October 10, 2024

Federal Minor NSR Permit Coordinator
Air and Radiation Division, U.S. EPA Region 8
Mail Code 8P-AR
1595 Wynkoop Street
Denver, CO 80202

And

Mr. Edmund Baker
Environmental Division
Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara Nation
404 Frontage Road
New Town, ND 58763

RE: Tribal NSR Part 2 Registration
Crosby Chase 2-1H Pad
WPX Energy Williston, LLC

NSR Permit Coordinator:

WPX Energy Williston, LLC (WPX) is submitting this updated Tribal NSR Part 2 Registration for the Crosby Chase 2-1H Pad (Facility). The Facility is located on the Fort Berthold Indian Reservation in the NW1/4 SE1/4 of Section 3, T150N, R94W.

The Facility was classified as a major source under Title V. Potential emissions from the Facility have decreased below the major source thresholds, and a withdrawal of the Title V was submitted by WPX. This updated Part 2 Registration is being submitted to inform EPA of WPX's reevaluation of emissions for this Facility (which has been operating for more than a year) by using site-specific throughputs.

Emission estimates in this registration are based on production during calendar year 2023.

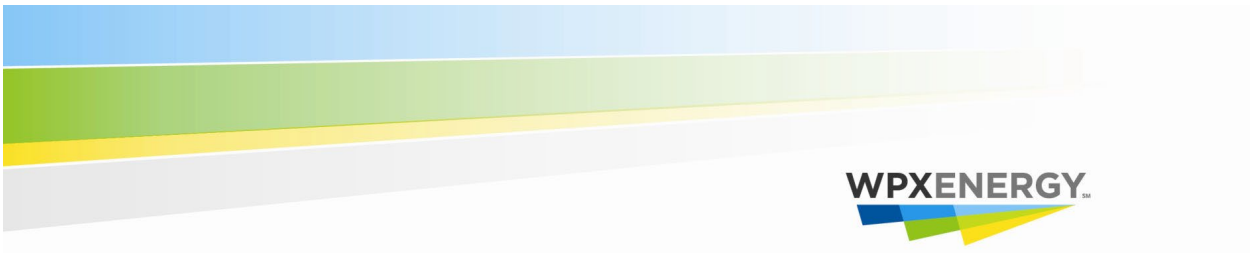
If you have questions or need additional information, please contact me at (918) 807-0647.

Sincerely,

William Fulk
EHS Professional

Attachments

Tribal NSR Part 2 Registration
Crosby Chase 2-1H Pad
McKenzie County, North Dakota



WPX Energy Williston, LLC
333 Sheridan Ave.
Oklahoma City, OK 73102-8260

October 10, 2024

Introduction

The Crosby Chase 2-1H Pad (Facility) is a five-well oil and gas production facility owned and operated by WPX Energy Williston, LLC (WPX). The Facility produces gas, oil and produced water from the Crosby Chase 2-1HC, HG, HY, HZ and HIL wells. No pipelines currently service the Facility, so the oil and produced water are stored in tanks and loaded to trucks for takeaway. Vapors from the oil and water tanks are routed to low-pressure flares. The produced gas is primarily used to fuel equipment owned and operated by Crusoe Energy Systems, Inc. (Crusoe) to power data centers. The Crusoe equipment includes a compressor engine, a generator engine and a turbine engine. Those sources are included in Crusoe's Minor Source Permit and WPX has no environmental control over them. Emissions from WPX's Facility and Crusoe's sources are not aggregated. Gas not consumed by Crusoe is flared. Operations occur 24 hours per day, 7 days per week, 365 days per year.

The Facility is located in the NW1/4 SE1/4 of Section 3, T150N, R94W in McKenzie County, North Dakota, on the Fort Berthold Indian Reservation (FBIR). The FBIR is classified as an attainment area.

Attachments included with this submittal are listed below.

Attachment A: Tribal NSR Part 2 Registration Form
Attachment B: Facility Location
Attachment C: Process Description
Attachment D: Emission Calculation Details
Attachment E: Regulatory Discussion
Attachment F: Annual Production and ProMax® 5.0 Simulation Output
Attachment G: Hydrocarbon Analyses
Attachment H: Combustion Control Device Documentation

Attachment A: Tribal NSR Part 2 Registration Form

EPA Form No. 5900-391
EPA ICR No. 1230.27
OMB Control No. 2060-0003
Approval expires 10/31/2020

United States Environmental Protection Agency
https://www.epa.gov/tribal-air/tribal-minor-new-source-review
April 29, 2019

Part 2: Submit Within 60 Days After Startup of Production -- Emission and Production Information

FEDERAL IMPLEMENTATION PLAN FOR TRUE MINOR SOURCES IN INDIAN COUNTRY IN THE OIL AND NATURAL GAS PRODUCTION AND NATURAL GAS PROCESSING SEGMENTS OF THE OIL AND NATURAL GAS SECTOR

Registration for New True Minor Oil and Natural Gas Sources and Minor Modifications at Existing True Minor Oil and Natural Gas Sources

Please submit information to:

[Reviewing Authority Address Phone]	Federal Minor NSR Permit Coordinator U.S. EPA, Region 8 1595 Wynkoop Street, 8P-AR Denver, CO 80202-1129 R8airpermitting@epa.gov

A. GENERAL SOURCE INFORMATION (See Instructions Below)

1. Company Name	**2. Source Name**
WPX Energy Williston, LLC	Crosby Chase 2-1H Pad
3. Type of Oil and Natural Gas Operation Oil and gas production	**4. New Minor Source?** ☐ Yes ■ No **5. True Source Modification?** ■ Yes ☐ No
6. NAICS Code 2111	**7. SIC Code** 1311

8. U.S. Well ID(s) or API Number(s) [if applicable]
Crosby Chase 2-1HIL 33-053-09328 Crosby Chase 2-1HG 33-053-09330 Crosby Chase 2-1HC 33-053-09332;
Crosby Chase 2-1HZ 33-053-09329 Crosby Chase 2-1HY 33-053-09331

9. Area of Indian Country	**10. County**	**11a. Latitude**	**11b. Longitude**
Fort Berthold Indian Reservation	McKenzie	47.839030	-102.696031

B. CONTACT INFORMATION (See Instructions Below)

1. Owner Name WPX Energy Williston, LLC	Title
Mailing Address 333 Sheridan Avenue, Oklahoma City, OK 73102-8260	
Email Address Will.Fulk2@dvn.com	
Telephone Number (918) 807-0647	Facsimile Number
2. Operator Name (if different from owner)	Title
Mailing Address	
Email Address	
Telephone Number	Facsimile Number
3. Source Contact William Fulk	Title EHS Professional
Mailing Address 333 Sheridan Avenue, Oklahoma City, OK 73102-8260	
Email Address Will.Fulk2@dvn.com	
Telephone Number (918) 807-0647	Facsimile Number

4. Compliance Contact	Title
William Fulk	EHS Professional
Mailing Address	
333 Sheridan Avenue, Oklahoma City, OK 73120-8260	
Email Address	
Will.Fulk2@dvn.com	
Telephone Number	Facsimile Number
(918) 807-0647	

C. EMISSIONS AND OTHER SOURCE INFORMATION

Include all of the following information in the table below and as attachments to this form:

Note: The emission estimates can be based upon actual test data or, in the absence of such data, upon procedures acceptable to the Reviewing Authority. The following procedures are generally acceptable for estimating emissions from air pollution sources: (1) unit-specific emission tests; (2) mass balance calculations; (3) published, verifiable emission factors that are applicable to the unit (i.e., manufacturer specifications); (4) other engineering calculations; or (5) other procedures to estimate emissions specifically approved by the Reviewing Authority. Guidance for estimating emissions can be found at https://www.epa.gov/chief.

☐ Narrative description of the operations.

☐ Identification and description of any air pollution control equipment and compliance monitoring devices or activities.

☐ Type and actual amount (annually) of each fuel that will be used.

☐ Type of raw materials used (e.g., water for hydraulic fracturing).

☐ Actual, annual production rates.

☐ Actual operating schedules.

☐ Any existing limitations on source operations affecting emissions or any work practice standards, where applicable, for all regulated New Source Review (NSR) pollutants at your source. Indicate all requirements referenced in the Federal Implementation Plan (FIP) for True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Sector that apply to emissions units and air pollution generating activities at the source or proposed. Include statements indicating each emissions unit that is an emissions unit potentially subject to the requirements referenced in the FIP, but does not meet the definition of an affected facility under the referenced requirement, and therefore, is not subject to those requirements.

☐ For each emissions unit comprising the new source or modification, estimates of the total allowable (potential to emit) annual emissions at startup of production from the air pollution source for the following air pollutants: particulate matter, PM_{10}, $PM_{2.5}$, sulfur oxides ( ), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H_2SO_4), hydrogen sulfide (H_2S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates. Allowable annual emissions are defined as: emissions rate of an emissions unit calculated using the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical

or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation, or the effect it would have on emissions, is legally and practically enforceable. You must determine the potential for emissions within 30 days from the startup of production.

☐ For each emissions unit comprising the new source or modification, estimates of the total actual annual emissions during the upcoming, consecutive 12 months from the air pollution source for the following air pollutants: particulate matter (PM, PM_{10}, $PM_{2.5}$), sulfur oxides (SO_x), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, ammonia (NH_3), fluorides (gaseous and particulate), sulfuric acid mist (H_2SO_4), hydrogen sulfide (H_2S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates. Estimates of actual emissions must take into account equipment, operating conditions, and air pollution control measures. You should calculate an estimate of the actual annual emissions using estimated operating hours, production rates, in-place control equipment, and types of materials processed, stored, or combusted.

D. TABLE OF ESTIMATED EMISSIONS

Provide in the table below estimates of the total allowable annual emissions in tons per year (tpy) and total actual annual emissions (tpy) for the following pollutants for all emissions units comprising the new source or modification.

POLLUTANT	TOTAL ALLOWABLE ANNUAL EMISSIONS (TPY)	TOTAL ACTUAL ANNUAL EMISSIONS (TPY)
PM	0.5	0.5
PM_{10}	0.5	0.5
$PM_{2.5}$	0.5	0.5
SO_x	0.0	0.0
NO_x	31.0	31.0
CO	65.6	65.6
VOC	84.1	84.1
Pb	0.0	0.0

POLLUTANT	TOTAL ALLOWABLE ANNUAL EMISSIONS (TPY)	TOTAL ACTUAL ANNUAL EMISSIONS (TPY)
NH3	0.0	0.0
Fluorides	0.0	0.0
H_2SO_4	0.0	0.0
H_2S	0.0	0.0
TRS	0.0	0.0

Instructions for Part 2

Please answer all questions. If the item does not apply to the source and its operations write "n/a". If the answer is not known write "unknown".

A. General Source Information

1. Company Name: Provide the complete company name. For corporations, include divisions or subsidiary name, if any.
2. Source Name: Provide the source name. Please note that a source is a site, place, or location that may contain one or more air pollution emitting units.
3. Type of Operation: Indicate the generally accepted name for the oil and natural gas production or natural gas processing segment operation (e.g., oil and gas well site, tank battery, compressor station, natural gas processing plant).
4. New True Minor Source: [Per Federal Indian Country Minor New Source Review Rule, 40 CFR 49.153].
5. True Minor Source Modification: [Per Federal Indian Country Minor New Source Review Rule, 40 CFR 49.153].
6. North American Industry Classification System (NAICS): The NAICS Code for your oil and natural gas source can be found at the following link for North American Industry Classification System: http://www.census.gov/eos/www/naics/.
7. Standard Industrial Classification Code (SIC Code): Although the new NAICS code has replaced the SIC codes, much of the Clean Air Act permitting processes continue to use these codes. The SIC Code for your oil and natural gas source can be found at the following link for Standard Industrial Classification Codes: http://www.osha.gov/pls/imis/sic_manual.html.
8. U.S. Well ID or API Number: Unique well identifier as assigned by the Federal or State oil and gas regulatory agency with primacy, using the American Petroleum Institute (API) Standard for number format (pre-2014) or the Professional Petroleum Data Management (PPDM) Association US Well Number Standard (2014-present). Provide IDs for all oil and natural gas production wells associated with the facility, if applicable. May not be applicable for downstream production sources, such as compressor stations.
9. Area of Indian Country: Provide the name of the Indian reservation within which the source is operating.
10. County: Provide the County within which the source is operating.
11. Latitude & Longitude (11a. and 11b.): Provide latitude and longitude location(s) in decimal degrees, indicating the datum used in parentheses. These are GPS (global positioning system) coordinates. This information should be provided in decimal degrees with 6 digits to the right of the decimal point, indicating the datum used in parentheses (i.e., NAD 27, NAD 83, WGS 84 – WGS 84 is preferred over NAD 27).

B. Contact Information

Please provide the information requested in full.

1. Owners: List the full name (last, middle initial, first) of all owners of the source.
2. Operator: Provide the name of the operator of the source if it is different from the owner(s).
3. Source Contact: The source contact must be the local contact authorized to receive requests for data and information.
4. Compliance Contact: The compliance contact must be the local contact responsible for the source's compliance with this rule. If this is the same as the Source Contact please note this on the form.

C. Attachments

The information requested in the attachments will enable the U.S. Environmental Protection Agency (EPA) to understand the type of oil and natural gas source being registered and the nature and extent of the air pollutants to be emitted.

Disclaimers:

The public reporting and recordkeeping burden for this collection of information is estimated to average 6 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

Information in these forms submitted in compliance with the final Federal Indian Country Minor NSR rule may be claimed as confidential. A company may assert a claim of confidentiality for information submitted by clearly marking that information as confidential. Such information shall be treated in accordance with EPA's procedures for information claimed as confidential at 40 CFR part 2, subpart B, and will only be disclosed by the means set forth in the subpart. If no claim of confidentiality accompanies the report when it is received by EPA, it may be made public without further notice to the company (40 CFR 2.203).

Attachment B: Facility Location

Crosby Chase Pad

devon

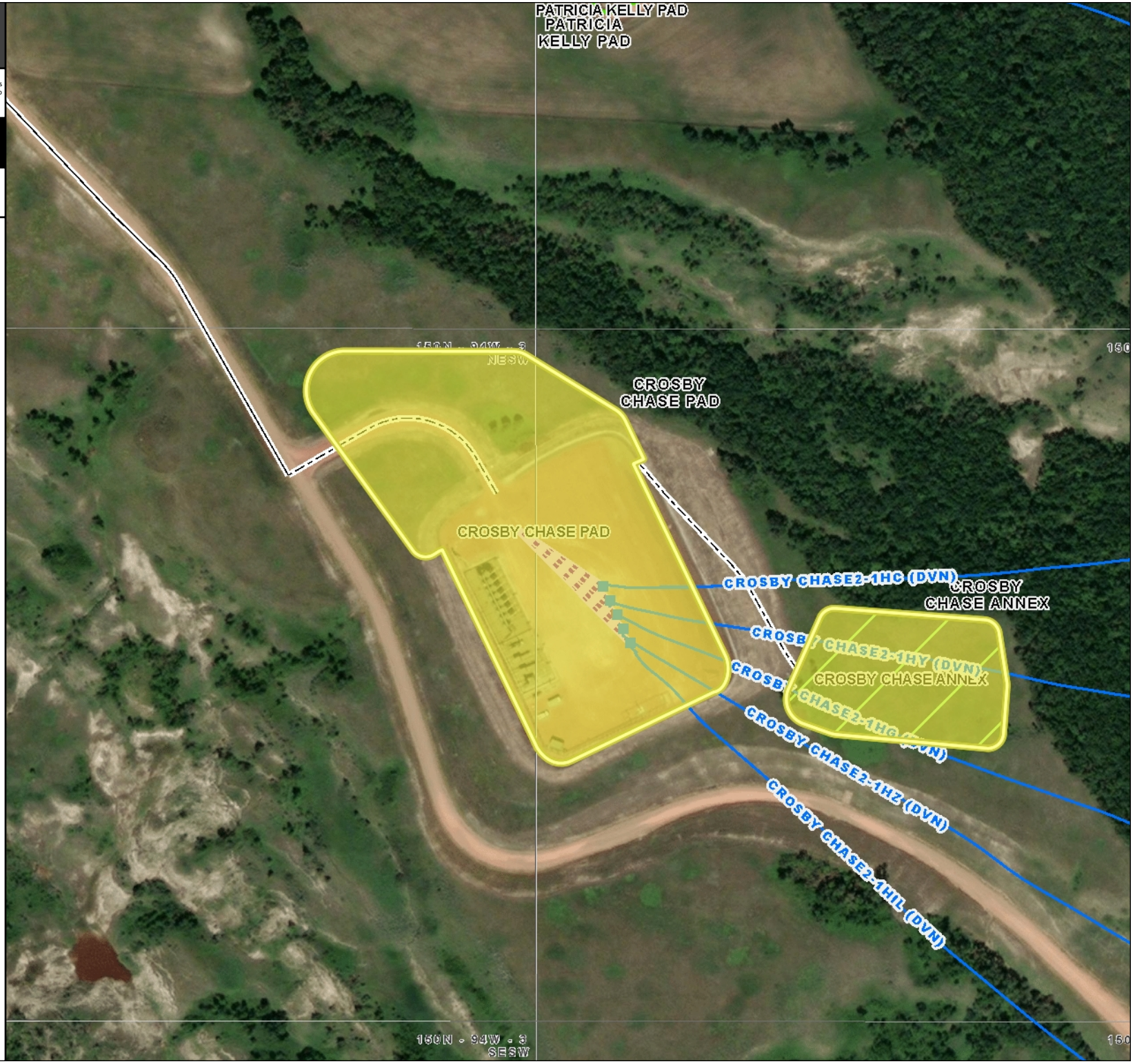
This map is for illustrative purposes only and is neither a legally recorded map nor survey and is not intended to be used as one. Devon makes no warranty, representation, or guarantee of any kind regarding this map.

WGS_1984_Web_Mercator_Auxiliary_Sphere
Prepared by:
Map is current as of: 17-Sep-2021

N

Miles
0 0.02 0.04 0.07 1:3,557

- Surface Hole (ACT-DVN/OBO)
- Other
- Deviated Surface
- Oil Producing Well
- Gas Producing Well
- Oil and Gas Producing Well
- Drilling or Completing
- Injection Well
- Salt Water Disposal Well
- Shut In
- Bore Path (ACT-DVN/OBO)
- Surface Hole (PRP-DVN/OBO)
- Vertical
- Deviated
- Bore Path (PRP-DVN/OBO)
- Prop / Plan / Const Sites
- FACILITY
- GATHERING
- PAD
- PROCESSING
- OTHER
- Operational Sites
- FACILITY
- GATHERING
- PAD
- PROCESSING
- OTHER
- Valve
- EL Construction / Planned
- EL Operational
- Corridors
- PL Prop / Plan / Const
- Air
- CO2
- Fiber Optic
- Fresh Water
- Gas
- Oil
- Mixed
- Produced Water
- PL Operational Air Supply
- PL Operational CO2
- PL Operational Communications
- PL Operational Crude
- PL Operational Fresh Water
- PL Operational Gas
- PL Operational Mixed
- PL Operational Produced Water
- PL Unknown
- PL Out of Service
- Surveyed Roads
- SURVEY
- OTHER
- Well XREF
- Facilities by Type
- PAD
- PROCESSING
- OTHER



Attachment C: Process Description

Process Description:

There are two Process Trains at the Facility. In Process Train 1, fluid and gas are pumped from the Crosby Chase 2-1HC, HG, HY, HZ well heads and sent through 3-phase separators. The vessels separate the incoming mixture into oil, gas, and water. Any gas collected is primarily sent to Crusoe's operation. Excess gas not directed to Crusoe's engines is sent to an on-site, high pressure flare.

The oil from Process Train 1 will be passed through a Vapor Recovery Tower (VRT) with an associated 3.25 MMBtu/hr bath heater. The VRT recovers gas that is transferred to a high-pressure flare. Oil continues to one of eight storage tanks, each with a capacity of 400 bbl (barrels). Because oil is transferred to the tanks under higher pressure, there will be potential for flash emissions. Oil is then metered through a LACT unit and takeaway is via truck hauling. The produced water is sent to one of four 400 bbl storage tanks. Water takeaway is also via truck hauling. Tank emissions from the oil and water tanks are collected and routed to the low-pressure flares.

In Process Train 2, fluid and gas are pumped from the Crosby Chase 2-1H HIL well head to a 0.5 MMBtu/hr heater treater which separates the oil, gas, and water. The separated gas is again primarily sent to Crusoe's equipment, with excess gas going to an on-site, high pressure flare. The oil is transferred to one of two 400 bbl storage tanks and the water is sent to one 400 bbl storage tank. Oil and water takeaway is via truck hauling and emissions from the tanks are routed to the low-pressure flares.

Sources of emissions include flashing, working and breathing losses from the oil and water tanks. The emissions from the oil and water tanks at the facility are controlled by the low-pressure flares, with a destruction and removal efficiency (DRE) of 98.0%. Also, fugitive emissions will emanate from various valves, flanges, connectors, pumps and other equipment at the facility. Emissions from the pneumatic devices are either low-bleed, intermittent bleed or mechanically driven. Two engines at the Facility providing electrical power generation also produce emissions.

The following equipment is installed at the facility:

- Ten (10) - 400 bbl oil storage tanks
- Five (5) - 400 bbl produced water storage tanks
- One (1) – 3.25 MMBtu/hr bath heater (Process Train 1)
- One (1) – 0.5 MMBtu/hr heater treater (Process Train 2)
- Two (2) – High-pressure flares w/ separator (control of produced gas)
- Two (2) – Low-pressure flares w/ separator (control of tank emissions)
- One (1) – Vapor recovery tower
- Two (2) - Natural gas-fired, 4-stroke rich burn engines
- Truck Loadouts for produced crude oil and water

Attachment D: Emission Calculation Details

Emission Calculation Details:

Emission calculations in this registration are based on production during calendar year 2023.

Oil Storage Tanks:

Standing, working and breathing losses as well as flashing emissions were estimated using the process simulation software ProMax V5.0. Standing, working and breathing losses are based on the June 2020 revision to AP-42 Chapter 7, Section 7.1. A site-specific hydrocarbon analysis was used to model emissions. The stock tank API gravity was taken from the analysis included in this application. All tank vapors are collected and routed to the low-pressure flares; therefore, controlled tank emissions at the tanks are shown as zero in the calculations. Any uncombusted tank emissions are calculated at the flares and based on a 98% destruction and removal efficiency.

Heaters:

Two heaters are equipped with burners that have rated heat input capacities of either 0.5 or 3.25 MMBtu/hr. Emission factors from AP-42 Chapter 1.4 were utilized to estimate emissions. Per guidance within AP-42, the emission factors were adjusted slightly because of the higher Btu of the field gas compared to natural gas. VOC and HAP emissions were estimated based on the site-specific VOC weight percent of the field gas.

Fugitive Leaks:

Fugitive emission calculations are estimated utilizing the EPA document titled "Protocol for Equipment Leaks Emission Estimates," Table 2.4 (November 1995). Additionally, the speciated emission factors listed in this guidance document were used to estimate VOC and HAP weight percentages for the light oil and water/oil streams at the facility. VOC and HAP weight percentages for light oil and gas were based on outputs from the ProMax simulation and the gas and liquid analyses included in this application.

Truck Loadout:

Oil and produced water at the facility is taken away via trucks. Emissions from the truck loadouts at the facility were estimated based on the equation outlined in AP-42, Chapter 5.2 along with the saturation factor value as outline in Table 5.2-1. Additionally, the vapor pressure and vapor molecular weight were obtained from the ProMax simulation calculations. The VOC and HAP weight percentages were taken from the representative hydrocarbon analysis.

Combustor/Flare Emissions:

Emissions from the low-pressure flares consist of working, breathing and flashing emissions routed from the tanks and the flare's pilot emissions. Emissions are based on estimated production volumes, ProMax simulation of the tank emissions, and a destruction and removal efficiency of 98%.

The high-pressure flares are used to control produced gas not sent to the data center engines. Emissions from the high-pressure flares were calculated based on the amount of gas produced and being flared (i.e., not sent to the data center engines) and the representative gas analysis included in the application.

Natural Gas-Fired Internal Combustion Engines:

Emissions from the natural gas-fired engines were calculated using engine-specific fuel consumption (MMBtu/hr) and AP-42 Table 3.2-3 emission factors. Controlled NO_X, VOC and CO emissions were calculated using engine-specific horsepower ratings and 40 CFR Subpart JJJJ emission standards.

Composite Hydrocarbon Analysis:

A representative hydrocarbon analysis from the Crosby Chase Pad was used for the calculations. This analysis is included in Attachment G.

Attachment E: Regulatory Discussion

Regulatory Discussion:

Indian Country: Air Quality Planning and Management

40 CFR Part 49 Subpart K – Implementation Plan for Tribes Region VIII. *Federal Implementation Plan (FIP) for Oil and Natural Gas Well Production Facilities; Fort Berthold Indian Reservation (Mandan, Hidatsa and Arikara Nation), North Dakota*. This FIP applies to each owner or operator constructing, modifying or operating an oil and natural gas production facility located on the Fort Berthold Indian Reservation producing from the Bakken Pool with one or more oil and natural gas wells, for which completion or recompletion operations were performed on or after August 12, 2007. The Facility is a natural gas production facility with various wells producing from the Bakken pool and located in the Fort Berthold Indian Reservation. Therefore, the storage tanks and flares are subject to the control and emission reduction requirements established under this subpart.

New Source Performance Standards (NSPS)

40 CFR Part 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. This Subpart applies to owners and operators of stationary Spark Ignition (SI) internal combustion engines (ICE) manufactured after July 1, 2007 or modified or reconstructed after June 12, 2006. There are natural gas-fired SI engines manufactured after 2007 at the Facility; therefore, this subpart is applicable.

40 CFR Part 60 Subpart OOOOa: Crude Oil and Natural Gas Production, Transmission, and Distribution. This subpart applies to crude oil and natural gas production, transmission, and distribution facilities constructed after September 18, 2015, which describes this Facility. Affected sources include pneumatic controllers, reciprocating compressors, equipment leaks, natural gas sweetening units and storage vessels. There are no reciprocating compressors or sweetening units, and all pneumatic controllers have a bleed rate of 6 standard cubic feet per hour or less. The Process Train 2 oil storage tanks were previously determined to be subject to the requirements of Subpart OOOOa because each tank's VOC PTE was above 6 ton/year. This determination accounts for the enforceable requirements under 40 CFR Part 49 Subpart K (98% control). The fugitive emission components are subject to the monitoring requirements of Subpart OOOOa.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

40 CFR Part 63 Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. This Subpart applies to reciprocating internal combustion engines located at major and area sources of HAP emissions. There are natural gas-fired SI engines at the Facility; therefore, this subpart is applicable. WPX will comply with the requirements of Subpart ZZZZ by complying with the requirements of NSPS JJJJ, per 40 CFR 63.6590(c). Subpart A does not apply to new or reconstructed stationary reciprocating internal combustion engines located at an area source of HAPs; therefore, the General Provisions do not apply.

