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

DAVID REINBEAU PAD

G70-D PERMIT MODIFICATION

REV	BY	DATE	DESCRIPTION	PERMIT	FACILITIES REVIEWED	DATE
0	SWN	04/2017	-	G70-D253		
1	SWN	11/2017	ADD: 1 COMP, 2 HT	G70-D253 AOS		
2	SWN	11/2017	ADD: 2 COMP	G70-D253A	DS	11/30/2017

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INTRODUCTION

SWN Production Company, LLC (SWN), is authorized to operate the David Reinbeau Pad under Permit No. G70-D253, issued on June 21, 2017. An alternative operating scenario update was submitted in November 2017 to add one (1) certified 23.6-hp Kubota engine and two (2) 1.5-mmBtu/hr heater treaters. With this application, SWN requests authorization to add two (2) 145-hp Caterpillar G3306 NA compressor engines and remove two (2) permitted 0.5-mmBtu/hr heater treaters. As a result of these changes, fugitive component counts and emissions have also been updated. All other emission units remain as permitted. The project is considered a modification. Equipment to be authorized includes the following:

- Four (4) Caterpillar G3306 NA Compressor Engines
- One (1) Caterpillar G3516B Compressor Engine
- One (1) Kubota DG972-E2 Compressor Engine
- Three (3) 1.0-mmBtu/hr Gas Production Units
- Two (2) 1.5-mmBtu/hr Heater Treaters
- One (1) 24-MMSCFD TEG Dehydration Unit
- One (1) 0.75-mmBtu/hr TEG Reboiler
- Four (4) 400-bbl Condensate Tanks
- Four (4) 400-bbl Produced Water Tanks
- Condensate Truck Loading
- Produced Water Truck Loading
- One (1) 15.0-mmBtu/hr Vapor Combustor with Pilot
- Fugitive Emissions
- Fugitive Haul Road Emissions

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 listed on the application form.

Proposed Emissions

Emissions calculations for this project are presented in Attachment T. 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.

Emissions from the Caterpillar engines were calculated with manufacturer data when available and AP-42/EPA emissions factors for the remaining pollutants. The proposed Kubota engine is an

EPA-certified engine with NMHC+NOx and CO emission standards in g/kW-hr. NMHC and NOx are grouped together for the purposes of the emission standard; therefore, the total emission factor was used to conservatively estimate emissions for both VOC and NOx, respectively. Since the engine is certified at a lower emission rate than the CO emission standard, the certification factor was used to estimate CO emissions. Certification test data was also used to estimate CO_2 and CH_4 emissions; all other pollutants were estimated using AP-42 emission factors.

Fugitive emissions were calculated with a component count by equipment type from a similar facility, and representative extended gas and liquids analyses. Fugitive 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 are attached.

Regulatory Discussion

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-D. 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. This project is considered a modification.

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 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 proposed 145-hp, four-stroke, rich-burn natural gas-fired flash gas compressor engines were constructed after the June 12, 2006 effective date and manufactured after July 1, 2008; therefore, they will be subject to this Subpart. Engines EU-ENG1, EU-ENG2, EU-ENG5, and EU-ENG6 have horsepower ratings of 145-hp each (between 100-hp and 499-hp) and were manufactured after January 1, 2011; therefore, they are subject to Stage 2 emission limitations under this Subpart. EU-ENG3 has a horsepower rating of 1,380-hp (≥ 1,350-hp) and was manufactured on September 30, 2014 (after July 1, 2010); therefore, it is subject to the Stage 2 emission limitations under this Subpart. EU-ENG4 has a horsepower rating of 23.6-hp (≤ 25-hp) and a manufacture date of May 1, 2012 (after July 1, 2008) and is certified as required by this Subpart. SWN will comply with all applicable requirements.

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 at this location were completed during the effective date of this Subpart and are subject to the compliance requirements. Reciprocating compressors located at well sites are not subject to this Subpart. The remaining proposed equipment at this production pad will be constructed after the effective date of 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 wells at this location were completed before the effective date of this Subpart and are not subject to the compliance requirements. Reciprocating compressors located at well sites are not subject to this Subpart. 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 storage vessel venting is controlled to less than six (6) TPY VOC and federally enforceable limits have been previously requested; therefore, the storage vessels are 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 original rule, published on February 26, 2004, initially affected new (constructed or reconstructed after December 19, 2002) reciprocating internal combustion engines (RICE) with a site-rating greater than 500 brake horsepower (HP) located at a major source of HAP emissions. On January 18, 2008, EPA published an amendment that promulgated standards for RICE constructed or reconstructed after June 12, 2006 with a site rating less than or equal to 500 HP located at major sources, and for engines constructed and reconstructed after June 12, 2006 located at area sources. On August 10, 2010, EPA published another amendment that promulgated standards for existing (constructed or reconstructed before June 12, 2006) RICE at area sources and existing RICE (constructed or reconstructed before June 12, 2006) with a site rating of less than or equal to 500 HP at major sources.

Owners and operators of new or reconstructed engines at area sources must meet the requirements of Subpart ZZZZ by complying with either 40 CFR Part 60 Subpart IIII (for CI engines) or 40 CFR Part 60 Subpart JJJJ (for SI engines). Based on emission calculations, this facility is a minor source of HAP. The 145-hp, four-stroke, rich-burn natural gas-fired flash gas compressor engines and 1,380-hp, four-stroke, lean-burn natural gas-fired flash gas compressor engine are considered new engines manufactured after July 1, 2010 and comply with this Subpart by complying with requirements under NSPS Subpart JJJJ. The 23.6-hp, four-stroke, rich-burn natural gas-fired flash gas compressor engine is considered a new engine manufactured after July 1, 2008 and complies with this Subpart by complying with requirements under NSPS Subpart JJJJ.

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-D GENERAL PERMIT REGISTRATION APPLICATION

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

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

SECTION 1. GENERAL INFORMATION

Name of Applicant (as registered with the WV Secretary of State's Office): 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: David Reinbeau Pad

Operating Site Physical Address: 843 Sorghum Ridge Rd.
If none available, list road, city or town and zip of facility.

City: Wheeling	Zip Code: 26003	County: Marshall

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.99496
Longitude: -80.66492

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities) 051-00244

CERTIFICATION OF INFORMATION

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

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

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

Responsible Official Signature:_____
Name and Title: Phone: Fax:
Email: Date:

If applicable:
Authorized Representative Signature: [signature]
Name and Title: Clay Murral, Regulatory Supervisor Phone: 304-884-1715 Fax:
Email: Clay_Murral@SWN.com Date: 11-30-2017

If applicable:
Environmental Contact
Name and Title: Clay Murral, Regulatory Supervisor Phone: 304-884-1715 Fax:
Email: Clay_Murral@SWN.com Date:

OPERATING SITE INFORMATION
Briefly describe the proposed new operation and/or any change(s) to the facility: This application is for the addition of two (2) 145-hp Caterpillar G3306 NA engines (EU-ENG5 – EU-ENG6) and the removal of two 0.5-mmBtu/hr heater treaters (EU-HT1 – EU-HT2). This application also incorporates a recently submitted AOS which included the addition of one 23.6-hp Kubota DG972-E2 engine (EU-ENG-4) and two (2) 1.5-mmBtu/hr heater treaters (EU-HT3 – EU-HT4).
Directions to the facility: From Interstate 470 in Wheeling, WV, take exit 2 (Bethlehem). Turn left after exiting onto CR 91/1 if traveling west bound on Interstate 470. Turn right onto CR 91/1 if traveling east bound on Interstate 470. Travel 0.46 miles to SR 88 and bear right at the stop light onto SR 88 South (Ridgecrest Road). Travel 4.729 miles on CR 88 to the intersection of SR 88 and CR 88/2 (Sorghum Ridge Road) and turn left onto CR 88/2. Travel 0.853 miles on CR 88/2 to future well pad access road on the right.

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

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

ATTACHMENT A: 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).

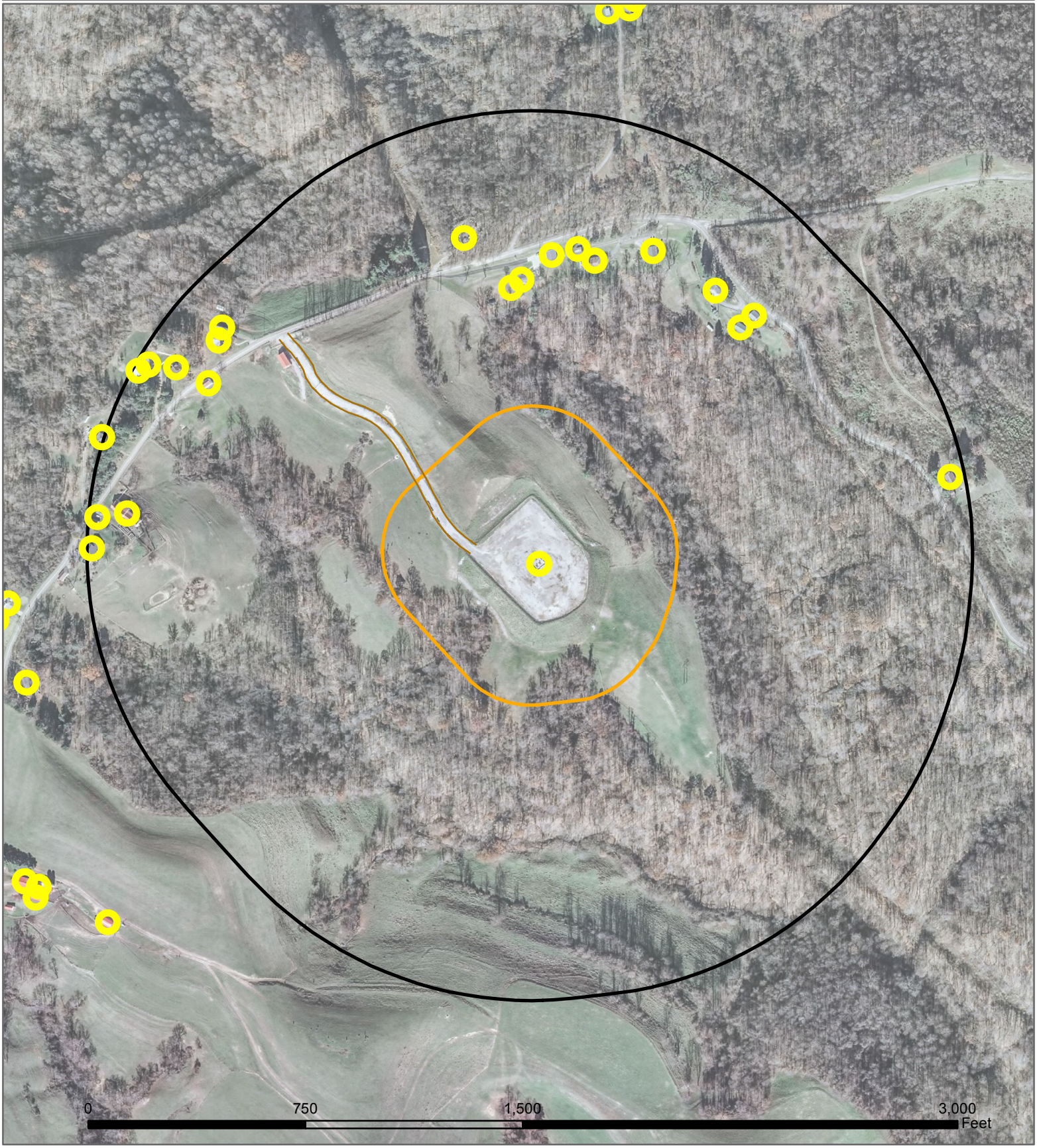
The Source Determination Rule for the oil and gas industry was published in the Federal Register on June 3, 2016 and will become effective on August 2, 2016. EPA defined the term "adjacent" and stated that equipment and activities in the oil and gas sector that are under common control will be considered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

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

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

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

Proximity Map



swn Production Company™

David Reinbeau Pad

NAD83 UTM Zone 17N
528.908 4,427.018 Kilometers
-80.664920 39.994960 Decimal Degrees

Schools
Residential Structures
Rivers and Lakes
Reinbeau Quarter Mile
Reinbeau 300Ft.
Compressor Stations
Processing Plant
Power Plant
Hospital

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.

