:

- One (1) gas well has been added to the equipment representation.
- One (1) 1.5-mmBtu/hr GPU burner has been added to the equipment representation.
- One (1) 1.5-mmBtu/hr line heater that was previously authorized has been removed from the equipment representation.
- The tank configuration has been revised to include two (2) 400-bbl condensate tanks and four (4) 400-bbl produced water tanks instead of the previously authorized three (3) condensate tanks and three (3) produced water tanks. Please note that actual tanks have not been replaced.
- The condensate throughput estimate has been revised from 0.66158 bbl/d to 5.15 bbl/d.
- The produced water throughput estimate has been revised from 100 bbl/d to 1,500 bbl/d.
- The condensate flash emission factor has been revised from 13.57 lb/bbl to 12.12 lb/bbl based on an updated process simulation report.
- The produced water flash emission factor has been revised from 0.02 lb/bbl to 0.0026 lb/bbl based on an updated process simulation report.
- Truck loading emissions have been revised based on the change in condensate and produced water composition and throughput.
- Fugitive component counts have been revised based on the equipment changes.
- Fugitive haulroad estimates have been revised based on the change in condensate and produced water throughput.
- Greenhouse gas emissions have been updated using the most current Global Warming Potential multipliers.

No changes were made to the emission estimates for the existing GPU burners or line heaters. Note that other small storage tanks may be present on site (i.e., methanol, lube oil) but are considered de minimis sources per Table 45-13B and are not addressed further in this application.

Proposed Emissions

Emissions calculations for the facility are presented in Attachment S. A fuel heating value of 905 Btu/scf was used to calculate emissions from natural gas-fired equipment. Actual heating value may vary (generally 905 - 1,300) but using a lower heating value in the emissions calculations provides a more conservative (higher) estimate of fuel use.

Condensate tank emissions were calculated by EPA TANKS 4.0.9d modeled as Gasoline RVP 9. Although produced water storage tanks contain primarily water, a profile was created in EPA TANKS 4.0.9d assuming 1% of the total throughput as condensate and 99% as water to provide a conservative emissions estimate of the trace hydrocarbons that may be entrained in the water. Flashing emissions were calculated using ProMax process simulation software. Truck loading emissions were calculated using AP-42/EPA and the properties from EPA TANKS 4.0.9d.

Fugitive emissions were calculated with a component count by equipment type from a similar facility, and representative extended gas and liquids analyses. Haul road emissions were calculated using EPA/AP-42 methodologies.

Greenhouse gas emissions were calculated with the latest EPA factors and manufacturer data when available. Documents used as references for the emissions calculations, including AP-42 and EPA emission factor references, gas and liquids analyses, and process simulation results are attached.

STATE

45 CSR 13 - PERMITS FOR CONSTRUCTION, MODIFICATION, RELOCATION AND OPERATION OF STATIONARY SOURCES OF AIR POLLUTANTS, NOTIFICATION REQUIREMENTS, ADMINISTRATIVE UPDATES, TEMPORARY PERMITS, GENERAL PERMITS, AND PROCEDURES FOR EVALUATION:

The facility requests to operate under the General Permit G70-C. Emissions of carbon monoxide and volatile organic compounds are less than 80 tons per year (TPY). Oxides of nitrogen emissions are less than 50 TPY and particulate matter 10/2.5 and sulfur dioxide emissions are each less than 20 TPY. Also, the facility will have less than 8 TPY for each hazardous air pollutant and less than 20 tons for total hazardous air pollutants.

45 CSR 22 - AIR QUALITY MANAGEMENT FEE PROGRAM:

The facility will be required to maintain a valid Certificate to Operate on the premises.

45 CSR 30 - REQUIREMENTS FOR OPERATING PERMITS:

Emissions from the facility do not exceed major source thresholds; therefore, this rule does not apply.

FEDERAL

40 CFR PART 60 SUBPART KB—STANDARDS OF PERFORMANCE FOR VOLATILE ORGANIC LIQUID STORAGE VESSELS (INCLUDING PETROLEUM LIQUID STORAGE VESSELS) FOR WHICH CONSTRUCTION, RECONSTRUCTION, OR MODIFICATION COMMENCED AFTER JULY 23, 1984

The affected facility to which this Subpart applies is each storage vessel with a capacity greater than or equal to 75 cubic meters (m^3) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984. The tanks at this facility were constructed after the effective date of this Subpart but are less than 75 m^3 (which equals approximately 471 bbl); therefore, this Subpart does not apply.

40 CFR PART 60 SUBPART KKK - STANDARDS OF PERFORMANCE FOR STATIONARY FOR EQUIPMENT LEAKS OF VOC FROM ONSHORE NATURAL GAS PROCESSING PLANTS:

The facility is not considered an affected source (natural gas processing plant) and is therefore not subject to this Subpart.

40 CFR PART 60 SUBPART IIII - STANDARDS OF PERFORMANCE FOR STATIONARY COMPRESSION IGNITION INTERNAL COMBUSTION ENGINES:

The facility does not contain the affected source (diesel-fired engine) and is therefore not subject to this Subpart.

40 CFR PART 60 SUBPART JJJJ - STANDARDS OF PERFORMANCE FOR STATIONARY SPARK IGNITION INTERNAL COMBUSTION ENGINES:

The facility does not contain the affected source (natural gas-fired engine) and is therefore not subject to this Subpart.

40 CFR PART 60 SUBPART OOOO - STANDARDS OF PERFORMANCE FOR CRUDE OIL AND NATURAL GAS PRODUCTION, TRANSMISSION, AND DISTRIBUTION:

The emission sources affected by this Subpart include well completions, pneumatic controllers, equipment leaks from natural gas processing plants, sweetening units at natural gas processing plants, reciprocating compressors, centrifugal compressors and storage vessels which are constructed, modified or reconstructed after August 23, 2011 and before September 18,

2015. The three existing wells located at this production facility were drilled after the effective date of the rule. Therefore, they are affected sources subject to the applicable provisions of this Subpart. The storage vessel venting is controlled to less than six (6) TPY volatile organic compounds (VOC) and federally enforceable limits have previously been requested. The storage vessels are not subject to this Subpart.

40 CFR PART 60 SUBPART OOOOA - STANDARDS OF PERFORMANCE FOR CRUDE OIL AND NATURAL GAS FACILITIES FOR WHICH CONSTRUCTION, MODIFICATION, OR RECONSTRUCTION COMMENCED AFTER SEPTEMBER 18, 2015:

The emission sources affected by this Subpart include well completions, centrifugal compressors, reciprocating compressors, pneumatic controllers, storage vessels, fugitive sources at well sites, fugitive sources at compressor stations, pneumatic pumps, equipment leaks from natural gas processing plants and sweetening units at natural gas processing plants which are constructed, modified or reconstructed after September 18, 2015.

The new well at this location will be completed after the effective date of this Subpart and is subject to the compliance requirements. There is no centrifugal compressor using wet gas seals at this facility. The pneumatic controllers utilized at the facility are considered low-bleed and are not subject to this Subpart. The well site is considered a new affected facility because a well was added after September 18, 2015 and it is subject to the fugitive source monitoring requirements of this Subpart.

40 CFR PART 63 SUBPART HH - NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES FROM OIL AND NATURAL GAS PRODUCTION FACILITIES:

The site is a minor (area) source of hazardous air pollutants. This Subpart applies to affected emission points that are located at facilities that are major and area sources of HAP, and either process, upgrade, or store hydrocarbon liquids prior to custody transfer or that process, upgrade, or store natural gas prior to entering the natural gas transmission and storage source category. For purposes of this Subpart natural gas enters the natural gas transmission and storage source category after the natural gas processing plant, if present. The facility is a minor (area) source of HAP and does not have an affected facility as defined by the area source requirements (TEG dehydrators).

40 CFR PART 63 SUBPART HHH - NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES FROM NATURAL GAS TRANSMISSION AND STORAGE FACILITIES:

The facility is not a natural gas transmission and storage facility and is therefore not subject to this Subpart.

40 CFR PART 63 SUBPART ZZZZ - NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES FROM STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - AREA SOURCE:

The facility does not contain the affected source (natural gas-fired engine) and is therefore not subject to this Subpart.

APPLICATION FOR GENERAL PERMIT REGISTRATION

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-C GENERAL PERMIT REGISTRATION APPLICATION

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

☒CONSTRUCTION
☐MODIFICATION
☐RELOCATION
☐CLASS I ADMINISTRATIVE UPDATE
☐CLASS II ADMINISTRATIVE UPDATE

SECTION 1. GENERAL INFORMATION

Name of Applicant (as registered with the WV Secretary of State's Office): SWN Production Company, LLC

Federal Employer ID No. (FEIN): 26-4388727

Applicant's Mailing Address: 10000 Energy Drive

City: Spring | State: TX | ZIP Code: 77389

Facility Name: O.E. Burge Pad

Operating Site Physical Address: 266 Teagarden Lane
If none available, list road, city or town and zip of facility.

City: Cameron, WV | Zip Code: 26033 | County: Marshall

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.75076
Longitude: -80.63191

SIC Code: 1311
NAICS Code: 211111

DAQ Facility ID No. (For existing facilities)
051-00154

CERTIFICATION OF INFORMATION

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

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

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

Responsible Official Signature: Carla J Suszkowski
Name and Title: Carla Suszkowski, P.E. Regulatory Manager – West Virginia Division Phone: 832-796-1000
Fax:
Email: Carla_Suszkowski@SWN.com Date:

If applicable:
Authorized Representative Signature: _____
Name and Title: Phone: Fax:
Email: Date:

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

OPERATING SITE INFORMATION	
Briefly describe the proposed new operation and/or any change(s) to the facility: One (1) 0.75-mmBtu/hr GPU burner, two (2) 1.0-mmBtu/hr GPU burners, one (1) 1.5-mmBtu/hr GPU burner, two (2) 1.5-mmBtu/hr line heaters, two (2) 400-bbl condensate tanks, four (4) 400-bbl produced water tanks, condensate and produced water truck loading, fugitive emissions, and fugitive haulroad emissions.	
Directions to the facility: From SR-7 staging go 0.1 mile on SR-7 east to junction of SR-7 and SR-1/15, (Brock Ridge Rd), and turn left on SR- 1/15 North. Travel 4.0 miles to junction of SR-1/15 and SR-89, (Proctor Creek Rd). Turn right on SR-89 and travel 4.3 miles to Silver Hill VFD on right and CR-6 (Macedonia Ridge Rd) on left. Turn left on CR-6 and travel 3.2 miles to intersection of CR-21/10, (Pleasant Ridge Rd) and CR-92, (Greenfield Ridge Rd). Turn right on CR-92 and travel 1.4 miles to intersection of CR-92 and CR-92/1, (Tea Garden Lane),in road. Turn right on CR-92/1 and travel 0.3 miles with access road on left. **Note there is no sign for CR-6 Macedonia Ridge Rd**	
ATTACHMENTS AND SUPPORTING DOCUMENTS	
I have enclosed the following required documents:	
Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22). ☒ Check attached to front of application. ☐ I wish to pay by electronic transfer. Contact for payment (incl. name and email address): ☐ I wish to pay by credit card. Contact for payment (incl. name and email address): ☒$500 (Construction, Modification, and Relocation) ☐$300 (Class II Administrative Update) ☒$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO [1] ☐$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH [2] [1] Only one NSPS fee will apply. [2] Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ. *NSPS and NESHAP fees apply to new construction or if the source is being modified.*	
☒ Responsible Official or Authorized Representative Signature (if applicable)	
☒ Single Source Determination Form **(must be completed in its entirety)** – Attachment A	
☐ Siting Criteria Waiver (if applicable) – Attachment B	☒ Current Business Certificate – Attachment C
☒ Process Flow Diagram – Attachment D	☒ Process Description – Attachment E
☒ Plot Plan – Attachment F	☒ Area Map – Attachment G
☒ G70-C Section Applicability Form – Attachment H	☒ Emission Units/ERD Table – Attachment I
☒ Fugitive Emissions Summary Sheet – Attachment J	
☒ Gas Well Affected Facility Data Sheet (if applicable) – Attachment K	
☒ Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment L	
☒ Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment M	
☐ Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N	
☒ Tanker Truck Loading Data Sheet (if applicable) – Attachment O	
☐ Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment P	
☒ Pneumatic Controllers Data Sheet – Attachment Q	
☐ Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment R	
☒ Emission Calculations (please be specific and include all calculation methodologies used) – Attachment S	
☒ Facility-wide Emission Summary Sheet(s) – Attachment T	
☒ Class I Legal Advertisement – Attachment U	
☒ 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: SINGLE SOURCE DETERMINATION

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

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

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

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

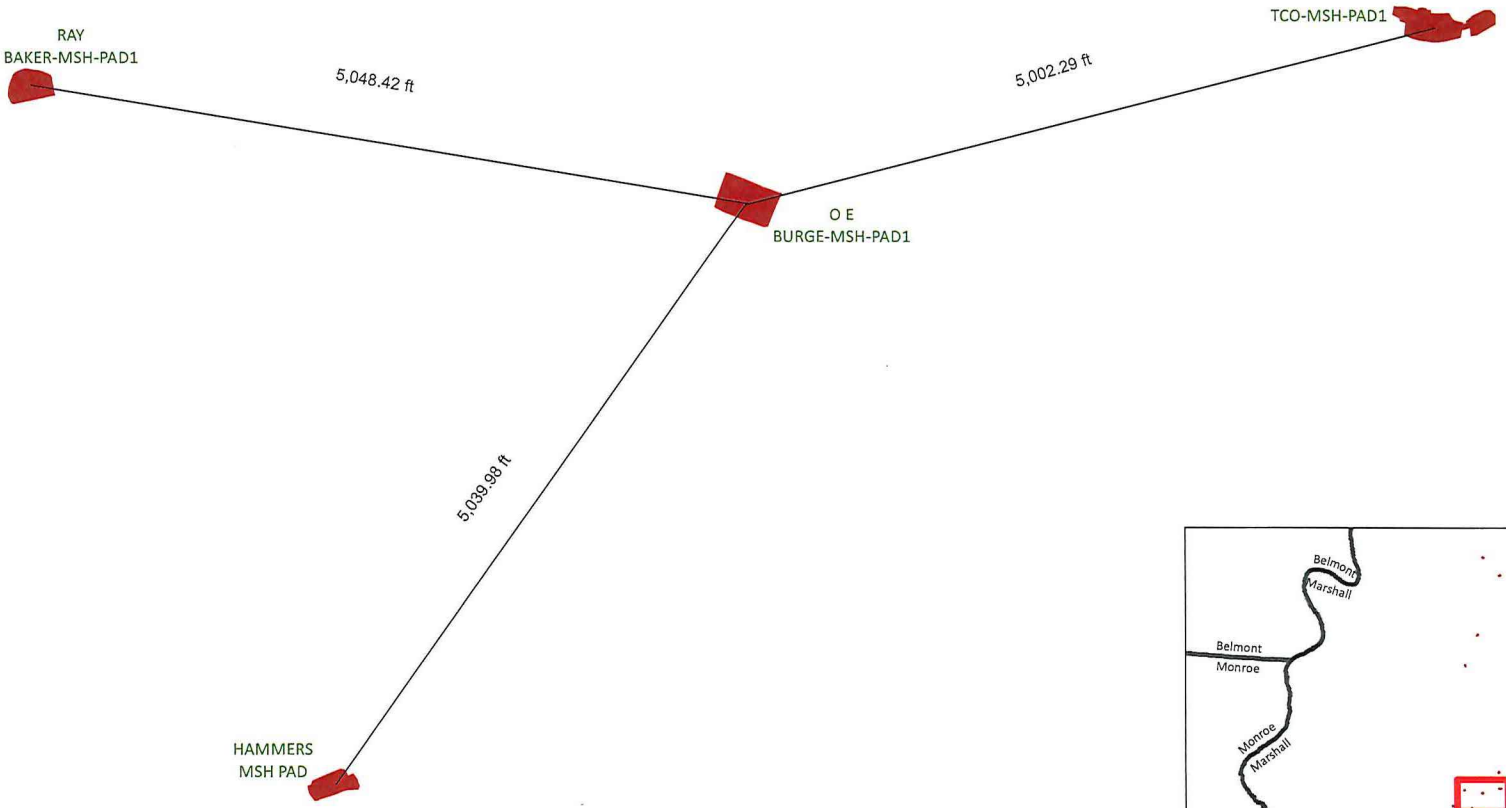
If Yes, please complete the questionnaire on the following page (Attachment A).