Attachment F: Annual Production and ProMax® 5.0 Simulation Output

Crosby Chase 2-1H Pad Production

Crosby Chase 2-1 HC, HG, HZ, HY, and HIL

	Oil (bbl)	Gas (mcf)	Water (bbl)
Total Production 1/1/2023 to 12/31/2023	214,681	961,446	224,892
Average Daily Production	590	2,635	617

DEET

Effective from Date	1/7/2020
Effective to Date	
Comments	
Site Name	Crosby Chase
# of Process Trains	2
State	
Workbook ID	0

		Process Train 1		Process Train 2	
Facility	UFID				
		Well Origin DUWI	**Well Name**	**Well Origin DUWI**	**Well Name**
Production Information					
Analysis		ND - Crosby Chase		ND - Crosby Chase	
Tank Design (psi)		Standard		Standard	
Oil Throughput	bopd	454.00		136.00	
Water Throughput	bwpd	493.00		124.00	
Gas Throughput	mscfd	2081.00		554.00	
Oil Throughput (Worst Case)	bopd	454.00		136.00	
Water Throughput (Worst Case)	bwpd	493.00		124.00	
Gas Throughput (Worst Case)	mscfd	2081.00		554.00	
2-Phase or 3-Phase Separation		3		3	
1st Stage Separator	psig	150		150	
1st Stage Separator	°F	135		135	
1st Stage Separator % to Flare	%	25%		30%	
1st Stage Separator % to Vent	%	0%		0%	
Volume to Flare	MSCF	0		0	
1st Stage Separator		EQUID		EQUID	
2nd Stage Separator	psig	150		150	
2nd Stage Separator	°F	135		135	
2nd Stage Separator % to Flare	%	0%		0%	
2nd Stage Separator % to Vent	%	0%		0%	
2nd Stage Separator		EQUID		EQUID	
Heater Treater	psig	150		20	
Heater Treater	°F	135		110	
Heater Treater % to Flare	%	0%		100%	
Heater Treater % to Vent	%	0%		0%	
Heater Treater % to Tanks (hourly/annual	%	0%	0%	0%	0%
Heater Treater		EQUID		EQUID	
ULPS	psig	5		20	
ULPS % to Flare	%	0%		0%	
ULPS % to Vent	%	0%		0%	
ULPS % to Tanks (hourly/annual)	%	0%	0%	0%	0%
		EQUID		EQUID	
GB/FWKO?		N		N	
GB/FWKO	psig	0.0		0.0	
GB/FWKO % to Flare	%	0%		0%	
GB/FWKO % to Vent	%	0%		0%	
		EQUID		EQUID	
Tank Temp Calculations?		User		User	
Tank Temperature	°F				

Tank Color		Medium Grey	Medium Grey
# Cond/ Tanks	#	8	2
Volume	bbl	400	400
Tank Height/Length	ft	20	20
Tank Diameter	ft	12	12
Control Type		Flare	Flare
Capture Effeciency	%	100%	100%
Run Hours	hrs	8760	8760
VRU Capture	%	0%	0%
Oil Tank		EQUID	EQUID
# Water Tanks:	#	4	1
Volume	bbl	400	400
Tank Height/Length	ft	20	20
Tank Diameter	ft	12	12
Control Type		Flare	Flare
Capture Effeciency	%	100%	100%
Run Hours	hrs	8760	8760
VRU Capture	%	0.00%	0.00%
Water Tank		EQUID	EQUID
# of Slop Oil Tanks	#	0	0
Pre Tank Oil to Pipeline	(Y/N)	N	N
Pre Tank % Oil to Pipeline	%	0%	0%
Post Tank Oil to Pipeline	(Y/N)	N	N
Post Tank % Oil to Pipeline	%	0%	0%
Pre Tank Water to Pipeline	(Y/N)	N	N
Pre Tank % Water to Pipeline	%	0%	0%
Post Tank Water to Pipeline	(Y/N)	N	N
Post Tank % Water to Pipeline	%	0%	0%
Oil lb/1000 gal Caclulation Method		Promax	Promax
Oil VOC Weight %	%	Promax	Promax
Water 1%		n	n
Vapor Balancing?	(Y/N)	Y	Y
Vapor Balancing Effeciency	%	70%	70%
Hourly Loading Rate	bb/hr	300	300
MSS? (y or n)	(Y/N)	N	N
Vent Run Hours	hrs	0	
Venting MSS?	(Y/N)	N	
Apply Venting % to lb/hr	(Y/N)	N	

Haul Road Emissions

Empty Vehicle Weight	tons	0
Truck Capacity	bbls	0
Road Segnment Length	mile	0

Fugitive Emissions

Equipment Count Set		Count 1
Run Hours	hrs	8760
LDAR Control Effeciency	%	0%
Compressor		4
Dehydrator		1
Separator (Gas Service)		3
Separator (Oil/Condensate Service)		3
Separator (Water/Light Oil Service)		3
VRT (Gas Service)		1
VRT (Oil Condensate Service)		1
Heater (Gas Service)		2
Heater (Oil/Condensate Service)		2
Heater (Water/Light Oil Service)		2
Oil Tank		10
Water Tank		5
Wellhead		5
Flare		4
Scrubber		7

# of Flares/Combustors	4	Flare/Combustor 1	Flare/Combustor 2	Flare/Combustor 3	Flare/Combustor 4
Process Train 1?	(Y/N)	Y	Y	N	N
Process Train 2?	(Y/N)	N	N	Y	Y
Process Train 3?	(Y/N)	N	N	N	N
Process Train 4?	(Y/N)	N	N	N	N
Process Train 5?	(Y/N)	N	N	N	N
Process Train 6?	(Y/N)	N	N	N	N
Process Train 7?	(Y/N)	N	N	N	N
Process Train 8?	(Y/N)	N	N	N	N
Process Vessels?	(Y/N)	Y	Y	Y	Y
Oil Tanks?	(Y/N)	Y	Y	Y	Y
Water Tanks?	(Y/N)	Y	Y	Y	Y
Slop Tanks?	(Y/N)	N	N	N	N
MSS Tank Degassing?	(Y/N)	N	N	N	N
MSS Blowdown?	(Y/N)	N	N	N	N
MSS VAC Truck?	(Y/N)	N	N	N	N
EQUID					
Permit Group Name		Flare 1	Flare 2	Flare 3	Flare 4
Combustor/Flare		Flare	Flare	Flare	Flare
Max Capacity	mscfd	140	140	140	140
Control Effeciency		98%	98%	98%	98%
Run Time	hr	8760	8760	8760	8760
Stack Height	ft	30	30	30	30
Stack Diameter	ft	4	4	4	4
Exit Temperature	F	250	250	250	250
Exhaust Gas Flowrate	ft3/min	250	250	250	250

# of Engines	2	Engine 1	Engine 2
EQUID			
Permit Group Name		Engine 1	Engine 2
Engine Controls?	(Y/N)	Y	Y
Engine Control Type		AFR/CC	AFR/CC
Engine Control Efficiency		0%	0%
Emission Factor Basis - Uncontrolled		AP-42	AP-42
Emission Factor Basis - Controlled		Quad J	Quad J
Make/Model		Doosan 11.1L	Doosan 11.1L
Max HP	hp	268	268
Fuel		Natural Gas	Natural Gas
Design Class		4-Stroke Rich Burn	4-Stroke Rich Burn
Fuel Consumption	Btu/bhp*hr	8750	8750
Ignition Type		Spark	Spark
Run Time	hr	8760	8760
Manufactured Date		11/1/2019	8/1/2014
Serial Number		EEIOH908942	EEIOH403777
Stack Height	ft	6.33	6.33
Stack Diameter	ft	0.17	0.17
Exit Temperature	F	1391	1391
Exhaust Gas Flowrate	ft3/min	1160	1160
User-Specified EF's		Uncontrolled	
NOX	g/(hp*hr)		
VOC	g/(hp*hr)		
CO	g/(hp*hr)		
PM10	g/(hp*hr)		
PM2.5	g/(hp*hr)		
SO2	g/(hp*hr)		
Formaldehyde	g/(hp*hr)		
User-Specified EF's		Controlled	Controlled
NOX	g/(hp*hr)		
VOC	g/(hp*hr)		
CO	g/(hp*hr)		
PM10	g/(hp*hr)		
PM2.5	g/(hp*hr)		
SO2	g/(hp*hr)		
Formaldehyde	g/(hp*hr)		

# of Heaters	2	Heater 1	Heater 2
EQUID			
Permit Group Name		Heater 1	Heater 2
Rating	mmbtuh	0.50	3.25
Run Time	hr	8760	8760
Stack Height	ft	20	20
Stack Diameter	ft	1	1
Exit Temperature	F	250	250
Exhaust Gas Flowrate	ft3/min	250	250

Total Emission Summary

Owner/Operator: Devon Energy
Facility: Crosby Chase

Emission Source	# Units		NOx		CO		VOC		PM		SO2		H2S		Total HAPS		CO2		Methane	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Flare	1	All	5.443	23.842	12.230	53.570	16.560	63.742			0.000	0.000	0.000	0.000	0.567	2.271	0.519	2.148	14.692	63.611
Fugitive	1	All					1.968	8.618					0.000	0.000	0.069	0.303	0.230	1.008	0.139	0.607
Heater Treater 1	1	All	0.061	0.268	0.051	0.226	0.003	0.015	0.005	0.020	0.000	0.001	0.000	0.000	0.001	0.005	73.550	322.151	0.001	0.006
Heater Treater 2	1	All	0.398	1.745	0.335	1.466	0.022	0.096	0.030	0.133	0.002	0.008	0.000	0.000	0.007	0.033	478.077	2093.979	0.009	0.040
Engine 1	1	All	0.591	2.588	1.182	5.176	0.468	2.051	0.044	0.191	0.001	0.006			0.066	0.290	257.950	1129.821	0.539	2.362
Engine 2	1	All	0.591	2.588	1.182	5.176	0.468	2.051	0.044	0.191	0.001	0.006			0.066	0.290	257.950	1129.821	0.539	2.362
Oil/Cond Tank	8	Process Train 1					0.000	0.000					0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water Tank	4	Process Train 1					0.000	0.000					0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Oil/Cond Loadout	8	Process Train 1					18.794	5.191					0.000	0.000	0.538	0.148	0.221	0.061	2.146	0.593
Water Loadout	4	Process Train 1					0.422	0.127					0.000	0.000	0.153	0.046	0.019	0.006	1.206	0.362
Oil/Cond Tank	2	Process Train 2					0.000	0.000					0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water Tank	1	Process Train 2					0.000	0.000					0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Oil/Cond Loadout	2	Process Train 2					25.883	2.094					0.000	0.000	0.540	0.044	0.406	0.033	1.637	0.132
Water Loadout	1	Process Train 2					0.982	0.074					0.000	0.000	0.148	0.011	0.005	0.000	0.404	0.031
Sum			7.085	31.031	14.980	65.612	65.570	84.058	0.122	0.535	0.005	0.022	0.000	0.000	2.155	3.442	1068.928	4679.028	21.314	70.107

Emission Source	# Units		Formaldehyde		Acetaldehyde		Acrolein		Benzene		Toluene		Xylene		Ethyl-benzene		n-Hexane	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Flare	1	All							0.032	0.125	0.027	0.110	0.021	0.089	0.006	0.023	0.481	1.922
Fugitive	1	All							0.003	0.012	0.005	0.024	0.012	0.051	0.003	0.012	0.047	0.205
Heater Treater 1	1	All	0.000	0.000					0.000	0.000	0.000	0.000					0.001	0.005
Heater Treater 2	1	All	0.000	0.001					0.000	0.000	0.000	0.000					0.007	0.031
Engine 1	1	All	0.048	0.211	0.007	0.029	0.006	0.027	0.004	0.016	0.001	0.006	0.000	0.002	0.000	0.000	0.000	0.000
Engine 2	1	All	0.048	0.211	0.007	0.029	0.006	0.027	0.004	0.016	0.001	0.006	0.000	0.002	0.000	0.000	0.000	0.000
Oil/Cond Tank	8	Process Train 1							0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water Tank	4	Process Train 1							0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Oil/Cond Loadout	8	Process Train 1							0.032	0.009	0.021	0.006	0.012	0.003	0.003	0.001	0.469	0.130
Water Loadout	4	Process Train 1							0.057	0.017	0.051	0.015	0.037	0.011	0.008	0.002	0.000	0.000
Oil/Cond Tank	2	Process Train 2							0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water Tank	1	Process Train 2							0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Oil/Cond Loadout	2	Process Train 2							0.033	0.003	0.020	0.002	0.012	0.001	0.003	0.000	0.472	0.038
Water Loadout	1	Process Train 2							0.058	0.004	0.048	0.004	0.033	0.002	0.007	0.001	0.003	0.000
Sum			0.096	0.423	0.013	0.057	0.012	0.054	0.222	0.203	0.175	0.172	0.127	0.162	0.029	0.040	1.480	2.332

The condensate tank, water tank, condensate loadout, water loadout, flare, fugitive, heater treater, and engine emission calculations were performed by Devon Energy Production Company, L.P. using a ProMax simulation.

Flare

Owner/Operator: Devon Energy
Facility: Crosby Chase

Equipment Specifications:

# of Flares/ Combustors	4	Flare 1	Flare 2	Flare 3	Flare 4
MF Capacity	mscfd	140	140	140	140
Annual Heat Rating	mmbtuh	39.45			
Design Heat Rating	mmbtuh	7.53	7.53	7.53	7.53
Control Efficiency		98%	98%	98%	98%
Stack Height	ft	30	30	30	30
Stack Diameter	ft	4	4	4	4
Exit Temperature	F	250	250	250	250
Exhaust Gas Flowrate	ft3/min	250	250	250	250

Emission Factors:

Per TCEQ Memorandum - 2/13/1995, (BTU/SCF)(MSCF/D)*(1000 SCF/MSCF)*(1 D/24HR)*(1 MMBTU/ 10^6 BTU)*(LB/BTU)

	LB/MMBTU	
Pollutant	>1000 BTU/SCF	192-1000 BTU/SCF
NOX	0.138	0.068
CO	0.31	0.5496

*The more conservative (higher) lb/MMBtu factor is selected from between the TCEQ guidance and AP-42 Ch. 13
*Per TCEQ Guidance: Technical Supplement 4 - Flares and EPA AP-42 - Ch 13, Table 13.5.1
*Per TCEQ Guidance: Technical Supplement 4 - Flares and EPA AP-42 - Ch 13, Table 13.5.2

		Daily (MSCFD)	Hourly (Mscf/hr)	Annual (Mscf/yr)	Percent to Flare	Control Efficiency	Corrected Gas to Flare (MSCF/yr)	Heating Value (Btu/ft^3)	Emissions													
									NOX		CO		VOC		SO2		H2S		Total HAP		CO2		Methane	
									lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Pilot Light		3.12	0.13	1138.80	100.00%	98.00%	1138.80	1275.36	0.023	0.100	0.051	0.225	0.059	0.259	0.000	0.000	0.000	0.000	0.002	0.009	0.000	0.001	0.008	0.036
1st Stage Sep	**Process Train 1**	2174.99	90.62	793871.70	25.00%	98.00%	198467.92	1275.36	3.987	17.465	8.957	39.233	10.321	45.205	0.000	0.000	0.000	0.000	0.366	1.602	0.360	1.575	10.951	47.967
ULPS	**Process Train 1**	54.07	2.25	19735.47	0.00%	98.00%	0.00	2218.47	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Oil/Cond Tanks	**Process Train 1**	2.06	0.09	752.45	100.00%	98.00%	752.45	2172.88	0.026	0.113	0.058	0.253	0.971	0.654	0.000	0.000	0.000	0.000	0.028	0.021	0.011	0.007	0.110	0.071
Water Tanks	**Process Train 1**	0.15	0.01	56.43	100.00%	98.00%	56.43	978.64	0.000	0.002	0.003	0.015	0.010	0.042	0.000	0.000	0.000	0.000	0.001	0.005	0.007	0.031	0.015	0.065
1st Stage Sep	**Process Train 2**	565.50	23.56	206405.91	30.00%	98.00%	61921.77	1273.70	1.242	5.442	2.791	12.225	3.204	14.035	0.000	0.000	0.000	0.000	0.116	0.507	0.112	0.492	3.423	14.994
HT	**Process Train 2**	10.10	0.42	3686.23	100.00%	98.00%	3686.23	1813.52	0.105	0.461	0.237	1.036	0.478	2.094	0.000	0.000	0.000	0.000	0.017	0.076	0.007	0.029	0.096	0.420
Oil/Cond Tanks	**Process Train 2**	4.45	0.19	1623.29	100.00%	98.00%	1623.29	2298.96	0.059	0.257	0.132	0.578	1.516	1.446	0.000	0.000	0.000	0.000	0.036	0.051	0.021	0.010	0.088	0.057
Water Tanks	**Process Train 2**	0.03	0.00	12.26	100.00%	98.00%	12.26	1593.45	0.000	0.001	0.001	0.003	0.002	0.008	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.000	0.002
Total							267659.15		5.443	23.842	12.230	53.570	16.560	63.742	0.000	0.000	0.000	0.000	0.567	2.271	0.519	2.148	14.692	63.611
	Weighted Average							1291.07																

		Daily (MSCFD)	Hourly (Mscf/hr)	Annual (Mscf/yr)	Percent to Flare	Control Efficiency	Corrected Gas to Flare (MSCF/yr)	Heating Value (Btu/ft^3)	Emissions									
									Benzene		Toluene		Xylene		Ethyl-benzene		n-Hexane	
									lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Pilot Light		3.12	0.13	1138.80	100.00%	98.00%	1138.80	1275.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.008
1st Stage Sep	**Process Train 1**	2174.99	90.62	793871.70	25.00%	98.00%	198467.92	1275.36	0.020	0.087	0.018	0.077	0.015	0.064	0.004	0.017	0.310	1.357
ULPS	**Process Train 1**	54.07	2.25	19735.47	0.00%	98.00%	0.00	2218.47	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Oil/Cond Tanks	**Process Train 1**	2.06	0.09	752.45	100.00%	98.00%	752.45	2172.88	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.025	0.018
Water Tanks	**Process Train 1**	0.15	0.01	56.43	100.00%	98.00%	56.43	978.64	0.000	0.002	0.000	0.002	0.000	0.001	0.000	0.000	0.000	0.000
1st Stage Sep	**Process Train 2**	565.50	23.56	206405.91	30.00%	98.00%	61921.77	1273.70	0.006	0.028	0.006	0.024	0.005	0.020	0.001	0.005	0.098	0.430
HT	**Process Train 2**	10.10	0.42	3686.23	100.00%	98.00%	3686.23	1813.52	0.001	0.004	0.001	0.003	0.001	0.002	0.000	0.001	0.015	0.065
Oil/Cond Tanks	**Process Train 2**	4.45	0.19	1623.29	100.00%	98.00%	1623.29	2298.96	0.002	0.003	0.001	0.002	0.001	0.001	0.000	0.000	0.032	0.044
Water Tanks	**Process Train 2**	0.03	0.00	12.26	100.00%	98.00%	12.26	1593.45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total							267659.15		0.032	0.125	0.027	0.110	0.021	0.089	0.006	0.023	0.481	1.922
	Weighted Average							1291.07										

*98% Control Efficiency, 100% Conversion of combusted H2S to SO2 assumed
* Heating values are from Promax streams

Heater Treaters

Owner/Operator: Devon Energy
Facility: Crosby Chase

Equipment Specifications:

# of Heaters	2	Heater 1	Heater 2
Design Heat Rating	mmbtuh	0.50	3.25
Stack Height	ft	20	20
Stack Diameter	ft	1	1
Exit Temperature	F	250	250
Exhaust Gas Flowrate	ft3/min	250	250

Emission Factors:

Pollutant	Emission Factors[a] (lb/MMSCF)	Adjusted Factors[b] (lb/MMSCF)
NOx (a)	100.00	125.036
CO (a)	84.00	105.030
VOC (a)	5.50	6.877
SO2 (c)	0.60	0.600
H2S (c)	0.00	0.000
PM/PM_{10} (a)	7.60	9.503
CO2	120000.00	150042.748
Methane	2.30	2.876
Formaldehyde (d)	0.075	0.094
Benzene (d)	0.002	0.003
Toluene (d)	0.003	0.004
Hexane (d)	1.800	2.251

[a] Criteria Pollutant Emission Factors obtained from AP-42 Nat Gas Combustion, Table 1.4-1, (7/98) < 100 MMBtu/hr heat input; & Table 1.4-2, (7/98).
[b] As per EPA AP-42 Emission Factor Adjusted for Fuel Gas Heating Value
[c] As per EPA AP-42 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion, Table 1.4-2
[d] As per EPA AP-42 Emission Factors for Speciated Organic Compounds from Natural Gas Combustion

SO2 Emission Factor:	mol H2S in feed gas	Molecular Weight SO2	Combustion Efficiency	Calculated EF
*Assumes ideal gas law:	fractional	lb/lbmol	fractional	lb/MMSCF
379 scf/lbmol	0	64.066	0.98	0

Calculation Method: (1/379)(lbmol/scf)(10^6 SCF/MMSCF)(Combustion Efficiency)(Mol fraction H2S)(64.066 lb/lbmol SO2) = lb/MMSCF
1. H2S emissions are calculated in the same manner, except using the bypass fraction instead of combustion efficiency and the molecular weight of H2S (34.081 lb/lbmol)
2. If the calculated SO2 EF is less than 0.6 lb/MMSCF (per AP-42 table 1.4-2), the EF is conservatively set at 0.6 lb/MMSCF

	Heat Rating (mmbtuh)	Run Hours	Heating Value (Btu/ft^3)	Emissions																	
				NO_x		CO		VOC		SO2		H2S		PM		Total HAP		CO2		Methane	
				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Heater 1	0.50	8760.0	1275.4	0.061	0.268	0.051	0.226	0.003	0.015	0.000	0.001	0.000	0.000	0.005	0.020	0.001	0.005	73.550	322.151	0.001	0.006
Heater 2	3.25	8760.0	1275.4	0.398	1.745	0.335	1.466	0.022	0.096	0.002	0.008	0.000	0.000	0.030	0.133	0.007	0.033	478.077	2093.979	0.009	0.040

	Heat Rating (mmbtuh)	Run Hours	Heating Value (Btu/ft^3)	Emissions							
				Formaldehyde		Benzene		Toluene		n-Hexane	
				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Heater 1	0.50	8760.0	1275.4	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005
Heater 2	3.25	8760.0	1275.4	0.000	0.001	0.000	0.000	0.000	0.000	0.007	0.031

Fugitives

Owner/Operator: **Devon Energy**
Facility: **Crosby Chase**

Component Count:
Liquid Stream Compositions ND - Crosby Chase First Stage Separator Liquid
Gas Stream Compositions ND - Crosby Chase First Stage Separator Gas
Equipment Count Method Used Count 1
Run Hours 8760

Gas Service

Component	Count	Emission Factor[a] (lb/hr/component)	Emissions	
			lb/hr	tpy
Valve	140	0.00992	1.389	6.083
Flanges	222	0.00086	0.191	0.836
Pump	0	0.00529	0.000	0.000
Compressor Seal	8	0.01940	0.155	0.680
Relief Valve	34	0.01940	0.660	2.889
Open-Ended Line	1	0.00441	0.004	0.019
Connectors	429	0.00044	0.189	0.827
Other	0	0.01940	0.000	0.000
Total			**2.588**	**11.334**

Component	wt fraction	lb/hr	tpy
Total VOC	3.33E-01	0.863	3.779
Hydrogen Sulfide	0.00E+00	0.000	0.000
CO2	1.21E-02	0.040	0.176
Methane	3.62E-01	0.027	0.117
Total HAP	5.18E-03	0.013	0.059
Benzene	0.00E+00	0.000	0.000
Toluene	0.00E+00	0.000	0.000
E-Benzene	0.00E+00	0.000	0.000
Xylenes	0.00E+00	0.000	0.000
N-Hexane	5.18E-03	0.013	0.059
2,2,4 Trimethylpentane	0.00E+00	0.000	0.000

Light Oil > 20° API

Component	Count	Emission Factor[a] (lb/hr/component)	Emissions	
			lb/hr	tpy
Valve	109	0.0055	0.600	2.626
Flanges	255	0.0002	0.061	0.268
Pump	4	0.0287	0.115	0.502
Compressor Seal	0	0.0165	0.000	0.000
Relief Valve	10	0.0165	0.165	0.723
Open-Ended Line	10	0.0031	0.031	0.135
Connectors	292	0.0005	0.134	0.588
Other	0	0.0165	0.000	0.000
Total			**1.106**	**4.842**

Component	wt fraction	lb/hr	tpy
Total VOC	9.99E-01	1.105	4.840
Hydrogen Sulfide	0.00E+00	0.000	0.000
CO2	0.00E+00	0.190	0.832
Methane	1.09E-05	0.112	0.489
Total HAP	5.05E-02	0.056	0.245
Benzene	2.47E-03	0.003	0.012
Toluene	4.90E-03	0.005	0.024
E-Benzene	2.43E-03	0.003	0.012
Xylenes	1.05E-02	0.012	0.051
N-Hexane	3.02E-02	0.033	0.146
2,2,4 Trimethylpentane	0.00E+00	0.000	0.000

Fugitives

Owner/Operator: Devon Energy
Facility: Crosby Chase

Water/Light Oil Service

Component	Count	Emission Factor[a] (lb/hr/component)	Emissions	
			lb/hr	tpy
Valve	65	0.0002	0.014	0.061
Flanges	125	6.17E-06	0.001	0.003
Pump	5	0.0001	0.000	0.001
Compressor Seal	0	0.0309	0.000	0.000
Relief Valve	5	0.0309	0.155	0.677
Open-Ended Line	5	0.0006	0.003	0.013
Connectors	140	0.0002	0.034	0.149
Other	0	0.0309	0.000	0.000
Total			**0.207**	**0.905**

Component	wt fraction	lb/hr	tpy
Total VOC	7.74E-05	0.000	0.000
Hydrogen Sulfide	0.00E+00	0.000	0.000
CO2	5.08E-05	0.000	0.000
Methane	3.82E-07	0.000	0.000
Total HAP	2.11E-05	0.000	0.000
Benzene	9.55E-06	0.000	0.000
Toluene	6.39E-06	0.000	0.000
E-Benzene	9.70E-07	0.000	0.000
Xylenes	3.85E-06	0.000	0.000
N-Hexane	3.82E-07	0.000	0.000
2,2,4 Trimethylpentane	0.00E+00	0.000	0.000