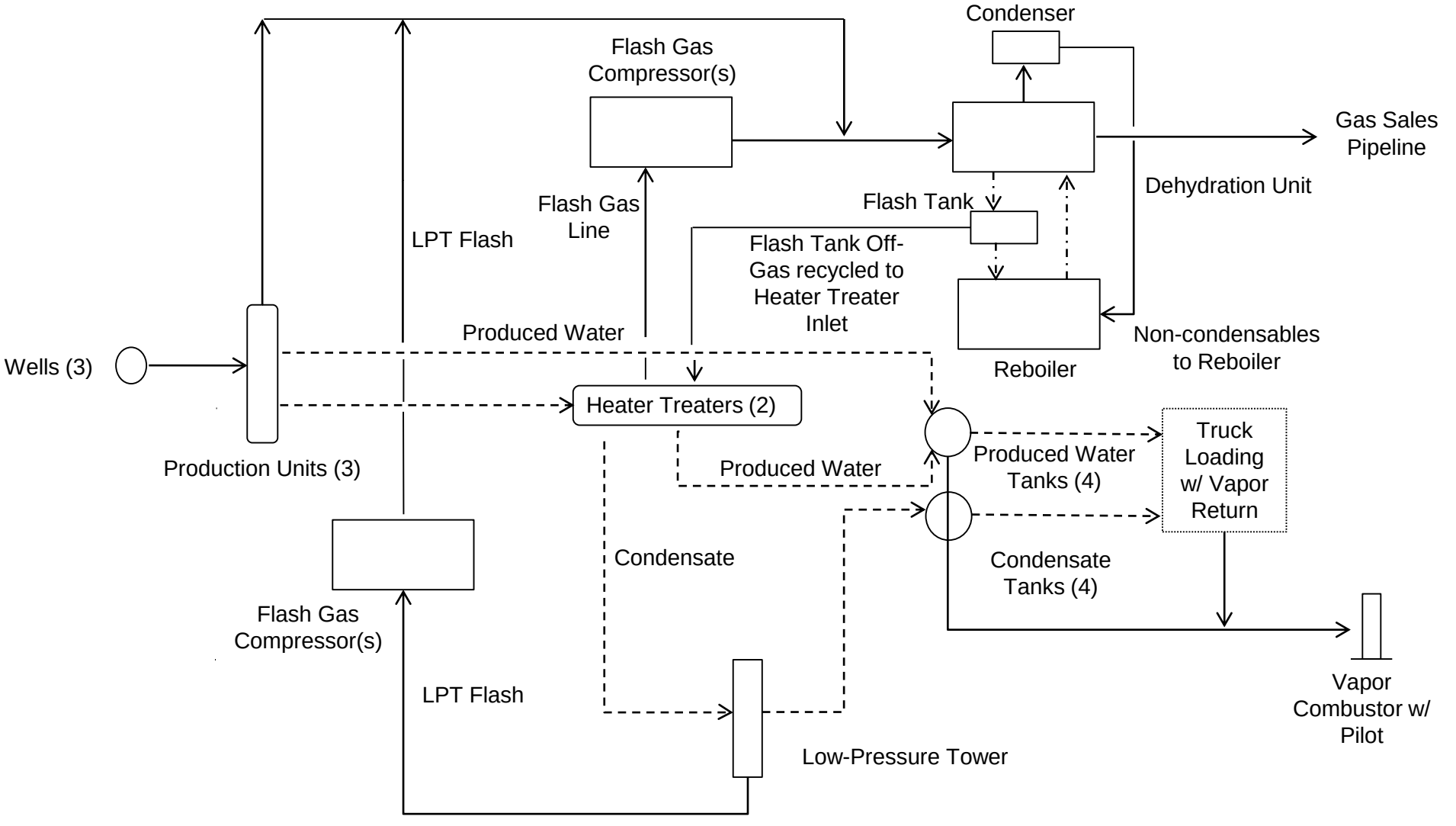
This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

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
L1160094016

ATTACHMENT D: PROCESS FLOW DIAGRAM



Gas/Vapor

Liquids (Condensate and Produced Water)

Glycol

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

SWN Production Company, LLC
David Reinbeau Pad
Attachment D: Process Flow Diagram
November 2017

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 also occurs on-site. A description of the facility process is as follows: Condensate, gas and water come from the wellheads to the production units, where the first stage of separation occurs. Produced water is sent from the production units to the produced water tanks. Condensate and residual water are sent to the heater treaters. The flash from the heater treaters is captured via natural gas-fired engine-driven flash gas compressors. Condensate flows into the low-pressure tower. Flash gases from the low-pressure tower are routed via hard-piping (with 100% capture efficiency) to the inlet of the flash gas compressors to be compressed.

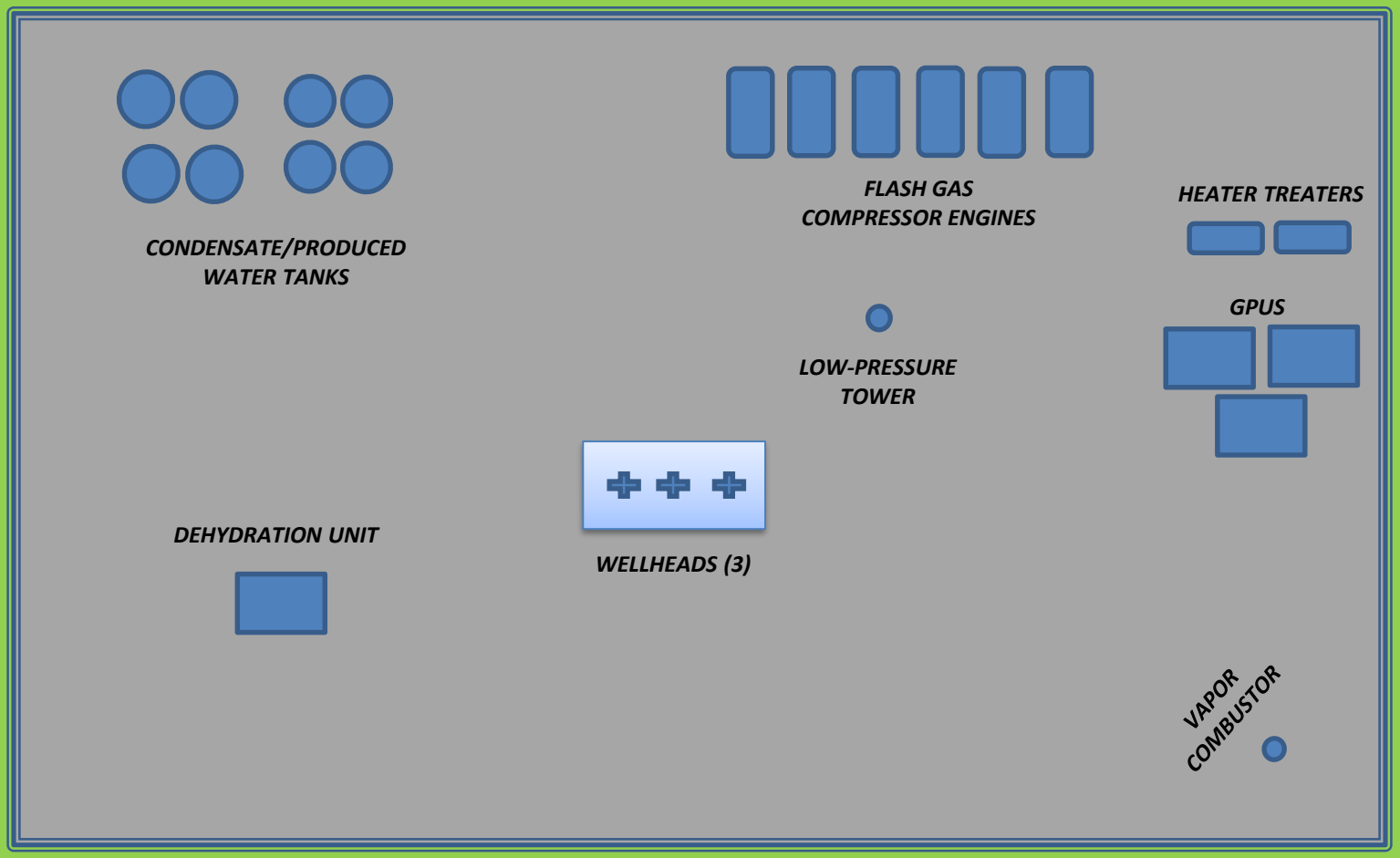
Working, breathing and flashing vapors from the condensate and produced water storage tanks are routed to the vapor combustor with 100% capture efficiency to be burned with at least 98% combustion efficiency. The vapor combustor has one (1) natural gas-fired pilot to ensure a constant flame for combustion.

The natural gas stream from the gas production units and flash gas compressors is routed to the dehydration unit before exiting the facility. In the dehydration process, gas passes through a contactor vessel where water is absorbed by the glycol. The “rich” glycol-containing water goes to the glycol dehydrator reboiler where heat is used to boil off the water. Still vent vapors from the dehydration unit are controlled by an air-cooled condenser. Non-condensables from the still column overheads are routed to the reboiler for combustion. It was conservatively assumed that the reboiler provides 50% destruction efficiency since the burner on the reboiler is necessary to maintain the temperature and is inherent in the process; therefore, it is appropriate to use 50% efficiency with no monitoring required. The manufacturer guarantees a higher control efficiency. Flash tank off-gases are routed to the heater treater and then recompressed. Flash tank off-gases can also be used as supplemental fuel for the reboiler; therefore, a destruction efficiency of 98% was used in GLYCalc as a conservative measure.

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

ATTACHMENT F: PLOT PLAN

Please note that the simple plot plan provided is only a representation of production/emissions equipment to be installed. Actual location specifications and equipment placement are not to scale.

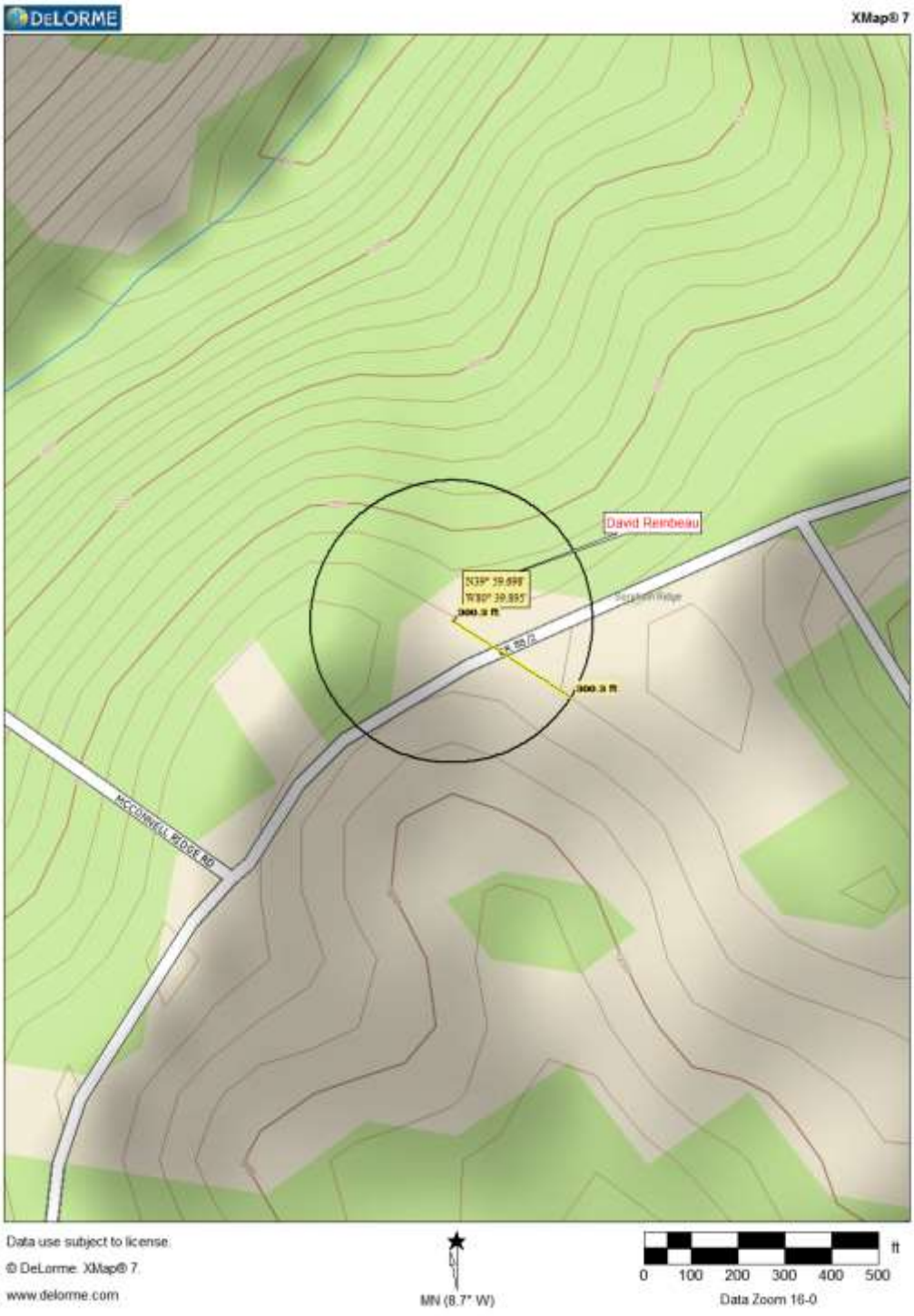


***NOTE**: Image is only a representation of production/emissions equipment. Actual location specifications and equipment placement are not to scale.*

SWN Production Company, LLC
David Reinbeau Pad
Attachment F: Simple Plot Plan
November 2017

ATTACHMENT G: AREA MAPS

SWN Production Company, LLC
David Reinbeau Pad
Attachment G: Area Map
November 2017