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

The aggregation of facilities is appropriate only if separate emissions sources meet the following three-prong test:

1. The sources belong to a single major industrial grouping (same two-digit major SIC code);
2. The sources are under common control of the same person (or persons under common control); and
3. The sources are located on one or more "contiguous or adjacent" properties.

Under the third prong, SWN determined that there were no other facilities contiguous with or adjacent to the O.E. Burge Pad to be permitted. To be considered contiguous, two operations must share a common fence line. As for adjacent, operations located more than a quarter of a mile apart are clearly not adjacent, but operations within a quarter of a mile require an analysis to determine if they meet the common sense notion of a plant. No other SWN locations are located within a quarter mile of the O.E. Burge Pad to be permitted; therefore, no additional facilities are contiguous or adjacent.


RAY
BAKER-MSH-PAD1
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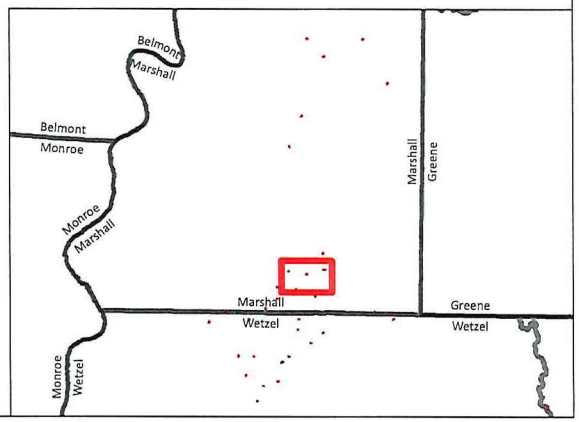
TCO-MSH-PAD1
5,002.29 ft
O E
BURGE-MSH-PAD1
5,039.98 ft
HAMMERS
MSH PAD


Belmont
Marshall
Belmont
Monroe
Monroe
Marshall
Marshall
Greene
Marshall
Wetzel
Greene
Wetzel
Monroe
Wetzel

ATTACHMENT C: BUSINESS REGISTRATION CERTIFICATE

WEST VIRGINIA
STATE TAX DEPARTMENT

BUSINESS REGISTRATION
CERTIFICATE

ISSUED TO:
SWN PRODUCTION COMPANY, LLC
5400D BIG TYLER RD
CHARLESTON, WV 25313-1103

BUSINESS REGISTRATION ACCOUNT NUMBER: **2307-3731**

This certificate is issued on: 12/8/2014

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.

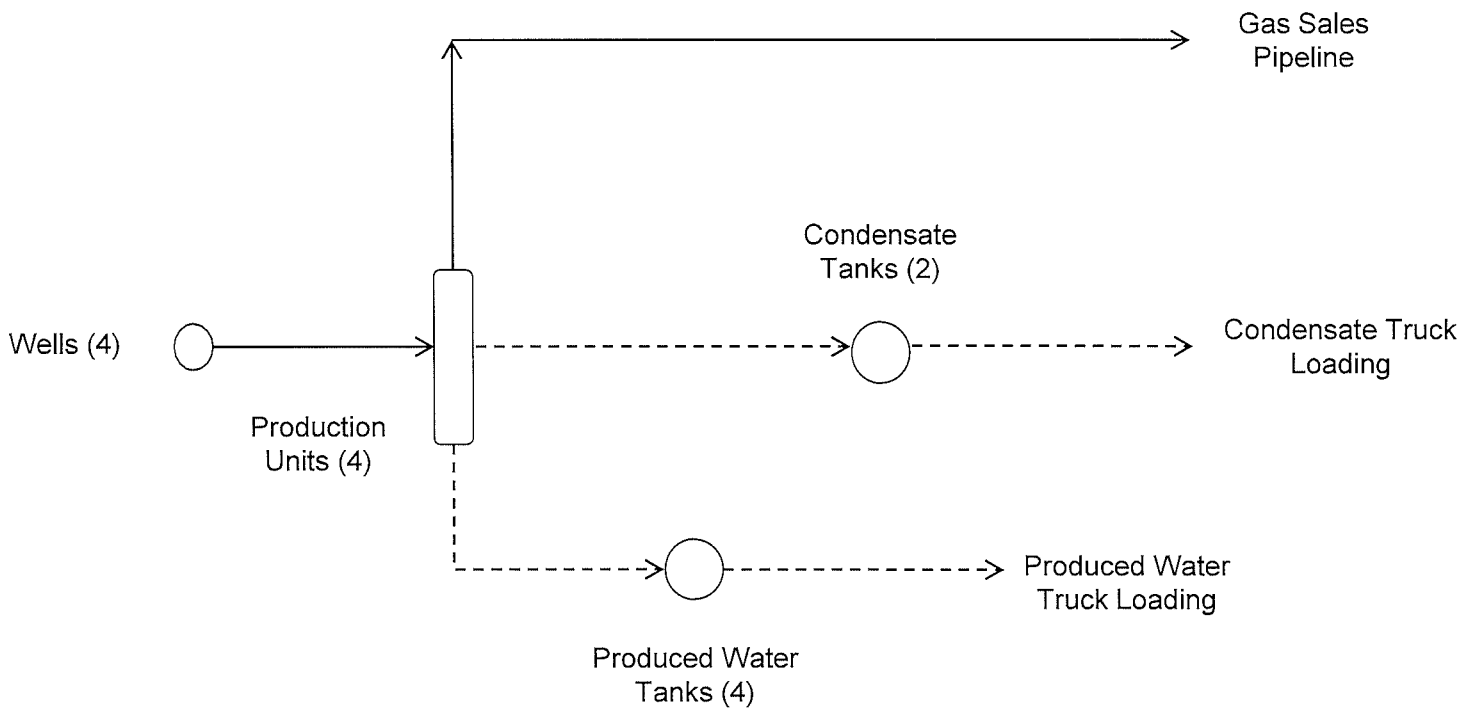
This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

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
L1180094016

ATTACHMENT D: PROCESS FLOW DIAGRAM



Gas/Vapor

Liquids (Condensate and Produced Water)

Note: Drawing is a depiction of general facility process and is not intended to represent facility and/or equipment layout.

SWN Production Company, LLC

O. E. Burge Pad

Attachment D: Process Flow Diagram

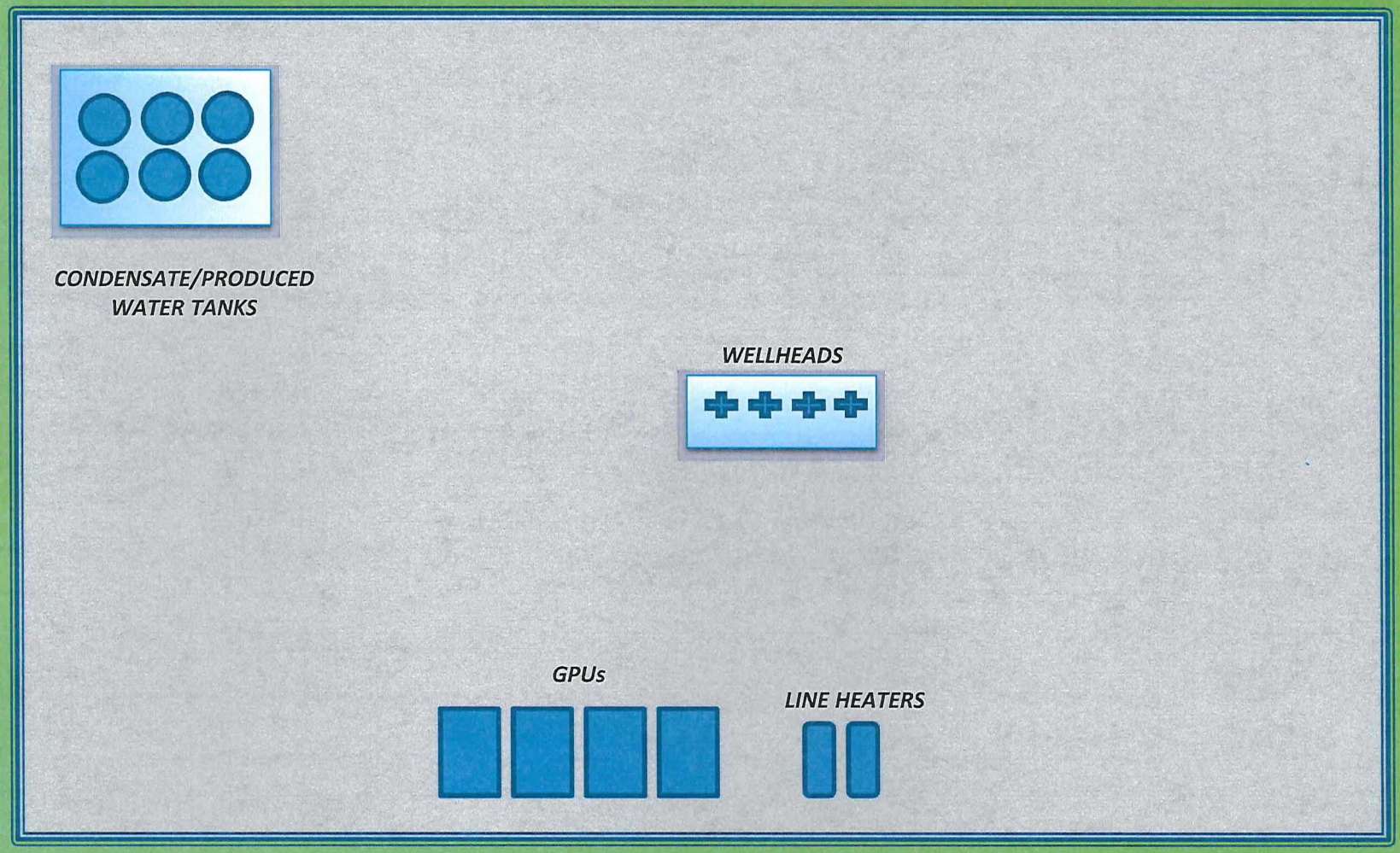
August 2016

ATTACHMENT E: PROCESS DESCRIPTION

The facility is an oil and natural gas exploration and production facility, responsible for the production of condensate and natural gas. Storage of condensate and produced water will also occur on-site. A description of the facility process is as follows: Condensate, gas and water come from the four (4) wellheads to the four (4) production units, where the first stage of separation occurs. Condensate flows to the two (2) condensate storage tanks and produced water flows to the four (4) produced water storage tanks. Working, breathing and flashing vapors from the condensate and produced water storage tanks are vented to the atmosphere. The natural gas stream exits the facility for transmission via pipeline. Condensate and produced water are transported offsite via truck. Fugitive emissions from equipment leaks and haul road emissions also occur.

A process flow diagram reflecting facility operations is shown in Attachment D.

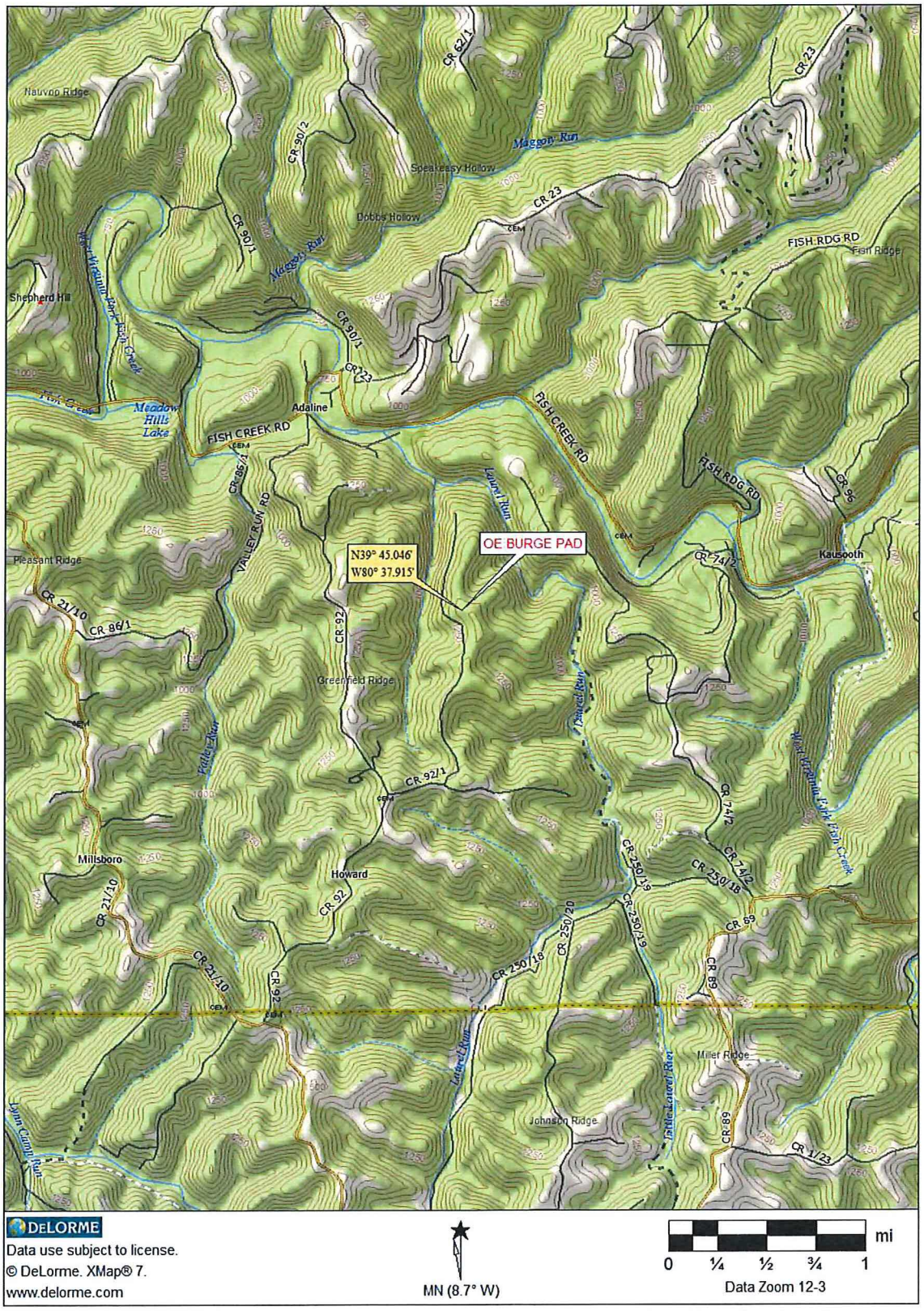
ATTACHMENT F: PLOT PLAN



***NOTE**: Image is only a representation of production/emissions equipment to be installed. Actual location specifications and equipment placement are not to scale.*

SWN Production Company, LLC
O.E. Burge Pad
Attachment F: Simple Plot Plan
August 2016

ATTACHMENT G: AREA MAP



SWN Production Company, LLC
OE Burge Pad
Attachment G: Area Map
August 2016

OE Burge Pad
Attachment G: Area Map with 300' Radius
Marshall County, West Virginia
August 2016