Fugitive Emissions Summary

Component		lb/hr	tpy
Total VOC		1.968	8.618
Hydrogen Sulfide		0.000	0.000
CO2		0.230	1.008
Methane		0.139	0.607
Total HAP		0.069	0.303
Benzene		0.003	0.012
Toluene		0.005	0.024
E-Benzene		0.003	0.012
Xylenes		0.012	0.051
N-Hexane		0.047	0.205
2,2,4 Trimethylpentane		0.000	0.000

[a] Per TCEQ Fugitive Guidance for Oil/Gas Production Operations, (lb/hr/component)(hr/yr)(1 ton/200(

Oil/Condensate Tank Emissions

Owner/Operator: Devon Energy
Facility: Crosby Chase

Throughput (bbl/hr)	18.92
Throughput (bbl/day)	454.00
Throughput (bbl/yr)	165,710.00
# Tanks	8.00
Controls	Flare
Control Efficiency	98%
Capture Efficiency	100%
Meteorological Data	Williston, ND
Run Hours	8760
VRU Capture	0%

Flashing Emissions

Pollutant	Emission Factors[a]		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.014	0.077	1.453	6.364	0.796	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.000	0.000	0.009	0.040	0.005	0.000	0.000	0.000
Methane	0.001	0.007	0.129	0.563	0.070	0.000	0.000	0.000
Total HAP	0.001	0.003	0.066	0.290	0.036	0.000	0.000	0.000
Benzene	0.000	0.000	0.004	0.016	0.002	0.000	0.000	0.000
Toluene	0.000	0.000	0.003	0.013	0.002	0.000	0.000	0.000
Xylene	0.000	0.000	0.002	0.009	0.001	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.001	0.002	0.000	0.000	0.000	0.000
n-Hexane	0.001	0.003	0.057	0.248	0.031	0.000	0.000	0.000

Working/Standing

Pollutant	Emission Factors[b]		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.031	0.172	3.246	14.217	1.777	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.000	0.002	0.038	0.167	0.021	0.000	0.000	0.000
Methane	0.004	0.020	0.371	1.623	0.203	0.000	0.000	0.000
Total HAP	0.001	0.005	0.093	0.407	0.051	0.000	0.000	0.000
Benzene	0.000	0.000	0.006	0.024	0.003	0.000	0.000	0.000
Toluene	0.000	0.000	0.004	0.016	0.002	0.000	0.000	0.000
Xylene	0.000	0.000	0.002	0.009	0.001	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.001	0.002	0.000	0.000	0.000	0.000
n-Hexane	0.001	0.004	0.081	0.355	0.044	0.000	0.000	0.000

Vapor Balance Emissions

Pollutant	Emission Factors		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr (95°F)	ton/yr	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.027	0.146	43.852	12.111	1.514	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.000	0.002	0.515	0.142	0.018	0.000	0.000	0.000
Methane	0.003	0.017	5.007	1.383	0.173	0.000	0.000	0.000
Total HAP	0.001	0.004	1.254	0.346	0.043	0.000	0.000	0.000
Benzene	0.000	0.000	0.075	0.021	0.003	0.000	0.000	0.000
Toluene	0.000	0.000	0.049	0.014	0.002	0.000	0.000	0.000
Xylene	0.000	0.000	0.028	0.008	0.001	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.007	0.002	0.000	0.000	0.000	0.000
n-Hexane	0.001	0.004	1.095	0.302	0.000	0.000	0.000	0.000

Total Emissions

Pollutant	Emission Factors		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.072	0.395	48.551	32.693	4.087	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.001	0.004	0.563	0.349	0.044	0.000	0.000	0.000
Methane	0.008	0.043	5.506	3.570	0.446	0.000	0.000	0.000
Total HAP	0.002	0.013	1.413	1.043	0.130	0.000	0.000	0.000
Benzene	0.000	0.001	0.084	0.061	0.008	0.000	0.000	0.000
Toluene	0.000	0.001	0.056	0.043	0.005	0.000	0.000	0.000
Xylene	0.000	0.000	0.032	0.026	0.003	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.009	0.007	0.001	0.000	0.000	0.000
n-Hexane	0.002	0.011	1.233	0.906	0.113	0.000	0.000	0.000

[a] ProMax Oil Tk Gas Stream
[b] Promax W & S Stream

Oil/Condensate Tank Emissions

Owner/Operator: Devon Energy
Facility: Crosby Chase

Throughput (bbl/hr)	5.67
Throughput (bbl/day)	136.00
Throughput (bbl/yr)	49,640.00
# Tanks	2.00
Controls	Flare
Control Efficiency	98%
Capture Efficiency	100%
Meteorological Data	Williston, ND
Run Hours	8760
VRU Capture	0%

Flashing Emissions

Pollutant	Emission Factors[a]		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.427	2.340	13.258	58.069	29.035	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.002	0.011	0.061	0.267	0.134	0.000	0.000	0.000
Methane	0.014	0.079	0.447	1.959	0.979	0.000	0.000	0.000
Total HAP	0.016	0.090	0.509	2.231	1.116	0.000	0.000	0.000
Benzene	0.001	0.005	0.029	0.129	0.065	0.000	0.000	0.000
Toluene	0.001	0.004	0.022	0.098	0.049	0.000	0.000	0.000
Xylene	0.000	0.003	0.015	0.067	0.034	0.000	0.000	0.000
Ethyl-benzene	0.000	0.001	0.004	0.018	0.009	0.000	0.000	0.000
n-Hexane	0.014	0.077	0.438	1.920	0.960	0.000	0.000	0.000

Working/Standing

Pollutant	Emission Factors[b]		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.069	0.377	2.135	9.352	4.676	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.001	0.006	0.033	0.147	0.073	0.000	0.000	0.000
Methane	0.004	0.024	0.135	0.592	0.296	0.000	0.000	0.000
Total HAP	0.001	0.008	0.045	0.195	0.097	0.000	0.000	0.000
Benzene	0.000	0.000	0.003	0.012	0.006	0.000	0.000	0.000
Toluene	0.000	0.000	0.002	0.007	0.004	0.000	0.000	0.000
Xylene	0.000	0.000	0.001	0.004	0.002	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000
n-Hexane	0.001	0.007	0.039	0.170	0.085	0.000	0.000	0.000

Vapor Balance Emissions

Pollutant	Emission Factors		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr (95°F)	ton/yr	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.036	0.197	60.394	4.887	2.443	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.001	0.003	0.947	0.077	0.038	0.000	0.000	0.000
Methane	0.002	0.012	3.821	0.309	0.155	0.000	0.000	0.000
Total HAP	0.001	0.004	1.259	0.102	0.051	0.000	0.000	0.000
Benzene	0.000	0.000	0.077	0.006	0.003	0.000	0.000	0.000
Toluene	0.000	0.000	0.048	0.004	0.002	0.000	0.000	0.000
Xylene	0.000	0.000	0.027	0.002	0.001	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.007	0.001	0.000	0.000	0.000	0.000
n-Hexane	0.001	0.004	1.101	0.089	0.000	0.000	0.000	0.000

Total Emissions

Pollutant	Emission Factors		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.532	2.913	75.786	72.307	36.154	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.004	0.020	1.041	0.490	0.245	0.000	0.000	0.000
Methane	0.021	0.115	4.403	2.859	1.430	0.000	0.000	0.000
Total HAP	0.019	0.102	1.813	2.528	1.264	0.000	0.000	0.000
Benzene	0.001	0.006	0.109	0.147	0.074	0.000	0.000	0.000
Toluene	0.001	0.004	0.072	0.109	0.055	0.000	0.000	0.000
Xylene	0.001	0.003	0.043	0.073	0.037	0.000	0.000	0.000
Ethyl-benzene	0.000	0.001	0.012	0.019	0.010	0.000	0.000	0.000
n-Hexane	0.016	0.088	1.578	2.179	1.090	0.000	0.000	0.000

[a] ProMax Oil Tk Gas Stream
[b] Promax W & S Stream

Water Tank Emissions

Owner/Operator: Devon Energy
Facility: Crosby Chase

Throughput (bbl/hr)	20.54
Throughput (bbl/day)	493.00
Throughput (bbl/yr)	179,945.00
# Tanks	4.00
Controls	Flare
Control Efficiency	98%
Capture Efficiency	100%
Meteorological Data	Williston, ND
Run Hours	8760
VRU Capture	0%

Flashing Emissions

Pollutant	Emission Factors[a]		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.004	0.020	0.406	1.780	0.445	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.001	0.008	0.157	0.688	0.172	0.000	0.000	0.000
Methane	0.006	0.033	0.669	2.928	0.732	0.000	0.000	0.000
Total HAP	0.000	0.001	0.030	0.132	0.033	0.000	0.000	0.000
Benzene	0.000	0.001	0.011	0.047	0.012	0.000	0.000	0.000
Toluene	0.000	0.000	0.009	0.038	0.010	0.000	0.000	0.000
Xylene	0.000	0.000	0.006	0.028	0.007	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.002	0.007	0.002	0.000	0.000	0.000
n-Hexane	0.000	0.000	0.003	0.012	0.003	0.000	0.000	0.000

Working/Standing

Pollutant	Emission Factors[b]		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.001	0.003	0.070	0.308	0.077	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.002	0.010	0.201	0.882	0.220	0.000	0.000	0.000
Methane	0.001	0.003	0.072	0.314	0.079	0.000	0.000	0.000
Total HAP	0.000	0.001	0.025	0.112	0.028	0.000	0.000	0.000
Benzene	0.000	0.000	0.009	0.042	0.010	0.000	0.000	0.000
Toluene	0.000	0.000	0.008	0.037	0.009	0.000	0.000	0.000
Xylene	0.000	0.000	0.006	0.027	0.007	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.001	0.006	0.001	0.000	0.000	0.000
n-Hexane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Total Emissions

Pollutant	Emission Factors		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.004	0.023	0.477	2.089	0.522	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.003	0.017	0.359	1.570	0.393	0.000	0.000	0.000
Methane	0.007	0.036	0.740	3.243	0.811	0.000	0.000	0.000
Total HAP	0.000	0.003	0.056	0.244	0.061	0.000	0.000	0.000
Benzene	0.000	0.001	0.020	0.089	0.022	0.000	0.000	0.000
Toluene	0.000	0.001	0.017	0.076	0.019	0.000	0.000	0.000
Xylene	0.000	0.001	0.013	0.055	0.014	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.003	0.013	0.003	0.000	0.000	0.000
n-Hexane	0.000	0.000	0.003	0.012	0.003	0.000	0.000	0.000

[a] ProMax Water Tank Gas Stream
[b] ProMax Water W & S Gas Stream

Water Tank Emissions

Owner/Operator:	**Devon Energy**
Facility:	**Crosby Chase**
Throughput (bbl/hr)	5.17
Throughput (bbl/day)	124.00
Throughput (bbl/yr)	45,260.00
# Tanks	1.00
Controls	Flare
Control Efficiency	98%
Capture Efficiency	100%
Meteorological Data	Williston, ND
Run Hours	8760
VRU Capture	0%

Flashing Emissions

Pollutant	Emission Factors[a]		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.002	0.009	0.046	0.203	0.203	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.000	0.000	0.002	0.008	0.008	0.000	0.000	0.000
Methane	0.000	0.002	0.012	0.052	0.052	0.000	0.000	0.000
Total HAP	0.000	0.000	0.001	0.005	0.005	0.000	0.000	0.000
Benzene	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000
Toluene	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000
Xylene	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
n-Hexane	0.000	0.000	0.000	0.002	0.002	0.000	0.000	0.000

Working/Standing

Pollutant	Emission Factors[b]		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.001	0.008	0.041	0.181	0.181	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.001	0.003	0.017	0.075	0.075	0.000	0.000	0.000
Methane	0.000	0.002	0.010	0.043	0.043	0.000	0.000	0.000
Total HAP	0.000	0.001	0.006	0.027	0.027	0.000	0.000	0.000
Benzene	0.000	0.000	0.002	0.011	0.011	0.000	0.000	0.000
Toluene	0.000	0.000	0.002	0.009	0.009	0.000	0.000	0.000
Xylene	0.000	0.000	0.001	0.006	0.006	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000
n-Hexane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Total Emissions

Pollutant	Emission Factors		Emissions					
			Uncontrolled			Controlled		
	tpy/bopd	lb/bbl	lb/hr	tpy	tpy/tank	lb/hr	tpy	tpy/tank
VOC	0.003	0.017	0.088	0.384	0.384	0.000	0.000	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO2	0.001	0.004	0.019	0.083	0.083	0.000	0.000	0.000
Methane	0.001	0.004	0.022	0.095	0.095	0.000	0.000	0.000
Total HAP	0.000	0.001	0.007	0.032	0.032	0.000	0.000	0.000
Benzene	0.000	0.001	0.003	0.012	0.012	0.000	0.000	0.000
Toluene	0.000	0.000	0.002	0.010	0.010	0.000	0.000	0.000
Xylene	0.000	0.000	0.002	0.007	0.007	0.000	0.000	0.000
Ethyl-benzene	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000
n-Hexane	0.000	0.000	0.001	0.002	0.002	0.000	0.000	0.000

[a] ProMax Water Tank Gas Stream
[b] ProMax Water W & S Gas Stream

Loading Emissions

Owner/Operator: Devon Energy
Facility: Crosby Chase

Oil/Condensate Loading	Hourly		Annual	
Throughput (bbl/hr)	300.00		-	*Amount of liquids that can be loading in one hour
Throughput (bbl/day)	454.00		454.00	
Run Hours		8760		
Throughput (bbl/yr)	-		165,710.00	
Saturation Factor, S		1.00		*Per AP-42 Table 5.2-1, Saturation Factors
Average Surface Temperature, (^{o}F)	46.25		46.25	
Temperature, T (R)	506.2		506.2	
TVP, (psia)	8.83		8.83	*Promax Oil Losses Stencil
Vapor MW, M (lb/lbmol)	34.94		34.94	*Promax Oil Losses Stencil
L_L, lb/1000 gal	7.595		7.595	*Per AP-42 5.2.2.1.1 - LL = 12.46*SPM/T
VOC wt%		65.46%		
H2S wt%		0.00%		
CO2 wt%		0.77%		
Methane wt%		7.47%		
Total HAP wt%		1.87%		
Benzene wt%		0.11%		
Toleune wt%		0.07%		
Xylene wt%		0.04%		
Ethyl-Benzene wt%		0.01%		
n-Hexane wt%		1.63%		
Oil to Pipeline		N		
% Oil to Pipeline		0%		
Controls		Vapor Balancing		
Capture Efficiency, eff		70%		

Pollutant	Emission Factors	Emissions	
		Uncontrolled	
	lb/bbl	lb/hr (95^{o}F)	ton/yr
VOC	0.063	18.794	5.191
H2S	0.000	0.000	0.000
CO2	0.001	0.221	0.061
Methane	0.007	2.146	0.593
Total HAP	0.002	0.538	0.148
Benzene	0.000	0.032	0.009
Toluene	0.000	0.021	0.006
Xylene	0.000	0.012	0.003
Ethyl-benzene	0.000	0.003	0.001
n-Hexane	0.002	0.469	0.130

Water Loading	Hourly		Annual	
Throughput (bbl/hr)	300.00		-	
Throughput (bbl/day)	493.00		493.00	
Run Hours		8760		
Throughput (bbl/yr)	-		179,945.00	
Saturation Factor, S		0.6		*Per AP-42 Table 5.2-1, Saturation Factors
Average Surface Temperature, (^{o}F)	46.25		46.25	*Promax Water Losses Stencil
Temperature, T (R)	506.2		506.2	
TVP, (psia)	12.56		12.56	*Promax Water Losses Stencil
Vapor MW, M (lb/lbmol)	23.59		23.59	
L_L, lb/1000 gal	4.375		4.375	*Per AP-41 5.2.2.1.1 - LL = 12.46*SPM/T*wt% VOC
VOC wt%		14.22%		
H2S wt%		0.00%		
CO2 wt%		40.66%		
Methane wt%		14.50%		
Total HAP wt%		5.15%		
Benzene wt%		1.91%		
Toleune wt%		1.71%		
Xylene wt%		1.25%		
Ethyl-Benzene wt%		0.25%		
n-Hexane wt%		0.01%		
Water to Pipeline		N		
% Water to Pipeline		0%		

Pollutant	Emission Factors	Emissions	
		Uncontrolled	
	lb/bbl	lb/hr (95^{o}F)	ton/yr
VOC	0.001	0.422	0.127
H2S	0.000	0.000	0.000
CO2	0.000	0.019	0.006
Methane	0.004	1.206	0.362
Total HAP	0.001	0.153	0.046
Benzene	0.000	0.057	0.017
Toluene	0.000	0.051	0.015
Xylene	0.000	0.037	0.011
Ethyl-benzene	0.000	0.008	0.002
n-Hexane	0.000	0.000	0.000

Loading Emissions

Owner/Operator: Devon Energy
Facility: Crosby Chase

Oil/Condensate Loading	Hourly		Annual	
Throughput (bbl/hr)	300.00		-	*Amount of liquids that can be loading in one hour
Throughput (bbl/day)	136.00		136.00	
Run Hours		8760		
Throughput (bbl/yr)	-		49,640.00	
Saturation Factor, S		1.00		*Per AP-42 Table 5.2-1, Saturation Factors
Average Surface Temperature, (^{o}F)	46.25		46.25	
Temperature, T (R)	506.2		506.2	
TVP, (psia)	12.42		12.42	*Promax Oil Losses Stencil
Vapor MW, M (lb/lbmol)	35.73		34.94	*Promax Oil Losses Stencil
L_L, lb/1000 gal	10.924		10.683	*Per AP-42 5.2.2.1.1 - LL = 12.46*SPM/T
VOC wt%		62.68%		
H2S wt%		0.00%		
CO2 wt%		0.98%		
Methane wt%		3.97%		
Total HAP wt%		1.31%		
Benzene wt%		0.08%		
Toleune wt%		0.05%		
Xylene wt%		0.03%		
Ethyl-Benzene wt%		0.01%		
n-Hexane wt%		1.14%		
Oil to Pipeline		N		
% Oil to Pipeline		0%		
Controls		Vapor Balancing		
Capture Efficiency, eff		70%		

Pollutant	Emission Factors	Emissions	
		Uncontrolled	
	lb/bbl	lb/hr (95^{o}F)	ton/yr
VOC	0.084	25.883	2.094
H2S	0.000	0.000	0.000
CO2	0.001	0.406	0.033
Methane	0.005	1.637	0.132
Total HAP	0.002	0.540	0.044
Benzene	0.000	0.033	0.003
Toluene	0.000	0.020	0.002
Xylene	0.000	0.012	0.001
Ethyl-benzene	0.000	0.003	0.000
n-Hexane	0.002	0.472	0.038

Water Loading	Hourly		Annual	
Throughput (bbl/hr)	300.00		-	
Throughput (bbl/day)	124.00		124.00	
Run Hours		8760		
Throughput (bbl/yr)	-		45,260.00	
Saturation Factor, S		0.6		*Per AP-42 Table 5.2-1, Saturation Factors
Average Surface Temperature, (^{o}F)	46.25		46.25	*Promax Water Losses Stencil
Temperature, T (R)	506.2		506.2	
TVP, (psia)	12.33		12.33	*Promax Water Losses Stencil
Vapor MW, M (lb/lbmol)	32.47		23.59	
L_L, lb/1000 gal	5.915		4.297	*Per AP-41 5.2.2.1.1 - LL = 12.46*SPM/T*wt% VOC
VOC wt%		36.27%		
H2S wt%		0.00%		
CO2 wt%		14.94%		
Methane wt%		8.53%		
Total HAP wt%		5.49%		
Benzene wt%		2.16%		
Toleune wt%		1.76%		
Xylene wt%		1.21%		
Ethyl-Benzene wt%		0.26%		
n-Hexane wt%		0.09%		
Water to Pipeline		N		
% Water to Pipeline		0%		

Pollutant	Emission Factors	Emissions	
		Uncontrolled	
	lb/bbl	lb/hr (95^{o}F)	ton/yr
VOC	0.003	0.982	0.074
H2S	0.000	0.000	0.000
CO2	0.000	0.005	0.000
Methane	0.001	0.404	0.031
Total HAP	0.000	0.148	0.011
Benzene	0.000	0.058	0.004
Toluene	0.000	0.048	0.004
Xylene	0.000	0.033	0.002
Ethyl-benzene	0.000	0.007	0.001
n-Hexane	0.000	0.003	0.000

Engine 1

Owner/Operator:	**Devon Energy**
Facility:	**Crosby Chase**
Make/Model:	Doosan 11.1L
Manufactured Date:	11/1/2019
Serial Number:	EEIOH908942
Emission Factors (Uncontrolled):	AP-42
Emission Factors (Controlled):	Quad J
Engine Make/Model:	Doosan 11.1L
Max HP, 100% Load:	268
Annual Run Time, hrs	8760
Design Class:	4-Stroke Rich Burn
Fuel Type:	Natural Gas
Ignition Type:	Spark
Fuel Consumption, Btu/bhp*hr	8750
Fuel Consumption, MMBtu/hr	2.35
Gas Heating Value, Btu/scf	1275.36
Stack Height (ft)	6.33
Stack Diameter (ft)	0.17
Exit Temperature (^{o}F)	1391.00
Exhaust Gas Flowrate (ft^{3}/min)	1160.00
Exhaust Velocity (ft/s)	851.76

*ND - Crosby Chase First Stage Separator Gas

Engine Controls

Controls?	Y
Control Type	AFR/CC
Control Efficiency	0

Engine 1 Emission Calculations

Pollutant	Uncontrolled Emissions				
	Emission Factors				
	EF	Units	Reference	lb/hr	ton/yr
NO_X	2.21	(lb/MMBtu)	AP-42	5.182	22.699
VOC	0.0296	(lb/MMBtu)	AP-42	0.124	0.543
CO	3.72	(lb/MMBtu)	AP-42	8.723	38.208
PM_{10}	0.0186	(lb/MMBtu)	AP-42	0.044	0.191
$PM_{2.5}$	0.0186	(lb/MMBtu)	AP-42	0.044	0.191
SO_2	0.000588	(lb/MMBtu)	AP-42	0.001	0.006
CO_2	110	(lb/MMBtu)	AP-42	257.950	1129.821
Methane	0.23	(lb/MMBtu)	AP-42	0.539	2.362
Formaldehyde	0.0205	(lb/MMBtu)	AP-42	0.048	0.211
Acetaldehyde	0.00279	(lb/MMBtu)	AP-42	0.007	0.029
Acrolein	0.00263	(lb/MMBtu)	AP-42	0.006	0.027
Benzene	0.00158	(lb/MMBtu)	AP-42	0.004	0.016
Toluene	0.000558	(lb/MMBtu)	AP-42	0.001	0.006
Xylene	0.000195	(lb/MMBtu)	AP-42	0.000	0.002
Ethyl-Benzene	0.0000248	(lb/MMBtu)	AP-42	0.000	0.000
n-Hexane	0	(lb/MMBtu)	AP-42	0.000	0.000

Pollutant	Controlled Emissions				
	Emission Factors				
	EF	Units	Reference	lb/hr	ton/yr
NO_X	1	g/(hp*hr)	Quad J	0.591	2.588
VOC	0.7	g/(hp*hr)	Quad J	0.468	2.051
CO	2	g/(hp*hr)	Quad J	1.182	5.176
PM_{10}	0.0186	(lb/MMBtu)	AP-42	0.044	0.191
$PM_{2.5}$	0.0186	(lb/MMBtu)	AP-42	0.044	0.191
SO_2	0.000588	(lb/MMBtu)	AP-42	0.001	0.006
CO_2	110	(lb/MMBtu)	AP-42	257.950	1129.821
Methane	0.23	(lb/MMBtu)	AP-42	0.539	2.362
Formaldehyde	0.0205	(lb/MMBtu)	AP-42	0.048	0.211
Acetaldehyde	0.00279	(lb/MMBtu)	AP-42	0.007	0.029
Acrolein	0.00263	(lb/MMBtu)	AP-42	0.006	0.027
Benzene	0.00158	(lb/MMBtu)	AP-42	0.004	0.016
Toluene	0.000558	(lb/MMBtu)	AP-42	0.001	0.006
Xylene	0.000195	(lb/MMBtu)	AP-42	0.000	0.002
Ethyl-Benzene	0.0000248	(lb/MMBtu)	AP-42	0.000	0.000
n-Hexane	0	(lb/MMBtu)	AP-42	0.000	0.000

**VOC includes Formaldehyde and Acetaldehyde*

Engine 2

Owner/Operator:	**Devon Energy**
Facility:	**Crosby Chase**
Make/Model:	Doosan 11.1L
Manufactured Date:	8/1/2014
Serial Number:	EEIOH403777
Emission Factors (Uncontrolled):	AP-42
Emission Factors (Controlled):	Quad J
Engine Make/Model:	Doosan 11.1L
Max HP, 100% Load:	268
Annual Run Time, hrs	8760
Design Class:	4-Stroke Rich Burn
Fuel Type:	Natural Gas
Ignition Type:	Spark
Fuel Consumption, Btu/bhp*hr	8750
Fuel Consumption, MMBtu/hr	2.35
Gas Heating Value, Btu/scf	1275.36
Stack Height (ft)	6.33
Stack Diameter (ft)	0.17
Exit Temperature (^{o}F)	1391.00
Exhaust Gas Flowrate (ft^3/min)	1160.00
Exhaust Velocity (ft/s)	851.76

*ND - Crosby Chase First Stage Separator Gas

Engine Controls

Controls?	Y
Control Type	AFR/CC
Control Efficiency	0

Engine 2 Emission Calculations

Pollutant	Uncontrolled Emissions				
	Emission Factors			Individual Engines	
	EF	Units	Reference	lb/hr	ton/yr
NO_X	2.21	(lb/MMBtu)	AP-42	5.182	22.699
VOC	0.0296	(lb/MMBtu)	AP-42	0.124	0.543
CO	3.72	(lb/MMBtu)	AP-42	8.723	38.208
PM_{10}	0.0186	(lb/MMBtu)	AP-42	0.044	0.191
$PM_{2.5}$	0.0186	(lb/MMBtu)	AP-42	0.044	0.191
SO_2	0.000588	(lb/MMBtu)	AP-42	0.001	0.006
CO_2	110	(lb/MMBtu)	AP-42	257.950	1129.821
Methane	0.23	(lb/MMBtu)	AP-42	0.539	2.362
Formaldehyde	0.0205	(lb/MMBtu)	AP-42	0.048	0.211
Acetaldehyde	0.00279	(lb/MMBtu)	AP-42	0.007	0.029
Acrolein	0.00263	(lb/MMBtu)	AP-42	0.006	0.027
Benzene	0.00158	(lb/MMBtu)	AP-42	0.004	0.016
Toluene	0.000558	(lb/MMBtu)	AP-42	0.001	0.006
Xylene	0.000195	(lb/MMBtu)	AP-42	0.000	0.002
Ethyl-Benzene	0.0000248	(lb/MMBtu)	AP-42	0.000	0.000
n-Hexane	0	(lb/MMBtu)	AP-42	0.000	0.000