SWN Production Company, LLC
David Reinbeau Pad
Attachment G: Area Map with 300' Radius
November 2017

ATTACHMENT H: G70-D SECTION APPLICABILITY FORM

General Permit G70-D Registration
Section Applicability Form

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

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

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

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

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

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

ATTACHMENT I: 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-ENG1	EP-ENG1	145-hp Caterpillar G3306 NA Engine	TBD	2/28/2012	145-hp	Existing	NSCR	NSCR
EU-ENG2	EP-ENG2	145-hp Caterpillar G3306 NA Engine	TBD	11/20/2013	145-hp	Existing	NSCR	NSCR
EU-ENG3	EP-ENG3	1,380-hp Caterpillar G3516B Engine	TBD	9/30/2014	1,380-hp	Existing	Oxid. Cat.	Oxid. Cat.
EU-ENG4	EP-ENG4	23.6-hp Kubota DG972-E2 Engine	TBD	5/1/2012	24-hp	Existing	None	None
EU-ENG5	EP-ENG5	145-hp Caterpillar 3306 NA Engine	TBD	9/23/2011	145-hp	New	NSCR	NSCR
EU-ENG6	EP-ENG6	145-hp Caterpillar 3306 NA Engine	TBD	2/6/2012	145-hp	New	NSCR	NSCR
EU-GPU1	EP-GPU1	1.0-mmBtu/hr GPU Burner	TBD	N/A	1.0-mmBtu/hr	Existing	N/A	N/A
EU-GPU2	EP-GPU2	1.0-mmBtu/hr GPU Burner	TBD	N/A	1.0-mmBtu/hr	Existing	N/A	N/A
EU-GPU3	EP-GPU3	1.0-mmBtu/hr GPU Burner	TBD	N/A	1.0-mmBtu/hr	Existing	N/A	N/A
EU-HT1	EP-HT1	0.5-mmBtu/hr Heater Treater	N/A	N/A	0.5-mmBtu/hr	Removal	N/A	N/A
EU-HT2	EP-HT2	0.5-mmBtu/hr Heater Treater	N/A	N/A	0.5-mmBtu/hr	Removal	N/A	N/A
EU-HT3	EP-HT3	1.5-mmBtu/hr Heater Treater	TBD	N/A	1.5-mmBtu/hr	Existing	N/A	N/A
EU-HT4	EP-HT4	1.5-mmBtu/hr Heater Treater	TBD	N/A	1.5-mmBtu/hr	Existing	N/A	N/A
EU-DEHY1	EP-RB1	24.0-MMSCFD TEG Dehydration Unit	TBD	N/A	24.0 MMSCFD	Existing	Condenser and EU-RB1	Condenser and EU-RB1
EU-RB1	EP-RB1	0.75-mmBtu/hr TEG Reboiler	TBD	N/A	0.75-mmBtu/hr	Existing	N/A	N/A
EU-TANKS-COND	APC-COMB	Four (4) 400-bbl Condensate Tanks Routed to Vapor Combustor	TBD	N/A	400-bbl	Existing	APC-COMB	APC-COMB
EU-TANKS-PW	APC-COMB	Four (4) 400-bbl Produced Water Tanks Routed to Vapor Combustor	TBD	N/A	400-bbl	Existing	APC-COMB	APC-COMB
EU-LOAD-COND	EU-LOAD-COND and APC-COMB	Condensate Truck Loading w/ Vapor Return Routed to Combustor	TBD	N/A	12,264,000 gal/yr	Existing	Vapor Return and APC-COMB	Vapor Return and APC-COMB
EU-LOAD-PW	EU-LOAD-PW and APC-COMB	Produced Water Truck Loading w/ Vapor Return Routed to Combustor	TBD	N/A	18,396,000 gal/yr	Existing	Vapor Return and APC-COMB	Vapor Return and APC-COMB
APC-COMB	APC-COMB	15.0-mmBtu/hr Vapor Combustor	TBD	N/A	15.0-mmBtu/hr	Existing	N/A	N/A
EU-PILOT	APC-COMB	Vapor Combustor Pilot	TBD	N/A	50-scfh	Existing	N/A	N/A
EU-FUG	EP-FUG	Fugitive Emissions	TBD	N/A	N/A	Modification	N/A	N/A
EU-HR	EP-HR	Fugitive Haul Road Emissions	TBD	N/A	N/A	Existing	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: EU-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 (methane, CO_2e)
Pumps	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Valves	☐ Yes ☒ No	110 – gas 120 – LL	EPA	☐ Gas ☐ Liquid ☒ Both	1.16 – gas 2.73 – LL	0.02 – gas 0.23 – LL	62.11 – gas 1.33 – LL
Safety Relief Valves	☐ Yes ☒ No	49	EPA	☒ Gas ☐ Liquid ☐ Both	1.01	0.02	54.11
Open Ended Lines	☐ Yes ☒ No	2	EPA	☒ Gas ☐ Liquid ☐ Both	0.01	<0.01	0.50
Sampling Connections	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Connections (Not sampling)	☐ Yes ☒ No	474	EPA	☐ Gas ☒ Liquid ☐ Both	0.91	0.08	0.44
Compressors	☐ Yes ☒ No	18	EPA	☒ Gas ☐ Liquid ☐ Both	0.37	0.01	19.88
Flanges	☐ Yes ☒ No	521	EPA	☒ Gas ☐ Liquid ☐ Both	0.47	0.01	25.50
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/rail car 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 M: NATURAL GAS FIRED FUEL BURNING UNITS DATA SHEET

AP-42 EMISSION FACTORS

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	TBD	EXIST	1.0	905
EU-GPU2	EP-GPU2	Gas Production Unit Burner	TBD	EXIST	1.0	905
EU-GPU3	EP-GPU3	Gas Production Unit Burner	TBD	EXIST	1.0	905
EU-HT3	EP-HT3	Heater Treater	TBD	NEW	1.5	905
EU-HT4	EP-HT4	Heater Treater	TBD	NEW	1.5	905
EU-RB1	EP-RB1	TEG Reboiler	TBD	EXIST	0.75	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 $1b/10^6$ 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 N: INTERNAL COMBUSTION ENGINE DATA SHEETS

ENGINE SPECIFICATION SHEETS

AP-42 AND EPA EMISSION FACTORS

ATTACHMENT N – INTERNAL COMBUSTION ENGINE DATA SHEET

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

Emission Unit ID#[1]	EU-ENG4	EU-ENG5	EU-ENG6
Engine Manufacturer/Model	Kubota DG972-E2	Caterpillar G3306 NA	Caterpillar G3306 NA
Manufacturers Rated bhp/rpm	23.6-hp/3,600-rpm	145-hp/1,800-rpm	145-hp/1,800-rpm
Source Status[2]	NS	NS	NS
Date Installed/ Modified/Removed/Relocated[3]	TBD	TBD	TBD
Engine Manufactured /Reconstruction Date[4]	5/1/2012	9/23/2011	2/6/2012
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable)[5]	☒40CFR60 Subpart JJJJ ☒JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☒40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☒40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☒40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☒40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☒40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources
Engine Type[6]	4SRB	4SRB	4SRB
APCD Type[7]	NSCR	NSCR	NSCR
Fuel Type[8]	PQ	PQ	PQ
H_2S (gr/100 scf)	Negligible	Negligible	Negligible
Operating bhp/rpm	23.6-hp/3,600-rpm	145-hp/1,800-rpm	145-hp/1,800-rpm
BSFC (BTU/bhp-hr)	11,771 BTU/kW-hr	8,625	
Hourly Fuel Throughput	229 ft^3/hr gal/hr	1,382 ft^3/hr gal/hr	1,382 ft^3/hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	2.01 $MMft^3$/yr gal/yr	12.11 $MMft^3$/yr gal/yr	12.11 $MMft^3$/yr gal/yr
Fuel Usage or Hours of Operation Metered	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☐ No ☒

Calculation Methodology[9]	**Pollutant[10]**	**Hourly PTE (lb/hr)[11]**	**Annual PTE (tons/year)[11]**	**Hourly PTE (lb/hr)[11]**	**Annual PTE (tons/year)[11]**	**Hourly PTE (lb/hr)[11]**	**Annual PTE (tons/year)[11]**
MD	NO_x	0.31	1.36	0.32	1.40	0.32	1.40
MD	CO	5.55	24.30	0.64	2.80	0.64	2.80
MD	VOC	0.31	1.36	0.16	0.69	0.16	0.69
AP	SO_2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AP	PM_{10}	<0.01	0.01	0.01	0.05	0.01	0.05
MD	Formaldehyde	<0.01	0.02	0.09	0.38	0.09	0.38
AP	Total HAPs	0.01	0.03	0.10	0.44	0.10	0.44
MD and EPA	GHG (CO_2e)	28.53	124.97	155.19	679.73	155.19	679.73

1 Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion engine/generator engine located at the well site. Multiple engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. Microturbine generator engines should be designated MT-1, MT-2, MT-3 etc. If more than three (3) engines exist, please use additional sheets.

2 Enter the Source Status using the following codes:

NS	Construction of New Source (installation)	ES	Existing Source
MS	Modification of Existing Source	RS	Relocated Source
REM	Removal of Source		

3 Enter the date (or anticipated date) of the engine's installation (construction of source), modification, relocation or removal.

4 Enter the date that the engine was manufactured, modified or reconstructed.

5 Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart IIII/JJJJ? If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance as appropriate.

Provide a manufacturer's data sheet for all engines being registered.

6 Enter the Engine Type designation(s) using the following codes:

2SLB	Two Stroke Lean Burn	4SRB	Four Stroke Rich Burn
4SLB	Four Stroke Lean Burn		

7 Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:

A/F	Air/Fuel Ratio	IR	Ignition Retard
HEIS	High Energy Ignition System	SIPC	Screw-in Precombustion Chambers
PSC	Prestratified Charge	LEC	Low Emission Combustion
NSCR	Rich Burn & Non-Selective Catalytic Reduction	OxCat	Oxidation Catalyst
SCR	Lean Burn & Selective Catalytic Reduction		

8 Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas /Production Gas	D	Diesel

9 Enter the Potential Emissions Data Reference designation using the following codes. Attach all reference data used.

MD	Manufacturer's Data	AP	AP-42	
GR	GRI-HAPCalc™	OT	Other	(please list)

10 Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the *Emissions Summary Sheet*.

11 PTE for engines shall be calculated from manufacturer's data unless unavailable.

Engine Air Pollution Control Device
(Emission Unit ID# APC-NSCR-ENG1, 2, 5, 6 use extra pages as necessary)

Air Pollution Control Device Manufacturer's Data Sheet included?
Yes ☒ No ☐

☒ NSCR ☐ SCR ☐ Oxidation Catalyst

Provide details of process control used for proper mixing/control of reducing agent with gas stream:

Manufacturer: N/A	Model #: N/A
Design Operating Temperature: 1,101 ºF	Design gas volume: 678 scfm
Service life of catalyst:	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: acfm at ºF	Operating temperature range for NSCR/Ox Cat: From 600 ºF to 1,250 ºF
Reducing agent used, if any:	Ammonia slip (ppm):

Pressure drop against catalyst bed (delta P): inches of H_2O

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions:

Is temperature and pressure drop of catalyst required to be monitored per 40CFR63 Subpart ZZZZ?
☐ Yes ☒ No

How often is catalyst recommended or required to be replaced (hours of operation)?