ATTACHMENT H: G70-C SECTION APPLICABILITY FORM

ATTACHMENT H – G70-C SECTION APPLICABILITY FORM

General Permit G70-C Registration
Section Applicability Form

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

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

GENERAL PERMIT G70-C APPLICABLE SECTIONS	
☒ Section 5.0	Gas Well Affected Facility (NSPS, Subpart OOOO)
☒ Section 6.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☐ Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO)
☐ Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO 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)
☐ Section 11.0	Centrifugal Compressor Affected Facility (NSPS, Subpart OOOO)[2]
☐ Section 12.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO)[2]
☐ Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines, Microturbines
☒ Section 14.0	Tanker Truck Loading[3]
☐ Section 15.0	Glycol Dehydration Units[4]

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

2 *Applicants that are subject to Section 11 and 12 may also be subject to the applicable RICE requirements of Section 13.*

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

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

ATTACHMENT I: EMISSIONS UNITS/ERD TABLE

ATTACHMENT I - EMISSION UNITS/EMISSION REDUCTION DEVICES (ERD) TABLE

Include ALL emission units and air pollution control devices/ERDs that will be part of this permit application review. 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]
EU-GPU1	EP-GPU1	0.75-mmBtu/hr GPU Burner	2012	N/A	0.75-mmBtu/hr	Existing	N/A	N/A
EU-GPU2	EP-GPU2	1.0-mmBtu/hr GPU Burner	2012	N/A	1-mmBtu/hr	Existing	N/A	N/A
EU-GPU3	EP-GPU3	1.0-mmBtu/hr GPU Burner	2012	N/A	1-mmBtu/hr	Existing	N/A	N/A
EU-GPU4	EP-GPU4	1.5-mmBtu/hr GPU Burner	TBD	N/A	1.5-mmBtu/hr	New	N/A	N/A
EU-LH1	EP-LH1	1.5-mmBtu/hr Line Heater	2012	N/A	1.5-mmBtu/hr	Existing	N/A	N/A
EU-LH2	EP-LH2	1.5-mmBtu/hr Line Heater	2012	N/A	1.5-mmBtu/hr	Existing	N/A	N/A
EU-LH3	EP-LH3	1.5-mmBtu/hr Line Heater	2012	N/A	1.5-mmBtu/hr	Removal	N/A	N/A
EU-TANKS-COND	EP-TANKS-COND	Two (2) 400-bbl Condensate Tanks	2012	N/A	1,879.75-bbl/yr	Modification	N/A	N/A
EU-TANKS-PW	EP-TANKS-PW	Four (4) 400-bbl Produced Water Tanks	2012	N/A	547,500-bbl/yr	Modification	N/A	N/A
EU-LOAD-COND	EP-LOAD-COND	Condensate Truck Loading	N/A	N/A	78,950 gal/yr	Modification	N/A	N/A
EU-LOAD-PW	EP-LOAD-PW	Produced Water Truck Loading	N/A	N/A	22,995,000 gal/yr	Modification	N/A	N/A
EU-FUG	EP-FUG	Fugitive Emissions	N/A	N/A	N/A	Modification	N/A	N/A
EU-HR	EP-HR	Fugitive Haul Road Emissions	N/A	N/A	N/A	Modification	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: FUGITIVE EMISSIONS SUMMARY SHEET

Fugitive emissions at this site consist of haul road emissions, condensate and produced water loading operations, and equipment leaks.

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: FUG

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 (CO_2e)
Pumps	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Valves	☐ Yes ☒ No	60-gas 41-light oil	EPA	☐ Gas ☐ Liquid ☒ Both	0.46 – gas 0.94 – light oil	0.01 – gas 0.07 – light oil	40.76 - gas 0.56 – light oil
Safety Relief Valves	☐ Yes ☒ No	19	EPA	☒ Gas ☐ Liquid ☐ Both	0.28	0.01	25.24
Open Ended Lines	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Sampling Connections	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Connections (Not sampling)	☐ Yes ☒ No	158	EPA	☐ Gas ☒ Liquid ☐ Both	0.30	0.02	0.18
Compressors	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Flanges	☐ Yes ☒ No	216	EPA	☒ Gas ☐ Liquid ☐ Both	0.14	<0.01	12.72
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.):
Equipment leaks

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 loading, etc.) N/A

TABLE 2-4. OIL AND GAS PRODUCTION OPERATIONS AVERAGE EMISSION FACTORS (kg/hr/source)

Equipment Type	Service[a]	Emission Factor (kg/hr/source)[b]
Valves	Gas	4.5E-03
	Heavy Oil	8.4E-06
	Light Oil	2.5E-03
	Water/Oil	9.8E-05
Pump seals	Gas	2.4E-03
	Heavy Oil	NA
	Light Oil	1.3E-02
	Water/Oil	2.4E-05
Others[c]	Gas	8.8E-03
	Heavy Oil	3.2E-05
	Light Oil	7.5E-03
	Water/Oil	1.4E-02
Connectors	Gas	2.0E-04
	Heavy Oil	7.5E-06
	Light Oil	2.1E-04
	Water/Oil	1.1E-04
Flanges	Gas	3.9E-04
	Heavy Oil	3.9E-07
	Light Oil	1.1E-04
	Water/Oil	2.9E-06
Open-ended lines	Gas	2.0E-03
	Heavy Oil	1.4E-04
	Light Oil	1.4E-03
	Water/Oil	2.5E-04

[a]Water/Oil emission factors apply to water streams in oil service with a water content greater than 50%, from the point of origin to the point where the water content reaches 99%. For water streams with a water content greater than 99%, the emission rate is considered negligible.

[b]These factors are for total organic compound emission rates (including non-VOC's such as methane and ethane) and apply to light crude, heavy crude, gas plant, gas production, and off shore facilities. "NA" indicates that not enough data were available to develop the indicated emission factor.

[c]The "other" equipment type was derived from compressors, diaphrams, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents. This "other" equipment type should be applied for any equipment type other than connectors, flanges, open-ended lines, pumps, or valves.

ATTACHMENT K: GAS WELL AFFECTED FACILITY DATA SHEET

ATTACHMENT K – GAS WELL AFFECTED FACILITY DATA SHEET			
Complete this data sheet if you are the owner or operator of a gas well affected facility for which construction, modification or reconstruction commenced after August 23, 2011. This form must be completed for natural gas well affected facilities regardless of when flowback operations occur (or have occurred).			
API Number	**Date of Flowback**	**Date of Well Completion**	**Green Completion and/or Combustion Device**
470-510-13150	4/10/2012	3/23/2012	Green Completion
470-510-12910	4/11/2012	3/19/2012	Green Completion
470-510-13230	4/11/2012	3/24/2012	Green Completion
470-510-18530	TBD	TBD	Green Completion

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

This is the same API (American Petroleum Institute) well number(s) provided in the well completion notification and as provided to the WVDEP, Office of Oil and Gas for the well permit. The API number may be provided on the application without the state code (047).

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

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

Where,

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

ATTACHMENT L: STORAGE VESSELS DATA SHEET

REPRESENTATIVE GAS ANALYSES
TANKS 4.0.9D REPORTS
PROMAX PROCESS SIMULATION RESULTS

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 Condensate Storage	2. Tank Name Two (2) 400-bbl Condensate Storage Tanks
3. Emission Unit ID number EU-TANKS-COND	4. Emission Point ID number EP-TANKS-COND
5. Date Installed , Modified or Relocated *(for existing tanks)* 2012 Was the tank manufactured after August 23, 2011? ☒ Yes ☐ No	6. Type of change: ☐ New construction ☐ New stored material ☒ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)* Quantity of tanks, throughput, and flash factor update	
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.***	

1. Bulk Storage Area Name Produced Water Storage	2. Tank Name Four (4) 400-bbl Produced Water Storage Tanks
3. Emission Unit ID number EU-TANKS-PW	4. Emission Point ID number EP-TANKS-PW
5. Date Installed , Modified or Relocated *(for existing tanks)* 2012 Was the tank manufactured after August 23, 2011? ☒ Yes ☐ No	6. Type of change: ☐ New construction ☐ New stored material ☒ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)* Quantity of tanks, throughput, and flash factor update	
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.***	

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]
EU-TANKS-METH	EXIST	Methanol	350 gal
EU-TANKS-METH	EXIST	Methanol	350 gal
EU-TANKS-METH	EXIST	Methanol	350 gal
EU-TANKS-METH	EXIST	Methanol	350 gal

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the compressor station. 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.

Chesapeake Energy Corporation
Shawn Harlan 3H

TABLE 1-B

COMPOSITIONAL ANALYSIS OF THE SEPARATOR GAS, OIL AND MATHEMATICALLY RECOMBINED WELLSTREAM THROUGH C_{11+}

SEPARATOR GOR.....: 263132 Scf/Sep Bbl
SEPARATOR PRESSURE.....: 353 psig
SEPARATOR TEMPERATURE.....: 90 °F

	SEPARATOR GAS		SEPARATOR OIL		WELLSTREAM	
Component	Mole%	* GPM	Mole %	Liquid Volume %	Mole %	* GPM
Hydrogen Sulfide	0.000	0.000	0.000	0.000	0.000	0.000
Nitrogen	0.324	0.000	0.033	0.009	0.323	0.000
Carbon Dioxide	0.178	0.000	0.031	0.013	0.177	0.000
Methane	79.264	0.000	11.976	4.996	79.003	0.000
Ethane	13.533	3.649	8.481	5.583	13.513	3.644
Propane	4.099	1.137	7.323	4.960	4.112	1.141
Iso-butane	0.616	0.203	2.306	1.856	0.623	0.205
N-butane	0.991	0.315	5.338	4.140	1.008	0.320
2-2 Dimethylpropane	0.007	0.003	0.086	0.081	0.007	0.003
Iso-pentane	0.311	0.115	3.693	3.326	0.324	0.120
N-pentane	0.246	0.090	3.851	3.434	0.260	0.095
2-2 Dimethylbutane	0.014	0.006	0.248	0.255	0.015	0.006
Cyclopentane	0.006	0.002	0.000	0.000	0.006	0.002
2-3 Dimethylbutane	0.011	0.005	0.390	0.393	0.012	0.005
2 Methylpentane	0.075	0.031	2.022	2.065	0.083	0.035
3 Methylpentane	0.048	0.020	1.473	1.480	0.054	0.022
Other Hexanes	0.000	0.000	0.000	0.000	0.000	0.000
n-Hexane	0.080	0.033	2.941	2.976	0.091	0.038
Methylcyclopentane	0.006	0.002	0.246	0.215	0.007	0.002
Benzene	0.002	0.001	0.068	0.047	0.002	0.001
Cyclohexane	0.008	0.003	0.477	0.399	0.010	0.003
2-Methylhexane	0.024	0.011	2.076	2.375	0.032	0.015
3-Methylhexane	0.026	0.012	2.202	2.488	0.034	0.016
2,2,4 Trimethylpentane	0.000	0.000	0.000	0.000	0.000	0.000
Other Heptanes	0.027	0.012	1.826	1.957	0.034	0.015
n-Heptane	0.027	0.013	3.037	3.448	0.039	0.018
Methylcyclohexane	0.017	0.007	1.997	1.975	0.025	0.010
Toluene	0.005	0.002	0.617	0.509	0.007	0.002
Other C-8's	0.034	0.016	8.080	9.322	0.065	0.031
n-Octane	0.007	0.004	2.531	3.190	0.017	0.009
Ethylbenzene	0.000	0.000	0.676	0.642	0.003	0.001
M&P-Xylene	0.002	0.001	0.748	0.714	0.005	0.002
O-Xylene	0.000	0.000	1.229	1.150	0.005	0.002
Other C-9's	0.009	0.005	5.137	6.619	0.029	0.015
n-Nonane	0.001	0.001	1.697	2.352	0.008	0.004
Other C10's	0.001	0.001	5.177	7.331	0.021	0.012
n-Decane	0.000	0.000	0.983	1.485	0.004	0.002
Undecanes Plus	0.001	0.001	11.005	18.218	0.044	0.030
TOTAL	100.000	5.696	100.000	100.000	100.000	5.825

Chesapeake Energy Corporation
Shawn Harlan 3H

TABLE 1-B

COMPOSITIONAL ANALYSIS OF THE SEPARATOR GAS, OIL AND MATHEMATICALLY RECOMBINED WELLSTREAM THROUGH C_{11+}

SEPARATOR GOR.....: 263132 Scf/Sep Bbl
SEPARATOR PRESSURE.....: 353 psig
SEPARATOR TEMPERATURE.....: 90 °F

UNDECANES PLUS (C_{11+}) FRACTION CHARACTERISTICS					
	Specific Gravity		Molecular Weight	Vapor Volume	Gross Heating Value
COMPONENT	°API	**	lb/lb-mole	Scf/Gal	***
Gas	N/A	0.8250	156.000	16.558	8,400
Oil	43.041	0.8107	172.100	14.749	128,811
Wellstream	N/A	0.8110	171.733	14.786	N/A

TOTAL SAMPLE CHARACTERISTICS						
	Specific Gravity		Molecular Weight	Vapor Volume	Gross Heating Value	
					Dry	Saturated
COMPONENT	°API	**	lb/lb-mole	Scf/Gal	***	***
Gas	N/A	0.7105	20.506	175.553	1,258	1,237
Oil	77.007	0.6786	87.027	24.415	N/A	114,910
Wellstream	N/A	0.7169	20.764	51.574	N/A	N/A

* GPM (gallons per Mscf) determined at 14.85 psia and 60 °F

** Gas specific gravity and wellstream specific gravity determined relative to air (SG=1.000).
Oil specific gravity determined relative to water (SG=1.000).

*** Gross Heating Value units for gas (real basis) and oil are BTU/Scf and BTU/Gal, respectively.

TANKS 4.0.9d
Emissions Report - Summary Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	OE Burge - Condensate
City:	Marshall County
State:	West Virginia
Company:	SWN Production Company, LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	Two (2) 400-bbl condensate tanks modeled as Gasoline RVP 9.

Tank Dimensions

Shell Height (ft):		20.00
Diameter (ft):		12.00
Liquid Height (ft) :		19.00
Avg. Liquid Height (ft):		10.00
Volume (gallons):		16,074.56
Turnovers:		4.96
Net Throughput(gal/yr):		78,950.00
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone	
Height (ft)		0.00
Slope (ft/ft) (Cone Roof)		0.06

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Pittsburgh, Pennsylvania (Avg Atmospheric Pressure = 14.11 psia)

TANKS 4.0.9d
Emissions Report - Summary Format
Liquid Contents of Storage Tank

OE Burge - Condensate - Vertical Fixed Roof Tank
Marshall County, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 9)	All	51.94	47.06	56.81	50.33	3.9245	3.5510	4.3292	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: Annual

OE Burge - Condensate - Vertical Fixed Roof Tank
Marshall County, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	494.27	700.35	1,194.62

TANKS 4.0.9d
Emissions Report - Summary Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	OE Burge - Produced Water
City:	Marshall County
State:	West Virginia
Company:	SWN Production Company, LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	Four (4) 400-bbl produced water tanks modeled as 1% Gasoline RVP 9 and 99% water.