Pollutant	Controlled Emissions				
	Emission Factors			Individual Engines	
	EF	Units	Reference	lb/hr	ton/yr
NO_X	1	g/(hp*hr)	Quad J	0.591	2.588
VOC	0.7	g/(hp*hr)	Quad J	0.468	2.051
CO	2	g/(hp*hr)	Quad J	1.182	5.176
PM_{10}	0.0186	(lb/MMBtu)	AP-42	0.044	0.191
$PM_{2.5}$	0.0186	(lb/MMBtu)	AP-42	0.044	0.191
SO_2	0.000588	(lb/MMBtu)	AP-42	0.001	0.006
CO_2	110	(lb/MMBtu)	AP-42	257.950	1129.821
Methane	0.23	(lb/MMBtu)	AP-42	0.539	2.362
Formaldehyde	0.0205	(lb/MMBtu)	AP-42	0.048	0.211
Acetaldehyde	0.00279	(lb/MMBtu)	AP-42	0.007	0.029
Acrolein	0.00263	(lb/MMBtu)	AP-42	0.006	0.027
Benzene	0.00158	(lb/MMBtu)	AP-42	0.004	0.016
Toluene	0.000558	(lb/MMBtu)	AP-42	0.001	0.006
Xylene	0.000195	(lb/MMBtu)	AP-42	0.000	0.002
Ethyl-Benzene	0.0000248	(lb/MMBtu)	AP-42	0.000	0.000
n-Hexane	0	(lb/MMBtu)	AP-42	0.000	0.000

**VOC includes Formaldehyde and Acetaldehyde*

Process Train 1

Project information	
File Name	DEET
Company	Devon Energy
City, State	{"Williston, ND","Williston, ND","Williston, ND"}
Equation of State	{"Peng-Robinson","Peng-Robinson","Peng-Robinson"}
Description	DEET Emissions Report

Stream Selection for Tank Losses Stencil	
Name of Property Stencil	Oil Tank Losses
Name of Process Stream	Tank Inlet[Oil Tanks]

Loading Information	
Mode of Operation	Submerged Loading of a Clean Cargo Tank
Cargo Carrier	Tank Truck or Rail Tank Car
Saturation Factor	1.0
VOCs [C3+]	65

Tank Information	
Shell Height [ft]	20
Diameter [ft]	12
Maximum Fill Percent [%]	90
Number of Tanks	8
Average Fill Percent [%]	50
Total Tank Volume [bbl]	3223.0
Net Throughput [bbl/yr]	165710
Max Liquid Surface Temperature [°F]	54.4832
Average Liquid Surface Temperature [°F]	46.2492
MW	34.9450
Turnovers (per year)	63.3851
Paint Characteristics	
Shell Color	Medium Grey
Shell Paint Condition	Average
Roof Color	Medium Grey
Roof Condition	Average
Roof Characteristics	
Type	Dome
Dome Radius [ft]	
Slope [ft/ft]	--
Breather Vent Settings	
Vacuum Settings [psig]	-0.0300000
Pressure Settings [psig]	0.0300000

Meteorological Data	
Location	Williston, ND
Ambient Pressure [psia]	13.72
Min Ambient Temperature [°F]	29.9
Max Ambient Temperature [°F]	53.2
Solar Insolation [BTU/ft2*day]	1193
Wind Speed [mph]	8.9

Emission Summary							
Item		Flash Gas	W/B Losses	Loading Losses	Heater Treater Gas	ULPS Gas	
		%	%	%	%	%	
Capture Effeciency		100	100	70	0	0	
Percent to Flare		100	100	--	0	0	

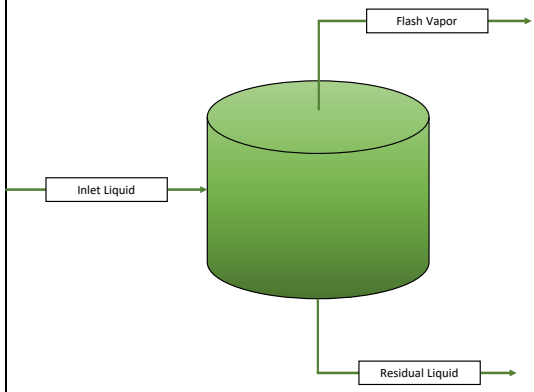
Emission Summary							
Item		Flash Gas	W/B Losses	Loading Losses	Heater Treater Gas	ULPS Gas	Total Losses
		[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]
VOCs [C3+]		0.000	0.000	0.000	0.000	0.000	0.000
Benzene		0.000	0.000	0.000	0.000	0.000	0.000
H2S		0.000	0.000	0.000	0.000	0.000	0.000

Emission Composition							
No.	Component	Flash Gas [Mol%]	W/B Losses [Mol%]	Loading Losses [Mol%]	Heater Treater [Mol%]	ULPS [Mol%]	
1	Hydrogen Sulfide	0.000	0.000	0.000	--	--	
2	Nitrogen	0.415	0.200	0.200	--	--	
3	Carbon Dioxide	0.443	0.670	0.670	--	--	
4	Methane	17.168	17.855	17.855	--	--	
5	Ethane	25.030	32.098	32.098	--	--	
6	Propane	26.605	26.369	26.369	--	--	
7	i-Butane	3.944	3.332	3.332	--	--	
8	n-Butane	13.310	10.606	10.606	--	--	
9	2,2-Dimethylpropane	0.003	0.002	0.002	--	--	
10	i-Pentane	2.738	1.863	1.863	--	--	
11	n-Pentane	4.138	2.656	2.656	--	--	
12	2,2-Dimethylbutane	0.010	0.006	0.006	--	--	
13	Cyclopentane	0.000	0.000	0.000	--	--	
14	2,3-Dimethylbutane	0.096	0.055	0.055	--	--	
15	2-Methylpentane	0.495	0.280	0.280	--	--	
16	3-Methylpentane	0.299	0.166	0.166	--	--	
17	n-Hexane	1.410	0.727	0.727	--	--	
18	Methylcyclopentane	0.408	0.225	0.225	--	--	
19	Benzene	0.103	0.055	0.055	--	--	
20	Cyclohexane	0.208	0.110	0.110	--	--	
21	2-Methylhexane	0.125	0.058	0.058	--	--	
22	3-Methylhexane	0.166	0.075	0.075	--	--	
23	2,2,4-Trimethylpentane	0.000	0.000	0.000	--	--	
24	n-Heptane	0.413	0.177	0.177	--	--	
25	Methylcyclohexane	0.257	0.116	0.116	--	--	
26	Toluene	0.070	0.030	0.030	--	--	
27	n-Octane	0.446	0.156	0.156	--	--	
28	Ethylbenzene	0.011	0.004	0.004	--	--	
29	m-Xylene	0.022	0.008	0.008	--	--	
30	p-Xylene	0.008	0.003	0.003	--	--	
31	o-Xylene	0.013	0.005	0.005	--	--	
32	n-Nonane	0.114	0.032	0.032	--	--	
33	n-Decane	0.037	0.009	0.009	--	--	
34	Undecane	0.007	0.001	0.001	--	--	
35	Dodecane	0.001	0.000	0.000	--	--	
36	Tridecane	0.000	0.000	0.000	--	--	
37	Tetradecane	0.001	0.000	0.000	--	--	
38	Pentadecane	0.000	0.000	0.000	--	--	
39	Hexadecane	0.000	0.000	0.000	--	--	
40	Heptadecane	0.000	0.000	0.000	--	--	
41	Octadecane	0.000	0.000	0.000	--	--	
42	Nonadecane	0.000	0.000	0.000	--	--	
43	Eicosane	0.000	0.000	0.000	--	--	
44	Heneicosane	0.000	0.000	0.000	--	--	
45	Docosane	0.000	0.000	0.000	--	--	
46	Tricosane	0.000	0.000	0.000	--	--	
47	Tetracosane	0.000	0.000	0.000	--	--	
48	Pentacosane	0.000	0.000	0.000	--	--	
49	Hexacosane	0.000	0.000	0.000	--	--	
50	Heptacosane	0.000	0.000	0.000	--	--	
51	Octacosane	0.000	0.000	0.000	--	--	
52	Nonacosane	0.000	0.000	0.000	--	--	
53	C30	0.000	0.000	0.000	--	--	
54	Water	1.486	2.051	2.051	--	--	
55	C10+	0.000	0.000	0.000	--	--	

Stream Compositional Data							
No.	Component	Flash Gas [ton/yr]	W/B Losses [ton/yr]	Loading Losses [ton/yr]	Heater Treater [ton/yr]	ULPS [ton/yr]	Total Losses [ton/yr]
1	Hydrogen Sulfide	0.000	0.000	0.000			0
2	Nitrogen	0.000	0.000	0.000			0
3	Carbon Dioxide	0.000	0.000	0.000			0
4	Methane	0.000	0.000	0.000			0
5	Ethane	0.000	0.000	0.000			0
6	Propane	0.000	0.000	0.000			0
7	i-Butane	0.000	0.000	0.000			0
8	n-Butane	0.000	0.000	0.000			0
9	2,2-Dimethylpropane	0.000	0.000	0.000			0
10	i-Pentane	0.000	0.000	0.000			0
11	n-Pentane	0.000	0.000	0.000			0
12	2,2-Dimethylbutane	0.000	0.000	0.000			0
13	Cyclopentane	0.000	0.000	0.000			0
14	2,3-Dimethylbutane	0.000	0.000	0.000			0
15	2-Methylpentane	0.000	0.000	0.000			0
16	3-Methylpentane	0.000	0.000	0.000			0
17	n-Hexane	0.000	0.000	0.000			0
18	Methylcyclopentane	0.000	0.000	0.000			0
19	Benzene	0.000	0.000	0.000			0
20	Cyclohexane	0.000	0.000	0.000			0
21	2-Methylhexane	0.000	0.000	0.000			0
22	3-Methylhexane	0.000	0.000	0.000			0
23	2,2,4-Trimethylpentane	0.000	0.000	0.000			0
24	n-Heptane	0.000	0.000	0.000			0
25	Methylcyclohexane	0.000	0.000	0.000			0
26	Toluene	0.000	0.000	0.000			0
27	n-Octane	0.000	0.000	0.000			0
28	Ethylbenzene	0.000	0.000	0.000			0
29	m-Xylene	0.000	0.000	0.000			0
30	p-Xylene	0.000	0.000	0.000			0
31	o-Xylene	0.000	0.000	0.000			0
32	n-Nonane	0.000	0.000	0.000			0
33	n-Decane	0.000	0.000	0.000			0
34	Undecane	0.000	0.000	0.000			0
35	Dodecane	0.000	0.000	0.000			0
36	Tridecane	0.000	0.000	0.000			0
37	Tetradecane	0.000	0.000	0.000			0
38	Pentadecane	0.000	0.000	0.000			0
39	Hexadecane	0.000	0.000	0.000			0
40	Heptadecane	0.000	0.000	0.000			0
41	Octadecane	0.000	0.000	0.000			0
42	Nonadecane	0.000	0.000	0.000			0
43	Eicosane	0.000	0.000	0.000			0
44	Heneicosane	0.000	0.000	0.000			0
45	Docosane	0.000	0.000	0.000			0
46	Tricosane	0.000	0.000	0.000			0
47	Tetracosane	0.000	0.000	0.000			0
48	Pentacosane	0.000	0.000	0.000			0
49	Hexacosane	0.000	0.000	0.000			0
50	Heptacosane	0.000	0.000	0.000			0
51	Octacosane	0.000	0.000	0.000			0
52	Nonacosane	0.000	0.000	0.000			0
53	C30	0.000	0.000	0.000			0
54	Water	0.000	0.000	0.000			0
55	C10+	0.000	0.000	0.000			0

Stream Properties							
		Flash Gas	W/B Losses	Loading Losses	Heater Treater	ULPS	
MW		41.975	38.323	38.323	--	42.932	
Heating Value [BTU/scf]		2172.885	1985.089	1985.089	--	2218.465	
Specific Gravity		1.449	1.323	1.323	--	1.482	
VOC Concentration [wt%]		100.000	100.000	100.000	--	100.000	
Temperature [°F]		99.914	54.483	54.483	135.000	122.177	
Gas Volumetric Flow [scf/hr]		17.721	49.102	27.246	0.000	0.000	

Inlet Stream Data	
Component	Tank Inlet [Mol%]
Hydrogen Sulfide	0.000
Nitrogen	0.001
Carbon Dioxide	0.006
Methane	0.106
Ethane	0.690
Propane	2.427
i-Butane	0.823
n-Butane	3.928
2,2-Dimethylpropane	0.001
i-Pentane	1.976
n-Pentane	3.876
2,2-Dimethylbutane	0.015
Cyclopentane	0.000
2,3-Dimethylbutane	0.188
2-Methylpentane	1.043
3-Methylpentane	0.702
n-Hexane	4.140
Methylcyclopentane	1.179
Benzene	0.319
Cyclohexane	0.745
2-Methylhexane	0.745
3-Methylhexane	1.089
2,2,4-Trimethylpentane	0.000
n-Heptane	3.505
Methylcyclohexane	2.082
Toluene	0.699
n-Octane	11.473
Ethylbenzene	0.333
m-Xylene	0.721
p-Xylene	0.241
o-Xylene	0.488
n-Nonane	8.675
n-Decane	8.219
Undecane	4.895
Dodecane	1.561
Tridecane	0.503
Tetradecane	8.630
Pentadecane	0.000
Hexadecane	0.000
Heptadecane	0.000
Octadecane	0.000
Nonadecane	0.000
Eicosane	0.000
Heneicosane	0.000
Docosane	0.000
Tricosane	0.000
Tetracosane	0.000
Pentacosane	0.000
Hexacosane	0.000
Heptacosane	0.000
Octacosane	0.000
Nonacosane	0.000
C30	0.000
Water	0.028
C10+	23.946



Residual Liquid Data	
Flow (bbl/d)	454.000
TVP [psia]	8.831

Project information	
File Name	DEET
Company	Devon Energy
City, State	{"Williston, ND","Williston, ND","Williston, ND"}
Equation of State	{"Peng-Robinson","Peng-Robinson","Peng-Robinson"}
Description	DEET Emissions Report

Stream Selection for Tank Losses Stencil	
Name of Property Stencil	Water Tank Losses
Name of Process Stream	Inlet[Water Tanks]

Loading Information	
Mode of Operation	Submerged Loading of a Clean Cargo Tank
Cargo Carrier	Tank Truck or Rail Tank Car
Saturation Factor	0.6
VOCs [C3+]	14

Tank Information	
Shell Height [ft]	20
Diameter [ft]	12
Maximum Fill Percent [%]	90
Number of Tanks	4
Average Fill Percent [%]	50
Total Tank Volume [bbl]	1611.5
Net Throughput [bbl/yr]	178204
Max Liquid Surface Temperature [°F]	54.4832
Average Liquid Surface Temperature [°F]	46.2492
MW	23.5897
Turnovers (per year)	137.991
Paint Characteristics	
Shell Color	Medium Grey
Shell Paint Condition	Average
Roof Color	Medium Grey
Roof Condition	Average
Roof Characteristics	
Type	Dome
Dome Radius [ft]	
Slope [ft/ft]	--
Breather Vent Settings	
Vacuum Settings [psig]	-0.0300000
Pressure Settings [psig]	0.0300000

Meteorological Data	
Location	Williston, ND
Ambient Pressure [psia]	13.72
Min Ambient Temperature [°F]	29.9
Max Ambient Temperature [°F]	53.2
Solar Insolation [BTU/ft2*day]	1193
Wind Speed [mph]	8.9

Emission Summary							
Item		Flash Gas	W/B Losses				
		%	%				
Capture Effeciency		100	100				
Percent to Flare		100	100				

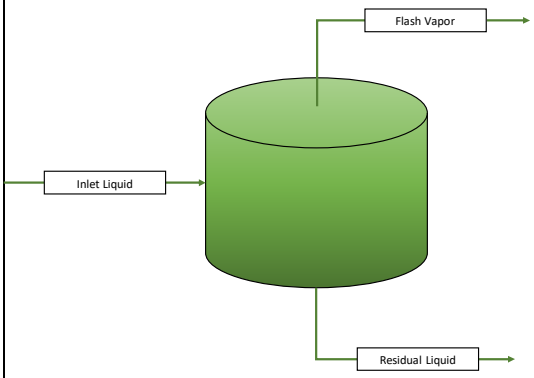
Emission Summary							
Item		Flash Gas	W/B Losses				Total Losses
		[ton/yr]	[ton/yr]				[ton/yr]
VOCs [C3+]		0.000	0.000				0.000
Benzene		0.000	0.000				0.000
H2S		0.000	0.000				0.000

Emission Composition							
No.	Component	Flash Gas [Mol%]	W/B Losses [Mol%]				
1	Hydrogen Sulfide	0.000	0.000				
2	Nitrogen	2.489	0.683				
3	Carbon Dioxide	4.170	27.089				
4	Methane	48.658	26.497				
5	Ethane	17.958	15.109				
6	Propane	6.117	3.835				
7	i-Butane	0.339	0.171				
8	n-Butane	1.794	1.037				
9	2,2-Dimethylpropane	0.000	0.000				
10	i-Pentane	0.184	0.084				
11	n-Pentane	0.176	0.028				
12	2,2-Dimethylbutane	0.000	0.000				
13	Cyclopentane	0.000	0.000				
14	2,3-Dimethylbutane	0.005	0.003				
15	2-Methylpentane	0.022	0.005				
16	3-Methylpentane	0.027	0.016				
17	n-Hexane	0.036	0.004				
18	Methylcyclopentane	0.058	0.054				
19	Benzene	0.161	0.719				
20	Cyclohexane	0.056	0.102				
21	2-Methylhexane	0.002	0.001				
22	3-Methylhexane	0.004	0.001				
23	2,2,4-Trimethylpentane	0.000	0.000				
24	n-Heptane	0.007	0.001				
25	Methylcyclohexane	0.035	0.033				
26	Toluene	0.111	0.544				
27	n-Octane	0.004	0.000				
28	Ethylbenzene	0.018	0.070				
29	m-Xylene	0.034	0.195				
30	p-Xylene	0.012	0.062				
31	o-Xylene	0.024	0.088				
32	n-Nonane	0.001	0.000				
33	n-Decane	0.000	0.000				
34	Undecane	0.000	0.000				
35	Dodecane	0.000	0.000				
36	Tridecane	0.000	0.000				
37	Tetradecane	0.000	0.000				
38	Pentadecane	0.000	0.000				
39	Hexadecane	0.000	0.000				
40	Heptadecane	0.000	0.000				
41	Octadecane	0.000	0.000				
42	Nonadecane	0.000	0.000				
43	Eicosane	0.000	0.000				
44	Heneicosane	0.000	0.000				
45	Docosane	0.000	0.000				
46	Tricosane	0.000	0.000				
47	Tetracosane	0.000	0.000				
48	Pentacosane	0.000	0.000				
49	Hexacosane	0.000	0.000				
50	Heptacosane	0.000	0.000				
51	Octacosane	0.000	0.000				
52	Nonacosane	0.000	0.000				
53	C30	0.000	0.000				
54	Water	17.499	23.567				
55	C10+	0.000	0.000				

Stream Compositional Data							
No.	Component	Flash Gas [ton/yr]	W/B Losses [ton/yr]				Total Losses [ton/yr]
1	Hydrogen Sulfide	0.000	0.000				0.000
2	Nitrogen	0.000	0.000				0.000
3	Carbon Dioxide	0.000	0.000				0.000
4	Methane	0.000	0.000				0.000
5	Ethane	0.000	0.000				0.000
6	Propane	0.000	0.000				0.000
7	i-Butane	0.000	0.000				0.000
8	n-Butane	0.000	0.000				0.000
9	2,2-Dimethylpropane	0.000	0.000				0.000
10	i-Pentane	0.000	0.000				0.000
11	n-Pentane	0.000	0.000				0.000
12	2,2-Dimethylbutane	0.000	0.000				0.000
13	Cyclopentane	0.000	0.000				0.000
14	2,3-Dimethylbutane	0.000	0.000				0.000
15	2-Methylpentane	0.000	0.000				0.000
16	3-Methylpentane	0.000	0.000				0.000
17	n-Hexane	0.000	0.000				0.000
18	Methylcyclopentane	0.000	0.000				0.000
19	Benzene	0.000	0.000				0.000
20	Cyclohexane	0.000	0.000				0.000
21	2-Methylhexane	0.000	0.000				0.000
22	3-Methylhexane	0.000	0.000				0.000
23	2,2,4-Trimethylpentane	0.000	0.000				0.000
24	n-Heptane	0.000	0.000				0.000
25	Methylcyclohexane	0.000	0.000				0.000
26	Toluene	0.000	0.000				0.000
27	n-Octane	0.000	0.000				0.000
28	Ethylbenzene	0.000	0.000				0.000
29	m-Xylene	0.000	0.000				0.000
30	p-Xylene	0.000	0.000				0.000
31	o-Xylene	0.000	0.000				0.000
32	n-Nonane	0.000	0.000				0.000
33	n-Decane	0.000	0.000				0.000
34	Undecane	0.000	0.000				0.000
35	Dodecane	0.000	0.000				0.000
36	Tridecane	0.000	0.000				0.000
37	Tetradecane	0.000	0.000				0.000
38	Pentadecane	0.000	0.000				0.000
39	Hexadecane	0.000	0.000				0.000
40	Heptadecane	0.000	0.000				0.000
41	Octadecane	0.000	0.000				0.000
42	Nonadecane	0.000	0.000				0.000
43	Eicosane	0.000	0.000				0.000
44	Heneicosane	0.000	0.000				0.000
45	Docosane	0.000	0.000				0.000
46	Tricosane	0.000	0.000				0.000
47	Tetracosane	0.000	0.000				0.000
48	Pentacosane	0.000	0.000				0.000
49	Hexacosane	0.000	0.000				0.000
50	Heptacosane	0.000	0.000				0.000
51	Octacosane	0.000	0.000				0.000
52	Nonacosane	0.000	0.000				0.000
53	C30	0.000	0.000				0.000
54	Water	0.000	0.000				0.000
55	C10+	0.000	0.000				0.000

Stream Properties							
		Flash Gas	W/B Losses				
MW		23.636	29.322				
Heating Value [BTU/scf]		978.644	693.946				
Specific Gravity		0.816	1.012				
VOC Concentration [wt%]		100.000	100.000				
Temperature [°F]		135.341	54.483				
Gas Volumetric Flow [scf/hr]		32.503	6.409				

Inlet Stream Data	
Component	Tank Inlet [Mol%]
Hydrogen Sulfide	0.000
Nitrogen	0.001
Carbon Dioxide	0.002
Methane	0.011
Ethane	0.004
Propane	0.001
i-Butane	0.000
n-Butane	0.000
2,2-Dimethylpropane	0.000
i-Pentane	0.000
n-Pentane	0.000
2,2-Dimethylbutane	0.000
Cyclopentane	0.000
2,3-Dimethylbutane	0.000
2-Methylpentane	0.000
3-Methylpentane	0.000
n-Hexane	0.000
Methylcyclopentane	0.000
Benzene	0.000
Cyclohexane	0.000
2-Methylhexane	0.000
3-Methylhexane	0.000
2,2,4-Trimethylpentane	0.000
n-Heptane	0.000
Methylcyclohexane	0.000
Toluene	0.000
n-Octane	0.000
Ethylbenzene	0.000
m-Xylene	0.000
p-Xylene	0.000
o-Xylene	0.000
n-Nonane	0.000
n-Decane	0.000
Undecane	0.000
Dodecane	0.000
Tridecane	0.000
Tetradecane	0.000
Pentadecane	0.000
Hexadecane	0.000
Heptadecane	0.000
Octadecane	0.000
Nonadecane	0.000
Eicosane	0.000
Heneicosane	0.000
Docosane	0.000
Tricosane	0.000
Tetracosane	0.000
Pentacosane	0.000
Hexacosane	0.000
Heptacosane	0.000
Octacosane	0.000
Nonacosane	0.000
C30	0.000
Water	99.979
C10+	0.000



Residual Liquid Data	
Flow (bbl/d)	488.231
TVP [psia]	12.559

Project information	
File Name	DEET
Company	Devon Energy
City, State	{"Williston, ND","Williston, ND","Williston, ND"}
Equation of State	{"Peng-Robinson","Peng-Robinson","Peng-Robinson"}
Description	DEETMax Emissions Report

Stream Selection											
Item		Inlet Gas	Inlet Gas	Inlet Oil	Inlet Oil						
Name of Process Stream		Gas	Gas	Oil	Oil						

Emission Composition											
No.	Component	Inlet Gas [Mol%]	Inlet Gas [Mass%]	Inlet Oil [Mol%]	Inlet Oil [Mass%]						
1	Hydrogen Sulfide	0.000	0.000	0.000	0.000						
2	Nitrogen	5.481	6.027	0.000	0.000						
3	Carbon Dioxide	0.698	1.206	0.000	0.000						
4	Methane	57.542	36.235	0.010	0.001						
5	Ethane	19.651	23.194	0.266	0.054						
6	Propane	10.279	17.792	1.521	0.455						
7	i-Butane	1.138	2.596	0.626	0.247						
8	n-Butane	3.487	7.955	3.492	1.379						
9	2,2-Dimethylpropane	0.000	0.000	0.006	0.003						
10	i-Pentane	0.633	1.793	1.930	0.946						
11	n-Pentane	0.914	2.588	3.999	1.959						
12	2,2-Dimethylbutane	0.000	0.000	0.030	0.018						
13	Cyclopentane	0.000	0.000	0.000	0.000						
14	2,3-Dimethylbutane	0.000	0.000	0.327	0.191						
15	2-Methylpentane	0.000	0.000	1.758	1.029						
16	3-Methylpentane	0.000	0.000	1.132	0.662						
17	n-Hexane	0.153	0.518	5.168	3.025						
18	Methylcyclopentane	0.000	0.000	1.748	0.999						
19	Benzene	0.000	0.000	0.465	0.247						
20	Cyclohexane	0.000	0.000	1.032	0.590						
21	2-Methylhexane	0.000	0.000	0.916	0.623						
22	3-Methylhexane	0.000	0.000	1.315	0.895						
23	2,2,4-Trimethylpentane	0.000	0.000	0.000	0.000						
24	n-Heptane	0.020	0.079	3.914	2.663						
25	Methylcyclohexane	0.000	0.000	2.408	1.606						
26	Toluene	0.000	0.000	0.783	0.490						
27	n-Octane	0.003	0.013	11.716	9.090						
28	Ethylbenzene	0.000	0.000	0.337	0.243						
29	m-Xylene	0.000	0.000	0.725	0.523						
30	p-Xylene	0.000	0.000	0.242	0.175						
31	o-Xylene	0.000	0.000	0.487	0.351						
32	n-Nonane	0.001	0.005	8.446	7.357						
33	n-Decane	0.000	0.000	7.858	7.593						
34	Undecane	0.000	0.000	4.643	4.929						
35	Dodecane	0.000	0.000	1.477	1.708						
36	Tridecane	0.000	0.000	0.476	0.595						
37	Tetradecane	0.000	0.000	8.149	10.979						
38	Pentadecane	0.000	0.000	0.000	0.000						
39	Hexadecane	0.000	0.000	0.000	0.000						
40	Heptadecane	0.000	0.000	0.000	0.000						
41	Octadecane	0.000	0.000	0.000	0.000						
42	Nonadecane	0.000	0.000	0.000	0.000						
43	Eicosane	0.000	0.000	0.000	0.000						
44	Heneicosane	0.000	0.000	0.000	0.000						
45	Docosane	0.000	0.000	0.000	0.000						
46	Tricosane	0.000	0.000	0.000	0.000						
47	Tetracosane	0.000	0.000	0.000	0.000						
48	Pentacosane	0.000	0.000	0.000	0.000						
49	Hexacosane	0.000	0.000	0.000	0.000						
50	Heptacosane	0.000	0.000	0.000	0.000						
51	Octacosane	0.000	0.000	0.000	0.000						
52	Nonacosane	0.000	0.000	0.000	0.000						
53	C30	0.000	0.000	0.000	0.000						
54	Water	0.000	0.000	0.000	0.000						
55	C10+	0.000	0.000	22.601	38.375						