How often is performance test required?
☒ Initial
☐ Annual
☐ Every 8,760 hours of operation
☐ Field Testing Required
☐ No performance test required. If so, why (please list any maintenance required and the applicable sections in NSPS/GACT,

G3306 NA

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1800	FUEL SYSTEM:	LPG IMPCO
COMPRESSION RATIO:	10.5:1		WITH CUSTOMER SUPPLIED AIR FUEL RATIO CONTROL
JACKET WATER OUTLET (°F):	210	**SITE CONDITIONS:**	
COOLING SYSTEM:	JW+OC	FUEL:	Nat Gas
IGNITION SYSTEM:	MAG	FUEL PRESSURE RANGE(psig):	1.5-10.0
EXHAUST MANIFOLD:	WC	FUEL METHANE NUMBER:	84.8
COMBUSTION:	Catalyst	FUEL LHV (Btu/scf):	905
EXHAUST O2 EMISSION LEVEL %:	0.5	ALTITUDE(ft):	500
SET POINT TIMING:	30.0	MAXIMUM INLET AIR TEMPERATURE(°F):	77
		NAMEPLATE RATING:	145 bhp@1800rpm

			MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING	**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(1)	bhp	145	145	109	72
INLET AIR TEMPERATURE		°F	77	77	77	77
ENGINE DATA						
FUEL CONSUMPTION (LHV)	(2)	Btu/bhp-hr	7775	7775	8318	9509
FUEL CONSUMPTION (HHV)	(2)	Btu/bhp-hr	8625	8625	9227	10548
AIR FLOW	(3)(4)	lb/hr	922	922	739	556
AIR FLOW WET (77°F, 14.7 psia)	(3)(4)	scfm	208	208	167	125
INLET MANIFOLD PRESSURE	(5)	in Hg(abs)	26.2	26.2	21.8	17.6
EXHAUST STACK TEMPERATURE	(6)	°F	1101	1101	1067	1037
EXHAUST GAS FLOW (@ stack temp, 14.5 psia)	(7)(4)	ft3/min	678	678	532	393
EXHAUST GAS MASS FLOW	(7)(4)	lb/hr	978	978	784	590
EMISSIONS DATA						
NOx (as NO2)	(8)	g/bhp-hr	13.47	13.47	12.15	9.76
CO	(8)	g/bhp-hr	13.47	13.47	11.44	9.56
THC (mol. wt. of 15.84)	(8)	g/bhp-hr	2.20	2.20	2.49	3.22
NMHC (mol. wt. of 15.84)	(8)	g/bhp-hr	0.33	0.33	0.37	0.48
NMNEHC (VOCs) (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	0.22	0.22	0.25	0.32
HCHO (Formaldehyde)	(8)	g/bhp-hr	0.27	0.27	0.31	0.33
CO2	(8)	g/bhp-hr	485	485	525	601
EXHAUST OXYGEN	(10)	% DRY	0.5	0.5	0.5	0.5
HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(11)	Btu/min	6049	6049	5237	4455
HEAT REJ. TO ATMOSPHERE	(11)	Btu/min	751	751	602	459
HEAT REJ. TO LUBE OIL (OC)	(11)	Btu/min	990	990	857	729

HEAT EXCHANGER SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC)	(12)	Btu/min	7842

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature.
100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature.
Max. rating is the maximum capability for the specified fuel at site altitude and reduced inlet air temperature.
Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 3.04.00
Ref. Data Set DM5053-07-000, Printed 31Jan2011

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Prepared For:
Jason Stinson
MIDCON COMPRESSION, LP

MANUFACTURED ON OR AFTER 1/1/2011

INFORMATION PROVIDED BY CATERPILLAR

Engine:	G3306 NA
Horsepower:	145
RPM:	1800
Compression Ratio:	10.5:1
Exhaust Flow Rate:	678 CFM
Exhaust Temperature:	1101 °F
Reference:	DM5053-07
Fuel:	Natural Gas
Annual Operating Hours:	8760

Uncontrolled Emissions

NOx:	13.47 g/bhp-hr
CO:	13.47 g/bhp-hr
THC:	2.20 g/bhp-hr
NMHC:	0.33 g/bhp-hr
NMNEHC:	0.22 g/bhp-hr
HCHO:	0.27 g/bhp-hr
Oxygen:	0.50 %

POST CATALYST EMISSIONS

NOx:	<1.0 g/bhp-hr
CO:	<2.0 g/bhp-hr
VOC:	<0.7 g/bhp-hr

CONTROL EQUIPMENT

Catalytic Converter

Model:	**EAH-1200T-0404F-21CEE**
Catalyst Type:	NSCR, Precious group metals
Manufacturer:	EMIT Technologies, Inc.
Element Size:	Round 12 x 3.5
Catalyst Elements:	1
Housing Type:	2 Element Capacity
Catalyst Installation:	Accessible Housing
Construction:	10 gauge Carbon Steel
Sample Ports:	6 (0.5" NPT)
Inlet Connections:	4" Flat Face Flange
Outlet Connections:	4" Flat Face Flange
Configuration:	End In / End Out
Silencer:	Integrated
Silencer Grade:	Hospital
Insertion Loss:	35-40 dBA

Air Fuel Ratio Controller

Model:	**ENG-S-075-T**
Manufacturer:	EMIT Technologies, Inc.
Description:	EDGE NG Air Fuel Ratio Controller 4-Wire Narrowband O2 Sensor Digital Power Valve O2 Sensor Weldment Wiring Harness (2) 25' Type K Thermocouple
Digital Power Valve Size:	0.75" NPT

CDM Resource Management LLC

Date: 10-30-17

Re: Engine Pedigree

Unit #1576

In order to better assist your company with any of its state and federal permitting needs, CDM Resource Management LLC submits the following information in regards to the engine of the above referenced compressor package. This letter should provide the information necessary to answer any questions pertaining to, but not limited to, the NSPS for SI-RICE, Subpart JJJJ. This information is current as of above date.

Engine Make:	**Caterpillar**
Engine Model:	**3306**
Engine Serial Number:	**G6X07691**
Engine Type:	4RB
Engine Category:	**NEW**
Engine Subcategory:	Non Certified
Engine NSPS Status:	QUAD-JJJJ
Engine Speed:	**1800**
Rated HP:	**145**
Engine Manufacture Date:	**09-23-2011**

Silencer Emit EAH-1200T-0404F-20CEE

CDM Resource Management LLC

Date: 10-30-17

Re: Engine Pedigree

Unit #1584

In order to better assist your company with any of its state and federal permitting needs, CDM Resource Management LLC submits the following information in regards to the engine of the above referenced compressor package. This letter should provide the information necessary to answer any questions pertaining to, but not limited to, the NSPS for SI-RICE, Subpart JJJJ. This information is current as of above date.

Engine Make:	**Caterpillar**
Engine Model:	**3306**
Engine Serial Number:	**G6X08185**
Engine Type:	4RB
Engine Category:	**NEW**
Engine Subcategory:	Non Certified
Engine NSPS Status:	QUAD-JJJJ
Engine Speed:	**1800**
Rated HP:	**145**
Engine Manufacture Date:	**02-06-2012**

Silencer Emit EAH-1200T-0404F-20CEE

CONFIDENTIAL

Kubota

Ref. No.: D13018

Brake specific emission

Engine Model (Engine code)	Family	Emission Levels (Certification Data[1,2]) **(g/kW.h)**			
		NOx	NMHC	CO	CO2
DG972-E2-BBH-1 (EG581-00000)	DKBXS.9622HP	2.137	4.352	142.742	685

Note1: Data sourse: Based on U.S. Certification test data.
Note2: Certification data may not be the test data of the model you request, it is the worst case data of the engine family which your requst model belongs to.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2013 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT OF 1990

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Kubota Corporation**
(U.S. Manufacturer or Importer)

Certificate Number: DKBXS.9622HP-002

Effective Date: 11/20/2012

Expiration Date: 12/31/2013

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 11/20/2012

Revision Date: N/A

Manufacturer: Kubota Corporation
Engine Family: DKBXS.9622HP
Certificate Number: DKBXS.9622HP-002
Useful Life : 1000 Hours / 5 Years
Engine Class : Nonhandheld-Class II
Fuel : Natural Gas (CNG/LNG)
Emission Standards : NMHC + NOx (g/kW-hr) : 8
CO (g/kW-hr) : 610

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547), 40 CFR Part 1054, 40 CFR Part 1068 and 40 CFR Part 60 (stationary only and combined stationary and mobile), and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued for the following small nonroad engine family, more fully described in the documentation required by 40 CFR Part 1054 and produced in the stated model year.

This certificate of conformity covers only those new small nonroad engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 1054 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 1054. This certificate of conformity does not cover small nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and 1068, Subpart E and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 1054. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 1054, 40 CFR Part 1068.

This certificate does not cover small nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Kubota

NATURAL GAS ENGINE

KUBOTA DG SERIES (3-cylinder)

DG972-E2

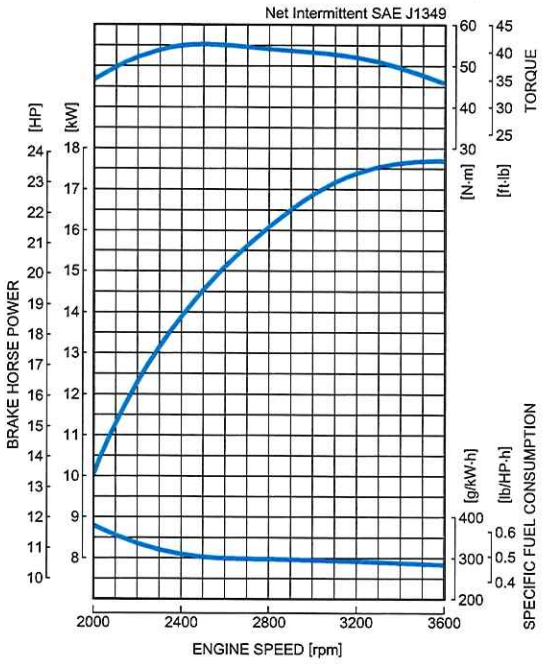
2 EPA Tier

RATED POWER

17.6kW@3600rpm

Photograph may show non-standard equipment.

PERFORMANCE CURVE



FEATURES and BENEFITS

New Engine Series

- The Kubota DG Series offers a new solution to the increasing needs for natural gas engine. The diesel engine based Kubota DG Series gives users the same foot-print, reliability and durability of D902, WG972, and DF972 acknowledged as the world's top quality small industrial engines.
- Kubota offers SAE Flywheel Housing and Rear End Plate specifications for the DG972 engine. These options offer users flexible Power Take Off (PTO) choices.
- The Kubota DG Series is designed to endure use outdoors under severe environment. This series is equipped with a bypass breather tube to avoid freezing below zero.

Emission

- Kubota DG Series complies with EPA Tier 2 Emissions Regulations. EPA regulation is one of the most stringent emissions regulations in the world.

Best Fuel System

- Specialized for Natural Gas use, the DG972 engine eliminated the carburetor, regulator and a fuel filter parts, which are only necessary for Gasoline or LPG use. Also, Kubota adopts the best jet set and the ignition timing that provides the best engine performance in severe conditions.

Ease maintenance cost and time

- Mechanical governor system will contribute to lower maintenance cost and prevents users from having to deal with complicated electric maintenance. Moreover, water resistant spark plug caps are adopted for outdoor use.

DG972-E2

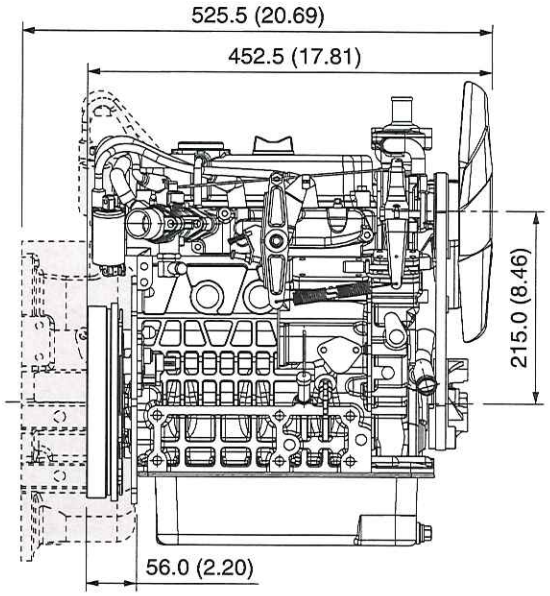
KUBOTA DG SERIES

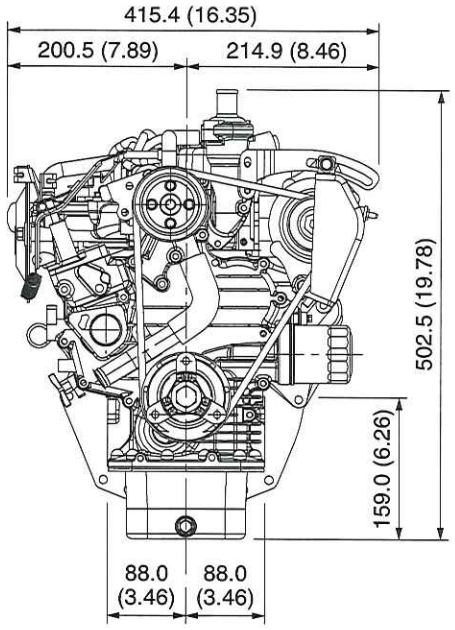
GENERAL SPECIFICATION

Model		DG972-E2
Emission Regulation		Tier 2
Type		Vertical 4-cycle Liquid Cooled Natural Gas
Number of Cylinders		3
Bore	mm (in)	74.5 (2.93)
Stroke	mm (in)	73.6 (2.9)
Displacement	L (cu.in)	0.962 (58.70)
Fuel		Natural Gas
Intake System		Naturally Aspirated
Maximum Speed	rpm	3600
Output: Net Intermittent	kW	17.6
	hp	23.6
	ps	23.9
Direction of Rotation		Counterclockwise Viewed on Flywheel
Oil Pan Capacity	L (gal)	3.7 (0.98)
Starter Capacity	V-kW	12-1.0
Alternator Capacity	V-A	12-40
Length	mm (in)	525.5 (20.69)*1 / 452.5 (17.81)*2
Width	mm (in)	415.4 (16.35)
Height (1)	mm (in)	502.5 (19.78)
Height (2)	mm (in)	159.0 (6.26)
Dry Weight	kg (lb)	72.0 (158.7)*1 / 95.4 (210.3)*2

*Specification is subject to change without notice.
*Output: Net Intermittent SAE J1349
*Dry weight is according to Kubota's standard specification. When specification varies, the weight will vary accordingly.
*1 with SAE Flywheel and Housing
*2 with Rear End Plate

