Hiland Partners Holdings LLC
a Kinder Morgan company

July 14, 2025

North Dakota Department of Environmental Quality (NDDEQ)
Division of Air Quality
4201 Normandy Street
Bismarck, ND 58503-1324

Re: Permit to Construct
Hiland Partners Holdings LLC
Silurian Compressor Station
Williams County, North Dakota

Dear Sir or Madam,

Hiland Partners Holdings LLC (Hiland), is submitting the enclosed Permit to Construct (PTC) application to authorize the construction of the Silurian Compressor Station (Silurian CS), located in Williams County. The enclosed application includes all required technical documents as well as administrative NDDEQ forms.

If you have any questions or require additional information, please contact me at 713-420-6314 or by email at brittany_brumley@kindermorgan.com.

Sincerely,

Brittany Brumley
EHS Manager

Enclosures

Air Quality Permit Application for Permit to Construct

Permit: TBD

Silurian Compressor Station

Williams County, North Dakota

July 2025

PREPARED FOR:

Hiland Partners Holdings LLC

Williams County, North Dakota

SPIRIT PROJECT: PROJ-055308

FOR SPIRIT ENVIRONMENTAL:

Jesse Babu

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20465 State Highway 249, Suite 300
Houston, TX 77070

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1.0 Introduction

Hiland Partners Holding, LLC (Hiland) is submitting this Permit To Construct application for the proposed construction of Silurian Compressor Station (CS), a natural gas compressor station located in Williams County, North Dakota. The Silurian CS compresses natural gas from nearby wells for pipeline transmission to a local gas plant. The field gas is separated into NGL and sales gas. Sales gas is compressed and routed into the sales pipeline, and NGL is sent offsite via pipeline.

On August 13, 2013, Hiland submitted a permit to construct application for the Silurian CS. Emission sources included two (2) heaters (EU 1 and EU 2) and one (1) storage tank (EU 3). On August 15, 2013, NDDEQ sent a letter to Hiland determining that Silurian CS is a minor significance source and a permit to construct is not required; thereby, authorizing Hiland to construct and operate Silurian CS as requested in the August 13, 2013 application submittal.

1.1 Proposed Construction

This permit to construct request is for the construction/modification of Silurian CS which includes installation of four (4) compressor engines (EU 4 – EU 7), one (1) produced water storage tank (existing tank EU 3), produced water loading operations (EU 8), one (1) flare (EU 9) for combustion of routine, maintenance, start-up and shutdown (MSS), and emergency vents, miscellaneous storage tanks (EU 10) (one (1) methanol tank, four (4) lube oil tanks, and four (4) antifreeze tanks), associated fugitive components (EU 11), and MSS emissions (EU 12). The two (2) existing heaters (EU 1 – EU 2) will be removed from the site and hence are not included in this submittal. Emissions from the proposed construction/modification can be found in Appendix A. Equipment specifications can be found in Appendix B.

1.2 Application

In accordance with North Dakota Division of Air Quality requirements, permit application forms have been completed and are included in Section 5.0.

1.3 Public Notice

As per North Dakota Administrative Code (NDAC) Section 33.1-15-14-02.6 – Public participation – Final action on application, Hiland will comply with any public participation procedures, as applicable.

1.4 Site Location

The Silurian CS is located approximately seven (7) miles south of Tioga, in Lot 2 of Section 31, Township 156 North, Range 95 West, in Williams County, North Dakota. The general coordinates are Latitude: 48.2945^{O} North, and Longitude: -102.9559^{O} West. The site elevation is approximately 2,350 feet above sea level. A map of the facility location can be found in Figure 1-1. A plot plan of the facility location can be found in Figure 1-2.

1.5 Site Description

The terrain surrounding the facility is characterized as flat to slightly rolling hills. The surrounding area is mainly used for agriculture and livestock grazing. The air quality classification for the area is “Better than National Standards” or unclassifiable/attainment for the National Ambient Air Quality Standards (NAAQS) for criteria pollutants [40 Code of Federal Regulations (CFR) 81.335]. There are no non-attainment areas within a reasonable distance of the site.