Stream Selection											
Item		Pilot Gas	Slop Tank	1st Stage Gas	2nd Stage Gas	Heater Treater Gas	Gunbarrel Gas	ULPS Gas	Oil Tanks	Water Tanks	
Name of Process Stream		1st Stage Gas	See Slop Tank Report	1st Stage Gas	2nd Stage Gas	HT Gas	5	ULPS Gas	See Oil Tank Report	SeeWater Tank Report	

Emission Summary											
Item		Pilot Gas	Slop Tank	1st Stage Gas	2nd Stage Gas	Heater Treater Gas	Gunbarrel Gas	ULPS Gas	Oil Tanks	Water Tanks	
		[%]		[%]	[%]	[%]	[%]	[%]	[%]	[%]	
Control Effenciency		98		98	98	98	98	98	98	98	
Percent to Flare		100.00		25	0	0	0	0	100	100	

Emission Summary											
Item		Pilot Gas	Slop Tank	1st Stage Gas	2nd Stage Gas	Heater Treater Gas	Gunbarrel Gas	ULPS Gas	Oil Tanks	Water Tanks	Total
		[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]
VOCs [C3+]		0.259		45.205				0.000	0.412	0.042	45.917
Benzene		0.000		0.087	0.000	0.000	0.000	0.000	0.001	0.002	0.090
H2S		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Emission Composition											
No.	Component	Pilot Gas [Mol%]	Slop Tank [Mol%]	1st Stage Gas [Mol%]	2nd Stage Gas [Mol%]	Heater Treater [Mol%]	Gunbarrel Gas [Mol%]	ULPS [Mol%]	Oil Tanks [Mol %]	Water Tanks [Mol %]	
1	Hydrogen Sulfide	0.000	See Slop Tank Report	0.000	--	--	--	0.000	See Oil Tank Report	See Water Tank Report	
2	Nitrogen	5.467		5.467	--	--	--	0.604			
3	Carbon Dioxide	0.684		0.684	--	--	--	0.421			
4	Methane	57.098		57.098	--	--	--	17.651			
5	Ethane	19.019		19.019	--	--	--	23.171			
6	Propane	9.527		9.527	--	--	--	25.695			
7	i-Butane	1.017		1.017	--	--	--	3.983			
8	n-Butane	3.115		3.115	--	--	--	13.712			
9	2,2-Dimethylpropane	0.001		0.001	--	--	--	0.003			
10	i-Pentane	0.569		0.569	--	--	--	2.974			
11	n-Pentane	0.852		0.852	--	--	--	4.585			
12	2,2-Dimethylbutane	0.002		0.002	--	--	--	0.012			
13	Cyclopentane	0.000		0.000	--	--	--	0.000			
14	2,3-Dimethylbutane	0.020		0.020	--	--	--	0.111			
15	2-Methylpentane	0.102		0.102	--	--	--	0.575			
16	3-Methylpentane	0.062		0.062	--	--	--	0.349			
17	n-Hexane	0.301		0.301	--	--	--	1.686			
18	Methylcyclopentane	0.084		0.084	--	--	--	0.479			
19	Benzene	0.021		0.021	--	--	--	0.121			
20	Cyclohexane	0.043		0.043	--	--	--	0.247			
21	2-Methylhexane	0.028		0.028	--	--	--	0.155			
22	3-Methylhexane	0.038		0.038	--	--	--	0.209			
23	2,2,4-Trimethylpentane	0.000		0.000	--	--	--	0.000			
24	n-Heptane	0.098		0.098	--	--	--	0.528			
25	Methylcyclohexane	0.059		0.059	--	--	--	0.324			
26	Toluene	0.016		0.016	--	--	--	0.089			
27	n-Octane	0.121		0.121	--	--	--	0.613			
28	Ethylbenzene	0.003		0.003	--	--	--	0.015			
29	m-Xylene	0.006		0.006	--	--	--	0.030			
30	p-Xylene	0.002		0.002	--	--	--	0.010			
31	o-Xylene	0.004		0.004	--	--	--	0.018			
32	n-Nonane	0.036		0.036	--	--	--	0.169			
33	n-Decane	0.014		0.014	--	--	--	0.059			
34	Undecane	0.003		0.003	--	--	--	0.013			
35	Dodecane	0.000		0.000	--	--	--	0.002			
36	Tridecane	0.000		0.000	--	--	--	0.000			
37	Tetradecane	0.000		0.000	--	--	--	0.001			
38	Pentadecane	0.000		0.000	--	--	--	0.000			
39	Hexadecane	0.000		0.000	--	--	--	0.000			
40	Heptadecane	0.000		0.000	--	--	--	0.000			
41	Octadecane	0.000		0.000	--	--	--	0.000			
42	Nonadecane	0.000		0.000	--	--	--	0.000			
43	Eicosane	0.000		0.000	--	--	--	0.000			
44	Heneicosane	0.000		0.000	--	--	--	0.000			
45	Docosane	0.000		0.000	--	--	--	0.000			
46	Tricosane	0.000		0.000	--	--	--	0.000			
47	Tetracosane	0.000		0.000	--	--	--	0.000			
48	Pentacosane	0.000		0.000	--	--	--	0.000			
49	Hexacosane	0.000		0.000	--	--	--	0.000			
50	Heptacosane	0.000		0.000	--	--	--	0.000			
51	Octacosane	0.000		0.000	--	--	--	0.000			
52	Nonacosane	0.000		0.000	--	--	--	0.000			
53	C30	0.000		0.000	--	--	--	0.000			
54	Water	1.590		1.590	--	--	--	1.387			
55	C10+	0.000		0.000	--	--	--	0.000			

Stream Compositional Data

No.	Component	Pilot Gas [ton/yr]	Slop Tank [ton/yr]	1st Stage Gas [ton/yr]	2nd Stage Gas [ton/yr]	Heater Treater [ton/yr]	Gunbarrel Gas [ton/yr]	ULPS [ton/yr]	Oil Tanks [ton/yr]	Water Tanks [ton/yr]	Total [ton/yr]
1	Hydrogen Sulfide	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
2	Nitrogen	0.05		8.02	0.00	0.00	0.00	0.00	0.00	0.01	8.073
3	Carbon Dioxide	0.01		1.58	0.00	0.00	0.00	0.00	0.00	0.03	1.620
4	Methane	0.27		47.97	0.00	0.00	0.00	0.00	0.04	0.06	48.350
5	Ethane	0.17		29.95	0.00	0.00	0.00	0.00	0.14	0.05	30.307
6	Propane	0.13		22.00	0.00	0.00	0.00	0.00	0.18	0.02	22.327
7	i-Butane	0.02		3.09	0.00	0.00	0.00	0.00	0.03	0.00	3.145
8	n-Butane	0.05		9.48	0.00	0.00	0.00	0.00	0.10	0.01	9.645
9	2,2-Dimethylpropane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.003
10	i-Pentane	0.01		2.15	0.00	0.00	0.00	0.00	0.02	0.00	2.186
11	n-Pentane	0.02		3.22	0.00	0.00	0.00	0.00	0.03	0.00	3.271
12	2,2-Dimethylbutane	0.00		0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.010
13	Cyclopentane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
14	2,3-Dimethylbutane	0.00		0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.090
15	2-Methylpentane	0.00		0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.467
16	3-Methylpentane	0.00		0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.283
17	n-Hexane	0.01		1.36	0.00	0.00	0.00	0.00	0.01	0.00	1.378
18	Methylcyclopentane	0.00		0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.374
19	Benzene	0.00		0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.090
20	Cyclohexane	0.00		0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.194
21	2-Methylhexane	0.00		0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.150
22	3-Methylhexane	0.00		0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.202
23	2,2,4-Trimethylpentane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
24	n-Heptane	0.00		0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.520
25	Methylcyclohexane	0.00		0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.306
26	Toluene	0.00		0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.080
27	n-Octane	0.00		0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.734
28	Ethylbenzene	0.00		0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.017
29	m-Xylene	0.00		0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.034
30	p-Xylene	0.00		0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.012
31	o-Xylene	0.00		0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.020
32	n-Nonane	0.00		0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.242
33	n-Decane	0.00		0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.102
34	Undecane	0.00		0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.026
35	Dodecane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.004
36	Tridecane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.001
37	Tetradecane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.004
38	Pentadecane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
39	Hexadecane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
40	Heptadecane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
41	Octadecane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
42	Nonadecane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
43	Eicosane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
44	Heneicosane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
45	Docosane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
46	Tricosane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
47	Tetracosane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
48	Pentacosane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
49	Hexacosane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
50	Heptacosane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
51	Octacosane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
52	Nonacosane	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
53	C30	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
54	Water	0.01		1.50	0.00	0.00	0.00	0.00	0.01	0.03	1.544
55	C10+	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.001

Stream Properties

		Pilot Gas	Slop Tank	1st Stage Gas	2nd Stage Gas	Heater Treater	Gunbarrel	ULPS	Oil Tanks	Water Tanks	
Heating Value [BTU/scf]		1275.363	See Slop Tank Report	1275.363	--	--	--	2218.465	See Oil Tank Report	See Oil Tank Report	
Molecular Weight [lb/lbmol]		25.630		25.630	--	--	--	42.932			
Gas Volumetric Flow [mscf/day]		3.120		543.748	0.000	0.000	0.000	0.000	1.604	0.019	

Process Train 2

Project information	
File Name	DEET
Company	Devon Energy
City, State	{"Williston, ND","Williston, ND","Williston, ND"}
Equation of State	{"Peng-Robinson","Peng-Robinson","Peng-Robinson"}
Description	DEET Emissions Report

Stream Selection for Tank Losses Stencil	
Name of Property Stencil	Oil Tank Losses
Name of Process Stream	Tank Inlet[Oil Tanks]

Loading Information	
Mode of Operation	Submerged Loading of a Clean Cargo Tank
Cargo Carrier	Tank Truck or Rail Tank Car
Saturation Factor	1.0
VOCs [C3+]	63

Tank Information	
Shell Height [ft]	20
Diameter [ft]	12
Maximum Fill Percent [%]	90
Number of Tanks	2
Average Fill Percent [%]	50
Total Tank Volume [bbl]	805.7
Net Throughput [bbl/yr]	49640.0
Max Liquid Surface Temperature [°F]	54.4832
Average Liquid Surface Temperature [°F]	46.2492
MW	35.7314
Turnovers (per year)	76.6888
Paint Characteristics	
Shell Color	Medium Grey
Shell Paint Condition	Average
Roof Color	Medium Grey
Roof Condition	Average
Roof Characteristics	
Type	Dome
Dome Radius [ft]	
Slope [ft/ft]	--
Breather Vent Settings	
Vacuum Settings [psig]	-0.0300000
Pressure Settings [psig]	0.0300000

Meteorological Data	
Location	Williston, ND
Ambient Pressure [psia]	13.72
Min Ambient Temperature [°F]	29.9
Max Ambient Temperature [°F]	53.2
Solar Insolation [BTU/ft2*day]	1193
Wind Speed [mph]	8.9

Emission Summary							
Item		Flash Gas	W/B Losses	Loading Losses	Heater Treater Gas	ULPS Gas	
		%	%	%	%	%	
Capture Effeciency		100	100	70	0	0	
Percent to Flare		100	100	--	0	0	

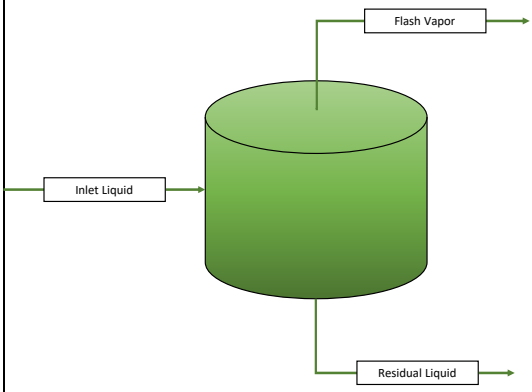
Emission Summary							
Item		Flash Gas	W/B Losses	Loading Losses	Heater Treater Gas	ULPS Gas	Total Losses
		[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]
VOCs [C3+]		0.000	0.000	0.000	0.000	0.000	0.000
Benzene		0.000	0.000	0.000	0.000	0.000	0.000
H2S		0.000	0.000	0.000	0.000	0.000	0.000

Emission Composition							
No.	Component	Flash Gas [Mol%]	W/B Losses [Mol%]	Loading Losses [Mol%]	Heater Treater [Mol%]	ULPS [Mol%]	
1	Hydrogen Sulfide	0.000	0.000	0.000	--	--	
2	Nitrogen	0.093	0.041	0.041	--	--	
3	Carbon Dioxide	0.366	0.866	0.866	--	--	
4	Methane	7.365	9.583	9.583	--	--	
5	Ethane	25.671	40.829	40.829	--	--	
6	Propane	32.939	29.737	29.737	--	--	
7	i-Butane	4.601	3.139	3.139	--	--	
8	n-Butane	14.928	9.318	9.318	--	--	
9	2,2-Dimethylpropane	0.004	0.002	0.002	--	--	
10	i-Pentane	2.794	1.429	1.429	--	--	
11	n-Pentane	4.140	1.987	1.987	--	--	
12	2,2-Dimethylbutane	0.011	0.005	0.005	--	--	
13	Cyclopentane	0.000	0.000	0.000	--	--	
14	2,3-Dimethylbutane	0.096	0.041	0.041	--	--	
15	2-Methylpentane	0.493	0.206	0.206	--	--	
16	3-Methylpentane	0.295	0.121	0.121	--	--	
17	n-Hexane	1.344	0.514	0.514	--	--	
18	Methylcyclopentane	0.397	0.162	0.162	--	--	
19	Benzene	0.100	0.040	0.040	--	--	
20	Cyclohexane	0.200	0.078	0.078	--	--	
21	2-Methylhexane	0.117	0.040	0.040	--	--	
22	3-Methylhexane	0.155	0.052	0.052	--	--	
23	2,2,4-Trimethylpentane	0.000	0.000	0.000	--	--	
24	n-Heptane	0.379	0.122	0.122	--	--	
25	Methylcyclohexane	0.238	0.079	0.079	--	--	
26	Toluene	0.064	0.021	0.021	--	--	
27	n-Octane	0.399	0.106	0.106	--	--	
28	Ethylbenzene	0.010	0.003	0.003	--	--	
29	m-Xylene	0.020	0.005	0.005	--	--	
30	p-Xylene	0.007	0.002	0.002	--	--	
31	o-Xylene	0.012	0.003	0.003	--	--	
32	n-Nonane	0.100	0.022	0.022	--	--	
33	n-Decane	0.032	0.006	0.006	--	--	
34	Undecane	0.006	0.001	0.001	--	--	
35	Dodecane	0.001	0.000	0.000	--	--	
36	Tridecane	0.000	0.000	0.000	--	--	
37	Tetradecane	0.001	0.000	0.000	--	--	
38	Pentadecane	0.000	0.000	0.000	--	--	
39	Hexadecane	0.000	0.000	0.000	--	--	
40	Heptadecane	0.000	0.000	0.000	--	--	
41	Octadecane	0.000	0.000	0.000	--	--	
42	Nonadecane	0.000	0.000	0.000	--	--	
43	Eicosane	0.000	0.000	0.000	--	--	
44	Heneicosane	0.000	0.000	0.000	--	--	
45	Docosane	0.000	0.000	0.000	--	--	
46	Tricosane	0.000	0.000	0.000	--	--	
47	Tetracosane	0.000	0.000	0.000	--	--	
48	Pentacosane	0.000	0.000	0.000	--	--	
49	Hexacosane	0.000	0.000	0.000	--	--	
50	Heptacosane	0.000	0.000	0.000	--	--	
51	Octacosane	0.000	0.000	0.000	--	--	
52	Nonacosane	0.000	0.000	0.000	--	--	
53	C30	0.000	0.000	0.000	--	--	
54	Water	2.626	1.443	1.443	--	--	
55	C10+	0.000	0.000	0.000	--	--	

Stream Compositional Data							
No.	Component	Flash Gas [ton/yr]	W/B Losses [ton/yr]	Loading Losses [ton/yr]	Heater Treater [ton/yr]	ULPS [ton/yr]	Total Losses [ton/yr]
1	Hydrogen Sulfide	0.000	0.000	0.000			0
2	Nitrogen	0.000	0.000	0.000			0
3	Carbon Dioxide	0.000	0.000	0.000			0
4	Methane	0.000	0.000	0.000			0
5	Ethane	0.000	0.000	0.000			0
6	Propane	0.000	0.000	0.000			0
7	i-Butane	0.000	0.000	0.000			0
8	n-Butane	0.000	0.000	0.000			0
9	2,2-Dimethylpropane	0.000	0.000	0.000			0
10	i-Pentane	0.000	0.000	0.000			0
11	n-Pentane	0.000	0.000	0.000			0
12	2,2-Dimethylbutane	0.000	0.000	0.000			0
13	Cyclopentane	0.000	0.000	0.000			0
14	2,3-Dimethylbutane	0.000	0.000	0.000			0
15	2-Methylpentane	0.000	0.000	0.000			0
16	3-Methylpentane	0.000	0.000	0.000			0
17	n-Hexane	0.000	0.000	0.000			0
18	Methylcyclopentane	0.000	0.000	0.000			0
19	Benzene	0.000	0.000	0.000			0
20	Cyclohexane	0.000	0.000	0.000			0
21	2-Methylhexane	0.000	0.000	0.000			0
22	3-Methylhexane	0.000	0.000	0.000			0
23	2,2,4-Trimethylpentane	0.000	0.000	0.000			0
24	n-Heptane	0.000	0.000	0.000			0
25	Methylcyclohexane	0.000	0.000	0.000			0
26	Toluene	0.000	0.000	0.000			0
27	n-Octane	0.000	0.000	0.000			0
28	Ethylbenzene	0.000	0.000	0.000			0
29	m-Xylene	0.000	0.000	0.000			0
30	p-Xylene	0.000	0.000	0.000			0
31	o-Xylene	0.000	0.000	0.000			0
32	n-Nonane	0.000	0.000	0.000			0
33	n-Decane	0.000	0.000	0.000			0
34	Undecane	0.000	0.000	0.000			0
35	Dodecane	0.000	0.000	0.000			0
36	Tridecane	0.000	0.000	0.000			0
37	Tetradecane	0.000	0.000	0.000			0
38	Pentadecane	0.000	0.000	0.000			0
39	Hexadecane	0.000	0.000	0.000			0
40	Heptadecane	0.000	0.000	0.000			0
41	Octadecane	0.000	0.000	0.000			0
42	Nonadecane	0.000	0.000	0.000			0
43	Eicosane	0.000	0.000	0.000			0
44	Heneicosane	0.000	0.000	0.000			0
45	Docosane	0.000	0.000	0.000			0
46	Tricosane	0.000	0.000	0.000			0
47	Tetracosane	0.000	0.000	0.000			0
48	Pentacosane	0.000	0.000	0.000			0
49	Hexacosane	0.000	0.000	0.000			0
50	Heptacosane	0.000	0.000	0.000			0
51	Octacosane	0.000	0.000	0.000			0
52	Nonacosane	0.000	0.000	0.000			0
53	C30	0.000	0.000	0.000			0
54	Water	0.000	0.000	0.000			0
55	C10+	0.000	0.000	0.000			0

Stream Properties							
		Flash Gas	W/B Losses	Loading Losses	Heater Treater	ULPS	
MW		44.588	38.766	38.766	35.475	--	
Heating Value [BTU/scf]		2298.957	2012.689	2012.689	1813.515	--	
Specific Gravity		1.540	1.338	1.338	1.225	--	
VOC Concentration [wt%]		100.000	100.000	100.000	100.000	--	
Temperature [°F]		96.608	54.483	54.483	110.000	--	
Gas Volumetric Flow [scf/hr]		143.635	33.343	11.899	0.000	0.000	

Inlet Stream Data	
Component	Tank Inlet [Mol%]
Hydrogen Sulfide	0.000
Nitrogen	0.003
Carbon Dioxide	0.017
Methane	0.296
Ethane	1.577
Propane	4.135
i-Butane	1.127
n-Butane	4.979
2,2-Dimethylpropane	0.002
i-Pentane	2.156
n-Pentane	4.114
2,2-Dimethylbutane	0.016
Cyclopentane	0.000
2,3-Dimethylbutane	0.197
2-Methylpentane	1.087
3-Methylpentane	0.726
n-Hexane	4.136
Methylcyclopentane	1.199
Benzene	0.324
Cyclohexane	0.748
2-Methylhexane	0.730
3-Methylhexane	1.063
2,2,4-Trimethylpentane	0.000
n-Heptane	3.380
Methylcyclohexane	2.016
Toluene	0.673
n-Octane	10.847
Ethylbenzene	0.315
m-Xylene	0.680
p-Xylene	0.227
o-Xylene	0.459
n-Nonane	8.127
n-Decane	7.674
Undecane	4.563
Dodecane	1.455
Tridecane	0.469
Tetradecane	8.039
Pentadecane	0.000
Hexadecane	0.000
Heptadecane	0.000
Octadecane	0.000
Nonadecane	0.000
Eicosane	0.000
Heneicosane	0.000
Docosane	0.000
Tricosane	0.000
Tetracosane	0.000
Pentacosane	0.000
Hexacosane	0.000
Heptacosane	0.000
Octacosane	0.000
Nonacosane	0.000
C30	0.000
Water	0.137
C10+	22.305



Residual Liquid Data	
Flow (bbl/d)	136.000
TVP [psia]	12.421

Project information	
File Name	DEET
Company	Devon Energy
City, State	{"Williston, ND","Williston, ND","Williston, ND"}
Equation of State	{"Peng-Robinson","Peng-Robinson","Peng-Robinson"}
Description	DEET Emissions Report

Stream Selection for Tank Losses Stencil	
Name of Property Stencil	Water Tank Losses
Name of Process Stream	Inlet[Water Tanks]

Loading Information	
Mode of Operation	Submerged Loading of a Clean Cargo Tank
Cargo Carrier	Tank Truck or Rail Tank Car
Saturation Factor	0.6
VOCs [C3+]	36

Tank Information	
Shell Height [ft]	20
Diameter [ft]	12
Maximum Fill Percent [%]	90
Number of Tanks	1
Average Fill Percent [%]	50
Total Tank Volume [bbl]	402.9
Net Throughput [bbl/yr]	44795.1
Max Liquid Surface Temperature [°F]	54.4832
Average Liquid Surface Temperature [°F]	46.2492
MW	32.4730
Turnovers (per year)	138.740
Paint Characteristics	
Shell Color	Medium Grey
Shell Paint Condition	Average
Roof Color	Medium Grey
Roof Condition	Average
Roof Characteristics	
Type	Dome
Dome Radius [ft]	
Slope [ft/ft]	--
Breather Vent Settings	
Vacuum Settings [psig]	-0.0300000
Pressure Settings [psig]	0.0300000

Meteorological Data	
Location	Williston, ND
Ambient Pressure [psia]	13.72
Min Ambient Temperature [°F]	29.9
Max Ambient Temperature [°F]	53.2
Solar Insolation [BTU/ft2*day]	1193
Wind Speed [mph]	8.9

Emission Summary							
Item		Flash Gas	W/B Losses				
		%	%				
Capture Effeciency		100	100				
Percent to Flare		100	100				

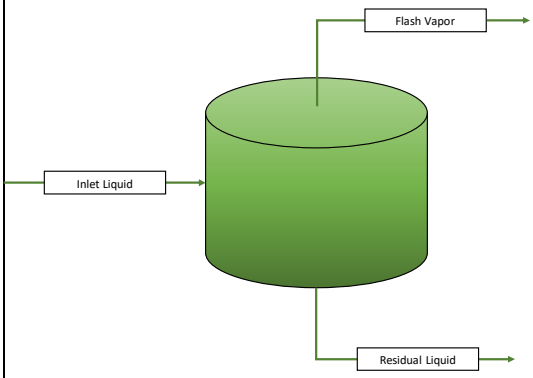
Emission Summary							
Item		Flash Gas	W/B Losses				Total Losses
		[ton/yr]	[ton/yr]				[ton/yr]
VOCs [C3+]		0.000	0.000				0.000
Benzene		0.000	0.000				0.000
H2S		0.000	0.000				0.000

Emission Composition							
No.	Component	Flash Gas [Mol%]	W/B Losses [Mol%]				
1	Hydrogen Sulfide	0.000	0.000				
2	Nitrogen	0.601	0.220				
3	Carbon Dioxide	1.497	10.490				
4	Methane	26.341	16.430				
5	Ethane	30.963	24.898				
6	Propane	19.882	12.525				
7	i-Butane	1.661	0.818				
8	n-Butane	7.198	4.281				
9	2,2-Dimethylpropane	0.001	0.000				
10	i-Pentane	0.938	0.442				
11	n-Pentane	0.841	0.198				
12	2,2-Dimethylbutane	0.002	0.000				
13	Cyclopentane	0.000	0.000				
14	2,3-Dimethylbutane	0.029	0.014				
15	2-Methylpentane	0.115	0.036				
16	3-Methylpentane	0.126	0.071				
17	n-Hexane	0.186	0.033				
18	Methylcyclopentane	0.230	0.182				
19	Benzene	0.127	0.853				
20	Cyclohexane	0.164	0.224				
21	2-Methylhexane	0.016	0.004				
22	3-Methylhexane	0.023	0.007				
23	2,2,4-Trimethylpentane	0.000	0.000				
24	n-Heptane	0.037	0.005				
25	Methylcyclohexane	0.136	0.105				
26	Toluene	0.084	0.589				
27	n-Octane	0.020	0.001				
28	Ethylbenzene	0.014	0.075				
29	m-Xylene	0.026	0.196				
30	p-Xylene	0.009	0.064				
31	o-Xylene	0.016	0.091				
32	n-Nonane	0.004	0.000				
33	n-Decane	0.000	0.000				
34	Undecane	0.000	0.000				
35	Dodecane	0.000	0.000				
36	Tridecane	0.000	0.000				
37	Tetradecane	0.000	0.000				
38	Pentadecane	0.000	0.000				
39	Hexadecane	0.000	0.000				
40	Heptadecane	0.000	0.000				
41	Octadecane	0.000	0.000				
42	Nonadecane	0.000	0.000				
43	Eicosane	0.000	0.000				
44	Heneicosane	0.000	0.000				
45	Docosane	0.000	0.000				
46	Tricosane	0.000	0.000				
47	Tetracosane	0.000	0.000				
48	Pentacosane	0.000	0.000				
49	Hexacosane	0.000	0.000				
50	Heptacosane	0.000	0.000				
51	Octacosane	0.000	0.000				
52	Nonacosane	0.000	0.000				
53	C30	0.000	0.000				
54	Water	8.713	27.147				
55	C10+	0.000	0.000				