DIMENSIONS





Kubota

Your Driving Force
KUBOTA ENGINE

KUBOTA Corporation
2-47, Shikitsuhigashi 1-chome, Naniwa-ku, Osaka, 556-8601 Japan
Fax: 06-6648-3521
http://www.engine.kubota.co.jp

1334-01-COM '08.09. .STD

Table 3.2-3. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE RICH-BURN ENGINES[a]
(SCC 2-02-002-53)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO_x[c] 90 - 105% Load	2.21 E+00	A
NO_x[c] <90% Load	2.27 E+00	C
CO[c] 90 - 105% Load	3.72 E+00	A
CO[c] <90% Load	3.51 E+00	C
CO_2[d]	1.10 E+02	A
SO_2[e]	5.88 E-04	A
TOC[f]	3.58 E-01	C
Methane[g]	2.30 E-01	C
VOC[h]	2.96 E-02	C
PM10 (filterable)[i,j]	9.50 E-03	E
PM2.5 (filterable)[j]	9.50 E-03	E
PM Condensable[k]	9.91 E-03	E
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane[l]	2.53 E-05	C
1,1,2-Trichloroethane[l]	<1.53 E-05	E
1,1-Dichloroethane	<1.13 E-05	E
1,2-Dichloroethane	<1.13 E-05	E
1,2-Dichloropropane	<1.30 E-05	E
1,3-Butadiene[l]	6.63 E-04	D
1,3-Dichloropropene[l]	<1.27 E-05	E
Acetaldehyde[l,m]	2.79 E-03	C
Acrolein[l,m]	2.63 E-03	C
Benzene[l]	1.58 E-03	B
Butyr/isobutyraldehyde	4.86 E-05	D
Carbon Tetrachloride[l]	<1.77 E-05	E

Table 3.2-3. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE RICH-BURN ENGINES (Concluded)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Chlorobenzene[l]	<1.29 E-05	E
Chloroform[l]	<1.37 E-05	E
Ethane[n]	7.04 E-02	C
Ethylbenzene[l]	<2.48 E-05	E
Ethylene Dibromide[l]	<2.13 E-05	E
Formaldehyde[l,m]	2.05 E-02	A
Methanol[l]	3.06 E-03	D
Methylene Chloride[l]	4.12 E-05	C
Naphthalene[l]	<9.71 E-05	E
PAH[l]	1.41 E-04	D
Styrene[l]	<1.19 E-05	E
Toluene[l]	5.58 E-04	A
Vinyl Chloride[l]	<7.18 E-06	E
Xylene[l]	1.95 E-04	A

[a] Reference 7. Factors represent uncontrolled levels. For NO_x, CO, and PM-10, "uncontrolled" means no combustion or add-on controls; however, the factor may include turbocharged units. For all other pollutants, "uncontrolled" means no oxidation control; the data set may include units with control techniques used for NOx control, such as PCC and SCR for lean burn engines, and PSC for rich burn engines. Factors are based on large population of engines. Factors are for engines at all loads, except as indicated. SCC = Source Classification Code. TOC = Total Organic Compounds. PM10 = Particulate Matter $\leq$ 10 microns (μm) aerodynamic diameter. A "<" sign in front of a factor means that the corresponding emission factor is based on one-half of the method detection limit.

[b] Emission factors were calculated in units of (lb/MMBtu) based on procedures in EPA Method 19. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by the heat content of the fuel. If the heat content is not available, use 1020 Btu/scf. To convert from (lb/MMBtu) to (lb/hp-hr) use the following equation:

$$\text{lb/hp-hr} = (\text{lb/MMBtu})(\text{heat input, MMBtu/hr})(\text{1/operating HP, 1/hp})$$

[c] Emission tests with unreported load conditions were not included in the data set.

[d] Based on 99.5% conversion of the fuel carbon to CO_2. CO_2 [lb/MMBtu] = (3.67)(%CON)(C)(D)(1/h), where %CON = percent conversion of fuel carbon to CO_2,

C = carbon content of fuel by weight (0.75), D = density of fuel, 4.1 E+04 lb/10^6 scf, and h = heating value of natural gas (assume 1020 Btu/scf at 60°F).

[e] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content in natural gas of 2,000 gr/10^6scf.

[f] Emission factor for TOC is based on measured emission levels from 6 source tests.

[g] Emission factor for methane is determined by subtracting the VOC and ethane emission factors from the TOC emission factor.

[h] VOC emission factor is based on the sum of the emission factors for all speciated organic compounds. Methane and ethane emissions were not measured for this engine category.

[i] No data were available for uncontrolled engines. PM10 emissions are for engines equipped with a PCC.

[j] Considered ≤ 1 μm in aerodynamic diameter. Therefore, for filterable PM emissions, PM10(filterable) = PM2.5(filterable).

[k] No data were available for condensable emissions. The presented emission factor reflects emissions from 4SLB engines.

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

[m] For rich-burn engines, no interference is suspected in quantifying aldehyde emissions. The presented emission factors are based on FTIR and CARB 430 emissions data measurements.

[n] Ethane emission factor is determined by subtracting the VOC emission factor from the NMHC emission factor.

ATTACHMENT T: EMISSIONS CALCULATIONS

SWN Production Company, LLC
David Reinbeau Pad
Summary of Criteria Air Pollutant Emissions

Equipment	Unit ID	Emission Point ID	NOx		CO		Total VOC[1]		SO_2		PM Total	
			lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
145-hp Caterpillar G3306 NA Engine	EU-ENG1	EP-ENG1	0.32	1.40	0.64	2.80	0.16	0.69	<0.01	<0.01	0.02	0.11
145-hp Caterpillar G3306 NA Engine	EU-ENG2	EP-ENG2	0.32	1.40	0.64	2.80	0.16	0.69	<0.01	<0.01	0.02	0.11
1,380-hp Caterpillar G3516B Engine	EU-ENG3	EP-ENG3	1.52	6.66	0.64	2.79	0.76	3.34	0.01	0.03	0.11	0.49
23.6-hp Kubota DG972-E2 Engine	EU-ENG4	EP-ENG4	0.31	1.36	5.55	24.30	0.31	1.36	<0.01	<0.01	<0.01	0.02
145-hp Caterpillar 3306 NA Engine	EU-ENG5	EP-ENG5	0.32	1.40	0.64	2.80	0.16	0.69	<0.01	<0.01	0.02	0.11
145-hp Caterpillar 3306 NA Engine	EU-ENG6	EP-ENG6	0.32	1.40	0.64	2.80	0.16	0.69	<0.01	<0.01	0.02	0.11
1.0-mmBtu/hr GPU Burner	EU-GPU1	EP-GPU1	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-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 Heater Treater	EU-HT3	EP-HT3	0.17	0.73	0.14	0.61	0.01	0.04	<0.01	<0.01	0.01	0.06
1.5-mmBtu/hr Heater Treater	EU-HT4	EP-HT4	0.17	0.73	0.14	0.61	0.01	0.04	<0.01	<0.01	0.01	0.06
24.0-MMSCFD TEG Dehydration Unit	EU-DEHY1	EP-RB1	-	-	-	-	2.76	12.10	-	-	-	-
0.75-mmBtu/hr TEG Reboiler	EU-RB1	EP-RB1	0.08	0.36	0.07	0.30	<0.01	0.02	<0.01	<0.01	0.01	0.03
Four (4) 400-bbl Condensate Tanks Routed to Vapor Combustor	EU-TANKS-COND	APC-COMB	-	-	-	-	-	-	-	-	-	-
Four (4) 400-bbl Produced Water Tanks Routed to Vapor Combustor	EU-TANKS-PW	APC-COMB	-	-	-	-	-	-	-	-	-	-
Condensate Truck Loading w/ Vapor Return Routed to Combustor	EU-LOAD-COND	APC-COMB	-	-	-	-	2.01	8.79	-	-	-	-
Produced Water Truck Loading w/ Vapor Return Routed to Combustor	EU-LOAD-PW	APC-COMB	-	-	-	-	0.02	0.09	-	-	-	-
15.0-mmBtu/hr Vapor Combustor	APC-COMB	APC-COMB	2.07	9.07	4.13	18.10	1.23	5.37	-	-	0.05	0.20
Vapor Combustor Pilot	EU-PILOT	APC-COMB	<0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fugitive Emissions	EU-FUG	EP-FUG	-	-	-	-	1.52	6.65	-	-	-	-
Fugitive Haul Road Emissions	EU-HR	EP-HR	-	-	-	-	-	-	-	-	1.46	4.80
Total =			**5.93**	**25.98**	**13.51**	**59.16**	**9.28**	**40.63**	**0.01**	**0.06**	**1.78**	**6.19**
Total minus fugitive emissions =			**5.93**	**25.98**	**13.51**	**59.16**	**7.76**	**33.98**	**0.01**	**0.06**	**0.32**	**1.39**

Notes:

[1] Total VOC includes all constituents heavier than Propane (C3+), including hazardous air pollutants (HAP). Speciated HAP presented in following table.

SWN Production Company, LLC
David Reinbeau Pad
Summary of Hazardous Air Pollutants

Equipment	Unit ID	Estimated Emissions (lb/hr)									
		Acetalde-hyde	Acrolein	Benzene	Ethyl-benzene	Formalde-hyde	Methanol	n-Hexane	Toluene	Xylenes	Total HAP
145-hp Caterpillar G3306 NA Engine	EU-ENG1	<0.01	<0.01	<0.01	<0.01	0.09	<0.01	-	<0.01	<0.01	0.10
145-hp Caterpillar G3306 NA Engine	EU-ENG2	<0.01	<0.01	<0.01	<0.01	0.09	<0.01	-	<0.01	<0.01	0.10
1,380-hp Caterpillar G3516B Engine	EU-ENG3	0.09	0.06	<0.01	<0.01	0.15	0.03	-	<0.01	<0.01	0.34
23.6-hp Kubota DG972-E2 Engine	EU-ENG4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	0.01
145-hp Caterpillar 3306 NA Engine	EU-ENG5	<0.01	<0.01	<0.01	<0.01	0.09	<0.01	-	<0.01	<0.01	0.10
145-hp Caterpillar 3306 NA Engine	EU-ENG6	<0.01	<0.01	<0.01	<0.01	0.09	<0.01	-	<0.01	<0.01	0.10
1.0-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 Heater Treater	EU-HT3	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
1.5-mmBtu/hr Heater Treater	EU-HT4	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
24.0-MMSCFD TEG Dehydration Unit	EU-DEHY1	-	-	0.07	0.00	-	-	0.10	0.10	0.04	0.31
0.75-mmBtu/hr TEG Reboiler	EU-RB1	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
Four (4) 400-bbl Condensate Tanks Routed to Vapor Combustor	EU-TANKS-COND	-	-	-	-	-	-	-	-	-	-
Four (4) 400-bbl Produced Water Tanks Routed to Vapor Combustor	EU-TANKS-PW	-	-	-	-	-	-	-	-	-	-
Condensate Truck Loading w/ Vapor Return Routed to Combustor	EU-LOAD-COND	-	-	<0.01	0.01	-	-	0.12	0.01	0.03	0.16
Produced Water Truck Loading w/ Vapor Return Routed to Combustor	EU-LOAD-PW	-	-	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01
15.0-mmBtu/hr Vapor Combustor	APC-COMB	-	-	<0.01	0.01	-	-	0.07	<0.01	0.02	0.10
Vapor Combustor Pilot	EU-PILOT	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
Fugitive Emissions	EU-FUG	-	-	<0.01	<0.01	-	-	0.06	<0.01	0.01	0.08
Fugitive Haul Road Emissions	EU-HR	-	-	-	-	-	-	-	-	-	-
	Total =	**0.11**	**0.07**	**0.09**	**0.02**	**0.50**	**0.04**	**0.37**	**0.13**	**0.10**	**1.42**

Continued on Next Page

SWN Production Company, LLC
David Reinbeau Pad
Summary of Hazardous Air Pollutants (Continued)