Figure 1-1 Silurian Compressor Station Area Map

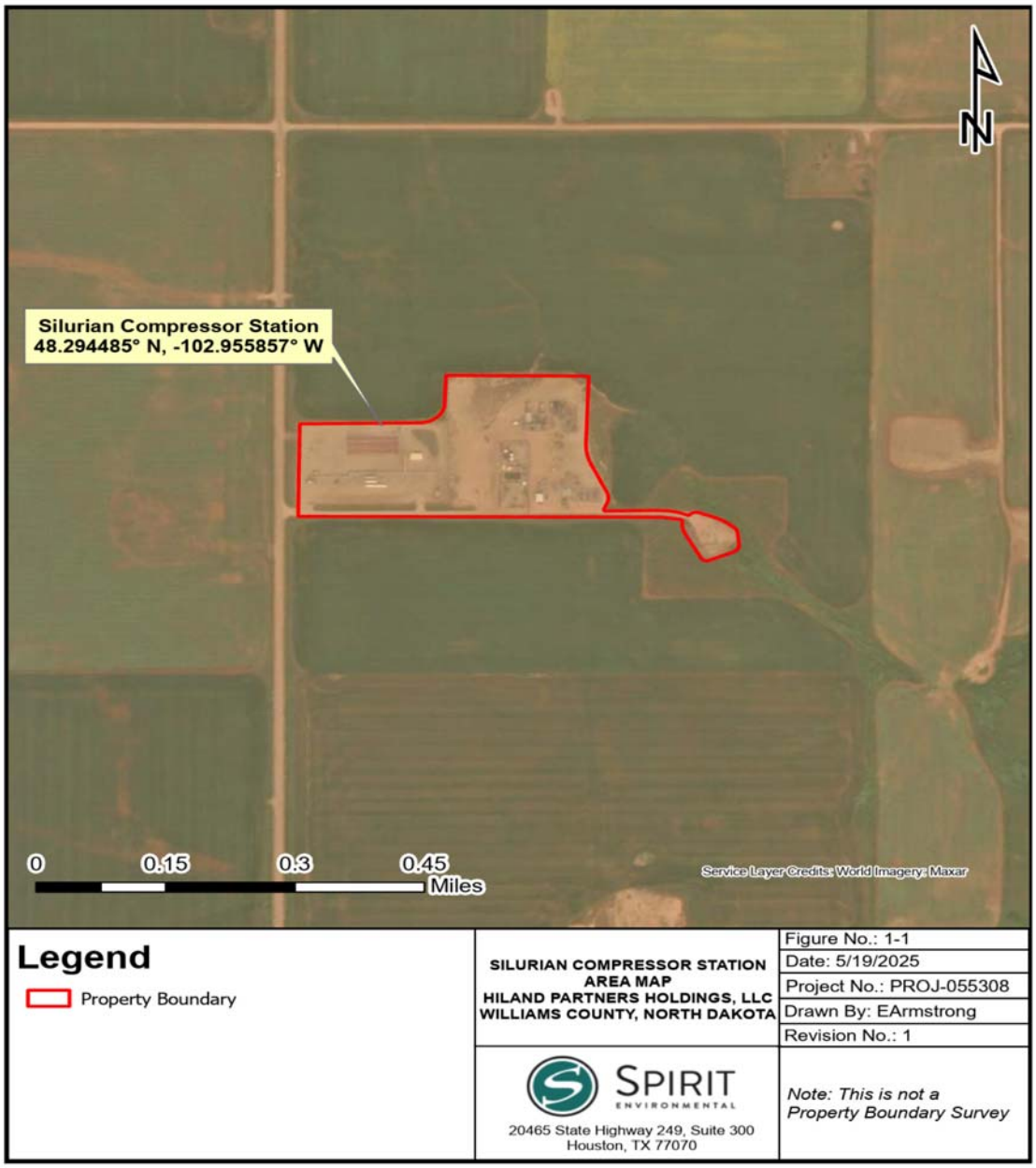