Tank Dimensions

Shell Height (ft):		20.00
Diameter (ft):		12.00
Liquid Height (ft) :		19.00
Avg. Liquid Height (ft):		10.00
Volume (gallons):		16,074.56
Turnovers:		1,430.52
Net Throughput(gal/yr):		22,995,000.00
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone	
Height (ft)		0.00
Slope (ft/ft) (Cone Roof)		0.06

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Pittsburgh, Pennsylvania (Avg Atmospheric Pressure = 14.11 psia)

TANKS 4.0.9d
Emissions Report - Summary Format
Liquid Contents of Storage Tank

OE Burge - Produced Water - Vertical Fixed Roof Tank
Marshall County, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Produced Water	All	51.94	47.06	56.81	50.33	0.1985	0.1659	0.2365	19.9326			18.17	
Gasoline (RVP 9)						3.9245	3.5510	4.3292	67.0000	0.0100	0.1313	92.00	Option 4: RVP=9, ASTM Slope=3
Water						0.1911	0.1592	0.2284	18.0200	0.9900	0.8687	18.02	Option 2: A=8.10765, B=1750.286, C=235

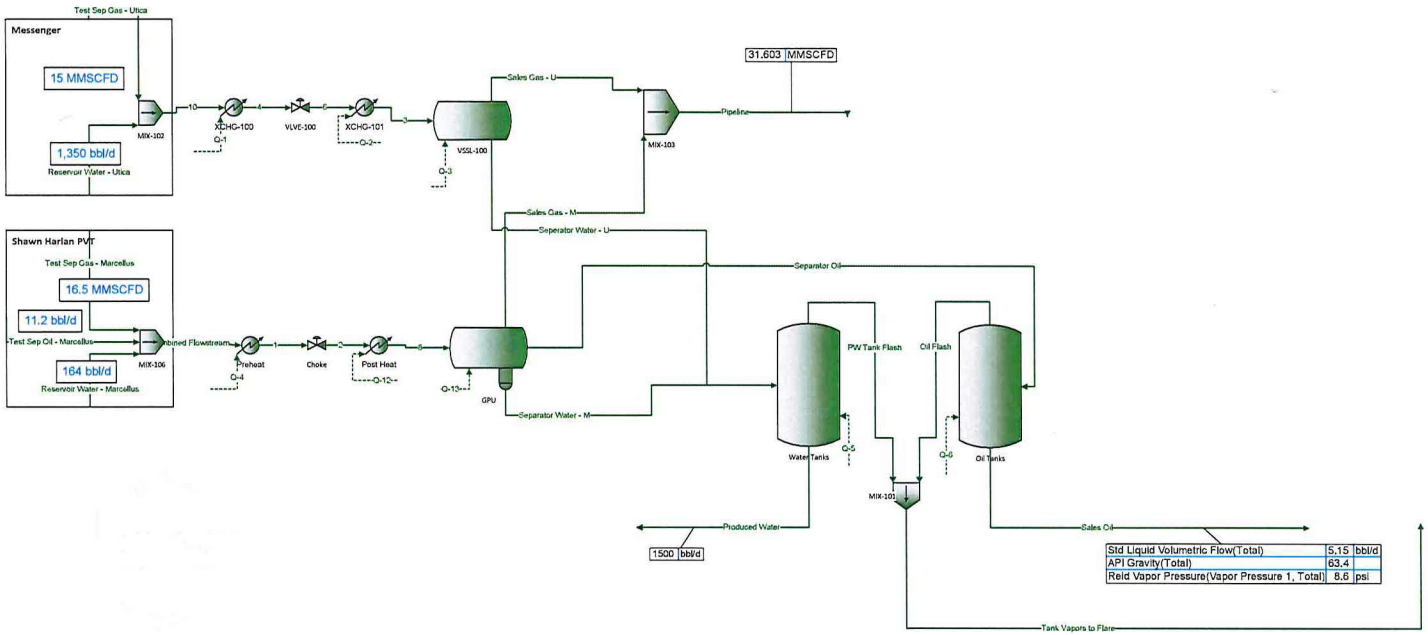
TANKS 4.0.9d
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: Annual

OE Burge - Produced Water - Vertical Fixed Roof Tank
Marshall County, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Produced Water	406.38	10.59	416.97
Water	353.04	9.20	362.24
Gasoline (RVP 9)	53.34	1.39	54.73

Names	Units	Reservoir Water - Utica	Reservoir Water - Marcellus	Test Sep Gas - Utica	Test Sep Gas - Marcellus	Test Sep Oil - Marcellus	Oil Flash	PW Tank Flash	Pipeline	Sales Oil	Produced Water
Temperature	°F	60*	90*	60*	90*	90*	75*	90	99.751	75	90*
Pressure	psia	2000*	367.7*	2000*	367.7*	367.7*	15.196	15.196	314.7	15.196*	15.196*
Mole Fraction Vapor	%	0	0	100	99.993	4.1807	100	100	99.998	0	0
Mole Fraction Light Liquid	%	100	100	0	0.0073881	95.819	0	0	0.0021193	100	100
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0	0	0	0
Mass Fraction Vapor	%	0	0	100	99.966	0.97302	100	100	99.998	0	0
Molecular Weight	lb/lbmol	18.015	18.015	16.841	20.507	88.433	35.566	20.579	18.769	125.55	18.017
Molar Flow	lbmol/h	1093.3	132.82	1647	1811.7	1.2243	0.11963	0.58979	3470	0.43208	1214.9
Mass Flow	lb/h	19697	2392.8	27737	37153	108.27	4.2548	12.137	65128	54.248	21889
Enthalpy	Btu/h	-1.3458e+008	-1.629e+007	-5.835e+007	-6.1977e+007	-1.0206e+005	-5028.4	-32426	-1.191e+008	-49089	-1.4902e+008
Nitrogen(Mole Fraction)	%	0*	0*	2*	0.324*	0.032999*	0.051901	0.79909	1.1183	8.7153e-005	8.9169e-006
CO2(Mole Fraction)	%	0*	0*	2*	0.178*	0.030999*	0.21922	14.469	1.0376	0.0041001	0.0062503
C1(Mole Fraction)	%	0*	0*	96*	79.264*	11.976*	34.083	78.541	86.938	0.17659	0.0017979
C2(Mole Fraction)	%	0*	0*	0*	13.533*	8.4808*	25.992	1.1576	7.0673	0.84012	2.9905e-005
C3(Mole Fraction)	%	0*	0*	0*	4.099*	7.3229*	18.866	0.30382	2.1417	2.2656	7.9226e-006
Isobutane(Mole Fraction)	%	0*	0*	0*	0.616*	2.306*	4.2988	0.016021	0.32211	1.334	1.5029e-007
n-Butane(Mole Fraction)	%	0*	0*	0*	0.991*	5.3379*	7.6884	0.057207	0.51859	3.3951	1.2142e-006
2,2-Dimethylpropane(Mole Fraction)	%	0*	0*	0*	0.007*	0.085998*	0.057905	0.00016197	0.0036785	0.035921	1.4683e-009
Isopentane(Mole Fraction)	%	0*	0*	0*	0.311*	3.6929*	2.7165	0.01043	0.16319	3.1566	1.4409e-007
n-Pentane(Mole Fraction)	%	0*	0*	0*	0.246*	3.8509*	2.1854	0.0088032	0.1293	3.3944	1.2579e-007


Test Sep Gas - Utica
Messenger
15 MMSCFD
MIX-102
1,350 bbl/d
Reservoir Water - Utica
10
XCHG-100
Q-1
4
VLVE-100
5
XCHG-101
Q-2
3
VSSL-100
Q-3
Sales Gas - U
31.603 MMSCFD
MIX-103
Pipeline
Sales Gas - M
Seperator Water - U
Separator Oil
Shawn Harlan PVT
Test Sep Gas - Marcellus
16.5 MMSCFD
11.2 bbl/d
Test Sep Oil - Marcellus
MIX-106
164 bbl/d
Reservoir Water - Marcellus
Combined Flowstream
1
Preheat
Q-4
2
Choke
6
Post Heat
Q-12
Q-13
GPU
Separator Water - M
PW Tank Flash
Oil Flash
Water Tanks
Q-5
Q-6
Oil Tanks
MIX-101
Produced Water
1500 bbl/d
Sales Oil
Std Liquid Volumetric Flow(Total) 5.15 bbl/d
API Gravity(Total) 63.4
Reid Vapor Pressure(Vapor Pressure 1, Total) 8.6 psi
Tank Vapors to Flare

ATTACHMENT M: NATURAL GAS FIRED FUEL BURNING UNITS DATA SHEET

ATTACHMENT M – SMALL HEATERS AND REBOILERS NOT SUBJECT TO 40CFR60 SUBPART DC
DATA SHEET

Complete this data sheet for each small heater and reboiler not subject to 40CFR60 Subpart Dc at the facility. ***The Maximum Design Heat Input (MDHI) must be less than 10 MMBTU/hr.***

Emission Unit ID#[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]
EU-GPU1	EP-GPU1	Gas Production Unit Burner	2012	N/A	0.75	905
EU-GPU2	EP-GPU2	Gas Production Unit Burner	2012	N/A	1.0	905
EU-GPU3	EP-GPU3	Gas Production Unit Burner	2012	N/A	1.0	905
EU-GPU4	EP-GPU4	Gas Production Unit Burner	TBD	N/A	1.5	905
EU-LH1	EP-LH1	Line Heater	2012	N/A	1.5	905
EU-LH2	EP-LH2	Line Heater	2012	N/A	1.5	905

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.

Table 1.4-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO_x) AND CARBON MONOXIDE (CO) FROM NATURAL GAS COMBUSTION[a]

Combustor Type (MMBtu/hr Heat Input) [SCC]	NO_x[b]		CO	
	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
Large Wall-Fired Boilers (>100) [1-01-006-01, 1-02-006-01, 1-03-006-01]				
Uncontrolled (Pre-NSPS)[c]	280	A	84	B
Uncontrolled (Post-NSPS)[c]	190	A	84	B
Controlled - Low NO_x burners	140	A	84	B
Controlled - Flue gas recirculation	100	D	84	B
Small Boilers (<100) [1-01-006-02, 1-02-006-02, 1-03-006-02, 1-03-006-03]				
Uncontrolled	100	B	84	B
Controlled - Low NO_x burners	50	D	84	B
Controlled - Low NO_x burners/Flue gas recirculation	32	C	84	B
Tangential-Fired Boilers (All Sizes) [1-01-006-04]				
Uncontrolled	170	A	24	C
Controlled - Flue gas recirculation	76	D	98	D
Residential Furnaces (<0.3) [No SCC]				
Uncontrolled	94	B	40	B

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. Emission factors are based on an average natural gas higher heating value of 1,020 Btu/scf. To convert from $lb/10^6$ scf to lb/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. SCC = Source Classification Code. ND = no data. NA = not applicable.

[b] Expressed as NO_2. For large and small wall fired boilers with SNCR control, apply a 24 percent reduction to the appropriate NO_x emission factor. For tangential-fired boilers with SNCR control, apply a 13 percent reduction to the appropriate NO_x emission factor.

[c] NSPS=New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction modification, or reconstruction after June 19, 1984.

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION[a]

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
91-57-6	2-Methylnaphthalene[b, c]	2.4E-05	D
56-49-5	3-Methylchloranthrene[b, c]	<1.8E-06	E
	7,12-Dimethylbenz(a)anthracene[b,c]	<1.6E-05	E
83-32-9	Acenaphthene[b,c]	<1.8E-06	E
203-96-8	Acenaphthylene[b,c]	<1.8E-06	E
120-12-7	Anthracene[b,c]	<2.4E-06	E
56-55-3	Benz(a)anthracene[b,c]	<1.8E-06	E
71-43-2	Benzene[b]	2.1E-03	B
50-32-8	Benzo(a)pyrene[b,c]	<1.2E-06	E
205-99-2	Benzo(b)fluoranthene[b,c]	<1.8E-06	E
191-24-2	Benzo(g,h,i)perylene[b,c]	<1.2E-06	E
205-82-3	Benzo(k)fluoranthene[b,c]	<1.8E-06	E
106-97-8	Butane	2.1E+00	E
218-01-9	Chrysene[b,c]	<1.8E-06	E
53-70-3	Dibenzo(a,h)anthracene[b,c]	<1.2E-06	E
25321-22-6	Dichlorobenzene[b]	1.2E-03	E
74-84-0	Ethane	3.1E+00	E
206-44-0	Fluoranthene[b,c]	3.0E-06	E
86-73-7	Fluorene[b,c]	2.8E-06	E
50-00-0	Formaldehyde[b]	7.5E-02	B
110-54-3	Hexane[b]	1.8E+00	E
193-39-5	Indeno(1,2,3-cd)pyrene[b,c]	<1.8E-06	E
91-20-3	Naphthalene[b]	6.1E-04	E
109-66-0	Pentane	2.6E+00	E
85-01-8	Phenanathrene[b,c]	1.7E-05	D

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION (Continued)

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
74-98-6	Propane	1.6E+00	E
129-00-0	Pyrene[b, c]	5.0E-06	E
108-88-3	Toluene[b]	3.4E-03	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $1b/10^6$ scf to lb/MMBtu, divide by 1,020. Emission Factors preceeded with a less-than symbol are based on method detection limits.

[b] Hazardous Air Pollutant (HAP) as defined by Section 112(b) of the Clean Air Act.

[c] HAP because it is Polycyclic Organic Matter (POM). POM is a HAP as defined by Section 112(b) of the Clean Air Act.

[d] The sum of individual organic compounds may exceed the VOC and TOC emission factors due to differences in test methods and the availability of test data for each pollutant.

ATTACHMENT O: TANKER TRUCK LOADING DATA SHEET

ATTACHMENT O – TANKER TRUCK LOADING DATA SHEET

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

Truck Loadout Collection Efficiencies

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

- For tanker trucks passing the MACT level annual leak test – 99.2%
- For tanker trucks passing the NSPS level annual leak test – 98.7%
- For tanker trucks not passing one of the annual leak tests listed above – 70%

Compliance with this requirement shall be demonstrated by keeping records of the applicable MACT or NSPS Annual Leak Test certification for ***every*** truck and railcar loaded/unloaded. This requirement can be satisfied if the trucking company provided certification that its entire fleet was compliant. This certification must be submitted in writing to the Director of the DAQ. These additional requirements must be noted in the Registration Application.

Emission Unit ID#: EU-LOAD-COND	Emission Point ID#: EP-LOAD-COND	Year Installed/Modified: 2012/2016
Emission Unit Description: Condensate Truck Loading Emissions		
Loading Area Data		
Number of Pumps: 1	Number of Liquids Loaded: 1	Max number of trucks loading at one (1) time: 1
Are tanker trucks 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. Vapors are collected and routed to a vapor combustor.		
Are any of the following truck loadout systems utilized? ☐ Closed System to tanker truck passing a MACT level annual leak test? ☐ Closed System to tanker truck passing a NSPS level annual leak test? ☐ Closed System to tanker truck not passing an annual leak test and has vapor return?		

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

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	24	24	24	24
Days/week	5	5	5	5

Bulk Liquid Data (use extra pages as necessary)

Liquid Name	Condensate		
Max. Daily Throughput (1000 gal/day)	0.22		
Max. Annual Throughput (1000 gal/yr)	78.95		
Loading Method[1]	SUB		
Max. Fill Rate (gal/min)	125		
Average Fill Time (min/loading)	Approx 60		
Max. Bulk Liquid Temperature (°F)	50.33		
True Vapor Pressure[2]	4.3292		
Cargo Vessel Condition[3]	U		
Control Equipment or Method[4]	None		
Max. Collection Efficiency (%)	0%		
Max. Control Efficiency (%)	0%		

Max.VOC Emission Rate	Loading (lb/hr)	31.87		
	Annual (ton/yr)	0.17		
Max.HAP Emission Rate	Loading (lb/hr)	2.26		
	Annual (ton/yr)	0.01		
Estimation Method[5]		EPA		

Emission Unit ID#: EU-LOAD-PW	Emission Point ID#: EP-LOAD-PW	Year Installed/Modified: 2012/2016
Emission Unit Description: Produced Water Truck Loading Emissions		
Loading Area Data		
Number of Pumps: 1	Number of Liquids Loaded: 1	Max number of trucks loading at one (1) time: 1
Are tanker trucks 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. Vapors are collected and routed to a vapor combustor.		
Are any of the following truck loadout systems utilized? ☐ Closed System to tanker truck passing a MACT level annual leak test? ☐ Closed System to tanker truck passing a NSPS level annual leak test? ☐ Closed System to tanker truck not passing an annual leak test and has vapor return?		