Stream Compositional Data							
No.	Component	Flash Gas [ton/yr]	W/B Losses [ton/yr]				Total Losses [ton/yr]
1	Hydrogen Sulfide	0.000	0.000				0.000
2	Nitrogen	0.000	0.000				0.000
3	Carbon Dioxide	0.000	0.000				0.000
4	Methane	0.000	0.000				0.000
5	Ethane	0.000	0.000				0.000
6	Propane	0.000	0.000				0.000
7	i-Butane	0.000	0.000				0.000
8	n-Butane	0.000	0.000				0.000
9	2,2-Dimethylpropane	0.000	0.000				0.000
10	i-Pentane	0.000	0.000				0.000
11	n-Pentane	0.000	0.000				0.000
12	2,2-Dimethylbutane	0.000	0.000				0.000
13	Cyclopentane	0.000	0.000				0.000
14	2,3-Dimethylbutane	0.000	0.000				0.000
15	2-Methylpentane	0.000	0.000				0.000
16	3-Methylpentane	0.000	0.000				0.000
17	n-Hexane	0.000	0.000				0.000
18	Methylcyclopentane	0.000	0.000				0.000
19	Benzene	0.000	0.000				0.000
20	Cyclohexane	0.000	0.000				0.000
21	2-Methylhexane	0.000	0.000				0.000
22	3-Methylhexane	0.000	0.000				0.000
23	2,2,4-Trimethylpentane	0.000	0.000				0.000
24	n-Heptane	0.000	0.000				0.000
25	Methylcyclohexane	0.000	0.000				0.000
26	Toluene	0.000	0.000				0.000
27	n-Octane	0.000	0.000				0.000
28	Ethylbenzene	0.000	0.000				0.000
29	m-Xylene	0.000	0.000				0.000
30	p-Xylene	0.000	0.000				0.000
31	o-Xylene	0.000	0.000				0.000
32	n-Nonane	0.000	0.000				0.000
33	n-Decane	0.000	0.000				0.000
34	Undecane	0.000	0.000				0.000
35	Dodecane	0.000	0.000				0.000
36	Tridecane	0.000	0.000				0.000
37	Tetradecane	0.000	0.000				0.000
38	Pentadecane	0.000	0.000				0.000
39	Hexadecane	0.000	0.000				0.000
40	Heptadecane	0.000	0.000				0.000
41	Octadecane	0.000	0.000				0.000
42	Nonadecane	0.000	0.000				0.000
43	Eicosane	0.000	0.000				0.000
44	Heneicosane	0.000	0.000				0.000
45	Docosane	0.000	0.000				0.000
46	Tricosane	0.000	0.000				0.000
47	Tetracosane	0.000	0.000				0.000
48	Pentacosane	0.000	0.000				0.000
49	Hexacosane	0.000	0.000				0.000
50	Heptacosane	0.000	0.000				0.000
51	Octacosane	0.000	0.000				0.000
52	Nonacosane	0.000	0.000				0.000
53	C30	0.000	0.000				0.000
54	Water	0.000	0.000				0.000
55	C10+	0.000	0.000				0.000

Stream Properties							
		Flash Gas	W/B Losses				
MW		32.343	30.897				
Heating Value [BTU/scf]		1593.454	1126.192				
Specific Gravity		1.117	1.067				
VOC Concentration [wt%]		100.000	100.000				
Temperature [°F]		110.047	54.483				
Gas Volumetric Flow [scf/hr]		1.071	1.398				

Inlet Stream Data	
Component	Tank Inlet [Mol%]
Hydrogen Sulfide	0.000
Nitrogen	0.000
Carbon Dioxide	0.001
Methane	0.001
Ethane	0.002
Propane	0.001
i-Butane	0.000
n-Butane	0.000
2,2-Dimethylpropane	0.000
i-Pentane	0.000
n-Pentane	0.000
2,2-Dimethylbutane	0.000
Cyclopentane	0.000
2,3-Dimethylbutane	0.000
2-Methylpentane	0.000
3-Methylpentane	0.000
n-Hexane	0.000
Methylcyclopentane	0.000
Benzene	0.000
Cyclohexane	0.000
2-Methylhexane	0.000
3-Methylhexane	0.000
2,2,4-Trimethylpentane	0.000
n-Heptane	0.000
Methylcyclohexane	0.000
Toluene	0.000
n-Octane	0.000
Ethylbenzene	0.000
m-Xylene	0.000
p-Xylene	0.000
o-Xylene	0.000
n-Nonane	0.000
n-Decane	0.000
Undecane	0.000
Dodecane	0.000
Tridecane	0.000
Tetradecane	0.000
Pentadecane	0.000
Hexadecane	0.000
Heptadecane	0.000
Octadecane	0.000
Nonadecane	0.000
Eicosane	0.000
Heneicosane	0.000
Docosane	0.000
Tricosane	0.000
Tetracosane	0.000
Pentacosane	0.000
Hexacosane	0.000
Heptacosane	0.000
Octacosane	0.000
Nonacosane	0.000
C30	0.000
Water	99.995
C10+	0.000



Residual Liquid Data	
Flow (bbl/d)	122.726
TVP [psia]	12.334

Project information	
File Name	DEET
Company	Devon Energy
City, State	{"Williston, ND","Williston, ND","Williston, ND"}
Equation of State	{"Peng-Robinson","Peng-Robinson","Peng-Robinson"}
Description	DEETMax Emissions Report

Stream Selection											
Item		Inlet Gas	Inlet Gas	Inlet Oil	Inlet Oil						
Name of Process Stream		Gas	Gas	Oil	Oil						

Emission Composition											
No.	Component	Inlet Gas [Mol%]	Inlet Gas [Mass%]	Inlet Oil [Mol%]	Inlet Oil [Mass%]						
1	Hydrogen Sulfide	0.000	0.000	0.000	0.000						
2	Nitrogen	5.481	6.027	0.000	0.000						
3	Carbon Dioxide	0.698	1.206	0.000	0.000						
4	Methane	57.542	36.235	0.010	0.001						
5	Ethane	19.651	23.194	0.266	0.054						
6	Propane	10.279	17.792	1.521	0.455						
7	i-Butane	1.138	2.596	0.626	0.247						
8	n-Butane	3.487	7.955	3.492	1.379						
9	2,2-Dimethylpropane	0.000	0.000	0.006	0.003						
10	i-Pentane	0.633	1.793	1.930	0.946						
11	n-Pentane	0.914	2.588	3.999	1.959						
12	2,2-Dimethylbutane	0.000	0.000	0.030	0.018						
13	Cyclopentane	0.000	0.000	0.000	0.000						
14	2,3-Dimethylbutane	0.000	0.000	0.327	0.191						
15	2-Methylpentane	0.000	0.000	1.758	1.029						
16	3-Methylpentane	0.000	0.000	1.132	0.662						
17	n-Hexane	0.153	0.518	5.168	3.025						
18	Methylcyclopentane	0.000	0.000	1.748	0.999						
19	Benzene	0.000	0.000	0.465	0.247						
20	Cyclohexane	0.000	0.000	1.032	0.590						
21	2-Methylhexane	0.000	0.000	0.916	0.623						
22	3-Methylhexane	0.000	0.000	1.315	0.895						
23	2,2,4-Trimethylpentane	0.000	0.000	0.000	0.000						
24	n-Heptane	0.020	0.079	3.914	2.663						
25	Methylcyclohexane	0.000	0.000	2.408	1.606						
26	Toluene	0.000	0.000	0.783	0.490						
27	n-Octane	0.003	0.013	11.716	9.090						
28	Ethylbenzene	0.000	0.000	0.337	0.243						
29	m-Xylene	0.000	0.000	0.725	0.523						
30	p-Xylene	0.000	0.000	0.242	0.175						
31	o-Xylene	0.000	0.000	0.487	0.351						
32	n-Nonane	0.001	0.005	8.446	7.357						
33	n-Decane	0.000	0.000	7.858	7.593						
34	Undecane	0.000	0.000	4.643	4.929						
35	Dodecane	0.000	0.000	1.477	1.708						
36	Tridecane	0.000	0.000	0.476	0.595						
37	Tetradecane	0.000	0.000	8.149	10.979						
38	Pentadecane	0.000	0.000	0.000	0.000						
39	Hexadecane	0.000	0.000	0.000	0.000						
40	Heptadecane	0.000	0.000	0.000	0.000						
41	Octadecane	0.000	0.000	0.000	0.000						
42	Nonadecane	0.000	0.000	0.000	0.000						
43	Eicosane	0.000	0.000	0.000	0.000						
44	Heneicosane	0.000	0.000	0.000	0.000						
45	Docosane	0.000	0.000	0.000	0.000						
46	Tricosane	0.000	0.000	0.000	0.000						
47	Tetracosane	0.000	0.000	0.000	0.000						
48	Pentacosane	0.000	0.000	0.000	0.000						
49	Hexacosane	0.000	0.000	0.000	0.000						
50	Heptacosane	0.000	0.000	0.000	0.000						
51	Octacosane	0.000	0.000	0.000	0.000						
52	Nonacosane	0.000	0.000	0.000	0.000						
53	C30	0.000	0.000	0.000	0.000						
54	Water	0.000	0.000	0.000	0.000						
55	C10+	0.000	0.000	22.601	38.375						

Stream Selection											
Item				1st Stage Gas	2nd Stage Gas	Heater Treater Gas	Gunbarrel Gas	ULPS Gas	Oil Tanks	Water Tanks	
Name of Process Stream				1st Stage Gas	2nd Stage Gas	HT Gas	5	ULPS Gas	See Oil Tank Report	SeeWater Tank Report	

Emission Summary											
Item				1st Stage Gas	2nd Stage Gas	Heater Treater Gas	Gunbarrel Gas	ULPS Gas	Oil Tanks	Water Tanks	
				[%]	[%]	[%]	[%]	[%]	[%]	[%]	
Control Effenciency				98	98	98	98	98	98	98	
Percent to Flare				30	0	100	0	0	100	100	

Emission Summary											
Item				1st Stage Gas	2nd Stage Gas	Heater Treater Gas	Gunbarrel Gas	ULPS Gas	Oil Tanks	Water Tanks	Total
				[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]	[ton/yr]
VOCs [C3+]				14.035		2.094			1.348	0.008	17.485
Benzene				0.028	0.000	0.004	0.000	0.000	0.003	0.000	0.035
H2S				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Emission Composition											
No.	Component			1st Stage Gas [Mol%]	2nd Stage Gas [Mol%]	Heater Treater [Mol%]	Gunbarrel Gas [Mol%]	ULPS [Mol%]	Oil Tanks [Mol %]	Water Tanks [Mol %]	
1	Hydrogen Sulfide			0.000	--	0.000	--	--	See Oil Tank Report	See Water Tank Report	
2	Nitrogen			5.481	--	0.981	--	--			
3	Carbon Dioxide			0.684	--	0.688	--	--			
4	Methane			57.206	--	26.924	--	--			
5	Ethane			18.993	--	27.776	--	--			
6	Propane			9.463	--	22.218	--	--			
7	i-Butane			1.006	--	2.705	--	--			
8	n-Butane			3.083	--	8.526	--	--			
9	2,2-Dimethylpropane			0.001	--	0.002	--	--			
10	i-Pentane			0.564	--	1.557	--	--			
11	n-Pentane			0.847	--	2.315	--	--			
12	2,2-Dimethylbutane			0.002	--	0.006	--	--			
13	Cyclopentane			0.000	--	0.000	--	--			
14	2,3-Dimethylbutane			0.021	--	0.054	--	--			
15	2-Methylpentane			0.106	--	0.279	--	--			
16	3-Methylpentane			0.064	--	0.168	--	--			
17	n-Hexane			0.306	--	0.773	--	--			
18	Methylcyclopentane			0.086	--	0.226	--	--			
19	Benzene			0.022	--	0.057	--	--			
20	Cyclohexane			0.045	--	0.114	--	--			
21	2-Methylhexane			0.029	--	0.069	--	--			
22	3-Methylhexane			0.039	--	0.092	--	--			
23	2,2,4-Trimethylpentane			0.000	--	0.000	--	--			
24	n-Heptane			0.099	--	0.228	--	--			
25	Methylcyclohexane			0.059	--	0.141	--	--			
26	Toluene			0.016	--	0.038	--	--			
27	n-Octane			0.122	--	0.251	--	--			
28	Ethylbenzene			0.003	--	0.006	--	--			
29	m-Xylene			0.006	--	0.012	--	--			
30	p-Xylene			0.002	--	0.004	--	--			
31	o-Xylene			0.004	--	0.007	--	--			
32	n-Nonane			0.036	--	0.066	--	--			
33	n-Decane			0.014	--	0.022	--	--			
34	Undecane			0.003	--	0.005	--	--			
35	Dodecane			0.000	--	0.001	--	--			
36	Tridecane			0.000	--	0.000	--	--			
37	Tetradecane			0.000	--	0.000	--	--			
38	Pentadecane			0.000	--	0.000	--	--			
39	Hexadecane			0.000	--	0.000	--	--			
40	Heptadecane			0.000	--	0.000	--	--			
41	Octadecane			0.000	--	0.000	--	--			
42	Nonadecane			0.000	--	0.000	--	--			
43	Eicosane			0.000	--	0.000	--	--			
44	Heneicosane			0.000	--	0.000	--	--			
45	Docosane			0.000	--	0.000	--	--			
46	Tricosane			0.000	--	0.000	--	--			
47	Tetracosane			0.000	--	0.000	--	--			
48	Pentacosane			0.000	--	0.000	--	--			
49	Hexacosane			0.000	--	0.000	--	--			
50	Heptacosane			0.000	--	0.000	--	--			
51	Octacosane			0.000	--	0.000	--	--			
52	Nonacosane			0.000	--	0.000	--	--			
53	C30			0.000	--	0.000	--	--			
54	Water			1.590	--	3.687	--	--			
55	C10+			0.000	--	0.000	--	--			

Stream Compositional Data											
No.	Component			1st Stage Gas [ton/yr]	2nd Stage Gas [ton/yr]	Heater Treater [ton/yr]	Gunbarrel Gas [ton/yr]	ULPS [ton/yr]	Oil Tanks [ton/yr]	Water Tanks [ton/yr]	Total [ton/yr]
1	Hydrogen Sulfide			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
2	Nitrogen			2.51	0.00	0.03	0.00	0.00	0.00	0.00	2.537
3	Carbon Dioxide			0.49	0.00	0.03	0.00	0.00	0.01	0.00	0.531
4	Methane			14.99	0.00	0.42	0.00	0.00	0.05	0.00	15.466
5	Ethane			9.33	0.00	0.81	0.00	0.00	0.35	0.00	10.497
6	Propane			6.82	0.00	0.95	0.00	0.00	0.58	0.00	8.355
7	i-Butane			0.96	0.00	0.15	0.00	0.00	0.10	0.00	1.211
8	n-Butane			2.93	0.00	0.48	0.00	0.00	0.33	0.00	3.740
9	2,2-Dimethylpropane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.001
10	i-Pentane			0.66	0.00	0.11	0.00	0.00	0.07	0.00	0.849
11	n-Pentane			1.00	0.00	0.16	0.00	0.00	0.11	0.00	1.271
12	2,2-Dimethylbutane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.004
13	Cyclopentane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
14	2,3-Dimethylbutane			0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.036
15	2-Methylpentane			0.15	0.00	0.02	0.00	0.00	0.02	0.00	0.189
16	3-Methylpentane			0.09	0.00	0.01	0.00	0.00	0.01	0.00	0.114
17	n-Hexane			0.43	0.00	0.06	0.00	0.00	0.04	0.00	0.537
18	Methylcyclopentane			0.12	0.00	0.02	0.00	0.00	0.01	0.00	0.149
19	Benzene			0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.035
20	Cyclohexane			0.06	0.00	0.01	0.00	0.00	0.01	0.00	0.077
21	2-Methylhexane			0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.058
22	3-Methylhexane			0.06	0.00	0.01	0.00	0.00	0.01	0.00	0.078
23	2,2,4-Trimethylpentane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
24	n-Heptane			0.16	0.00	0.02	0.00	0.00	0.01	0.00	0.198
25	Methylcyclohexane			0.10	0.00	0.01	0.00	0.00	0.01	0.00	0.117
26	Toluene			0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.030
27	n-Octane			0.23	0.00	0.03	0.00	0.00	0.02	0.00	0.271
28	Ethylbenzene			0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.006
29	m-Xylene			0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.012
30	p-Xylene			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.004
31	o-Xylene			0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.007
32	n-Nonane			0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.087
33	n-Decane			0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.036
34	Undecane			0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.009
35	Dodecane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.001
36	Tridecane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
37	Tetradecane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.001
38	Pentadecane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
39	Hexadecane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
40	Heptadecane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
41	Octadecane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
42	Nonadecane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
43	Eicosane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
44	Heneicosane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
45	Docosane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
46	Tricosane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
47	Tetracosane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
48	Pentacosane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
49	Hexacosane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
50	Heptacosane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
51	Octacosane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
52	Nonacosane			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
53	C30			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
54	Water			0.47	0.00	0.06	0.00	0.00	0.02	0.00	0.552
55	C10+			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000

Stream Properties											
				1st Stage Gas	2nd Stage Gas	Heater Treater	Gunbarrel	ULPS	Oil Tanks	Water Tanks	
Heating Value [BTU/scf]				1273.695	--	1813.515	--	--	See Oil Tank Report	See Oil Tank Report	
Molecular Weight [lb/lbmol]				25.602	--	35.475	--	--			
Gas Volumetric Flow [mscf/day]				169.649	0.000	10.099	0.000	0.000	4.247	0.001	

Attachment G: Hydrocarbon Analyses

Date: 10-Jan-2022

Certificate of Analysis: WN22-00001.001

Kevin Dixon

CLIENT ORDER NUMBER :	T&T MEASUREMENT	SGS ORDER NO.:	4867205
CLIENT ID :	DEVON/WPX		
LOCATION :	Crosby, ND	PRODUCT DESCRIPTION :	Natural Gas
SAMPLE SOURCE :	As Supplied		
SAMPLE TYPE :	As Submitted	SAMPLED BY :	Client
SAMPLED :	02-Dec-2022	RECEIVED	22-Dec-2022
ANALYSED :	10-Jan-2022	COMPLETED :	10-Jan-2022
SAMPLE COMMENT :	**Conditions: 162.7 psi @ 125 °F Sampled by Derrick Thompson**		

PROPERTY	METHOD	RESULT UNITS
Extended Analysis of Natural Gas and Similar Gaseous Mixtures by GC	GPA 2286	
See Attachment		See Attached --

AUTHORISED SIGNATORY

Curtis Kendal
Laboratory Technician

SGS North America Inc. | Oil, Gas & Chemicals Services 301 West 2nd Street, P.O.Box 1527, Williston, ND, 58801, U.S.A. Tel: +1-(701)-572-3632 Fax: +1-(701)-572-4654

SGS North America_Williston, N.D.

C10+ Extended Natural Gas Analysis Report

Sample Information

	Sample Information
Analysis Number	Job#00001
Customer	T&T MEASUREMENTS INC
Sample Name	DEVON/ WPX
Property	CROSBY CHASE
Well ID	
Sample Type	Natural Gas
Cylinder Number	
Pressure PSIG	162.7 psi
Temp F	125°F
Field H2S ppm	
Moisture (mmcf)	
Sample Technician	Derek T
Sample Date	12/22/21
Lab Technician	Paige Wallery
Reviewed by	Curtis Kendal
Comments	
Methods/Calculations/Constants	----------GPA 2286, GPA 2172, GPA 2145----------
Report Date	2022-01-07 17:12:29

Component Results

Component Name	Norm Mole%	Norm Weight%	Norm Volume%	GPM (Dry) (Gal. / 1000 cu.ft.)
Nitrogen	5.481	6.027	2.917	0.606
Methane	57.542	36.234	47.186	9.802
Carbon Dioxide	0.698	1.206	0.576	0.120
Ethane	19.651	23.194	25.422	5.281
Propane	10.279	17.792	13.699	2.845
i-Butane	1.138	2.596	1.801	0.374
n-Butane	3.487	7.955	5.317	1.105
i-Pentane	0.633	1.793	1.120	0.233
n-Pentane	0.914	2.588	1.602	0.333
n-Hexane	0.153	0.518	0.305	0.063
n-Heptane	0.020	0.079	0.045	0.009
n-Octane	0.003	0.013	0.007	0.002
n-Nonane	0.001	0.005	0.003	0.001
n-Decane	0.000	0.000	0.000	0.000
Total:	100.000	100.000	100.000	20.773

Results Summary

Result	Dry	C6+
Gross Heating Value (BTU / Ideal cu.ft.)	1412.2	4898.8
Gross Heating Value (BTU / Real cu.ft.)	1419.3	
Gross Heating Value (BTU / lbm)	20987	20922
Gross Heating Value (BTU / gal.)	68326	116644
Relative Density (G), Ideal	0.8796	3.0607
Relative Density (G), Real	0.8837	
Compressibility (Z) Factor	0.9950	
Total Molecular Weight	25.476	88.647
Total Vapor Pressure (psia)	3339.24	4.46
Total Volume (cu.ft. / gal.)	48.3831	23.8110

Total Component Results

Component	Weight%	Mole%	Volume%
Nitrogen	6.027	5.481	2.917
Methane	36.234	57.542	47.186
Carbon Dioxide	1.206	0.698	0.576
Ethane	23.194	19.651	25.422
Propane	17.792	10.279	13.699
i-Butane	2.596	1.138	1.801
n-Butane	7.955	3.487	5.317
i-Pentane	1.793	0.633	1.120
n-Pentane	2.588	0.914	1.602
n-Hexane	0.518	0.153	0.305
n-Heptane	0.079	0.020	0.045
n-Octane	0.013	0.003	0.007
n-Nonane	0.005	0.001	0.003
n-Decane	0.000	0.000	0.000
Total:	100.000	100.000	100.000

Date: 10-Jan-2022

Certificate of Analysis: WN22-00001.002

Kevin Dixon

CLIENT ORDER NUMBER :	T&T MEASUREMENT	SGS ORDER NO.:	4867205
CLIENT ID :	DEVON/WPX		
LOCATION :	Crosby, ND	PRODUCT DESCRIPTION :	Natural Gas Liquid
SAMPLE SOURCE :	As Supplied		
SAMPLE TYPE :	As Submitted	SAMPLED BY :	Client
SAMPLED :	22-Dec-2022	RECEIVED	22-Dec-2022
ANALYSED :	10-Jan-2022	COMPLETED :	10-Jan-2022
SAMPLE COMMENT :	**Conditions: 162.7 psi @ 125 °F Sampled by Derrick Thompson**		

PROPERTY	METHOD	RESULT UNITS
Individual Components in Spark Ignition Engine Fuels by 100m HRGC	ASTM D6730	
See Attachment		See Attached ---

**** End of Analytical Results ****

This document is only valid in its entirety and your attention is drawn to the Terms and Conditions on Page 1 of this report

AUTHORISED SIGNATORY

Curtis Kendal
Laboratory Technician

SGS North America Inc. | Oil, Gas & Chemicals Services 301 West 2nd Street, P.O.Box 1527, Williston, ND, 58801, U.S.A. Tel: +1-(701)-572-3632 Fax: +1-(701)-572-4654

Sample: DP21-00227-001 07-Jan-22, 16:10:49
File: C:\Chem32\1\DATA\010722\122221 2022-01-07 16-03-25\DP21-00227-001.D\DP21-00227-001_FID1_A.SSM
Parameter: C:\SeparationSystems\HCE5\Templates\normal-D6730-052421.HCDX
LIMS Id:

Summary by Group

Group	%Wgt	%Vol	%Mol	Avg MW	Avg SG
Paraffin	23.409	26.925	29.395	27.315	0.180
I-Paraffins	26.112	28.378	26.552	30.470	0.200
Aromatics	12.037	10.452	11.328	14.046	0.092
Mono-Aromatics	11.350	9.917	10.738	13.244	0.087
Naphthalenes	0.437	0.328	0.373	0.510	0.003
Indanes	0.251	0.207	0.217	0.293	0.002
Indenes	0.000	0.000	0.000	0.000	0.000
Naphthenes	18.629	18.613	20.565	21.738	0.143
Mono-Naphthenes	18.535	18.532	20.483	21.628	0.142
Di/Bicyclo-Naphthenes	0.094	0.081	0.083	0.109	0.001
Olefins	0.817	0.879	0.761	0.954	0.006
n-Olefins	0.000	0.000	0.000	0.000	0.000
Iso-Olefins	0.718	0.775	0.656	0.838	0.006
Naphtheno-Olefins	0.099	0.104	0.105	0.116	0.001
Di-Olefins	0.000	0.000	0.000	0.000	0.000
Oxygenates	0.000	0.000	0.000	0.000	0.000
Unidentified	1.084	1.014	0.844	1.265	0.008
Plus	17.911	13.739	10.556	20.901	0.137
	100.000	**100.000**	**100.000**	**116.690**	**0.767**

Recovery = 100.000

Sample: DP21-00227-001
File: C:\Chem32\1\DATA\010722\122221 2022-01-07 16-03-25\DP21-00227-001.D\DP21-00227-001_FID1_A.SSM 07-Jan-22, 16:10:49
Parameter: C:\SeparationSystems\HCE5\Templates\normal-D6730-052421.HCDX
LIMS Id:

Summary by Carbon

C#	%Wgt	%Vol	%Mol
C1	0.002	0.005	0.013
C2	0.089	0.200	0.344
C3	0.744	1.141	1.970
C4	2.657	3.542	5.335
C5	4.754	5.843	7.688
C6	9.586	10.641	13.125
C7	12.936	13.681	15.282
C8	14.585	14.903	15.178
C9	11.873	12.040	10.942
C10	12.151	11.913	10.179
C11	7.920	7.741	6.015
C12	2.735	2.610	1.913
C13	0.973	0.986	0.616
C14	17.911	13.739	10.556