Equipment	Unit ID	Estimated Emissions (TPY)									
		Acetalde-hyde	Acrolein	Benzene	Ethyl-benzene	Formalde-hyde	Methanol	n-Hexane	Toluene	Xylenes	Total HAP
145-hp Caterpillar G3306 NA Engine	EU-ENG1	0.02	0.01	0.01	<0.01	0.38	0.02	-	<0.01	<0.01	0.44
145-hp Caterpillar G3306 NA Engine	EU-ENG2	0.02	0.01	0.01	<0.01	0.38	0.02	-	<0.01	<0.01	0.44
1,380-hp Caterpillar G3516B Engine	EU-ENG3	0.41	0.25	0.02	<0.01	0.67	0.12	-	0.02	0.01	1.51
23.6-hp Kubota DG972-E2 Engine	EU-ENG4	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	-	<0.01	<0.01	0.03
145-hp Caterpillar 3306 NA Engine	EU-ENG5	0.02	0.01	0.01	<0.01	0.38	0.02	-	<0.01	<0.01	0.44
145-hp Caterpillar 3306 NA Engine	EU-ENG6	0.02	0.01	0.01	<0.01	0.38	0.02	-	<0.01	<0.01	0.44
1.0-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 Heater Treater	EU-HT3	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
1.5-mmBtu/hr Heater Treater	EU-HT4	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
24.0-MMSCFD TEG Dehydration Unit	EU-DEHY1	-	-	0.31	0.00	-	-	0.46	0.44	0.16	1.36
0.75-mmBtu/hr TEG Reboiler	EU-RB1	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
Four (4) 400-bbl Condensate Tanks Routed to Vapor Combustor	EU-TANKS-COND	-	-	-	-	-	-	-	-	-	-
Four (4) 400-bbl Produced Water Tanks Routed to Vapor Combustor	EU-TANKS-PW	-	-	-	-	-	-	-	-	-	-
Condensate Truck Loading w/ Vapor Return Routed to Combustor	EU-LOAD-COND	-	-	0.01	0.04	-	-	0.51	0.03	0.13	0.71
Produced Water Truck Loading w/ Vapor Return Routed to Combustor	EU-LOAD-PW	-	-	<0.01	<0.01	-	-	0.01	<0.01	<0.01	0.01
15.0-mmBtu/hr Vapor Combustor	APC-COMB	-	-	<0.01	0.02	-	-	0.31	0.02	0.08	0.44
Vapor Combustor Pilot	EU-PILOT	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
Fugitive Emissions	EU-FUG	-	-	<0.01	0.02	-	-	0.28	0.02	0.06	0.37
Fugitive Haul Road Emissions	EU-HR	-	-	-	-	-	-	-	-	-	-
	Total =	**0.48**	**0.31**	**0.38**	**0.08**	**2.20**	**0.19**	**1.61**	**0.55**	**0.43**	**6.23**

SWN Production Company, LLC
David Reinbeau 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
145-hp Caterpillar G3306 NA Engine	EU-ENG1	155.04	616.04	<0.01	0.01	0.07	0.27	<0.01	<0.01	0.08	0.33	155.19	616.64
145-hp Caterpillar G3306 NA Engine	EU-ENG2	155.04	616.04	<0.01	0.01	0.07	0.27	<0.01	<0.01	0.08	0.33	155.19	616.64
1,380-hp Caterpillar G3516B Engine	EU-ENG3	1,591.14	6,322.33	0.02	0.10	0.62	2.47	<0.01	0.01	0.74	2.94	1,592.50	6,327.74
23.6-hp Kubota DG972-E2 Engine	EU-ENG4	26.58	105.61	0.08	0.31	1.94	7.71	<0.01	<0.01	0.01	0.05	28.53	113.37
145-hp Caterpillar 3306 NA Engine	EU-ENG5	155.04	616.04	<0.01	0.01	0.07	0.27	<0.01	<0.01	0.08	0.33	155.19	616.64
145-hp Caterpillar 3306 NA Engine	EU-ENG6	155.04	616.04	<0.01	0.01	0.07	0.27	<0.01	<0.01	0.08	0.33	155.19	616.64
1.0-mmBtu/hr GPU Burner	EU-GPU1	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-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 Heater Treater	EU-HT3	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 Heater Treater	EU-HT4	175.47	697.21	<0.01	0.01	0.08	0.33	<0.01	<0.01	0.10	0.39	175.65	697.93
24.0-MMSCFD TEG Dehydration Unit	EU-DEHY1	<0.01	<0.01	0.39	1.54	9.66	38.40	-	-	-	-	9.67	38.40
0.75-mmBtu/hr TEG Reboiler	EU-RB1	87.73	348.60	<0.01	0.01	0.04	0.16	<0.01	<0.01	0.05	0.20	87.82	348.96
Four (4) 400-bbl Condensate Tanks Routed to Vapor Combustor	EU-TANKS-COND	-	-	-	-	-	-	-	-	-	-	-	-
Four (4) 400-bbl Produced Water Tanks Routed to Vapor Combustor	EU-TANKS-PW	-	-	-	-	-	-	-	-	-	-	-	-
Condensate Truck Loading w/ Vapor Return Routed to Combustor	EU-LOAD-COND	<0.01	0.01	0.43	1.72	10.84	43.09	-	-	-	-	10.85	43.10
Produced Water Truck Loading w/ Vapor Return Routed to Combustor	EU-LOAD-PW	<0.01	0.01	0.65	2.59	16.27	64.63	-	-	-	-	16.27	64.65
15.0-mmBtu/hr Vapor Combustor	APC-COMB	1,754.66	6,972.07	0.03	0.13	0.83	3.28	<0.01	0.01	0.99	3.92	1,756.47	6,979.27
Vapor Combustor Pilot	EU-PILOT	5.29	21.03	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.01	5.30	21.05
Fugitive Emissions	EU-FUG	0.01	0.03	1.50	5.94	37.40	148.62	-	-	-	-	37.41	148.66
Fugitive Haul Road Emissions	EU-HR	-	-	-	-	-	-	-	-	-	-	-	-
Total =		**4,787.43**	**19,022.68**	**3.13**	**12.43**	**78.21**	**310.78**	**0.01**	**0.03**	**2.51**	**9.99**	**4,868.16**	**19,343.45**

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 (which is controlled by the vapor combustor in this case), working and breathing loss emissions of these gases are very small in production and virtually non-existent in the downstream segments. Vapors from the tanks are routed to the vapor combustor at this site. Therefore, GHG emissions from the condensate and produced water tanks are assumed to be negligible.

SWN Production Company, LLC
David Reinbeau 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
145-hp Caterpillar G3306 NA Engine	EU-ENG1	155.04	679.06	<0.01	0.01	0.07	0.30	<0.01	<0.01	0.08	0.36	155.19	679.73
145-hp Caterpillar G3306 NA Engine	EU-ENG2	155.04	679.06	<0.01	0.01	0.07	0.30	<0.01	<0.01	0.08	0.36	155.19	679.73
1,380-hp Caterpillar G3516B Engine	EU-ENG3	1,591.14	6,969.18	0.02	0.11	0.62	2.72	<0.01	0.01	0.74	3.24	1,592.50	6,975.14
23.6-hp Kubota DG972-E2 Engine	EU-ENG4	26.58	116.41	0.08	0.34	1.94	8.50	<0.01	<0.01	0.01	0.06	28.53	124.97
145-hp Caterpillar 3306 NA Engine	EU-ENG5	155.04	679.06	<0.01	0.01	0.07	0.30	<0.01	<0.01	0.08	0.36	155.19	679.73
145-hp Caterpillar 3306 NA Engine	EU-ENG6	155.04	679.06	<0.01	0.01	0.07	0.30	<0.01	<0.01	0.08	0.36	155.19	679.73
1.0-mmBtu/hr GPU Burner	EU-GPU1	116.98	512.36	<0.01	0.01	0.06	0.24	<0.01	<0.01	0.07	0.29	117.10	512.89
1.0-mmBtu/hr GPU Burner	EU-GPU2	116.98	512.36	<0.01	0.01	0.06	0.24	<0.01	<0.01	0.07	0.29	117.10	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	0.07	0.29	117.10	512.89
1.5-mmBtu/hr Heater Treater	EU-HT3	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 Heater Treater	EU-HT4	175.47	768.54	<0.01	0.01	0.08	0.36	<0.01	<0.01	0.10	0.43	175.65	769.33
24.0-MMSCFD TEG Dehydration Unit	EU-DEHY1	<0.01	0.01	0.39	1.69	9.66	42.32	-	-	-	-	9.67	42.33
0.75-mmBtu/hr TEG Reboiler	EU-RB1	87.73	384.27	<0.01	0.01	0.04	0.18	<0.01	<0.01	0.05	0.22	87.82	384.67
Four (4) 400-bbl Condensate Tanks Routed to Vapor Combustor	EU-TANKS-COND	-	-	-	-	-	-	-	-	-	-	-	-
Four (4) 400-bbl Produced Water Tanks Routed to Vapor Combustor	EU-TANKS-PW	-	-	-	-	-	-	-	-	-	-	-	-
Condensate Truck Loading w/ Vapor Return Routed to Combustor	EU-LOAD-COND	<0.01	0.01	0.43	1.90	10.84	47.50	-	-	-	-	10.85	47.51
Produced Water Truck Loading w/ Vapor Return Routed to Combustor	EU-LOAD-PW	<0.01	0.02	0.65	2.85	16.27	71.25	-	-	-	-	16.27	71.26
15.0-mmBtu/hr Vapor Combustor	APC-COMB	1,754.66	7,685.39	0.03	0.14	0.83	3.62	<0.01	0.01	0.99	4.32	1,756.47	7,693.33
Vapor Combustor Pilot	EU-PILOT	5.29	23.18	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.01	5.30	23.21
Fugitive Emissions	EU-FUG	0.01	0.04	1.50	6.55	37.40	163.83	-	-	-	-	37.41	163.86
Fugitive Haul Road Emissions	EU-HR	-	-	-	-	-	-	-	-	-	-	-	-
Total =		**4,787.43**	**20,968.91**	**3.13**	**13.70**	**78.21**	**342.58**	**0.01**	**0.04**	**2.51**	**11.01**	**4,868.16**	**21,322.51**

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 (which is controlled by the vapor combustor in this case), working and breathing loss emissions of these gases are very small in production and virtually non-existent in the downstream segments. Vapors from the tanks are routed to the vapor combustor at this site. Therefore, GHG emissions from the condensate and produced water tanks are assumed to be negligible.

SWN Production Company, LLC
David Reinbeau Pad
Engine Emissions Calculations - Criteria Air Pollutants

Equipment Information

Unit ID:	**EU-ENG1**	**EU-ENG2**	**EU-ENG3**	**EU-ENG4**	**EU-ENG5**	**EU-ENG6**
Emission Point ID:	EP-ENG1	EP-ENG2	EP-ENG3	EP-ENG4	EP-ENG5	EP-ENG6
Make:	Caterpillar	Caterpillar	Caterpillar	Kubota	Caterpillar	Caterpillar
Model:	G3306 NA	G3306 NA	G3516B	DG972-E2	3306 NA	3306 NA
Design Class:	4S-RB	4S-RB	4S-LB	4S-RB	4S-RB	4S-RB
Controls:	NSCR	NSCR	Oxid. Cat.	None	NSCR	NSCR
Horsepower (hp):	145	145	1,380	23.6	145	145
Capacity (kW):	NA	NA	NA	17.6	NA	NA
Fuel Use (Btu/hp-hr):	8,625	8,625	8,163	NA	8,625	8,625
Fuel Use (Btu/kW-hr):	NA	NA	NA	11,771	NA	NA
Fuel Use (scfh):	1,382	1,382	12,447	229	1,382	1,382
Annual Fuel Use (mmscf):	12.11	12.11	109.04	2.01	12.11	12.11
Fuel Use (mmBtu/hr):	1.25	1.25	11.26	0.21	1.25	1.25
Exhaust Flow (acfm):	678	678	9,230	NA	678	679
Exhaust Temp (°F):	1,101	1,101	1,011	NA	1,101	1,102
Manufacture Date:	2/28/2012	11/20/2013	9/30/2014	5/1/2012	9/23/2011	2/6/2012
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760
Fuel Heating Value (Btu/scf):	905	905	905	905	905	905
Uncontrolled Manufacturer Emission Factors [1]						
NOx (g/hp-hr):	13.47	13.47	0.50	NA	13.47	13.47
CO (g/hp-hr):	13.47	13.47	3.08	NA	13.47	13.47
NMNEHC/VOC (g/hp-hr):	0.22	0.22	1.26	NA	0.22	0.22
Total VOC = NMNEHC + HCHO (g/hp-hr):	0.49	0.49	1.31	NA	0.49	0.49
NMHC + NOx as NOx (g/kW-hr):	NA	NA	NA	8.00	NA	NA
CO (g/kW-hr):	NA	NA	NA	143.00	NA	NA
NMHC + NOx as VOC (g/kW-hr):	NA	NA	NA	8.00	NA	NA
Post-Catalyst Emission Factors						
NOx Control Eff. %	92.58%	92.58%	0.00%	NA	92.58%	92.58%
CO Control Eff. %	85.15%	85.15%	93.20%	NA	85.15%	85.15%
VOC Control Eff. %	0.00%	0.00%	84.10%	NA	0.00%	0.00%
NOx (g/hp-hr):	1.00	1.00	0.50	NA	1.00	1.00
CO (g/hp-hr):	2.00	2.00	0.21	NA	2.00	2.00
NMNEHC/VOC (g/hp-hr):	0.22	0.22	0.20	NA	0.22	0.22
Total VOC = NMNEHC + HCHO (g/hp-hr):	0.49	0.49	0.25	NA	0.49	0.49
NMHC + NOx as NOx (g/kW-hr):	NA	NA	NA	8.00	NA	NA
CO (g/kW-hr):	NA	NA	NA	143.00	NA	NA
NMHC + NOx as VOC (g/kW-hr):	NA	NA	NA	8.00	NA	NA

SWN Production Company, LLC
David Reinbeau Pad
Engine Emissions Calculations - Criteria Air Pollutants (Continued)