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

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	24	24	24	24
Days/week	5	5	5	5

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		Produced Water		
Max. Daily Throughput (1000 gal/day)		63		
Max. Annual Throughput (1000 gal/yr)		22,995		
Loading Method[1]		SUB		
Max. Fill Rate (gal/min)		125		
Average Fill Time (min/loading)		Approx 60		
Max. Bulk Liquid Temperature (°F)		50.33		
True Vapor Pressure[2]		0.2365		
Cargo Vessel Condition[3]		U		
Control Equipment or Method[4]		None		
Max. Collection Efficiency (%)		0%		
Max. Control Efficiency (%)		0%		
Max.VOC Emission Rate	Loading (lb/hr)	0.52		
	Annual (ton/yr)	0.79		
Max.HAP Emission Rate	Loading (lb/hr)	0.04		
	Annual (ton/yr)	0.06		
Estimation Method[5]		EPA		

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)

loading operation, resulting in high levels of vapor generation and loss. If the turbulence is great enough, liquid droplets will be entrained in the vented vapors.

A second method of loading is submerged loading. Two types are the submerged fill pipe method and the bottom loading method. In the submerged fill pipe method, the fill pipe extends almost to the bottom of the cargo tank. In the bottom loading method, a permanent fill pipe is attached to the cargo tank bottom. During most of submerged loading by both methods, the fill pipe opening is below the liquid surface level. Liquid turbulence is controlled significantly during submerged loading, resulting in much lower vapor generation than encountered during splash loading.

The recent loading history of a cargo carrier is just as important a factor in loading losses as the method of loading. If the carrier has carried a nonvolatile liquid such as fuel oil, or has just been cleaned, it will contain vapor-free air. If it has just carried gasoline and has not been vented, the air in the carrier tank will contain volatile organic vapors, which will be expelled during the loading operation along with newly generated vapors.

Cargo carriers are sometimes designated to transport only one product, and in such cases are practicing "dedicated service". Dedicated gasoline cargo tanks return to a loading terminal containing air fully or partially saturated with vapor from the previous load. Cargo tanks may also be "switch loaded" with various products, so that a nonvolatile product being loaded may expel the vapors remaining from a previous load of a volatile product such as gasoline. These circumstances vary with the type of cargo tank and with the ownership of the carrier, the petroleum liquids being transported, geographic location, and season of the year.

One control measure for vapors displaced during liquid loading is called "vapor balance service", in which the cargo tank retrieves the vapors displaced during product unloading at bulk plants or service stations and transports the vapors back to the loading terminal. Figure 5.2-5 shows a tank truck in vapor balance service filling a service station underground tank and taking on displaced gasoline vapors for return to the terminal. A cargo tank returning to a bulk terminal in vapor balance service normally is saturated with organic vapors, and the presence of these vapors at the start of submerged loading of the tanker truck results in greater loading losses than encountered during nonvapor balance, or "normal", service. Vapor balance service is usually not practiced with marine vessels, although some vessels practice emission control by means of vapor transfer within their own cargo tanks during ballasting operations, discussed below.

Emissions from loading petroleum liquid can be estimated (with a probable error of ±30 percent)[4] using the following expression:

$$L_L = 12.46 \frac{SPM}{T} \quad (1)$$

where:

L_L = loading loss, pounds per 1000 gallons ($lb/10^3$ gal) of liquid loaded

S = a saturation factor (see Table 5.2-1)
P = true vapor pressure of liquid loaded, pounds per square inch absolute (psia) (see Figure 7.1-5, Figure 7.1-6, and Table 7.1-2)
M = molecular weight of vapors, pounds per pound-mole (lb/lb-mole) (see Table 7.1-2)
T = temperature of bulk liquid loaded, °R (°F + 460)

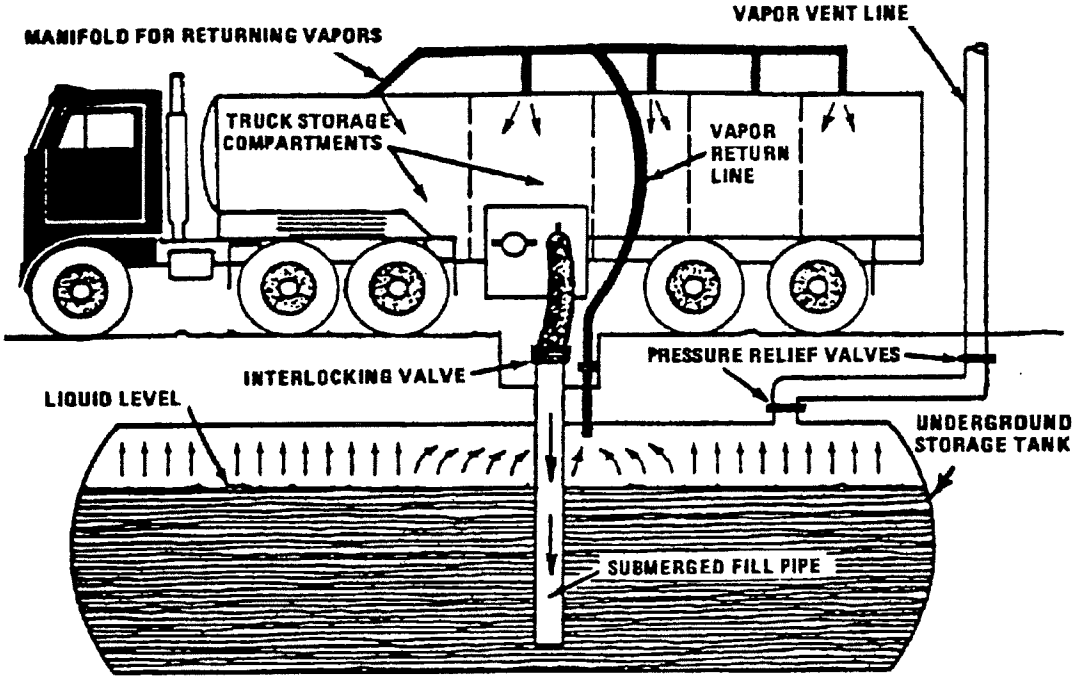


Figure 5.2-5. Tank truck unloading into a service station underground storage tank and practicing "vapor balance" form of emission control.

Table 5.2-1. SATURATION (S) FACTORS FOR CALCULATING PETROLEUM LIQUID LOADING LOSSES

Cargo Carrier	Mode Of Operation	S Factor
Tank trucks and rail tank cars	Submerged loading of a clean cargo tank	0.50
	Submerged loading: dedicated normal service	0.60
	Submerged loading: dedicated vapor balance service	1.00
	Splash loading of a clean cargo tank	1.45
	Splash loading: dedicated normal service	1.45
	Splash loading: dedicated vapor balance service	1.00
Marine vessels[a]	Submerged loading: ships	0.2
	Submerged loading: barges	0.5

[a] For products other than gasoline and crude oil. For marine loading of gasoline, use factors from Table 5.2-2. For marine loading of crude oil, use Equations 2 and 3 and Table 5.2-3.

ATTACHMENT Q: PNEUMATIC CONTROLLERS DATA SHEET

ATTACHMENT Q – PNEUMATIC CONTROLLERS DATA SHEET
Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after August 23, 2011? ☐ 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? ☐ Yes ☒ No Please list approximate number.

ATTACHMENT S: EMISSIONS CALCULATIONS

SWN Production Company, LLC
O.E. Burge Pad
Summary of Criteria Air Pollutant Emissions

Equipment	Unit ID	Emission Point ID	NOx		CO		VOC		SO_2		PM Total	
			lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
0.75-mmBtu/hr GPU Burner	EU-GPU1	EP-GPU1	0.08	0.36	0.07	0.30	<0.01	0.02	<0.01	<0.01	0.01	0.03
1.0-mmBtu/hr GPU Burner	EU-GPU2	EP-GPU2	0.11	0.48	0.09	0.41	0.01	0.03	<0.01	<0.01	0.01	0.04
1.0-mmBtu/hr GPU Burner	EU-GPU3	EP-GPU3	0.11	0.48	0.09	0.41	0.01	0.03	<0.01	<0.01	0.01	0.04
1.5-mmBtu/hr GPU Burner	EU-GPU4	EP-GPU4	0.17	0.73	0.14	0.61	0.01	0.04	<0.01	<0.01	0.01	0.06
1.5-mmBtu/hr Line Heater	EU-LH1	EP-LH1	0.17	0.73	0.14	0.61	0.01	0.04	<0.01	<0.01	0.01	0.06
1.5-mmBtu/hr Line Heater	EU-LH2	EP-LH2	0.17	0.73	0.14	0.61	0.01	0.04	<0.01	<0.01	0.01	0.06
1.5-mmBtu/hr Line Heater - Removed	EU-LH3	EP-LH3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Two (2) 400-bbl Condensate Tanks	EU-TANKS-COND	EP-TANKS-COND	-	-	-	-	2.74	11.99	-	-	-	-
Four (4) 400-bbl Produced Water Tanks	EU-TANKS-PW	EP-TANKS-PW	-	-	-	-	0.17	0.74	-	-	-	-
Condensate Truck Loading	EU-LOAD-COND	EP-LOAD-COND	-	-	-	-	0.04	0.17	-	-	-	-
Produced Water Truck Loading	EU-LOAD-PW	EP-LOAD-PW	-	-	-	-	0.18	0.79	-	-	-	-
Fugitive Emissions	EU-FUG	EP-FUG	-	-	-	-	0.48	2.12	-	-	-	-
Fugitive Haul Road Emissions	EU-HR	EP-HR	-	-	-	-	-	-	-	-	1.15	5.03
Total Emissions =			**0.80**	**3.51**	**0.67**	**2.95**	**3.65**	**16.00**	**<0.01**	**0.02**	**1.21**	**5.30**

SWN Production Company, LLC
O.E. Burge Pad
Summary of Hazardous Air Pollutants

Equipment	Unit ID	Estimated Emissions (lb/hr)								
		Acetalde-hyde	Acrolein	Benzene	Ethyl-benzene	Formalde-hyde	n-Hexane	Toluene	Xylenes	Total HAPs
0.75-mmBtu/hr GPU Burner	EU-GPU1	-	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01
1.0-mmBtu/hr GPU Burner	EU-GPU2	-	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01
1.0-mmBtu/hr GPU Burner	EU-GPU3	-	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01
1.5-mmBtu/hr GPU Burner	EU-GPU4	-	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01
1.5-mmBtu/hr Line Heater	EU-LH1	-	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01
1.5-mmBtu/hr Line Heater	EU-LH2	-	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01
1.5-mmBtu/hr Line Heater - Removed	*EU-LH3*	-	-	*0.00*	-	*0.00*	*0.00*	*0.00*	-	*0.00*
Two (2) 400-bbl Condensate Tanks	EU-TANKS-COND	-	-	<0.01	0.02	-	0.08	0.02	0.07	0.19
Four (4) 400-bbl Produced Water Tanks	EU-TANKS-PW	-	-	<0.01	<0.01	-	0.01	<0.01	<0.01	0.01
Condensate Truck Loading	EU-LOAD-COND	-	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01
Produced Water Truck Loading	EU-LOAD-PW	-	-	<0.01	<0.01	-	0.01	<0.01	<0.01	0.01
Fugitive Emissions	EU-FUG	-	-	<0.01	<0.01	-	0.01	<0.01	0.01	0.03
Fugitive Haul Road Emissions	EU-HR	-	-	-	-	-	-	-	-	-
Total Emissions =		**-**	**-**	**<0.01**	**0.03**	**<0.01**	**0.12**	**0.02**	**0.09**	**0.26**

Continued on Next Page

SWN Production Company, LLC
O.E. Burge Pad
Summary of Hazardous Air Pollutants (Continued)

Equipment	Unit ID	Estimated Emissions (TPY)								
		Acetalde-hyde	Acrolein	Benzene	Ethyl-benzene	Formalde-hyde	n-Hexane	Toluene	Xylenes	Total HAPs
0.75-mmBtu/hr GPU Burner	EU-GPU1	-	-	<0.01	-	<0.01	0.01	<0.01	-	0.01
1.0-mmBtu/hr GPU Burner	EU-GPU2	-	-	<0.01	-	<0.01	0.01	<0.01	-	0.01
1.0-mmBtu/hr GPU Burner	EU-GPU3	-	-	<0.01	-	<0.01	0.01	<0.01	-	0.01
1.5-mmBtu/hr GPU Burner	EU-GPU4	-	-	<0.01	-	<0.01	0.01	<0.01	-	0.01
1.5-mmBtu/hr Line Heater	EU-LH1	-	-	<0.01	-	<0.01	0.01	<0.01	-	0.01
1.5-mmBtu/hr Line Heater	EU-LH2	-	-	<0.01	-	<0.01	0.01	<0.01	-	0.01
1.5-mmBtu/hr Line Heater - Removed	*EU-LH3*	-	-	*0.00*	-	*0.00*	*0.00*	*0.00*	-	*0.00*
Two (2) 400-bbl Condensate Tanks	EU-TANKS-COND	-	-	0.01	0.10	-	0.36	0.08	0.30	0.85
Four (4) 400-bbl Produced Water Tanks	EU-TANKS-PW	-	-	<0.01	0.01	-	0.02	0.01	0.02	0.05
Condensate Truck Loading	EU-LOAD-COND	-	-	<0.01	<0.01	-	0.01	<0.01	<0.01	0.01
Produced Water Truck Loading	EU-LOAD-PW	-	-	<0.01	0.01	-	0.02	0.01	0.02	0.06
Fugitive Emissions	EU-FUG	-	-	<0.01	0.01	-	0.06	0.01	0.03	0.11
Fugitive Haul Road Emissions	EU-HR	-	-	-	-	-	-	-	-	-
Total Emissions =		**-**	**-**	**0.01**	**0.13**	**<0.01**	**0.53**	**0.10**	**0.37**	**1.14**

SWN Production Company, LLC
O.E. Burge Pad
Summary of Greenhouse Gas Emissions - Metric Tons per Year (Tonnes)

Equipment	Unit ID	Carbon Dioxide (CO_2)		Methane (CH_4)		Methane (CH_4) as $CO_{2\,Eq.}$		Nitrous Oxide (N_2O)		Nitrous Oxide (N_2O) as $CO_{2\,Eq.}$		Total CO_2 + $CO_{2\,Eq.}$[1]	
		lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr
0.75-mmBtu/hr GPU Burner	EU-GPU1	87.73	348.60	<0.01	0.01	0.04	0.16	<0.01	<0.01	0.05	0.20	87.82	348.96
1.0-mmBtu/hr GPU Burner	EU-GPU2	116.98	464.80	<0.01	0.01	0.06	0.22	<0.01	<0.01	0.07	0.26	117.10	465.28
1.0-mmBtu/hr GPU Burner	EU-GPU3	116.98	464.80	<0.01	0.01	0.06	0.22	<0.01	<0.01	0.07	0.26	117.10	465.28
1.5-mmBtu/hr GPU Burner	EU-GPU4	175.47	697.21	<0.01	0.01	0.08	0.33	<0.01	<0.01	0.10	0.39	175.65	697.93
1.5-mmBtu/hr Line Heater	EU-LH1	175.47	697.21	<0.01	0.01	0.08	0.33	<0.01	<0.01	0.10	0.39	175.65	697.93
1.5-mmBtu/hr Line Heater	EU-LH2	175.47	697.21	<0.01	0.01	0.08	0.33	<0.01	<0.01	0.10	0.39	175.65	697.93
1.5-mmBtu/hr Line Heater - Removed	*EU-LH3*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
Three (3) 400-bbl Condensate Tanks[2]	EU-TANKS-COND	-	-	-	-	-	-	-	-	-	-	-	-
Three (3) 400-bbl Produced Water Tanks[2]	EU-TANKS-PW	-	-	-	-	-	-	-	-	-	-	-	-
Condensate Truck Loading	EU-LOAD-COND	<0.01	<0.01	0.01	0.04	0.28	1.11	-	-	-	-	0.28	1.11
Produced Water Truck Loading	EU-LOAD-PW	0.02	0.08	3.27	12.97	81.63	324.37	-	-	-	-	81.65	324.45
Fugitive Emissions	EU-FUG	<0.01	0.02	0.73	2.88	18.14	72.07	-	-	-	-	18.14	72.09
Fugitive Haul Road Emissions	EU-HR	-	-	-	-	-	-	-	-	-	-	-	-
Total Emissions =		**848.11**	**3,369.93**	**4.02**	**15.97**	**100.45**	**399.14**	**<0.01**	**0.01**	**0.48**	**1.89**	**949.04**	**3,770.97**

Notes:
[1] CO_2 Equivalent = Pollutant times GWP multiplier. 40 CFR 98 Table A-1, Global Warming Potential (GWP) multiplier (100-Year Time Horizon): CO_2 = 1, CH_4 = 25, N_2O = 298
[2] Per API Compendium (2009) Chapter 5; Because most of the CH_4 and CO_2 emissions from storage tanks occur as a result of flashing, working and breathing loss emissions of these gases are very small in production and virtually non-existent in the downstream segments. Therefore, GHG emissions from condensate and produced water tanks are assumed to be negligible.