Recovery = 100.000

Sample: DP21-00227-001
File: C:\Chem32\1\DATA\010722\122221 2022-01-07 16-03-25\DP21-00227-001.D\DP21-00227-001_FID1_A.SSM 07-Jan-22, 16:10:49
Parameter: C:\SeparationSystems\HCE5\Templates\normal-D6730-052421.HCDX
LIMS Id:

Calculated Octane Numbers

Group	RON	MON
Paraffin	2.33	2.30
I-Paraffins	13.43	14.85
Aromatics	0.00	0.00
Mono-Aromatics	*12.36*	*11.27*
Naphthalenes	*0.33*	*0.29*
Indanes	*0.29*	*0.26*
Indenes	*0.00*	*0.00*
Naphthenes	0.00	0.00
Mono-Naphthenes	*13.94*	*13.20*
Di/Bicyclo-Naphthenes	*0.12*	*0.11*
Olefins	0.00	0.00
n-Olefins	*0.00*	*0.00*
Iso-Olefins	*0.62*	*0.53*
Naphtheno-Olefins	*0.09*	*0.08*
Di-Olefins	*0.00*	*0.00*
Oxygenates	0.00	0.00
Unidentified	0.00	0.00
Plus	0.22	0.19

Total Linear RON = 43.74
Total Linear MON = 43.10

Total Calculated RON = 45.42
Total Calculated MON = 45.39

Recovery = 100.000

Sample: DP21-00227-001
File: C:\Chem32\1\DATA\010722\122221 2022-01-07 16-03-25\DP21-00227-001.D\DP21-00227-001_FID1_A.SSM
Parameter: C:\SeparationSystems\HCE5\Templates\normal-D6730-052421.HCDX
LIMS Id:

07-Jan-22, 16:10:49

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol	%Mol
1	6.63	100.00	1	Methane	0.002	0.005	0.013
2	6.81	200.00	2	Ethane	0.089	0.200	0.344
3	7.36	300.00	3	Propane	0.744	1.141	1.970
4	8.36	354.21	4	i-Butane	0.404	0.556	0.811
5	9.31	400.00	4	n-Butane	2.253	2.986	4.524
6	9.78	410.87	5	2,2-Dimethylpropane	0.005	0.006	0.008
7	12.97	472.36	5	i-Pentane	1.546	1.914	2.500
8	14.72	500.00	5	n-Pentane	3.203	3.923	5.180
9	17.16	538.30	6	2,2-Dimethylbutane	0.029	0.034	0.039
10	19.11	565.13	6	2,3-Dimethylbutane	0.312	0.362	0.423
11	19.29	567.45	6	4-Methyl-c-pentene-2	0.152	0.172	0.210
12	19.64	571.93	6	2-Methylpentane	1.682	1.975	2.277
13	20.64	584.28	6	3-Methylpentane	1.082	1.250	1.466
14	21.98	600.00	6	n-Hexane	3.328	3.871	4.506
15	23.91	622.33	7	2,2-Dimethylpentane	0.034	0.039	0.040
16	24.07	624.11	6	Methylcyclopentane	1.633	1.673	2.264
17	24.47	628.54	7	2,4-Dimethylpentane	0.114	0.130	0.133
18	24.86	632.74	7	2,2,3-Trimethylbutane	0.007	0.007	0.008
19	26.32	647.92	6	Benzene	0.403	0.352	0.602
20	26.74	652.18	7	3,3-Dimethylpentane	0.030	0.033	0.035
21	27.10	655.73	6	Cyclohexane	0.964	0.950	1.337
22	28.12	665.54	7	2-Methylhexane	1.001	1.132	1.166
23	28.26	666.87	7	2,3-Dimethylpentane	0.392	0.433	0.457
24	28.53	669.41	7	1,1-Dimethylcyclopentane	0.317	0.322	0.376
25	29.05	674.24	7	3-Methylhexane	1.463	1.633	1.704
26	29.74	680.42	7	1c,3-Dimethylcyclopentane	0.685	0.706	0.815
27	30.06	683.28	7	1t,3-Dimethylcyclopentane	0.649	0.665	0.772
28	30.23	684.77	7	3-Ethylpentane	0.129	0.142	0.150
29	30.39	686.16	7	1t,2-Dimethylcyclopentane	1.203	1.228	1.430
30	32.01	700.00	7	n-Heptane	3.277	3.677	3.816
31	34.69	717.08	7	Methylcyclohexane	2.624	2.616	3.119
32	35.14	719.77	8	1,1,3-tm-cycloC5 + 2,2-dm-C6	0.525	0.539	0.546
33	36.50	727.83	7	Ethylcyclopentane	0.209	0.209	0.248
34	36.68	728.87	8	2,5-Dimethylhexane	0.122	0.135	0.125
35	36.98	730.63	8	2,4-Dimethylhexane	0.217	0.237	0.221
36	37.91	735.86	8	1c,2t,4-Trimethylcyclopentane	0.569	0.571	0.591
37	38.12	737.04	8	3,3-Dimethylhexane	0.053	0.058	0.055
38	39.19	742.90	8	1t,2c,3-Trimethylcyclopentane	0.551	0.549	0.573
39	39.66	745.47	8	2,3,4-Trimethylpentane	0.023	0.025	0.024
40	40.63	750.56	7	Toluene	0.801	0.709	1.014
41	41.82	756.67	8	2,3-Dimethylhexane	0.368	0.396	0.375
42	42.03	757.74	8	2-Methyl-3-ethylpentane	0.079	0.085	0.080
43	43.07	762.93	8	2-Methylheptane	1.386	1.523	1.416
44	43.38	764.44	8	4-Methylheptane	0.489	0.533	0.500
45	43.70	766.01	8	3,4-Dimethylhexane	0.164	0.175	0.168
46	44.16	768.24	8	1-c,2-t,4-trimethyl cyclopent	0.085	0.085	0.088
47	44.69	770.75	8	1,3-dimethyl-t-cyclohexane	0.904	0.900	0.940
48	44.93	771.92	8	1,3-dimethyl-c-cyclohexane	1.400	1.409	1.456

Recovery = 100.000

Sample: DP21-00227-001 07-Jan-22, 16:10:49
File: C:\Chem32\1\DATA\010722\122221 2022-01-07 16-03-25\DP21-00227-001.D\DP21-00227-001_FID1_A.SSM
Parameter: C:\SeparationSystems\HCE5\Templates\normal-D6730-052421.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol	%Mol
49	45.36	773.91	8	3-ethylhexane	0.377	0.405	0.385
50	46.59	779.60	8	1t,3-Dimethylcyclohexane	0.126	0.125	0.131
51	47.50	783.68	8	1t,4-Dimethylcyclohexane	0.162	0.163	0.168
52	48.01	785.98	8	1,1-Dimethylcyclohexane	0.141	0.138	0.147
53	48.33	787.35	8	C8 MonoNaph - 2	0.325	0.323	0.338
54	48.82	789.51	9	2,2,5-Trimethylhexane	0.070	0.076	0.064
55	49.49	792.42	8	1t,2-Dimethylcyclohexane	0.588	0.581	0.612
56	51.30	800.00	8	n-Octane	3.005	3.281	3.070
57	53.38	808.17	8	1c,4-Dimethylcyclohexane	0.091	0.089	0.095
58	54.43	812.16	8	C8 MonoNaph - 3	0.020	0.020	0.021
59	55.10	814.65	8	C8 - MonoNaph - 4	0.047	0.047	0.049
60	55.91	817.67	9	2,2,3,4-Tetramethylpentane	0.041	0.043	0.038
61	56.40	819.44	9	2,3,4-Trimethylhexane	0.045	0.046	0.041
62	57.06	821.83	8	Cyclopentane, 1-ethyl-2-methyl	0.032	0.032	0.034
63	58.20	825.90	8	1,4-Dimethyl-1-cyclohexene	0.099	0.104	0.105
64	58.43	826.70	8	1c,2-Dimethylcyclohexane	0.230	0.221	0.239
65	59.13	829.14	?	Unidentified	0.044	0.041	0.034
66	59.94	831.95	9	1,3,5-trimethylhexane	0.932	0.985	0.848
67	60.65	834.36	9	1,1,4-Trimethylcyclohexane	0.438	0.435	0.405
68	61.05	835.72	9	2,2,3-Trimethylhexane	0.050	0.054	0.046
69	61.72	837.94	9	2,4-dimethylheptane	0.506	0.546	0.460
70	62.51	840.56	9	4,4-dimethylheptane	0.064	0.068	0.058
71	62.94	841.98	8	Ethylcyclohexane	0.223	0.218	0.232
72	63.37	843.37	8	n-Propylcyclopentane	0.072	0.071	0.074
73	63.65	844.28	9	1c,3c,5-Trimethylcyclohexane	0.088	0.088	0.081
74	64.12	845.77	9	2,5-Dimethylheptane	0.176	0.189	0.160
75	64.71	847.64	9	3,3-dimethylheptane	0.097	0.103	0.088
76	66.23	852.42	9	1,1,3-Trimethylcyclohexane	0.057	0.055	0.052
77	66.81	854.21	8	Ethylbenzene	0.398	0.352	0.437
78	67.32	855.76	9	1c,2t,4t-Trimethylcyclohexane	0.436	0.429	0.403
79	68.06	858.00	9	C9 - MonoNaph - 4	0.037	0.036	0.034
80	68.93	860.60	10	C10 - Isoparaffin - 2	0.064	0.068	0.053
81	70.11	864.10	8	m-Xylene	0.854	0.758	0.939
82	70.50	865.25	8	p-Xylene	0.286	0.255	0.314
83	70.74	865.94	9	2,3-Dimethylheptane	0.226	0.239	0.206
84	71.44	867.95	9	3,4-Dimethylheptane	0.251	0.263	0.228
85	72.51	871.01	9	C9 - MonoNapth - 5	0.174	0.173	0.161
86	73.57	873.99	9	4-Ethylheptane	0.474	0.505	0.431
87	73.93	874.97	9	3,3-Diethylpentane	0.510	0.520	0.464
88	74.34	876.12	9	2-Methyloctane	0.049	0.053	0.045
89	75.04	878.04	10	C10 - MonoNaph - 1	0.170	0.180	0.140
90	75.51	879.33	9	1c,2t,3-Trimethylcyclohexane	0.197	0.200	0.182
91	75.94	880.47	9	Heptane, 3-ethyl-	0.852	0.900	0.776
92	77.14	883.70	8	o-Xylene	0.574	0.500	0.631
93	78.93	888.41	9	Cyclohexane, 1,2,4-trimethyl-,	0.779	0.774	0.720
94	79.53	889.96	9	Cyclohexane, 1-ethyl-2-methyl-	0.266	0.255	0.246
95	80.33	892.02	9	C9 MonoNaph - 6	0.033	0.032	0.031
96	80.76	893.11	9	i-Butylcyclopentane	0.083	0.081	0.077

Recovery = 100.000

Sample: DP21-00227-001
File: C:\Chem32\1\DATA\010722\122221 2022-01-07 16-03-25\DP21-00227-001.D\DP21-00227-001_FID1_A.SSM
Parameter: C:\SeparationSystems\HCE5\Templates\normal-D6730-052421.HCDX
LIMS Id:
07-Jan-22, 16:10:49

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol	%Mol
97	81.86	895.89	9	C9 - mononaph - 8	0.033	0.032	0.031
98	82.55	897.61	10	C10 - IsoOlefin - 1	0.074	0.080	0.061
99	83.17	899.14	10	C10 - isoparaffin - 5	0.127	0.134	0.104
100	83.52	900.00	9	n-Nonane	2.454	2.623	2.233
101	84.14	903.60	9	1-ethyl-4-t-methylcyclohexane	0.052	0.049	0.048
102	84.40	905.12	10	3,7-Dimethyloctene-1	0.060	0.065	0.050
103	85.40	910.84	9	Cyclohexane, 1-ethyl-4-methyl-, trans	0.024	0.024	0.023
104	85.67	912.39	9	i-Propylbenzene	0.067	0.060	0.065
105	86.01	914.30	9	i-Propylcyclohexane	0.315	0.302	0.292
106	86.55	917.39	10	2,3-Dimethyloctane	0.184	0.195	0.151
107	87.26	921.37	10	Heptane, 2,3,5-trimethyl-	0.146	0.112	0.120
108	87.79	924.33	10	Heptane, 2,4,6-trimethyl-	0.177	0.136	0.145
109	88.44	927.91	9	Cyclohexane, 1-ethyl-2-methyl-, trans	0.084	0.081	0.078
110	88.97	930.81	10	C10 IsoParaffin - 1	0.459	0.484	0.377
111	89.33	932.78	9	C9 MonoNaph - 8	0.138	0.132	0.128
112	89.94	936.12	10	C10 - IsoParaffin - 2(1)	0.148	0.156	0.121
113	90.26	937.85	10	2,5-Dimethyloctane	0.190	0.200	0.156
114	90.68	940.10	9	C9-MonoNaphthene-9	0.095	0.091	0.088
115	91.11	942.39	10	2,6-Dimethyloctane	0.571	0.600	0.468
116	91.54	944.71	10	3,3-dimethyloctane	0.174	0.181	0.143
117	91.87	946.46	9	n-Propylbenzene	0.108	0.096	0.105
118	92.08	947.56	?	Unidentified	0.189	0.176	0.147
119	92.43	949.40	10	3,6-Dimethyloctane	0.351	0.366	0.288
120	92.77	951.21	10	3-Methyl-5-ethylheptane	0.109	0.115	0.089
121	93.39	954.48	9	1-Methyl-3-ethylbenzene	0.467	0.414	0.453
122	93.74	956.25	9	1-Methyl-4-ethylbenzene	0.152	0.135	0.148
123	94.05	957.90	9	1,3,5-Trimethylbenzene	0.221	0.196	0.215
124	94.86	962.07	10	2,3-Dimethyloctane(1)	0.674	0.700	0.552
125	95.19	963.76	10	2,3-Dimethyl-2-octene	0.141	0.154	0.117
126	95.35	964.56	?	Unidentified	0.106	0.099	0.083
127	96.00	967.91	10	4-Methylnonane	0.165	0.173	0.136
128	96.30	969.43	10	I17	0.617	0.640	0.506
129	96.77	971.78	10	2-Methylnonane	0.475	0.501	0.389
130	97.32	974.53	10	3-Ethyloctane	0.182	0.188	0.149
131	97.86	977.25	10	3-Methylnonane	0.544	0.569	0.446
132	98.61	980.98	10	C10-Isoparaffin-7	0.048	0.051	0.040
133	99.07	983.25	11	C11-Isoparaffin-2	1.350	1.392	1.008
134	99.65	986.10	10	C10 IsoParaffin - 8	0.292	0.306	0.240
135	99.90	987.32	10	i-Butylcyclohexane	0.215	0.207	0.179
136	101.35	994.32	9	C9 - MonoNaph - 10	0.306	0.293	0.282
137	101.67	995.85	10	C10 - MonoNaph - 2	0.072	0.069	0.060
138	102.04	997.62	10	sec-Butylbenzene	0.245	0.218	0.213
139	102.54	1000.00	10	n-Decane	1.725	1.813	1.415
140	103.39	1006.66	9	1,2,3-Trimethylbenzene	0.423	0.362	0.410
141	103.79	1009.77	10	1-Methyl-3-i-propylbenzene	0.122	0.109	0.106
142	104.23	1013.14	10	1-Methyl-4-i-propylbenzene	0.094	0.084	0.082
143	104.79	1017.42	11	C11 IsoParaffin - 5	0.038	0.039	0.028
144	104.99	1018.95	11	C11 IsoParaffin - 6	0.203	0.209	0.152

Recovery = 100.000

Sample: DP21-00227-001
File: C:\Chem32\1\DATA\010722\122221 2022-01-07 16-03-25\DP21-00227-001.D\DP21-00227-001_FID1_A.SSM
Parameter: C:\SeparationSystems\HCE5\Templates\normal-D6730-052421.HCDX
LIMS Id:
07-Jan-22, 16:10:49

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol	%Mol
145	105.54	1023.10	11	C11-Isoparaffin-7	0.223	0.230	0.167
146	106.13	1027.60	10	1-Methyl-2-i-propylbenzene	0.533	0.467	0.464
147	106.69	1031.83	11	2,5,6-Trimethyloctane	0.427	0.441	0.319
148	107.32	1036.52	11	C11-Isoparaffin-9	0.238	0.245	0.177
149	107.77	1039.89	10	1,3-Diethylbenzene	0.142	0.126	0.124
150	108.33	1044.06	11	Nonane, 3,7-dimethyl-	0.476	0.491	0.355
151	108.61	1046.11	10	1-Methyl-4-n-propylbenzene	0.109	0.097	0.095
152	108.77	1047.27	10	1,4-Diethylbenzene	0.078	0.069	0.067
153	109.07	1049.51	10	1,3-Dimethyl-5-ethylbenzene	0.200	0.175	0.174
154	109.46	1052.37	10	1,2-Diethylbenzene	0.224	0.195	0.194
155	110.14	1057.32	10	1-Methyl-2-n-propylbenzene	0.386	0.339	0.336
156	110.46	1059.59	11	C11 IsoParaffin - 13	0.036	0.037	0.027
157	110.85	1062.46	11	C11 IsoParaffin - 14	0.236	0.243	0.176
158	111.25	1065.35	11	C11- Isoparaffin-16	0.303	0.313	0.226
159	111.58	1067.74	11	C11- Isoparaffin - 17	0.157	0.162	0.117
160	111.75	1068.90	10	1,4,Dimethyl-2-ethylbenzene	0.408	0.357	0.355
161	112.56	1074.69	10	1,2-Dimethyl-4-ethylbenzene	0.478	0.419	0.416
162	112.87	1076.91	11	C11 - IsoOlefin - 2	0.136	0.141	0.103
163	113.19	1079.20	10	1,3-Dimethyl-2-ethylbenzene	0.083	0.071	0.072
164	113.53	1081.57	?	Unidentified	0.047	0.044	0.037
165	113.99	1084.79	11	C11 - IsoParaffin - 19	0.127	0.131	0.095
166	114.18	1086.12	11	C11 - IsoParaffin - 20	0.155	0.160	0.116
167	114.50	1088.39	11	1-methyl-4-(1-methylpropyl)be	0.133	0.114	0.105
168	114.71	1089.85	11	1-Octene, 6-methyl-	0.097	0.100	0.073
169	114.97	1091.69	11	1-Ethyl-3-i-propylbenzene	0.110	0.094	0.086
170	115.21	1093.36	10	1,2-Dimethyl-3-ethylbenzene	0.196	0.169	0.171
171	115.46	1095.07	10	2-Methylindan	0.101	0.081	0.090
172	115.71	1096.82	11	1-Ethyl-2-i-propylbenzene	0.078	0.067	0.061
173	116.17	1100.00	11	n-Undecane	1.424	1.468	1.063
174	116.64	1104.31	10	1,2,4,5-Tetramethylbenzene	0.220	0.190	0.191
175	117.05	1108.14	11	1-Methyl-1-n-butylbenzene	0.437	0.376	0.344
176	117.59	1113.09	11	C11-MonoNaphthene-2	0.049	0.046	0.037
177	117.99	1116.81	11	1-t-Butyl-2-methylbenzene	0.108	0.093	0.085
178	118.35	1120.05	11	C11 - Aromatic - 2	0.064	0.055	0.050
179	118.47	1121.13	12	C12 IsoParaffin - 2	0.181	0.187	0.124
180	119.00	1125.97	11	1-Methyl-3-n-butylbenzene	0.199	0.172	0.157
181	119.16	1127.45	10	5-Methylindan	0.033	0.029	0.030
182	119.57	1131.14	12	1,2-Di-i-propylbenzene	0.140	0.121	0.101
183	119.81	1133.32	10	4-Methylindan	0.050	0.043	0.044
184	120.08	1135.77	11	Benzene, 1-(1,1-dimethylethyl)-3-methyl-	0.169	0.145	0.133
185	120.24	1137.19	10	2-Methylindan(1)	0.023	0.020	0.021
186	120.55	1139.99	11	C11 - Aromatic - 4	0.050	0.043	0.040
187	120.77	1141.92	12	1,3-Di-i-propylbenzene	0.077	0.066	0.055
188	120.98	1143.87	11	Benzene, 1-ethyl-3-(1-methylethyl)-	0.075	0.064	0.059
189	121.19	1145.66	12	Heptane, 3-ethyl-2-methyl-	0.006	0.006	0.004
190	121.45	1148.01	11	2,4-diethyl-1-methylbenzene	0.074	0.064	0.059
191	121.83	1151.41	11	n-Pentylbenzene	0.012	0.010	0.009
192	121.97	1152.68	12	1t-M-2-(4-MP)cyclopentane	0.016	0.015	0.011

Recovery = 100.000

Sample: DP21-00227-001 07-Jan-22, 16:10:49
File: C:\Chem32\1\DATA\010722\122221 2022-01-07 16-03-25\DP21-00227-001.D\DP21-00227-001_FID1_A.SSM
Parameter: C:\SeparationSystems\HCE5\Templates\normal-D6730-052421.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol	%Mol
193	122.09	1153.73	11	C11 - Aromatic - 5	0.022	0.019	0.017
194	122.31	1155.63	11	1,4-diethyl-2-methylbenzene	0.022	0.019	0.017
195	122.60	1158.20	12	C12 - Isoparaffin - 5	0.248	0.253	0.170
196	122.74	1159.39	11	1-Methyl-2-n-butylbenzene	0.133	0.114	0.104
197	123.16	1163.12	10	Tetralin	0.094	0.081	0.083
198	123.63	1167.24	10	Naphthalene	0.173	0.130	0.158
199	123.83	1169.02	11	C11 - Aromatic - 9	0.016	0.014	0.013
200	124.35	1173.52	12	1t-Butyl-4-ethylbenzene	0.146	0.126	0.105
201	124.61	1175.79	12	1-t-Butyl-3,5-dimethylbenzene	0.021	0.018	0.015
202	124.77	1177.16	?	Unidentified	0.004	0.004	0.003
203	124.77	1177.18	12	C12 - IsoParaffin - 6	0.002	0.002	0.002
204	124.94	1178.63	12	C12 - IsoParaffin - 7	0.011	0.012	0.008
205	125.14	1180.38	12	C12-Aromatic-1	0.015	0.013	0.010
206	125.29	1181.69	11	1,1-Dimethyl Indane	0.033	0.026	0.026
207	125.45	1183.02	?	Unidentified	0.091	0.085	0.070
208	125.83	1186.33	11	C11 - Aromatic - 10	0.017	0.016	0.014
209	126.03	1188.02	12	1,3-Di-n-propylbenzene	0.085	0.074	0.061
210	126.22	1189.61	11	C11 - Aromatic - 11	0.008	0.008	0.007
211	126.47	1191.76	12	C12-IsoOlefin-5	0.060	0.062	0.041
212	126.60	1194.58	12	1,1,3-Trimethyl Indane	0.010	0.008	0.007
213	127.18	1197.83	11	C11 - Aromatic - 12	0.069	0.062	0.054
214	127.44	1200.00	12	n-Dodecane	1.072	1.092	0.734
215	127.65	1202.25	?	Unidentified	0.003	0.003	0.002
216	128.11	1207.08	?	Unidentified	0.051	0.048	0.040
217	128.46	1210.65	?	Unidentified	0.020	0.019	0.016
218	128.82	1214.39	12	1,3,5-Triethylbenzene	0.020	0.017	0.014
219	129.06	1216.85	12	1,2,4-Triethylbenzene	0.409	0.352	0.294
220	129.42	1220.63	?	Unidentified	0.020	0.019	0.016
221	129.68	1223.29	?	Unidentified	0.011	0.010	0.008
222	129.85	1224.97	?	Unidentified	0.045	0.042	0.035
223	130.14	1228.02	?	Unidentified	0.060	0.056	0.047
224	130.72	1233.91	?	Unidentified	0.000	0.000	0.000
225	131.39	1240.69	12	1-Methyl-4-n-pentylbenzene	0.065	0.056	0.046
226	131.67	1243.54	?	Unidentified	0.039	0.037	0.031
227	131.88	1245.67	?	Unidentified	0.014	0.014	0.011
228	132.44	1251.35	?	Unidentified	0.033	0.031	0.026
229	132.82	1255.14	12	n-Hexylbenzene	0.151	0.130	0.109
230	133.02	1257.21	?	Unidentified	0.054	0.051	0.042
231	133.49	1261.89	?	Unidentified	0.090	0.084	0.070
232	133.79	1264.86	?	Unidentified	0.036	0.033	0.028
233	133.90	1265.95	?	Unidentified	0.019	0.018	0.015
234	133.95	1266.42	?	Unidentified	0.087	0.082	0.068
235	134.13	1268.24	?	Unidentified	0.017	0.016	0.014
236	134.60	1272.88	13	C13 - IsoParaffin - 1	0.141	0.143	0.089
237	135.01	1276.92	11	Pentamethylbenzene	0.155	0.119	0.122
238	135.37	1280.52	11	2-Methylnaphthalene	0.219	0.165	0.178
239	135.61	1282.85	?	Unidentified	0.002	0.002	0.002
240	135.87	1285.41	11	1-Methylnaphthalene	0.045	0.034	0.036

Recovery = 100.000

Sample: DP21-00227-001 07-Jan-22, 16:10:49
File: C:\Chem32\1\DATA\010722\122221 2022-01-07 16-03-25\DP21-00227-001.D\DP21-00227-001_FID1_A.SSM
Parameter: C:\SeparationSystems\HCE5\Templates\normal-D6730-052421.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol	%Mol
241	136.99	1296.35	14	C14+	0.200	0.153	0.118
242	137.36	1300.00	13	n-Tridecane	0.832	0.843	0.526
243	154.64	1455.84	14	C14+	17.711	13.585	10.438

Recovery = 100.000

Steve Hackley

Gas Measurement

Division Branch Manager

steve@doubleee.com

701-572-2332

Williston, ND

Analyzed By: Chris Hackley
Meter ID: Valence
Residue Gas Trailer (Crosby/Chase Pad)
Sample Source: Residue Gas
Ambient Temp: 62 Deg. F
Analysis Time: 06/21/2021 11:25 Sample Type: Spot
Flowing Temp.: 63 Deg. F Flowing Pressure: 500 psig

Comp	UnNorm %	Normal %	Liquids (USgal/MCF)	Ideal (Btu/SCF)	Rel. Density
Nitrogen	3.12037	3.13364	0.34592	0.00000	0.03031
Methane	69.71163	70.00816	11.90864	707.08246	0.38778
Carbon Dioxide	0.66843	0.67127	0.11495	0.00000	0.01020
Ethane	18.95184	19.03246	5.10720	336.81741	0.19760
Propane	5.68923	5.71343	1.57937	143.75560	0.08699
IsoButane	0.32920	0.33060	0.10855	10.75087	0.00663
Butane	0.86474	0.86842	0.27471	28.33055	0.01743
NeoPentane	0.00082	0.00082	0.00030	0.03285	0.00002
IsoPentane	0.07359	0.07390	0.02712	2.95663	0.00184
Pentane	0.09159	0.09198	0.03346	3.68737	0.00229
Hexanes	0.02826	0.02838	0.01171	1.34955	0.00084
Heptanes	0.01412	0.01418	0.00656	0.78025	0.00049
Octanes	0.00747	0.00750	0.00386	0.46888	0.00030
Nonane+	0.02514	0.00000	0.00000	0.00000	0.00000
Nonanes	0.00000	0.02524	0.01425	1.76608	0.00112
Total	99.57643	100.00000	19.53658	1237.77856	0.74627

Inferior Wobbe 1418.3320 (Btu/SCF) Superior Wobbe 1441.3716 (Btu/SCF)
Compressibility 0.9964 Density 0.0571 (lbm/ft3)
Real Rel. Density 0.7463 Ideal CV 1237.7786 (Btu/SCF)
Wet CV 1223.5262 (Btu/SCF) Dry CV 1245.1537 (Btu/SCF)
Contract Temp. 60.0000 (deg F) Contract Press. 14.7300 (psia)
Number of Cycles 3 Connected Stream 1
Atmospheric Pressure 13.5

Portable gas chromatagraph – ABB Totalflow 8209
Last Cal.: 8-3-2020
Last Verify: 6-14-2021

Attachment H: Combustion Control Device Documentation

PRECISION ANALYSIS
GAS MEASUREMENT EMISSIONS TESTING LABORATORY
307.856.0866
www.precision-labs.com

Steffes Corporation
Dickinson, North Dakota

High Pressure Coanda Flare Tip And Low Pressure Ball Tip Performance Testing

Test Dates:
July 24 & 25, 2012

Report Prepared By:

Steve Freeman
Project Manager

PRECISION ANALYSIS
GAS MEASUREMENT EMISSIONS TESTING LABORATORY
307.856.0866
www.precision-labs.com

Summary:

Precision Analysis was contracted to evaluate for compliance, the Steffes Corporation Flare Stacks. Field testing was conducted at the Kodiak Oil & Gas Inc., Smokey 16-20-32-16H3 location in McKenzie County south of Watford City, North Dakota. The high pressure Coanda flare tip and the low pressure Ball flare tip were tested to satisfy the specifications as described in 40 Code of Federal Reference (CFR) §60.18.