Uncontrolled Criteria Air Pollutant Emissions

Unit ID:	EU-ENG1		EU-ENG2		EU-ENG3		EU-ENG4		EU-ENG5		EU-ENG6	
Pollutant	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**
NOx	4.31	18.86	4.31	18.86	1.52	6.66	NA	NA	4.31	18.86	4.31	18.86
NMHC + NOx as NOx	NA	NA	NA	NA	NA	NA	0.31	1.36	NA	NA	NA	NA
CO	4.31	18.86	4.31	18.86	9.37	41.04	5.55	24.30	4.31	18.86	4.31	18.86
NMNEHC/VOC (does not include HCHO)	0.07	0.31	0.07	0.31	3.83	16.79	NA	NA	0.07	0.31	0.07	0.31
Total VOC (includes HCHO)	0.16	0.69	0.16	0.69	3.99	17.46	NA	NA	0.16	0.69	0.16	0.69
NMHC + NOx as VOC	NA	NA	NA	NA	NA	NA	0.31	1.36	NA	NA	NA	NA
SO_2	<0.01	<0.01	<0.01	<0.01	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
$PM_{10/2.5}$	0.01	0.05	0.01	0.05	<0.01	<0.01	<0.01	0.01	0.01	0.05	0.01	0.05
PM_{COND}	0.01	0.05	0.01	0.05	0.11	0.49	<0.01	0.01	0.01	0.05	0.01	0.05
PM_{TOT}	0.02	0.11	0.02	0.11	0.11	0.49	<0.01	0.02	0.02	0.11	0.02	0.11

Proposed Criteria Air Pollutant Emissions[2]

Pollutant	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**
NOx	0.32	1.40	0.32	1.40	1.52	6.66	NA	NA	0.32	1.40	0.32	1.40
NMHC + NOx as NOx	NA	NA	NA	NA	NA	NA	0.31	1.36	NA	NA	NA	NA
CO	0.64	2.80	0.64	2.80	0.64	2.79	5.55	24.30	0.64	2.80	0.64	2.80
NMNEHC/VOC (does not include HCHO)	0.07	0.31	0.07	0.31	0.61	2.67	NA	NA	0.07	0.31	0.07	0.31
Total VOC (includes HCHO)	0.16	0.69	0.16	0.69	0.76	3.34	NA	NA	0.16	0.69	0.16	0.69
NMHC + NOx as VOC	NA	NA	NA	NA	NA	NA	0.31	1.36	NA	NA	NA	NA
SO_2	<0.01	<0.01	<0.01	<0.01	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
$PM_{10/2.5}$	0.01	0.05	0.01	0.05	<0.01	<0.01	<0.01	0.01	0.01	0.05	0.01	0.05
PM_{COND}	0.01	0.05	0.01	0.05	0.11	0.49	<0.01	0.01	0.01	0.05	0.01	0.05
PM_{TOT}	0.02	0.11	0.02	0.11	0.11	0.49	<0.01	0.02	0.02	0.11	0.02	0.11

SWN Production Company, LLC
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AP-42 Emission Factors (lb/mmBtu)[3]

	4S-RB	4S-LB
Pollutant	**3.2-3 (7/00)**	**3.2-2 (7/00)**
SO_2	5.88E-04	5.88E-04
$PM_{10/2.5}$	9.50E-03	7.71E-05
PM_{COND}	9.91E-03	9.91E-03
PM_{TOT}	1.94E-02	9.99E-03

Notes:

[1] Uncontrolled emission factors based on engine manufacturer data. Per Caterpillar, NMNEHC emission factor does not include formaldehyde (HCHO); therefore, NMNEHC and HCHO factors have been added to demonstrate total uncontrolled VOC.

[2] Post-catalyst emission factors for the Caterpillar engines are based on catalyst manufacturer data and/or NSPS Subpart JJJJ limits, if applicable. Per NSPS Subpart JJJJ, VOC limit does not include HCHO; therefore, HCHO emissions have been added to the NSPS JJJJ VOC emission rates for demonstration purposes only.

[3] Per AP-42, all particulate matter (PM) from combustion of natural gas (total, condensable and filterable PM) is presumed <1 micrometer in diameter.

SWN Production Company, LLC
David Reinbeau Pad
Engine Emissions Calculations - Hazardous Air Pollutants

Equipment Information

Unit ID:	EU-ENG1	EU-ENG2	EU-ENG3	EU-ENG4	EU-ENG5	EU-ENG6
Emission Point ID:	EP-ENG1	EP-ENG2	EP-ENG3	EP-ENG4	EP-ENG5	EP-ENG6
Make:	Caterpillar	Caterpillar	Caterpillar	Kubota	Caterpillar	Caterpillar
Model:	G3306 NA	G3306 NA	G3516B	DG972-E2	3306 NA	3306 NA
Design Class:	4S-RB	4S-RB	4S-LB	4S-RB	4S-RB	4S-RB
Controls:	NSCR	NSCR	Oxid. Cat.	None	NSCR	NSCR
Horsepower (hp):	145	145	1,380	23.6	145	145
Capacity (kW):	NA	NA	NA	17.6		
Fuel Use (Btu/hp-hr):	8,625	8,625	8,163	NA	8,625	8,625
Fuel Use (Btu/kW-hr):	NA	NA	NA	11,771		
Fuel Use (scfh):	1,382	1,382	12,447	229	1,382	1,382
Annual Fuel Use (mmscf):	12.11	12.11	109.04	2.01	12.11	12.11
Fuel Use (mmBtu/hr):	1.25	1.25	11.26	0.21	1.25	1.25
Exhaust Flow (acfm):	678	678	9,230	NA	678	679
Exhaust Temp (°F):	1,101	1,101	1,011	NA	1,101	1,102
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760

Proposed HAP Emissions[1,2]

Unit ID:	EU-ENG1		EU-ENG2		EU-ENG3		EU-ENG4		EU-ENG5		EU-ENG6	
Pollutant	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**
Acetaldehyde	<0.01	0.02	<0.01	0.02	0.09	0.41	<0.01	<0.01	<0.01	0.02	<0.01	0.02
Acrolein	<0.01	0.01	<0.01	0.01	0.06	0.25	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Benzene	<0.01	0.01	<0.01	0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01	<0.01	0.01
Ethylbenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Formaldehyde	0.09	0.38	0.09	0.38	0.15	0.67	<0.01	0.02	0.09	0.38	0.09	0.38
Methanol	<0.01	0.02	<0.01	0.02	0.03	0.12	<0.01	<0.01	<0.01	0.02	<0.01	0.02
Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total HAP =	**0.10**	**0.44**	**0.10**	**0.44**	**0.34**	**1.51**	**0.01**	**0.03**	**0.10**	**0.44**	**0.10**	**0.44**

AP-42 Emission Factors (lb/mmBtu)

	4S-RB	4S-LB
Pollutant	**3.2-3 (7/00)**	**3.2-2 (7/00)**
Acetaldehyde	2.79E-03	8.36E-03
Acrolein	2.63E-03	5.14E-03
Benzene	1.58E-03	4.40E-04
Ethylbenzene	2.18E-05	3.97E-05
Methanol	3.06E-03	2.50E-03
Toluene	5.58E-04	4.08E-04
Xylenes	1.95E-04	1.84E-04

Notes:

[1] Manuf. data for uncontrolled Caterpillar G3306 HCHO emissions (g/hp-hr): 0.27
Manuf. data for uncontrolled Caterpillar G3516B HCHO emissions (g/hp-hr): 0.37
Controlled (86.5% Control Efficiency) = 0.05
Manuf. Data for uncontrolled Kubota DG972-E2 HCHO emissions (g/kW-hr): NA

[2] For conservative estimate, no reduction taken for any HAP except formaldehyde.

SWN Production Company, LLC
David Reinbeau Pad
Engine Emissions Calculations - Greenhouse Gases

Equipment Information

Unit ID:	EU-ENG1	EU-ENG2	EU-ENG3	EU-ENG4	EU-ENG5	EU-ENG6
Emission Point ID:	EP-ENG1	EP-ENG2	EP-ENG3	EP-ENG4	EP-ENG5	EP-ENG6
Make:	Caterpillar	Caterpillar	Caterpillar	Kubota	Caterpillar	Caterpillar
Model:	G3306 NA	G3306 NA	G3516B	DG972-E2	3306 NA	3306 NA
Design Class:	4S-RB	4S-RB	4S-LB	4S-RB	4S-RB	4S-RB
Controls:	NSCR	NSCR	Oxid. Cat.	None	NSCR	NSCR
Horsepower (hp):	145	145	1,380	24	145	145
Capacity (kW):	NA	NA	NA	17.6	NA	NA
Fuel Use (Btu/hp-hr):	8,625	8,625	8,163	NA	8,625	8,625
Fuel Use (Btu/kW-hr):	NA	NA	NA	11,771	NA	NA
Fuel Use (scfh):	1,382	1,382	12,447	229	1,382	1,382
Fuel Use (mmBtu/hr):	1.25	1.25	11.26	0.21	1.25	1.25
Exhaust Flow (acfm):	678	678	9,230	NA	678	679
Exhaust Temp (°F):	1,101	1,101	1,011	NA	1,101	1,102
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760

Manufacturer Emission Factors (g/hp-hr)[1]

CO_2 =	485	485	523	685	485	485
CH_4 =	NA	NA	NA	2	NA	NA

Greenhouse Gas (GHG) Emissions[1]

Pollutant	lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr
CO_2	155.04	616.04	155.04	616.04	1,591.14	6,322.33	26.58	105.61	155.04	616.04	155.04	616.04
CH_4	<0.01	0.01	<0.01	0.01	0.02	0.10	0.08	0.31	<0.01	0.01	<0.01	0.01
N_2O	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CH_4 as CO_2e	0.07	0.27	0.07	0.27	0.62	2.47	1.94	7.71	0.07	0.27	0.07	0.27
N_2O as CO_2e	0.08	0.33	0.08	0.33	0.74	2.94	0.01	0.05	0.08	0.33	0.08	0.33
Total CO_2 + CO_2e =	**155.19**	**616.64**	**155.19**	**616.64**	**1,592.50**	**6,327.74**	**28.53**	**113.37**	**155.19**	**616.64**	**155.19**	**616.64**

40 CFR 98 Tables ENG-1 and ENG-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] Manufacturer data used to estimate CO_2 emissions for the Caterpillar engines. All other emissions estimated using EPA data. 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
David Reinbeau Pad
Heater Treater Emissions Calculations - Criteria Air Pollutants

Equipment Information

Unit ID:	**EU-HT3 - EU-HT4 (EACH)**
Emission Point ID:	EP-HT3 - EP-HT4
Description:	Heater Treater
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-HT3 - EU-HT4 (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]

Uncontrolled

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
David Reinbeau Pad
Heater Treater Emissions Calculations - Hazardous Air Pollutants

Equipment Information

Unit ID:	**EU-HT3 - EU-HT4 (EACH)**
Emission Point ID:	EP-HT3 - EP-HT4
Description:	Heater Treater
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-HT3 - EU-HT4 (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 HAP =	**<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
David Reinbeau Pad
Heater Treater Emissions Calculations - Greenhouse Gases

Equipment Information

Unit ID:	**EU-HT3 - EU-HT4 (EACH)**
Emission Point ID:	EP-HT3 - EP-HT4
Description:	Heater Treater
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-HT3 - EU-HT4 (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
David Reinbeau 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	110	9.92E-03	0.00%	1.09	4.78	24.18%
Flanges - Gas	521	8.60E-04	0.00%	0.45	1.96	24.18%
Compressor Seals - Gas	18	1.94E-02	0.00%	0.35	1.53	24.18%
Relief Valves - Gas	49	1.94E-02	0.00%	0.95	4.16	24.18%
Open-Ended Lines - Gas	2	4.41E-03	0.00%	0.01	0.04	24.18%
Total TOC (Gas Components) =				**2.85**	**12.47**	-
Valves - Light Oil	120	5.51E-03	0.00%	0.66	2.90	94.29%
Connectors - Light Oil	474	4.63E-04	0.00%	0.22	0.96	94.29%
Total TOC (Liquid Components) =				**0.88**	**3.86**	-

VOC and Greenhouse Gas Emissions

Source Type/Service	VOC		CH_4		CO_2	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Valves - Gas	0.26	1.16	0.57	2.48	<0.01	0.01
Flanges - Gas	0.11	0.47	0.23	1.02	<0.01	0.01
Compressor Seals - Gas	0.08	0.37	0.18	0.79	<0.01	<0.01
Relief Valves - Gas	0.23	1.01	0.49	2.16	<0.01	0.01
Open-Ended Lines - Gas	<0.01	0.01	<0.01	0.02	<0.01	<0.01
Components in Gas Service =	**0.69**	**3.02**	**1.48**	**6.48**	**0.01**	**0.04**
Valves - Light Oil	0.62	2.73	0.01	0.05	<0.01	<0.01
Connectors - Light Oil	0.21	0.91	<0.01	0.02	<0.01	<0.01
Components in Liquid Service =	**0.83**	**3.64**	**0.02**	**0.07**	**<0.01**	**<0.01**
Total (Gas + Liquid Components) =	**1.52**	**6.65**	**1.50**	**6.55**	**0.01**	**0.04**