SWN Production Company, LLC
O.E. Burge Pad
Summary of Greenhouse Gas Emissions - Short Tons per Year (Tons)

Equipment	Unit ID	Carbon Dioxide (CO_2)		Methane (CH_4)		Methane (CH_4) as $CO_{2\,Eq.}$		Nitrous Oxide (N_2O)		Nitrous Oxide (N_2O) as $CO_{2\,Eq.}$		Total CO_2 + $CO_{2\,Eq.}$[1]	
		lb/hr	tons/yr[2]	lb/hr	tons/yr[2]	lb/hr	tons/yr	lb/hr	tons/yr[2]	lb/hr	tons/yr	lb/hr	tons/yr
0.75-mmBtu/hr GPU Burner	EU-GPU1	87.73	384.27	<0.01	0.01	0.04	0.18	<0.01	<0.01	0.05	0.22	87.82	384.67
1.0-mmBtu/hr GPU Burner	EU-GPU2	116.98	512.36	<0.01	0.01	0.06	0.24	<0.01	<0.01	0.05	0.29	117.08	512.89
1.0-mmBtu/hr GPU Burner	EU-GPU3	116.98	512.36	<0.01	0.01	0.06	0.24	<0.01	<0.01	0.05	0.29	117.08	512.89
1.5-mmBtu/hr GPU Burner	EU-GPU4	175.47	768.54	<0.01	0.01	0.08	0.36	<0.01	<0.01	0.10	0.43	175.65	769.33
1.5-mmBtu/hr Line Heater	EU-LH1	175.47	768.54	<0.01	0.01	0.08	0.36	<0.01	<0.01	0.10	0.43	175.65	769.33
1.5-mmBtu/hr Line Heater	EU-LH2	175.47	768.54	<0.01	0.01	0.08	0.36	<0.01	<0.01	0.10	0.43	175.65	769.33
1.5-mmBtu/hr Line Heater - Removed	*EU-LH3*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
Three (3) 400-bbl Condensate Tanks[3]	EU-TANKS-COND	-	-	-	-	-	-	-	-	-	-	-	-
Three (3) 400-bbl Produced Water Tanks[3]	EU-TANKS-PW	-	-	-	-	-	-	-	-	-	-	-	-
Condensate Truck Loading	EU-LOAD-COND	<0.01	<0.01	0.01	0.05	0.28	1.23	-	-	-	-	0.28	1.23
Produced Water Truck Loading	EU-LOAD-PW	0.02	0.09	3.27	14.30	81.63	357.56	-	-	-	-	81.65	357.65
Fugitive Emissions	EU-FUG	<0.01	0.02	0.73	3.18	18.14	79.45	-	-	-	-	18.14	79.47
Fugitive Haul Road Emissions	EU-HR	-	-	-	-	-	-	-	-	-	-	-	-
	Total Emissions =	**848.11**	**3,714.71**	**4.02**	**17.60**	**100.45**	**439.98**	**<0.01**	**0.01**	**0.44**	**2.09**	**949.00**	**4,156.78**

Notes:
[1] CO_2 Equivalent = Pollutant times GWP multiplier. 40 CFR 98 Table A-1, Global Warming Potential (GWP) multiplier (100-Year Time Horizon): CO_2 = 1, CH_4 = 25, N_2O = 298
[2] EPA and API GHG calculation methodologies calculate emissions in metric tons (tonnes). These values have been converted to short tons for consistency with permitting threshold units.
[3] Per API Compendium (2009) Chapter 5: Because most of the CH_4 and CO_2 emissions from storage tanks occur as a result of flashing, working and breathing loss emissions of these gases are very small in production and virtually non-existent in the downstream segments. Therefore, GHG emissions from condensate and produced water tanks are assumed to be negligible.

SWN Production Company, LLC
O.E. Burge Pad
Gas Production Unit Burner Emissions Calculations - Criteria Air Pollutants

Equipment Information

Unit ID:	EU-GPU1	EU-GPU2 and EU-GPU3 (EACH)	EU-GPU4
Emission Point ID:	EP-GPU1	EP-GPU2 - EP-GPU3	EP-GPU4
Description:	Gas Production Unit Burner	Gas Production Unit Burner	Gas Production Unit Burner
Number of Units:	1	2	1
Burner Design (mmBtu/hr):	0.75	1.0	1.50
Fuel HHV (Btu/scf):	905	905	905
Annual Fuel Use (mmscf):	7.26	9.68	14.52
Annual Operating Hours:	8,760	8,760	8,760

Criteria Air Pollutant Emissions

Unit ID:	EU-GPU1		EU-GPU2 and EU-GPU3 (EACH)		EU-GPU4	
Pollutant	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**
NOx	0.08	0.36	0.11	0.48	0.17	0.73
CO	0.07	0.30	0.09	0.41	0.14	0.61
VOC	<0.01	0.02	0.01	0.03	0.01	0.04
SO_2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
$PM_{10/2.5}$	<0.01	0.02	0.01	0.03	0.01	0.04
PM_{COND}	<0.01	0.01	<0.01	0.01	<0.01	<0.01
PM_{TOT}	0.01	0.03	0.01	0.04	0.01	0.06

AP-42 Emission Factors for Units <100 mmBtu/hr (lb/mmscf)[1]

Pollutant	1.4-1, -2 (7/98)
NOx	100.0
CO	84.0
VOC	5.5
SO_2	0.6
$PM_{10/2.5}$	5.7
PM_{COND}	1.9
PM_{TOT}	7.6

Notes:

[1] All PM (total, condensable and filterable) is assumed to be <1 micrometer in diameter. Total PM is the sum of filterable PM and condensable PM.

SWN Production Company, LLC
O.E. Burge Pad
Gas Production Unit Burner Emissions Calculations - Hazardous Air Pollutants

Equipment Information

Unit ID:	EU-GPU1	EU-GPU2 and EU-GPU3 (EACH)	EU-GPU4
Emission Point ID:	EP-GPU1	EP-GPU2 - EP-GPU3	EP-GPU4
Description:	Gas Production Unit Burner	Gas Production Unit Burner	Gas Production Unit Burner
Number of Units:	1	2	1
Burner Design (mmBtu/hr):	0.75	1.0	1.50
Fuel HHV (Btu/scf):	905	905	905
Annual Fuel Use (mmscf):	7.26	9.68	9.68
Annual Operating Hours:	8,760	8,760	8,760

Hazardous Air Pollutant Emissions

Unit ID:	EU-GPU1		EU-GPU2 and EU-GPU3 (EACH)		EU-GPU4	
Pollutant	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
n-Hexane	<0.01	0.01	<0.01	0.01	<0.01	<0.01
Formaldehyde	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total HAPs =	**<0.01**	**0.01**	**<0.01**	**0.01**	**<0.01**	**0.01**

AP-42 Emission Factors (lb/mmscf)

Pollutant	1.4-3 (7/98)
n-Hexane	1.80E+00
Formaldehyde	7.50E-02
Benzene	2.10E-03
Toluene	3.40E-03

SWN Production Company, LLC
O.E. Burge Pad
Gas Production Unit Burner Emissions Calculations - Greenhouse Gases

Equipment Information

Unit ID:	EU-GPU1	EU-GPU2 and EU-GPU3 (EACH)	EU-GPU4
Emission Point ID:	EP-GPU1	EP-GPU2 - EP-GPU3	EP-GPU4
Description:	Gas Production Unit Burner	Gas Production Unit Burner	Gas Production Unit Burner
Number of Units:	1	2	1
Burner Design (mmBtu/hr):	0.75	1.0	1.50
Fuel HHV (Btu/scf):	905	905	905
Annual Fuel Use (mmscf):	7.26	9.68	14.52
Annual Operating Hours:	8,760	8,760	8,760

Greenhouse Gas (GHG) Emissions[1]

Unit ID:	EU-GPU1		EU-GPU2 and EU-GPU3 (EACH)		EU-GPU4	
Pollutant	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**
CO_2	87.73	348.60	116.98	464.80	175.47	697.21
CH_4	<0.01	0.01	<0.01	0.01	<0.01	<0.01
N_2O	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CH_4 as CO_2e	0.04	0.16	0.06	0.22	0.08	0.33
N_2O as CO_2e	0.05	0.20	0.07	0.26	0.10	0.39
Total CO_2 + CO_2e =	**87.82**	**348.96**	**117.10**	**465.28**	**175.65**	**697.93**

40 CFR 98 Tables C-1 and C-2 Emission Factors (kg/mmBtu)[2]

Carbon Dioxide (CO_2)	53.06
Methane (CH_4)	1.00E-03
Nitrous Oxide (N_2O)	1.00E-04

Notes:
[1] Conversion to short tons (tons) found in site-wide Summary of Greenhouse Gases - Short Tons per Year (tons) table.
[2] CO_2e = CO_2 equivalent (Pollutant times GWP multiplier):
40 CFR 98 Table A-1, Global Warming Potential (GWP) multiplier: CO_2 = 1, CH_4 = 25, N_2O = 298

SWN Production Company, LLC
O.E. Burge Pad
Line Heater Emissions Calculations - Criteria Air Pollutants

Equipment Information

Unit ID:	**EU-LH1 - EU-LH2 (EACH)**
Emission Point ID:	EP-LH1 - EP-LH2
Description:	Line Heater
Number of Units:	2
Burner Design (mmBtu/hr):	1.5
Fuel HHV (Btu/scf):	905
Annual Fuel Use (mmscf):	14.52
Annual Operating Hours:	8,760

Criteria Air Pollutant Emissions

Unit ID: **EU-LH1 - EU-LH2 (EACH)**

Pollutant	lb/hr	TPY
NOx	0.17	0.73
CO	0.14	0.61
VOC	0.01	0.04
SO_2	<0.01	<0.01
$PM_{10/2.5}$	0.01	0.04
PM_{COND}	<0.01	0.01
PM_{TOT}	0.01	0.06

AP-42 Emission Factors for Units <100 mmBtu/hr (lb/mmscf)[1]

Pollutant	1.4-1, -2 (7/98)
NOx	100.0
CO	84.0
VOC	5.5
SO_2	0.6
$PM_{10/2.5}$	5.7
PM_{COND}	1.9
PM_{TOT}	7.6

Notes:
[1]All PM (total, condensable and filterable) is assumed to be <1 micrometer in diameter. Total PM is the sum of filterable PM and condensable PM.

SWN Production Company, LLC
O.E. Burge Pad
Line Heater Emissions Calculations - Hazardous Air Pollutants

Equipment Information

Unit ID:	**EU-LH1 - EU-LH2 (EACH)**
Emission Point ID:	EP-LH1 - EP-LH2
Description:	Line Heater
Number of Units:	2
Burner Design (mmBtu/hr):	1.5
Fuel HHV (Btu/scf):	905
Annual Fuel Use (mmscf):	14.52
Annual Operating Hours:	8,760

Hazardous Air Pollutant Emissions

Unit ID: **EU-LH1 - EU-LH2 (EACH)**

Pollutant	lb/hr	TPY
n-Hexane	<0.01	0.01
Formaldehyde	<0.01	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Total HAPs =	**<0.01**	**0.01**

AP-42 Emission Factors (lb/mmscf)

Pollutant	1.4-3 (7/98)
n-Hexane	1.80E+00
Formaldehyde	7.50E-02
Benzene	2.10E-03
Toluene	3.40E-03

SWN Production Company, LLC
O.E. Burge Pad
Line Heater Emissions Calculations - Greenhouse Gases

Equipment Information

Unit ID:	**EU-LH1 - EU-LH2 (EACH)**
Emission Point ID:	EP-LH1 - EP-LH2
Description:	Line Heater
Number of Units:	2
Burner Design (mmBtu/hr):	1.5
Fuel HHV (Btu/scf):	905
Annual Fuel Use (mmscf):	14.52
Annual Operating Hours:	8,760

Greenhouse Gas (GHG) Emissions[1]

Unit ID: **EU-LH1 - EU-LH2 (EACH)**

Pollutant	lb/hr	tonnes/yr
CO_2	175.47	697.21
CH_4	<0.01	0.01
N_2O	<0.01	<0.01
CH_4 as CO_2e	0.08	0.33
N_2O as CO_2e	0.10	0.39
Total CO_2 + CO_2e =	**175.65**	**697.93**

40 CFR 98 Tables C-1 and C-2 Emission Factors (kg/mmBtu)[2]

Carbon Dioxide (CO_2)	53.06
Methane (CH_4)	1.00E-03
Nitrous Oxide (N_2O)	1.00E-04

Notes:
[1] Conversion to short tons (tons) found in site-wide Summary of Greenhouse Gases - Short Tons per Year (tons) table.
[2] CO_2e = CO_2 equivalent (Pollutant times GWP multiplier):
40 CFR 98 Table A-1, Global Warming Potential (GWP) multiplier: CO_2 = 1, CH_4 = 25, N_2O = 298

SWN Production Company, LLC
O.E. Burge Pad
Storage Tank Emissions - Criteria Air Pollutants

Tank Information

Unit ID:	EU-TANKS-COND	EU-TANKS-PW
Emission Point ID:	EP-TANKS-COND	EP-TANKS-PW
Contents: [1]	Condensate	Produced Water
Number of Tanks: [2]	2	4
Capacity (bbl) - Per Tank:	400	400
Capacity (gal) - Per Tank:	16,800	16,800
Total Throughput (bbl/yr):	1,879.75	547,500.00
Total Throughput (gal/yr):	78,950	22,995,000
Total Throughput (bbl/d):	5.15	1,500.00
Tank Flashing Emission Factor (lb/bbl):	12.12	0.0026
Total Working Losses (lb/yr): [3]	494.27	53.34
Breathing Losses per Tank (lb/yr): [3]	700.35	1.39

Uncontrolled Storage Tank Emissions

Unit ID:	EU-TANKS-COND		EU-TANKS-PW	
Emissions	**lb/hr**	**TPY**	**lb/hr**	**TPY**
Working Losses	0.06	0.25	0.01	0.03
Breathing Losses	0.08	0.35	0.00	0.00
Flashing Losses	2.60	11.39	0.16	0.71
Total VOC =	**2.74**	**11.99**	**0.17**	**0.74**
Per Tank =	**1.37**	**5.99**	**0.04**	**0.19**

Notes:

[1] Produced water tanks assumed to contain 99% produced water and 1% condensate.

[2] SWN requests to combine working, breathing and flashing emissions from each tank type to be combined into one emissions point with a total throughput limit rather than an individual tank limit.

[3] Flashing calculated using ProMax process simulation. Reports located in Attachment L.