- Flare Operates with no visible emissions
  - High Pressure Flare. Confirmed no visible emissions at 27 mscfd and 1403 mscfd.
  - Low Pressure Flare. Confirmed no visible emissions at 17,280 scfd and 106.560 scfd.
- Flame is present at all times
  - Observed thermocouple data logging system of pilot temperature was operational.
- Exit Velocity is less than 400 fps
  - High Pressure Flare. Confirmed exit velocity less than 400 fps for flow rates up to 1.1 mmscfd.
  - Low Pressure Flare. Confirmed exit velocity less than 400 fps for all flow rates tested. Tested to 146,880 scfd.
- BTU content of gas in high and low pressure flare systems was greater than 1,000 BTU/scf which allows an exit velocity of 400 fps. Actual measurements during the test ranged from 1477 to 1774 BTU/scf.

The testing occurred on Tuesday, July 24 and Wednesday, July 25, 2012. Present during the tests were Dean Kovash, Jim Godlevsky, Todd Mayer, and Levi Jurgens from the Steffes Corporation. Kodiak Oil and Gas was represented by Travis Simnioniw and the testers for Precision Analysis were Scott Fairfield and Steve Freeman.

The high pressure Coanda flare tip and the low pressure Ball flare tip performance tests have shown the flares to be operating in accordance to specifications as described in 40 Code of Federal Reference (CFR) §60.18.

Methods:

The following EPA source emissions test methods were used.

40 CFR Part 60, Appendix A

- EPA Test Method 2 – Determination of Stack Gas Velocity and Volumetric Flow Rate
- EPA Test Method 22 – Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares

GPA METHOD 2261

- GPA Test Method 2261 – Analysis for Natural and Similar Gaseous Mixtures by Gas Chromatography

Analysis for Natural Gas and Similar Gaseous Mixtures by Gas Chromatography

Components to be determined in a gaseous sample are physically separated by gas chromatography and compared to calibration data obtained under identical operating conditions. A fixed volume of sample in the gaseous phase is isolated in a suitable inlet sample system and entered into the column.

STEFFES

CUSTOMER FOCUSED. SOLUTION DRIVEN. FIELD PROVEN.

FLARE SYSTEMS
Line Card

Flare Tip Model		Technology	Back Pressure*	Max Flow Rate*1	Power Required	Pipe Connections	Typical Installations	
							Produced Gas	Tank Gas
High Pressure	SHP - 6	Variable Orifice	5.5 - 10 PSI	1.1 MMSCFD	No	4”	X	
High Pressure	SHC - 6		4 - 6 PSI	3.0 MMSCFD	No	4”	X	
Low Pressure	SVG - 3B4		3 - 5 OSI	106 MSCFD	No	3”		X
Low Pressure	SVG - 3D4		4 - 6 OSI	106 MSCFD	No	3”		X
Low Pressure	SVG - 3D8		7 - 10 OSI	120 MSCFD	No	3”		X
Low Pressure	SAA - 2	Air Assist	0 - 3 OSI	200 MSCFD	120 v	3”		X
Pilot*2	SPL-1	Pilot	8 PSI	264 SCFD	Spark System Required	3/8” Compression	X or Propane	

*MEASURED AT FLARE TIP. *1DATA IS FOR REFERENCE ONLY. CALL FACTORY FOR MORE SPECIFICS.
*2PILOT CAN RUN AT 6 - 10 PSI, FLOW RATE WILL VARY BY PRESSURE AND GAS COMPOSITION.

STEFFES IS COMMITTED TO WORKING WITH OUR CUSTOMERS TO PROVIDE THE SIMPLEST, MOST EFFICIENT, AND MOST RELIABLE SOLUTIONS FOR FLARING REQUIREMENTS. THE PATENT PENDING TECHNOLOGY IS DESIGNED TO HELP OPERATORS MEET THE EPA 40 CFR §60.18 REQUIREMENTS.

ENGINEERED FLARE SYSTEM

SHP - 6

SHC - 6

SVG - 3B4

SVG - 3D4

SVG - 3D8

The Steffes Engineered Flare System’s variable orifice design gives optimum system performance over a wide range of gas flows for both high pressure and low pressure gases. Configure your flare system with a singular or multiple flare tips to maximize performance. Models SHP - 6, SHC - 6, SVG - 3B4, SVG - 3D4, and SVG - 3D8.

AIR ASSIST SYSTEM

The Steffes Air Assist Flare burns low pressure gas over a wide range of flow rates. Low pressure gas is mixed with air from a variable speed fan to provide a clean burn. Model SAA - 2.

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ENGINEERED FLARE SYSTEM

Steffes is committed to working with our customers to provide the simplest, most efficient, and most reliable solutions for flaring requirements.

The variable annular orifice designs used on the Steffes Engineered Flare System give optimum system performance over a wide range of gas flows for both high pressure and low pressure gases. The annular orifice provides excellent mixing of air with the gas prior to combustion, which helps to facilitate smokeless operation under most conditions.

CAPABILITIES:

- High capacity flare tip - max flow rate 3.0 MMSCFD
- High pressure flare tip - max flow rate 1.1 MMSCFD
- Low pressure flare tip - max flow rate 106 MSCFD
- Single or combo flare tip
- Patent pending technology
- Designed to meet the EPA 40 CFR §60.18 requirements

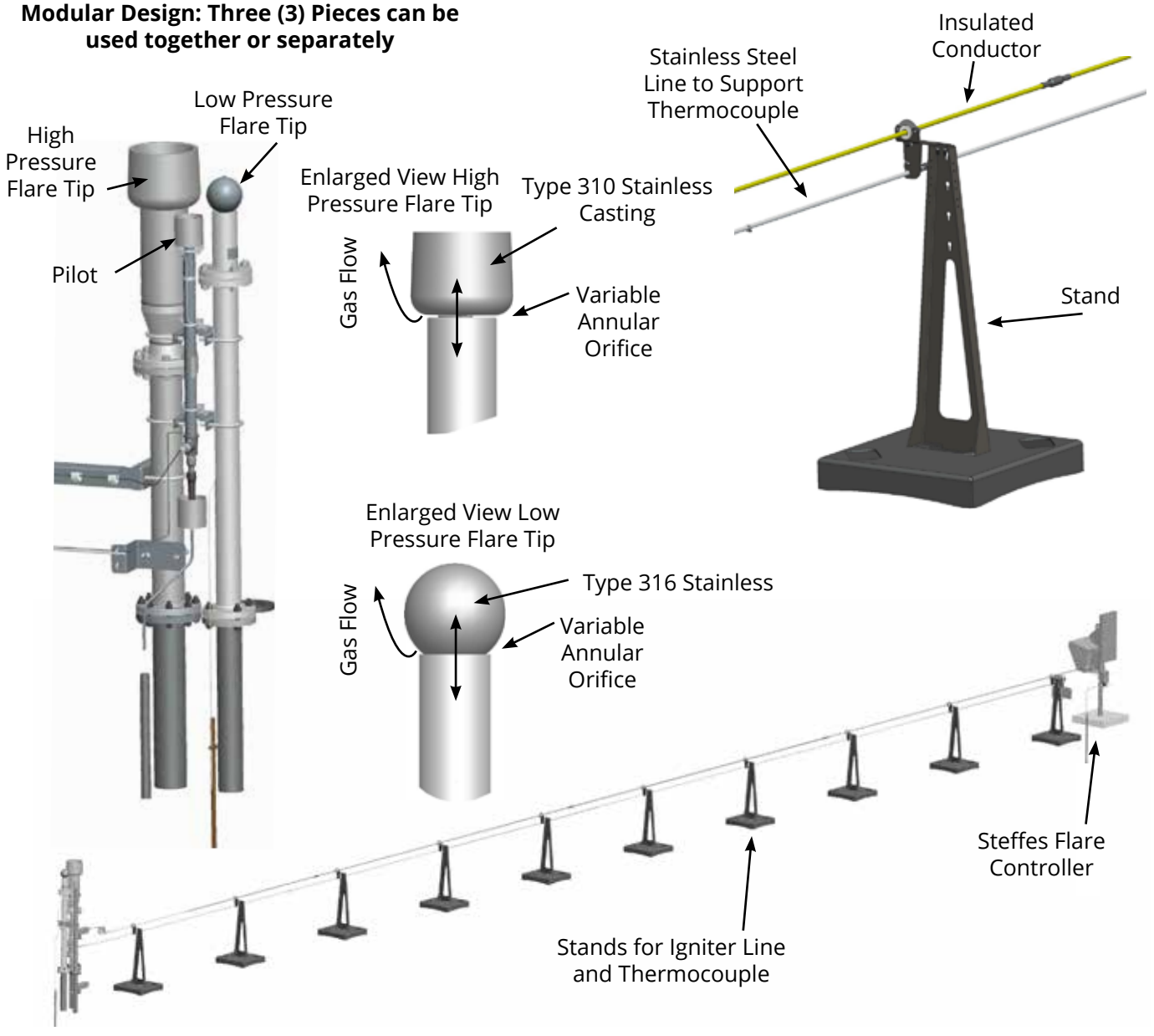
FEATURES:

- High, low, and combination pressure systems
- High temperature ignition
- Data logger and thermocouple monitoring
- Stainless steel construction
- Ignition controller operating options:
  - Steffes flare controller
  - Standard fencer
- Reliable and complete solution
- Pre-fabricated flare bases are available
- Flare extension kits are available

High Pressure		Low Pressure Flare Tip	Pilot
Standard Capacity Flare Tip	**High Capacity Flare Tip**		
Model: SHP-6 **Max Flow Rate:** 1.1 MMSCFD* **Weight:** 200 lbs	**Model:** SHC-6 **Max Flow Rate:** 3.0 MMSCFD* **Weight:** 230 lbs	**Model:** SVG-3 **Max Flow Rate:** 106 MSCFD* **Weight:** 70 lbs	**Model:** SPL-1 **Gas Flow Rate:** Pilot orifice is a #70 MTD Propane at 8 PSI is 11 Cu. Ft./Hr.* Propane at 10 PSI is 13 Cu. Ft./Hr.* **Weight:** 15 lbs Multiply flow by 1.6 for Natural Gas

DATA IS FOR REFERENCE ONLY. CALL FACTORY FOR MORE SPECIFICS.

Modular Design: Three (3) Pieces can be used together or separately



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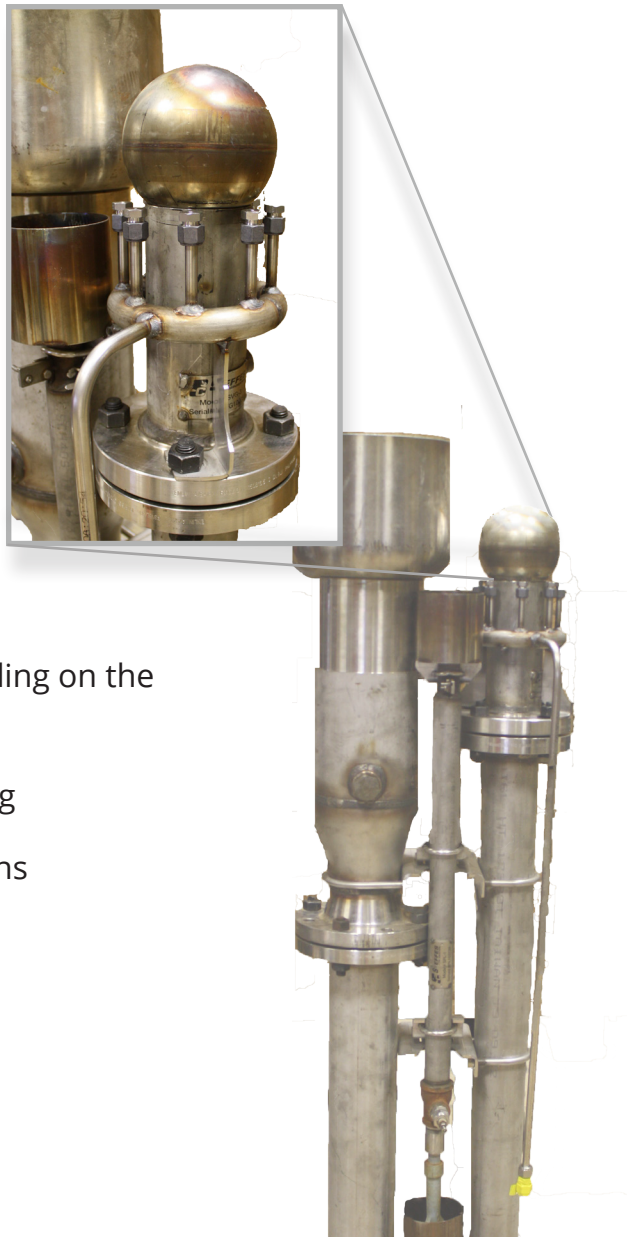
GAS ASSIST RING

The Steffes Gas Assist Ring is an option for improving the combustion performance of low pressure flares. This option is used to reduce smoke from low pressure flares, in cases when the BTU of gas is too high and the flow rate is too low or too high. The gas assist ring creates a flame shroud between the tip of the flare and the ignition point of the flares flame front to ensure that any reactants do not escape without hitting the flame first.



FEATURES:

- Stable and reliable combustion
- Stainless steel Construction
- Fits for the Steffes low pressure ball design (SVG-3B4) and dashpot designs (SVG-3D4 and SVG-3D8)

BENEFITS:

- Tank gas flow rates of up to 160,000 SCFD depending on the gas type
- Can increase operating range for smokeless flaring
- Long service life under normal operating conditions

SPECIFICATIONS:

- Model SGA-80 - flow rate up to 80,000 SCFD
- Model SGA-140 - flow rate up to 160,000 SCFD

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AIR ASSIST FLARES

Steffes Air Assist Flares are a reliable solution to burn gases at low pressures. We've equipped our Air Assist Flares with an efficient variable speed fan to produce a smokeless, clean burn. The continuous running stable pilot ensures the flare remains lit and running, even in some of the harshest conditions. All Steffes Air Assist Flares have user-friendly controllers to operate the variable speed fans and provide reliable pilot monitoring.

In addition to their smokeless operation, Steffes Air Assist Flares can reduce back pressure for safer, more efficient production. Steffes Air Assist Flares come in two models to accommodate a variety of flow rates. Our experienced sales team can help you determine which model meets your requirements.

FEATURES:

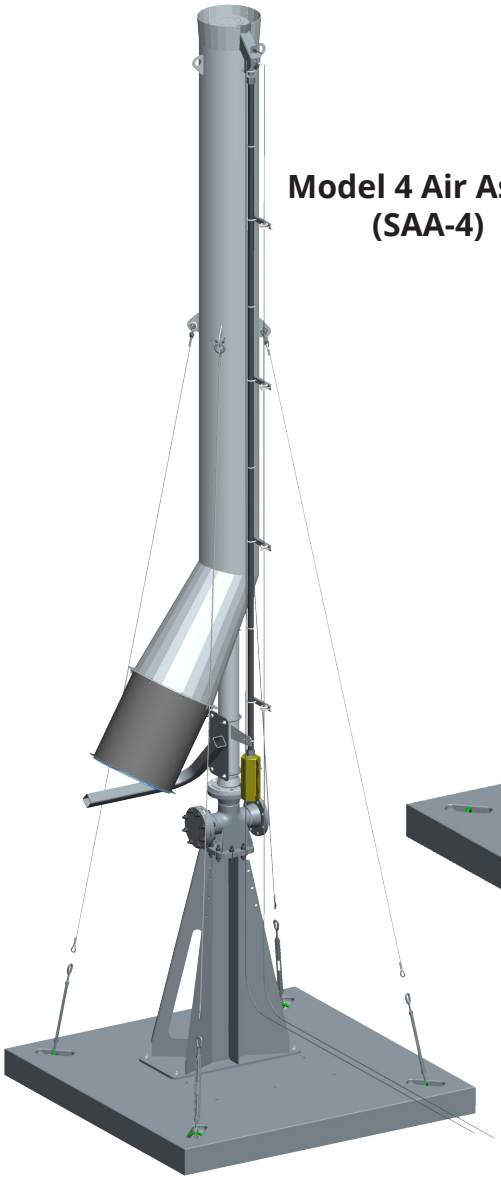
- Two models with capabilities to burn gases at low pressure over a wide range of flow rates
- Clean burn from a variable speed fan
- Stainless steel construction
- Field proven 98% destruction efficiency
- Designed to meet EPA 40 CFR §60.18 requirement

BENEFITS:

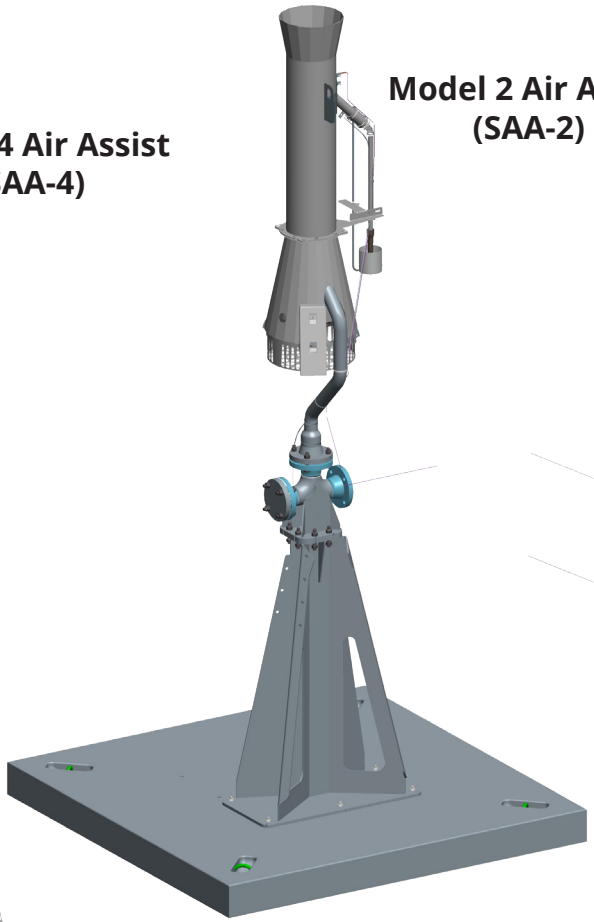
- Low back pressure operation
- Continuous running stable pilot
- Thermocouple for monitoring pilot with datalogger and temperature transmitter
- Smokeless operation
- Reliable and complete solution

AIR ASSIST FLARES		Pilot
Model 2 Air Assist	**Model 4 Air Assist**	**Gas Flow Rate:** Pilot orifice is a #70 MTD Propane at 8 PSI is 11 Cu. Ft./Hr. Propane at 10 PSI is 13 Cu. Ft./Hr. **Weight:** 15 lbs Multiply flow by 1.6 for Natural Gas
Model: SAA-2 **Rated Flow Rate:** 200 MSCFD* **Max Flow Capacity:**[*1] 450 MSCFD[*2] **Weight:** 160 lbs **Power Requirements:** 120AC	**Model:** SAA-4 **Rated Flow Rate:** 600 MSCFD* **Max Flow Capacity:**[*1] 2.2 MMSCFD[*2] **Weight:** 800 lbs **Power Requirements:** 480VAC 3 Phase	***All data is for reference only.*** ***Call Factory for more specifics.***

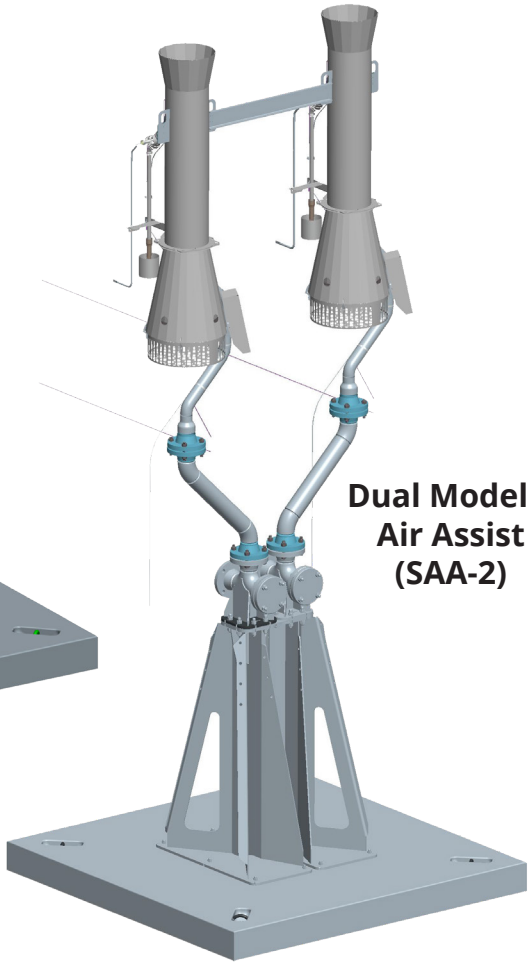
**Rated flow, third party tested, to meet EPA 40 CFR §60.18 requirements was with 2479 BTU gas. [*1]Max flow rate to meet exit velocity per EPA 40 CFR §60.18 [*2]Flow rates higher than rated flow need to be evaluated for flame stability, re-light capability, radiation and smokeless operation per Method 22.*



Model 4 Air Assist (SAA-4)



Model 2 Air Assist (SAA-2)



Dual Model 2 Air Assist (SAA-2)

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Steffes flares meet all federal and State of North Dakota environmental regulations.

The use of flares as a control device in oil and gas extraction activity is governed by a mixture of federal and state laws. Federal regulations developed by the U.S. Environmental Protection Agency pursuant to the Clean Air Act [1] (42 U.S.C. §7401 *et* seq.) and found in the U.S. Code of Federal Regulations at 40 CFR 60.18 (for VOCs) and 40 CFR 63.11 (for HAPs) establish prescriptive compliance requirements for flares.

For both VOCs and HAPs, EPA presumes compliance with these prescriptive requirements will result in a "destruction efficiency of 98 percent or greater."[2]

While EPA is responsible for establishing minimum requirements, the Clean Air Act delegates responsibility for administering and enforcing these federal requirements to the individual states. In addition, the Clean Air Act specifies that states like North Dakota may lawfully modify EPA's regulations so long as such modifications do not make the requirements less stringent.

Under the prescriptive federal regulations for flares cited above, key provisions are:

1. Smoke must not be visible from the flare for more than 5 minutes during any continuous two hour observation period,
2. A flame must be present at all times, and
3. The flare must destroy at least 98% of:
    a. volatile organic compounds (40 CFR 60.18) and/or
    b. volatile hazardous air pollutants (40 CFR 63.11).

On May 2, 2011, the North Dakota Department of Health, Division of Air Quality issued a document entitled, *Bakken Pool Oil and Gas Production Facilities, Air Pollution Control Permitting & Compliance Guidance.*[3] Appendix C to that documents states that acceptable control systems include

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[1] *See https://www.epa.gov/laws-regulations/summary-clean-air-act.*

[2] *See Basis and Purpose Document on Specifications for Hydrogen-Fueled Flares,* U.S. Environmental Protection Agency (1998) found at http://nepis.epa.gov/Exe/ZyPDF.cgi/2000NX99.PDF?Dockey=2000NX99.PDF at 1.

[3] *See* http://www.ndhealth.gov/AQ/Policy/20110502Oil%20%20Gas%20Permitting%20Guidance.pdf. The document has not been updated since 2011.

> An enclosed, smokeless combustion device or utility flare that is designed and operated to reduce the mass content of VOC and total HAP emissions in the vapors vented to the device by at least 98% by weight. A utility flare is any flare that is designed and operated in accordance with the requirements of NDAC 33-15-12-02, Subpart A 60.18 (40 CFR 60.18).[4]

Thus, North Dakota has adopted federal flare design and performance requirements without modification; flares built and operated to the prescriptive specifications found in 40 CFR 60.18 are deemed to be 98% efficient in their destruction of VOCs and HAPs. *(See* footnote 2 above*).*

Independent, third party testing has confirmed that Steffes flares comply with the prescriptive requirements of 40 CFR 60.18 (and by inference, 40 CFR 63.11).

Accordingly, Steffes flares comply with all federal and State of North Dakota regulations governing the construction and use of flares in oil and gas exploration activities.

[4] The language found in 40 CFR 63.11 with respect to prescriptive flare requirements is identical to that in 40 CFR 60.18.