SWN Production Company, LLC
David Reinbeau 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	<0.01	<0.01	0.00	<0.01
Flanges - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Compressor Seals - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Relief Valves - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Open-Ended Lines - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Components in Gas Service =	**0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.00**	**0.01**
Valves - Light Oil	0.04	<0.01	<0.01	<0.01	0.01	0.00	0.05
Connectors - Light Oil	0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.02
Components in Liquid Service =	**0.05**	**<0.01**	**<0.01**	**<0.01**	**0.01**	**0.00**	**0.07**
Total (Gas + Liquid Components) =	**0.06**	**<0.01**	**<0.01**	**<0.01**	**0.01**	**0.00**	**0.08**

Hazardous Air Pollutant (HAP) Emissions (TPY)

Source Type/Service	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	2,2,4-Tri.	Total
Valves - Gas	0.02	<0.01	<0.01	<0.01	<0.01	0.00	0.02
Flanges - Gas	0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.01
Compressor Seals - Gas	0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.01
Relief Valves - Gas	0.02	<0.01	<0.01	<0.01	<0.01	0.00	0.02
Open-Ended Lines - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Components in Gas Service =	**0.05**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.00**	**0.05**
Valves - Light Oil	0.17	<0.01	0.01	0.01	0.04	0.00	0.23
Connectors - Light Oil	0.06	<0.01	<0.01	<0.01	0.01	0.00	0.08
Components in Liquid Service =	**0.22**	**<0.01**	**0.02**	**0.02**	**0.06**	**0.00**	**0.31**
Total (Gas + Liquid Components) =	**0.28**	**<0.01**	**0.02**	**0.02**	**0.06**	**0.00**	**0.37**

SWN Production Company, LLC
David Reinbeau 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	DEHY
Valves - Gas	12	3	2	5	5	0	0	24
Flanges - Gas	37	15	9	24	33	3	2	90
Compressor Seals - Gas	0	0	0	0	3	0	0	0
Relief Valves - Gas	1	3	1	1	1	3	1	2
Open-Ended Lines - Gas	0	0	0	0	0	0	0	2
Valves - Light Oil	0	5	6	12	3	6	9	0
Connectors - Light Oil	0	20	24	48	12	24	30	0
Pump Seals - Light Oil	0	0	0	0	0	0	0	0
Other - Light Oil	0	0	0	0	0	0	0	0

Equipment Type	WH	GPU	HT	LPT	FGC	OT	TT-O	DEHY
Number of Each Type On Pad =	3	3	3	1	6	8	1	1

SWN Production Company, LLC
David Reinbeau 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	0.149%	0.066	0.295%	-	0.01	0.04
Nitrogen	28.013	0.513%	0.144	0.646%	-	0.02	0.08
Methane	16.042	71.427%	11.458	51.479%	51.968%	1.48	6.48
Ethane	30.069	17.491%	5.259	23.629%	23.853%	0.68	2.98
Propane	44.096	6.802%	2.999	13.476%	13.603%	0.39	1.70
i-Butane	58.122	0.668%	0.388	1.744%	1.761%	0.05	0.22
n-Butane	58.122	1.828%	1.062	4.773%	4.819%	0.14	0.60
i-Pentane	72.149	0.327%	0.236	1.060%	1.070%	0.03	0.13
n-Pentane	72.149	0.440%	0.317	1.426%	1.440%	0.04	0.18
n-Hexane	86.175	0.107%	0.092	0.414%	0.418%	0.01	0.05
Other Hexanes	86.175	0.135%	0.116	0.523%	0.528%	0.02	0.07
Heptanes (as n-Heptane)	100.202	0.078%	0.078	0.351%	0.354%	0.01	0.04
Benzene	78.114	0.001%	0.001	0.004%	0.004%	<0.01	<0.01
Toluene	92.141	0.002%	0.002	0.008%	0.008%	<0.01	<0.01
Ethylbenzene	106.167	0.000%	0.000	0.001%	0.001%	<0.01	<0.01
Xylenes	106.167	0.001%	0.001	0.005%	0.005%	<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	0.022%	0.025	0.113%	0.114%	<0.01	0.01
Nonanes (as n-Nonane)	128.255	0.006%	0.008	0.035%	0.035%	<0.01	<0.01
Decanes (as n-Decane)	142.282	0.003%	0.004	0.019%	0.019%	<0.01	<0.01
TOTAL =		**100.00%**	**22.26**	**100.00%**	**100.00%**	**2.87**	**12.59**
		TOTAL HC =	**22.05**	**TOTAL VOC =**	**24.18%**	**0.69**	**3.02**
				TOTAL HAP =	**0.44%**	**0.01**	**0.05**

SWN Production Company, LLC
David Reinbeau 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	0.013%	0.006	0.007%	-	<0.01	<0.01
Nitrogen	28.013	0.026%	0.007	0.009%	-	<0.01	<0.01
Methane	16.042	8.861%	1.421	1.836%	1.836%	0.02	0.07
Ethane	30.069	9.965%	2.996	3.870%	3.871%	0.03	0.15
Propane	44.096	11.708%	5.163	6.668%	6.669%	0.06	0.26
i-Butane	58.122	2.480%	1.441	1.862%	1.862%	0.02	0.07
n-Butane	58.122	9.597%	5.578	7.204%	7.206%	0.06	0.28
i-Pentane	72.149	3.683%	2.657	3.432%	3.433%	0.03	0.13
n-Pentane	72.149	6.541%	4.719	6.095%	6.096%	0.05	0.24
n-Hexane	86.175	5.195%	4.477	5.782%	5.783%	0.05	0.22
Other Hexanes	86.175	5.393%	4.647	6.002%	6.003%	0.05	0.23
Heptanes (as n-Heptane)	100.202	10.008%	10.028	12.952%	12.954%	0.11	0.50
Benzene	78.114	0.069%	0.054	0.070%	0.070%	<0.01	<0.01
Toluene	92.141	0.328%	0.302	0.390%	0.390%	<0.01	0.02
Ethylbenzene	106.167	0.307%	0.326	0.421%	0.421%	<0.01	0.02
Xylenes	106.167	1.044%	1.108	1.432%	1.432%	0.01	0.06
2,2,4-Trimethylpentane	114.230	0.000%	0.000	0.000%	0.000%	0.00	0.00
Octanes (as n-Octane)	114.229	7.566%	8.643	11.162%	11.164%	0.10	0.43
Nonanes (as n-Nonane)	128.255	4.597%	5.896	7.615%	7.616%	0.07	0.29
Decanes (as n-Decane)	142.282	12.619%	17.955	23.190%	23.193%	0.20	0.89
	TOTAL =	**100.00%**	**77.43**	**100.00%**	**100.00%**	**0.88**	**3.86**
		TOTAL HC =	**77.41**	**TOTAL VOC =**	**94.29%**	**0.83**	**3.64**
				TOTAL HAP =	**8.10%**	**0.07**	**0.31**

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, LPT = Low-Pressure Tower, FGC = Flash Gas Compressor, OT = Oil Tank, TT-O = Tank Truck - Oil, DEHY = Dehydration Unit

[4] Gas and liquids analyses located in Attachment L.

ATTACHMENT U: FACILITY-WIDE EMISSION SUMMARY SHEETS

ATTACHMENT U – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

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

Emission Point ID #	NO_X		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		CH4		GHG (CO_2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
EP-ENG1	0.32	1.40	0.64	2.80	0.16	0.69	<0.01	<0.01	0.02	0.11	0.02	0.11	<0.01	0.01	155.19	679.73
EP-ENG2	0.32	1.40	0.64	2.80	0.16	0.69	<0.01	<0.01	0.02	0.11	0.02	0.11	<0.01	0.01	155.19	679.73
EP-ENG3	1.52	6.66	0.64	2.79	0.76	3.34	0.01	0.03	0.11	0.49	0.11	0.49	0.02	0.11	1,592.50	6,975.14
EP-ENG4	0.31	1.36	5.55	24.30	0.31	1.36	<0.01	<0.01	<0.01	0.02	<0.01	0.02	0.08	0.34	28.53	124.97
EP-ENG5	0.32	1.40	0.64	2.80	0.16	0.69	<0.01	<0.01	0.02	0.11	0.02	0.11	<0.01	0.01	155.19	679.73
EP-ENG6	0.32	1.40	0.64	2.80	0.16	0.69	<0.01	<0.01	0.02	0.11	0.02	0.11	<0.01	0.01	155.19	679.73
EP-GPU1	0.11	0.48	0.09	0.41	0.01	0.03	<0.01	<0.01	0.01	0.04	0.01	0.04	<0.01	0.01	117.10	512.89
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	<0.01	0.01	117.10	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	<0.01	0.01	117.10	512.89
EP-HT3	0.17	0.73	0.14	0.61	0.01	0.04	<0.01	<0.01	0.01	0.06	0.01	0.06	<0.01	0.01	175.65	769.33
EP-HT4	0.17	0.73	0.14	0.61	0.01	0.04	<0.01	<0.01	0.01	0.06	0.01	0.06	<0.01	0.01	175.65	769.33
EP-RB1	0.08	0.36	0.07	0.30	2.77	12.12	<0.01	<0.01	0.01	0.03	0.01	0.03	0.39	1.70	97.49	427.00
EP-LOAD-COND	-	-	-	-	2.01	8.79	-	-	-	-	-	-	0.43	1.90	10.85	47.51
EP-LOAD-PW	-	-	-	-	0.02	0.09	-	-	-	-	-	-	0.65	2.85	16.27	71.26
APC-COMB	2.08	9.09	4.14	18.12	1.23	5.38	<0.01	<0.01	0.05	0.21	0.05	0.21	0.03	0.15	1,761.77	7,716.54
TOTAL	5.93	25.98	13.51	59.16	7.76	33.98	0.01	0.06	0.32	1.39	0.32	1.39	1.63	7.15	4,830.75	21,158.65

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.

Note that EP-RB1 include emissions from the dehydration unit and reboiler and APC-COMB includes uncombusted emissions from the tanks and loading operations, as well as combustor pilot emissions.

ATTACHMENT U – FACILITY-WIDE HAP CONTROLLED EMISSIONS SUMMARY SHEET														
List all sources of emissions in this table. Use extra pages if necessary.														
Emission Point ID #	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
EP-ENG1	0.09	0.38	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	0.10	0.44
EP-ENG2	0.09	0.38	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	0.10	0.44
EP-ENG3	0.15	0.67	<0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	0.01	-	-	0.34	1.51
EP-ENG4	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	0.01	0.03
EP-ENG5	0.09	0.38	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	0.10	0.44
EP-ENG6	0.09	0.38	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	0.10	0.44
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-HT3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	<0.01	0.01	<0.01	0.01
EP-HT4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	<0.01	0.01	<0.01	0.01
EP-RB1	<0.01	<0.01	0.07	0.31	0.10	0.44	0.00	0.00	0.04	0.16	0.11	0.46	0.31	1.37
EP-LOAD-COND	-	-	<0.01	0.01	0.01	0.03	0.01	0.04	0.03	0.13	0.12	0.51	0.16	0.71
EP-LOAD-PW	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01
APC-COMB	<0.01	<0.01	<0.01	0.01	0.01	0.06	0.01	0.06	0.05	0.20	0.19	0.82	0.26	1.15
TOTAL	0.50	2.20	0.09	0.37	0.12	0.53	0.01	0.06	0.09	0.37	0.31	1.34	1.34	5.86

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.

Note that EP-RB1 include emissions from the dehydration unit and reboiler and APC-COMB includes uncombusted emissions from the tanks and loading operations, as well as combustor pilot emissions.

ATTACHMENT V: 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-D General Permit Registration Modification for a natural gas production facility (David Reinbeau Pad) located in Marshall County, West Virginia. From Interstate 470 in Wheeling, WV, take exit 2 (Bethlehem). Turn left after exiting onto CR 91/1 if traveling west bound on Interstate 470. Turn right onto CR 91/1 if traveling east bound on Interstate 470. Travel 0.46 miles to SR 88 and bear right at the stop light onto SR 88 South (Ridgecrest Road). Travel 4.729 miles on CR 88 to the intersection of SR 88 and CR 88/2 (Sorghum Ridge Road) and turn left onto CR 88/2. Travel 0.853 miles on CR 88/2 to future well pad access road on the right. Latitude/longitude coordinates are: 39.99496, -80.66492.

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

Nitrogen Oxides (NOx)	25.98 tons/yr
Carbon Monoxide (CO)	59.16 tons/yr
Volatile Organic Compounds (VOC)	33.98 tons/yr
Sulfur Dioxide (SO_2)	0.06 tons/yr
Particulate Matter (PM)	1.39 tons/yr
Acetaldehyde	0.48 tons/yr
Acrolein	0.31 tons/yr
Benzene	0.38 tons/yr
Ethylbenzene	0.08 tons/yr
Formaldehyde	2.20 tons/yr
Methanol	0.19 tons/yr
n-Hexane	1.61 tons/yr
Toluene	0.55 tons/yr
Xylenes	0.43 tons/yr
Carbon Dioxide	20,968.91 tons/yr
Methane	13.70 tons/yr
Nitrous Oxide	0.04 tons/yr
CO_2 Equivalent	21,322.51 tons/yr

Operations is planned to begin on or about February 15, 2017. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice. Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the 30th of November 2017

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