Total Annual Emissions (TPY) = Tank Working + Breathing + Flashing Emissions (TPY)

SWN Production Company, LLC
O.E. Burge Pad
Storage Tank Emissions - Hazardous Air Pollutants

Uncontrolled Storage Tank Emissions

Unit ID: EU-TANKS-COND EU-TANKS-PW

Pollutant	lb/hr	TPY	lb/hr	TPY
Total VOC = [1]	**2.74**	**11.99**	**0.17**	**0.74**
n-Hexane	0.08	0.36	0.01	0.02
Benzene	<0.01	0.01	<0.01	<0.01
Toluene	0.02	0.08	<0.01	0.01
Ethylbenzene	0.02	0.10	<0.01	0.01
Xylenes	0.07	0.30	<0.01	0.02
Total HAPs =	**0.19**	**0.85**	**0.01**	**0.05**

Estimated HAP Composition (% by Weight)[2]

Pollutant	Wt%
n-Hexane	3.007%
Benzene	0.063%
Toluene	0.675%
Ethylbenzene	0.852%
Xylenes	2.491%
Total HAPs =	**7.087%**

Notes:

[1] VOC emissions calculated in Criteria Air Pollutant calculations.

[2] Speciated liquids analysis located in Fugitive Emissions Calculations. HAP weight % calculated as % of total hydrocarbons in the sample. All HAP assumed to volatilize from liquids for most conservative emissions estimate.

SWN Production Company, LLC
O.E. Burge Pad
Condensate Truck Loading Emissions - Criteria and Hazardous Air Pollutants

Loading Information

Unit ID:	**EU-LOAD-COND**
Emission Point ID:	EP-LOAD-COND
Fill Method:	Submerged
Type of Service:	Dedicated
Mode of Operation:	Normal
Saturation Factor:	0.6
Em. Factor (lb/1000 gal): [1]	4.25
Throughput (1000 gal):	78.950
Control Type:	None
Average Fill Rate (gal/hr):	7,500

4.3292	= P, True vapor pressure of liquid loaded (max. psia)
67	= M, Molecular weight of vapor (lb/lb-mol)
50.33	= T, Temperature of bulk liquid loaded (average °F)
510.33	= T, Temperature of bulk liquid loaded (°F + 460 = °R)

Uncontrolled Loading Emissions[2]

Pollutant	Max. lb/hr	Avg. lb/hr	TPY
VOC =	**31.87**	**0.04**	**0.17**
n-Hexane	0.96	<0.01	0.01
Benzene	0.02	<0.01	<0.01
Toluene	0.21	<0.01	<0.01
Ethylbenzene	0.27	<0.01	<0.01
Xylenes	0.79	<0.01	<0.01
Total HAPs [3] =	**2.26**	**<0.01**	**0.01**

SWN Production Company, LLC
O.E. Burge Pad
Condensate Truck Loading Emissions - Criteria and Hazardous Air Pollutants (Continued)

Notes:

[1] AP-42 5.2-4 Eq.1: Loading Loss (lb/1000 gal) = 12.46 *S*P*M/T.

[2] Maximum lb/hr based on average hourly truck loading rate. Average lb/hr based on TPY conversion assuming continuous operation.

[3] Speciated liquids analysis located in Fugitive Emissions Calculations. HAP weight % calculated as % of total hydrocarbons in the sample. All HAP assumed to volatilize from liquids for most conservative emissions estimate.

Pollutant	Wt%
n-Hexane	3.007%
Benzene	0.063%
Toluene	0.675%
Ethylbenzene	0.852%
Xylenes	2.491%
Total HAPs =	**7.087%**

SWN Production Company, LLC
O.E. Burge Pad
Condensate Truck Loading Emissions - Greenhouse Gases

Loading Information

Unit ID:	**EU-LOAD-COND**
Emission Point ID:	EP-LOAD-COND
Fill Method:	Submerged
Type of Service:	Dedicated
Mode of Operation:	Normal
TOC Em. Factor (tonne/10^6 gal): [1]	0.91
Throughput (10^6 gal):	0.07895
Control Type:	None
Average Fill Rate (gal/hr):	7,500

Analysis CH_4 wt % =	62.00514%
Analysis CO_2 wt % =	0.38200%

Uncontrolled Loading Emissions[2, 3]

Pollutant	Max. lb/hr	Avg. lb/hr	tonnes/yr	tons/yr
CH_4	9.33	0.01	0.04	0.05
CH_4 as CO_2e	233.24	0.28	1.11	1.23
CO_2	0.06	<0.01	<0.01	<0.01
Total CO_2 + CO_2e =	**233.30**	**0.28**	**1.11**	**1.23**

SWN Production Company, LLC
O.E. Burge Pad
Condensate Truck Loading Emissions - Greenhouse Gases (Continued)

API Compendium Table 5-12

Loading Type	Emission Factor (tonne TOC/10^6 gal)
Rail/Truck - Submerged Loading - Dedicated Normal Service	0.91
Rail/Truck - Submerged Loading - Vapor Balance Service	1.51
Rail/Truck - Splash Loading - Dedicated Normal Service	2.20
Rail/Truck - Splash Loading - Vapor Balance Service	1.51
Marine Loading - Ships/Ocean Barges	0.28
Marine Loading - Barges	0.45

Notes:

[1] API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry, Table 5-12.

[2] Maximum lb/hr based on average hourly truck loading rate. Average lb/hr based on TPY conversion assuming continuous operation.

[3] CO_2e = CO_2 equivalent (Pollutant times GWP multiplier):

40 CFR 98 Table A-1, Global Warming Potential (GWP) multiplier: CO_2 = 1, CH_4 = 25, N_2O = 298

SWN Production Company, LLC
O.E. Burge Pad
Produced Water Truck Loading Emissions - Criteria and Hazardous Air Pollutants

Loading Information

Unit ID:	**EU-LOAD-PW**
Emission Point ID:	EP-LOAD-PW
Fill Method:	Submerged
Type of Service:	Dedicated
Mode of Operation:	Normal
Saturation Factor:	0.6
Em. Factor (lb/1000 gal): [1]	0.07
Throughput (1000 gal):	22,995.000
Control Type:	None
Average Fill Rate (gal/hr):	7,500

0.2365	= P, True vapor pressure of liquid loaded (max. psia)
19.9326	= M, Molecular weight of vapor (lb/lb-mol)
50.33	= T, Temperature of bulk liquid loaded (average °F)
510.33	= T, Temperature of bulk liquid loaded (°F + 460 = °R)

Uncontrolled Loading Emissions[2]

Pollutant	Max. lb/hr	Avg. lb/hr	TPY
VOC =	**0.52**	**0.18**	**0.79**
n-Hexane	0.02	0.01	0.02
Benzene	<0.01	<0.01	<0.01
Toluene	<0.01	<0.01	0.01
Ethylbenzene	<0.01	<0.01	0.01
Xylenes	0.01	<0.01	0.02
Total HAPs[4] =	**0.04**	**0.01**	**0.06**

SWN Production Company, LLC
O.E. Burge Pad
Produced Water Truck Loading Emissions - Criteria and Hazardous Air Pollutants (Continued)

Notes:

[1] AP-42 5.2-4 Eq.1: Loading Loss (lb/1000 gal) = 12.46 *S*P*M/T. Properties based on mixture of 99% water and 1% condensate.

[2] Maximum lb/hr based on average hourly truck loading rate. Average lb/hr based on TPY conversion assuming continuous operation.

[3] Speciated liquids analysis located in Fugitive Emissions Calculations. HAP weight % calculated as % of total hydrocarbons in the sample. All HAP assumed to volatilize from liquids for most conservative emissions estimate.

Pollutant	Wt%
n-Hexane	3.007%
Benzene	0.063%
Toluene	0.675%
Ethylbenzene	0.852%
Xylenes	2.491%
Total HAPs =	**7.087%**

SWN Production Company, LLC
O.E. Burge Pad
Produced Water Truck Loading Emissions - Greenhouse Gases

Loading Information

Unit ID:	**EU-LOAD-PW**
Emission Point ID:	EP-LOAD-PW
Fill Method:	Submerged
Type of Service:	Dedicated
Mode of Operation:	Normal
TOC Em. Factor (tonne/10^6 gal): [1]	0.91
Throughput (10^6 gal):	22.995
Control Type:	None
Average Fill Rate (gal/hr):	7,500

Analysis CH_4 wt % =	62.00514%
Analysis CO_2 wt % =	0.38200%

Uncontrolled Loading Emissions[2, 3]

Pollutant	Max. lb/hr	Avg. lb/hr	tonnes/yr	tons/yr
CH_4	9.33	3.27	12.97	14.30
CH_4 as CO_2e	233.24	81.63	324.37	357.56
CO_2	0.06	0.02	0.08	0.09
Total CO_2 + CO_2e =	**233.30**	**81.65**	**324.45**	**357.65**

SWN Production Company, LLC
O.E. Burge Pad
Produced Water Truck Loading Emissions - Greenhouse Gases (Continued)

API Compendium Table 5-12

Loading Type	Emission Factor (tonne TOC/10^6 gal)
Rail/Truck - Submerged Loading - Dedicated Normal Service	0.91
Rail/Truck - Submerged Loading - Vapor Balance Service	1.51
Rail/Truck - Splash Loading - Dedicated Normal Service	2.20
Rail/Truck - Splash Loading - Vapor Balance Service	1.51
Marine Loading - Ships/Ocean Barges	0.28
Marine Loading - Barges	0.45

Notes:

[1] API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry, Table 5-12.

[2] Maximum lb/hr based on average hourly truck loading rate. Average lb/hr based on TPY conversion assuming continuous operation.

[3] CO_2e = CO_2 equivalent (Pollutant times GWP multiplier):

40 CFR 98 Table A-1, Global Warming Potential (GWP) multiplier: CO_2 = 1, CH_4 = 25, N_2O = 298

SWN Production Company, LLC
O.E. Burge Pad
Fugitive Emissions Calculations - Criteria and Hazardous Air Pollutants and Greenhouse Gases

Equipment Information

Source Type/Service	Number of Sources[1]	Em. Factor (lb/hr/source)[2]	Control Efficiency	TOC lb/hr	TOC TPY	VOC Wt %
Valves - Gas	60	9.92E-03	0.00%	0.60	2.61	17.47%
Flanges - Gas	216	8.60E-04	0.00%	0.19	0.81	17.47%
Relief Valves - Gas	19	1.94E-02	0.00%	0.37	1.61	17.47%
			Total TOC (Gas Components) =	**1.15**	**5.04**	-
Valves - Light Oil	41	5.51E-03	0.00%	0.23	0.99	94.69%
Connectors - Light Oil	158	4.63E-04	0.00%	0.07	0.32	94.69%
			Total TOC (Liquid Components) =	**0.30**	**1.31**	-

VOC and Greenhouse Gas Emissions

Source Type/Service	VOC		CH_4		CO_2	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Valves - Gas	0.10	0.46	0.37	1.63	<0.01	0.01
Flanges - Gas	0.03	0.14	0.12	0.51	<0.01	<0.01
Relief Valves - Gas	0.06	0.28	0.23	1.01	<0.01	0.01
Components in Gas Service =	**0.20**	**0.88**	**0.72**	**3.15**	**<0.01**	**0.02**
Valves - Light Oil	0.21	0.94	0.01	0.02	<0.01	<0.01
Connectors - Light Oil	0.07	0.30	<0.01	0.01	<0.01	<0.01
Components in Liquid Service =	**0.28**	**1.24**	**0.01**	**0.03**	**<0.01**	**<0.01**
Total (Gas + Liquid Components) =	**0.48**	**2.12**	**0.73**	**3.18**	**<0.01**	**0.02**

SWN Production Company, LLC
O.E. Burge Pad
Fugitive Emissions Calculations (Continued)

Hazardous Air Pollutant (HAP) Emissions (lb/hr)

Source Type/Service	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	2,2,4-Tri.	Total
Valves - Gas	<0.01	<0.01	<0.01	0.00	<0.01	0.00	<0.01
Flanges - Gas	<0.01	<0.01	<0.01	0.00	<0.01	0.00	<0.01
Relief Valves - Gas	<0.01	<0.01	<0.01	0.00	<0.01	0.00	<0.01
Components in Gas Service =	**<0.01**	**<0.01**	**<0.01**	**0.00**	**<0.01**	**0.00**	**<0.01**
Valves - Light Oil	0.01	<0.01	<0.01	<0.01	0.01	0.00	0.02
Connectors - Light Oil	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.01
Components in Liquid Service =	**0.01**	**<0.01**	**<0.01**	**<0.01**	**0.01**	**0.00**	**0.02**
Total (Gas + Liquid Components) =	**0.01**	**<0.01**	**<0.01**	**<0.01**	**0.01**	**0.00**	**0.03**

Hazardous Air Pollutant (HAP) Emissions (TPY)

Source Type/Service	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	2,2,4-Tri.	Total
Valves - Gas	0.01	<0.01	<0.01	0.00	<0.01	0.00	0.01
Flanges - Gas	<0.01	<0.01	<0.01	0.00	<0.01	0.00	<0.01
Relief Valves - Gas	0.01	<0.01	<0.01	0.00	<0.01	0.00	0.01
Components in Gas Service =	**0.02**	**<0.01**	**<0.01**	**0.00**	**<0.01**	**0.00**	**0.02**
Valves - Light Oil	0.03	<0.01	0.01	0.01	0.02	0.00	0.07
Connectors - Light Oil	0.01	<0.01	<0.01	<0.01	0.01	0.00	0.02
Components in Liquid Service =	**0.04**	**<0.01**	**0.01**	**0.01**	**0.03**	**0.00**	**0.09**
Total (Gas + Liquid Components) =	**0.06**	**<0.01**	**0.01**	**0.01**	**0.03**	**0.00**	**0.11**

SWN Production Company, LLC
O.E. Burge Pad
Fugitive Emissions Calculations (Continued)

Typical Component Count per Equipment Type based on Representative Facility[3]

Source Type/Service	WH	GPU	HT	LPT	FGC	OT	TT-O
Valves - Gas	12	3	2	5	5	0	0
Flanges - Gas	37	15	9	24	33	3	2
Compressor Seals - Gas	0	0	0	0	3	0	0
Relief Valves - Gas	1	3	1	1	1	1	1
Open-Ended Lines - Gas	0	0	0	0	0	0	0
Valves - Light Oil	0	5	6	12	3	6	9
Connectors - Light Oil	0	20	24	48	12	24	30
Pump Seals - Light Oil	0	0	0	0	0	0	0
Other - Light Oil	0	0	0	0	0	0	0

Equipment Type	WH	GPU	HT	LPT	FGC	OT	TT-O
Number of Each Type On Pad =	4	4	0	0	0	2	1

SWN Production Company, LLC
O.E. Burge Pad
Fugitive Emissions Calculations (Continued)

Speciated Gas Analysis[4]

Component	Molecular Weight	Mole %	Equiv. Wt. Basis	Weight %	HC Weight %	lb/hr	TPY
Hydrogen Sulfide	34.082	0.000%	0.000	0.000%	-	0.00	0.00
Carbon Dioxide	44.010	0.178%	0.078	0.382%	-	<0.01	0.02
Nitrogen	28.013	0.324%	0.091	0.443%	-	0.01	0.02
Methane	16.042	79.264%	12.716	62.005%	62.521%	0.72	3.15
Ethane	30.069	13.533%	4.069	19.843%	20.008%	0.23	1.01
Propane	44.096	4.099%	1.807	8.814%	8.887%	0.10	0.45
i-Butane	58.122	0.616%	0.358	1.746%	1.760%	0.02	0.09
n-Butane	58.122	0.991%	0.576	2.809%	2.832%	0.03	0.14
i-Pentane	72.149	0.324%	0.234	1.140%	1.149%	0.01	0.06
n-Pentane	72.149	0.246%	0.177	0.865%	0.873%	0.01	0.04
n-Hexane	86.175	0.080%	0.069	0.336%	0.339%	<0.01	0.02
Other Hexanes	86.175	0.162%	0.140	0.681%	0.686%	0.01	0.03
Heptanes (as n-Heptane)	100.202	0.121%	0.121	0.591%	0.596%	0.01	0.03
Benzene	78.114	0.002%	0.002	0.008%	0.008%	<0.01	<0.01
Toluene	92.141	0.005%	0.005	0.022%	0.023%	<0.01	<0.01
Ethylbenzene	106.167	0.000%	0.000	0.000%	0.000%	0.00	0.00
Xylenes	106.167	0.002%	0.002	0.010%	0.010%	<0.01	<0.01
2,2,4-Trimethylpentane	114.230	0.000%	0.000	0.000%	0.000%	0.00	0.00
Octanes (as n-Octane)	114.229	0.041%	0.047	0.228%	0.230%	<0.01	0.01
Nonanes (as n-Nonane)	128.255	0.010%	0.013	0.063%	0.063%	<0.01	<0.01
Decanes (as n-Decane)	142.282	0.002%	0.003	0.014%	0.014%	<0.01	<0.01
	TOTAL =	**100.00%**	**20.51**	**100.00%**	**100.00%**	**1.16**	**5.08**
		TOTAL HC =	**20.34**	**TOTAL VOC =**	**17.47%**	**0.20**	**0.88**
				TOTAL HAP =	**0.38%**	**<0.01**	**0.02**

SWN Production Company, LLC
O.E. Burge Pad
Fugitive Emissions Calculations (Continued)

Speciated Liquids Analysis[4]

Component	Molecular Weight	Mole %	Equiv. Wt. Basis	Weight %	HC Weight %	lb/hr	TPY
Hydrogen Sulfide	34.082	0.000%	0.000	0.000%	-	0.00	0.00
Carbon Dioxide	44.010	0.031%	0.014	0.016%	-	<0.01	<0.01
Nitrogen	28.013	0.033%	0.009	0.011%	-	<0.01	<0.01
Methane	16.042	11.976%	1.921	2.279%	2.280%	0.01	0.03
Ethane	30.069	8.481%	2.550	3.025%	3.026%	0.01	0.04
Propane	44.096	7.323%	3.229	3.831%	3.832%	0.01	0.05
i-Butane	58.122	2.306%	1.340	1.590%	1.590%	<0.01	0.02
n-Butane	58.122	5.338%	3.103	3.680%	3.681%	0.01	0.05
i-Pentane	72.149	3.779%	2.727	3.234%	3.235%	0.01	0.04
n-Pentane	72.149	3.851%	2.778	3.296%	3.297%	0.01	0.04
n-Hexane	86.175	2.941%	2.534	3.007%	3.007%	0.01	0.04
Other Hexanes	86.175	4.856%	4.185	4.964%	4.966%	0.01	0.07
Heptanes (as n-Heptane)	100.202	11.138%	11.160	13.239%	13.243%	0.04	0.17
Benzene	78.114	0.068%	0.053	0.063%	0.063%	<0.01	<0.01
Toluene	92.141	0.617%	0.569	0.674%	0.675%	<0.01	0.01
Ethylbenzene	106.167	0.676%	0.718	0.851%	0.852%	<0.01	0.01
Xylenes	106.167	1.977%	2.099	2.490%	2.491%	0.01	0.03
2,2,4-Trimethylpentane	114.230	0.000%	0.000	0.000%	0.000%	0.00	0.00
Octanes (as n-Octane)	114.229	10.611%	12.121	14.379%	14.383%	0.04	0.19
Nonanes (as n-Nonane)	128.255	6.834%	8.765	10.398%	10.400%	0.03	0.14
Decanes (as n-Decane)	142.282	17.165%	24.423	28.972%	28.980%	0.09	0.38
TOTAL =		**100.00%**	**84.30**	**100.00%**	**100.00%**	**0.30**	**1.31**
		TOTAL HC =	**84.27**	**TOTAL VOC =**	**94.69%**	**0.28**	**1.24**
				TOTAL HAP =	**7.09%**	**0.02**	**0.09**

Notes:

[1] Component counts taken by equipment type at representative facility and made site-specific according to the number of each equipment type at this site.

[2] Emission Factor Source: EPA-453/R-95-017. TOC multiplied by pollutant content of streams (weight %) to obtain pollutant emissions.

[3] Equipment Type Key: WH = Well Head, GPU = Gas Production Unit, HT = Heater Treater, LPT = Low-Pressure Tower, FGC = Flash Gas Compressor, OT = Oil Tank, TT-O = Tank Truck - Oil

[4] Representative gas and liquids analyses (Shawn Harlan 3H PVT) located in Appendix A.

SWN Production Company, LLC
O.E. Burge Pad
Fugitive Unpaved Haul Road Emissions Calculations

Facility Data[1]

Vehicle Type	Light Vehicles (Pick-ups and Cars)	Medium Trucks (Service Trucks)	Heavy Trucks (Tanker Trucks)[2]
Average vehicle weight ((empty + full)/2) (tons)	2	15	23.5
Number of wheels per vehicle type (w)	4	10	18
Average number of round trips/day/vehicle type	4	2	8
Distance per round trip (miles/trip)	0.71	0.71	0.71
Vehicle miles travelled (miles/day)	2.81	1.41	5.62
Number of days operational (days/yr)	365	365	365
Vehicle miles travelled VMT (miles/yr)	1,026.25	513.13	2,052.51
Average vehicle speed S (mph)	10	10	10
Average number of round trips/hour/vehicle type	0.17	0.08	0.33
Average number of round trips/year/vehicle type	1,446	723	2,891
Estimated maximum number of round trips/hour/vehicle type	3	3	2
Estimated maximum number of round trips/day/vehicle type	6	4	10
Estimated maximum number of round trips/year/vehicle type	2,300	1,533	3,803

190	Average Tanker Volume (bbl)
7,980	Gallons Tanker Volume
1,500	bwpd
5.15	bopd
7.92	Tanker Trucks per Day
1,465	Length Leased Access Road (ft)
409	Longest Pad Side (ft)
3,748	Total Round Trip Feet

Formula & Calculation Inputs

$E=k(s/12)^a * (W/3)^b * ((365-P) / 365)$

Reference : AP-42, Section 13.2.2 (11/06), Equation 1a and 2

where:

	Rate	Units	Comment
Days per year	365		
Annual average hours per day of road operations	24		
k = PM Particle Size Multiplier	4.90	lb/VMT	AP-42 Section 13.2.2 (11/06), Table 13.2.2-2 (PM)
k = PM10 Particle Size Multiplier	1.50	lb/VMT	AP-42 Section 13.2.2 (11/06), Table 13.2.2-2 (PM_{10})
k = PM2.5 Particle Size Multiplier	0.15	lb/VMT	AP-42 Section 13.2.2 (11/06), Table 13.2.2-2 ($PM_{2.5}$)
s = Surface Material Silt Content	3.9	%	State Default Data from AP-42 Data (1999 NEI Data)
P = Number of days > 0.01 inch of rain	150	days/year	AP-42 Section 13.2.2 (11/06), Figure 13.2.2-1
a = PM Constant	0.70	unitless	AP-42 Section 13.2.2 (11/06), Table 13.2.2-2 (PM)
a = PM10 & PM2.5 Constant	0.90	unitless	AP-42 Section 13.2.2 (11/06), Table 13.2.2-2 (PM_{10} & $PM_{2.5}$)
b = PM, PM10, & PM2.5 Constant	0.45	unitless	AP-42 Section 13.2.2 (11/06), Table 13.2.2-2
Total hourly fleet vehicle miles travelled (miles/hr)	0.41	VMT/hr	
Total annual fleet vehicle miles travelled (miles/yr)[3]	3,591.89	VMT/yr	
Average wheels[4]	13		
Average vehicle weight of the fleet (W)[5]	16.1	tons	
Moisture Ratio	1.00		Estimated based on 0.2% uncontrolled surface water content assuming no watering
Control Efficiency (CF)	0.00	%	Based on Moisture Ratio and Figure 13.2.2-2 Control

EPA - BID Document 13.2.2 - 1998

Continued on Next Page

SWN Production Company, LLC
O.E. Burge Pad
Fugitive Unpaved Haul Road Emissions Calculations (Continued)

Emission Calculations

	Emission Factors			Control	Total Vehicle Miles Travelled		Uncontrolled Emission Rates			Uncontrolled Emission Rates		
	PM	PM_{10}	$PM_{2.5}$	Efficiency			Total PM	Total PM_{10}	$PM_{2.5}$	Total PM	Total PM_{10}	$PM_{2.5}$
Vehicle Type	(lbs/VMT)	(lbs/VMT)	(lbs/VMT)	(%)	(VMT/hr)	(VMT/yr)	(lb/hr)	(lb/hr)	(lb/hr)	(tons/yr)	(tons/yr)	(tons/yr)
Light Vehicles	2.80	0.69	0.07	0.00	0.12	1,026.25	0.33	0.08	0.01	1.44	0.35	0.04
Medium Trucks	2.80	0.69	0.07	0.00	0.06	513.13	0.16	0.04	<0.01	0.72	0.18	0.02
Heavy Trucks	2.80	0.69	0.07	0.00	0.23	2,052.51	0.66	0.16	0.02	2.88	0.70	0.07
			Total =	**0.00**	**0.41**	**3,591.89**	**1.15**	**0.28**	**0.03**	**5.03**	**1.23**	**0.12**

Notes:

1) Facility vehicle data based on estimates, GP5.1 and AP-42 13.2.2-2 defaults for industrial unpaved roads
2) Tank trucker average vehicle weight as $(W_{(empty)}+W_{(full)})/2 = (7 + 40)/2 = 23.7$ tons
3) Average vehicle miles travelled (VMT/yr) as (No. of round trip/vehicle * No. of vehicles/type * Roundtrip miles/trip)* 365 days/yr * No. of vehicle type)
4) Average wheels calculated as average of (No. of wheels per vehicle type * No. of vehicle/type)
5) Average vehicle fleet calculated as (Average weight of vehicle type * Percentage of each vehicle type on unpaved surface). Percentage of each vehicle type= $VMT_{vehicle\ type}/VMT$
6) Minimum one-per-day average pick-up trucks and service trucks even if tanker not required every day.
7) Per EPA BID calculations, all emissions based on average trips. Estimated maximum hourly, daily and yearly trips provided for information only.

Calculation of Emission Factors (AP-42, 13.2.2)

Equation 1a: $EF = k(s/12)^a (W/3)^b$ *where k, a, and b are empirical constants and*
EF = size-specific emission factor (lb/VMT)
s = surface material silt content %
W = mean vehicle weight (tons)

Equation 2: $EF_{ext} = EF*((365-P)/365)$ *where:*
EF_{ext} *= annual size-specific emission factor extrapolated for natural mitigation, lb/VMT*
EF = emission factor from Equation 1a
P = number of days in a year with at least 0.01 inches of precipitation

Calculation of Emissions

$E = EF_{ext} * VMT/yr * ((1-CF)/100) * 1\ ton/2000\ lbs$ *where:*
E = annual emissions (tons/yr)
EF_{ext} *= annual size-specific emission factor extrapolated for natural mitigation, lb/VMT*
CF = control efficiency (%)

ATTACHMENT T: FACILITY-WIDE EMISSION SUMMARY SHEETS

ATTACHMENT T – 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}		$PM_{2.5}$		GHG (CO_2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
EP-GPU1	0.08	0.36	0.07	0.30	<0.01	0.02	<0.01	<0.01	0.01	0.03	0.01	0.03	87.82	384.67
EP-GPU2	0.11	0.48	0.09	0.41	0.01	0.03	<0.01	<0.01	0.01	0.04	0.01	0.04	117.08	512.89
EP-GPU3	0.11	0.48	0.09	0.41	0.01	0.03	<0.01	<0.01	0.01	0.04	0.01	0.04	117.08	512.89
EP-GPU4	0.17	0.73	0.14	0.61	0.01	0.04	<0.01	<0.01	0.01	0.06	0.01	0.06	175.65	769.33
EP-LH1	0.17	0.73	0.14	0.61	0.01	0.04	<0.01	<0.01	0.01	0.06	0.01	0.06	175.65	769.33
EP-LH2	0.17	0.73	0.14	0.61	0.01	0.04	<0.01	<0.01	0.01	0.06	0.01	0.06	175.65	769.33
EP-TANKS-COND	-	-	-	-	2.74	11.99	-	-	-	-	-	-	-	-
EP-TANKS-PW	-	-	-	-	0.17	0.74	-	-	-	-	-	-	-	-
EP-LOAD-COND	-	-	-	-	0.04	0.17	-	-	-	-	-	-	0.28	1.23
EP-LOAD-PW	-	-	-	-	0.18	0.79	-	-	-	-	-	-	81.65	357.65
EP-FUG	-	-	-	-	0.48	2.12	-	-	-	-	-	-	18.14	79.47
EP-HR	-	-	-	-	-	-	-	-	1.15	5.03	1.15	5.03	-	-
TOTAL	0.80	3.51	0.67	2.95	3.65	16.00	<0.01	0.02	1.21	5.30	1.21	5.30	949.00	4,156.78

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 T – 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
EP-GPU1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	<0.01	0.01	<0.01	0.01
EP-GPU2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	<0.01	0.01	<0.01	0.01
EP-GPU3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	<0.01	0.01	<0.01	0.01
EP-GPU4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	<0.01	0.01	<0.01	0.01
EP-LH1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	<0.01	0.01	<0.01	0.01
EP-LH2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	<0.01	0.01	<0.01	0.01
EP-TANKS-COND	-	-	<0.01	0.01	0.02	0.08	0.02	0.10	0.07	0.30	0.08	0.36	0.19	0.85
EP-TANKS-PW	-	-	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	0.02	0.01	0.02	0.01	0.05
EP-LOAD-COND	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
EP-LOAD-PW	-	-	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	0.02	0.01	0.02	0.01	0.06
EP-FUG	-	-	<0.01	<0.01	<0.01	0.01	<0.01	0.01	0.01	0.03	0.01	0.06	0.03	0.11
EP-HR	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	<0.01	<0.01	<0.01	0.01	0.02	0.10	0.03	0.13	0.09	0.37	0.12	0.53	0.26	1.14

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: CLASS I LEGAL ADVERTISEMENT

Note: Affidavit of Publication will be submitted upon receipt by SWN from the publisher.

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that SWN Production Company, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-C General Permit Registration for a natural gas production facility (O.E. Burge Pad) located near Cameron in Marshall County, West Virginia. From SR-7 staging go 0.1 mile on SR-7 east to junction of SR-7 and SR-1/15, (Brock Ridge Rd), and turn left on SR-1/15 North. Travel 4.0 miles to junction of SR-1/15 and SR-89, (Proctor Creek Rd). Turn right on SR-89 and travel 4.3 miles to Silver Hill VFD on right and CR-6 (Macedonia Ridge Rd) on left. Turn left on CR-6 and travel 3.2 miles to intersection of CR-21/10, (Pleasant Ridge Rd) and CR-92, (Greenfield Ridge Rd). Turn right on CR-92 and travel 1.4 miles to intersection of CR-92 and CR-92/1, (Tea Garden Lane), in road. Turn right on CR-92/1 and travel 0.3 miles with access road on left. **Note there is no sign for CR-6 Macedonia Ridge Rd** Latitude and longitude coordinates are: 39.75076, -80.63191.

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

Nitrogen Oxides (NOx)	3.51 tons/yr
Carbon Monoxide (CO)	2.95 tons/yr
Volatile Organic Compounds (VOC)	16.00 tons/yr
Sulfur Dioxide (SO_2)	0.02 tons/yr
Particulate Matter (PM)	5.30 tons/yr
Benzene	0.01 tons/yr
Ethylbenzene	0.13 tons/yr
Formaldehyde	<0.01 tons/yr
n-Hexane	0.53 tons/yr
Toluene	0.10 tons/yr
Xylenes	0.37 tons/yr
Carbon Dioxide	3,714.71 tons/yr
Methane	17.60 tons/yr
Nitrous Oxide	0.01 tons/yr
CO_2 Equivalent	4,156.78 tons/yr

The change in equipment and operations is planned to begin on or about November 20, 2016. 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 30th of August, 2016

By: SWN Production Company, LLC
Carla Suszkowski, P.E.
Regulatory Manager – West Virginia Division
10000 Energy Drive
Spring, TX 77389