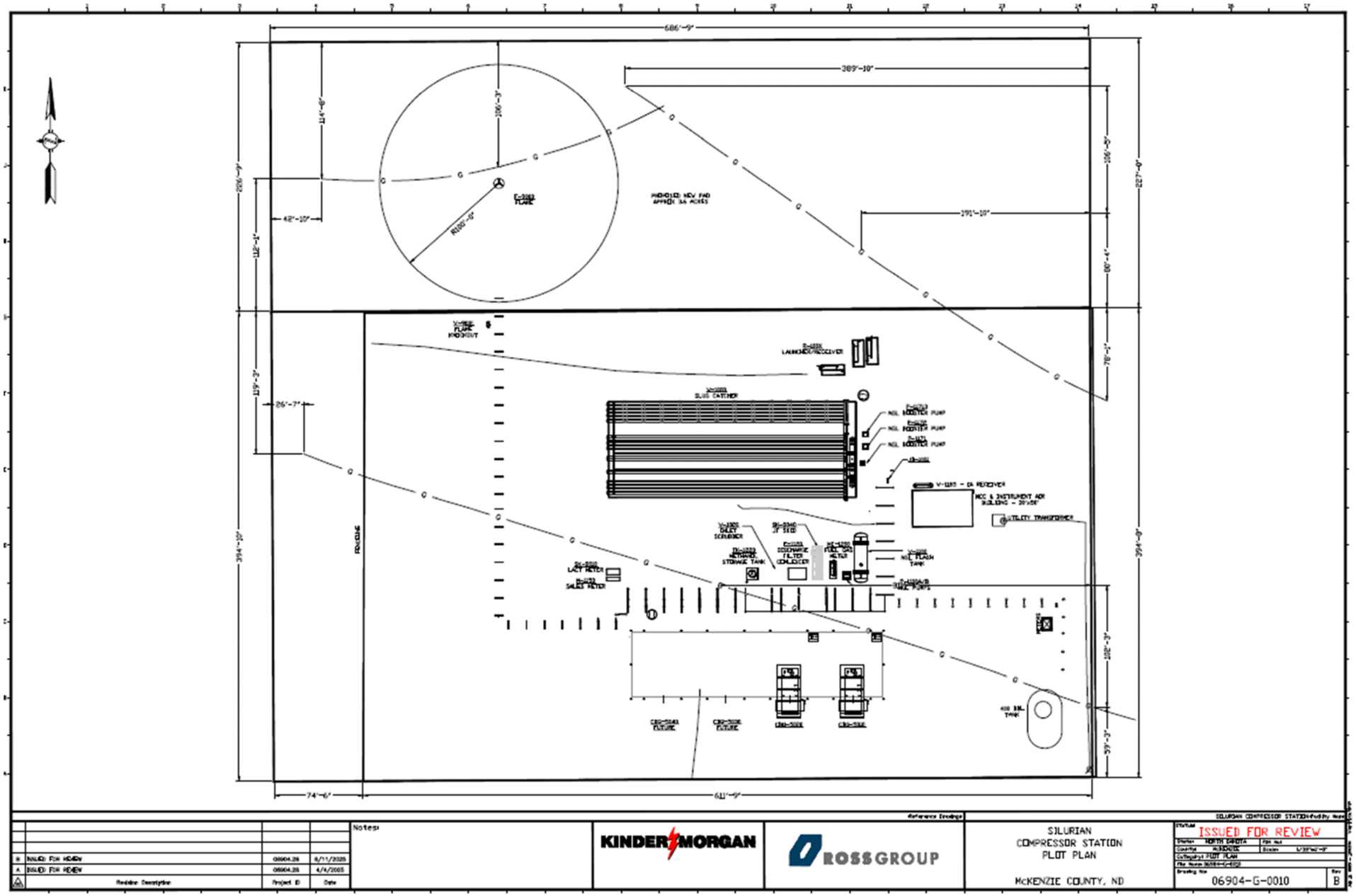


Figure 1-2 Silurian Compressor Station Facility Layout

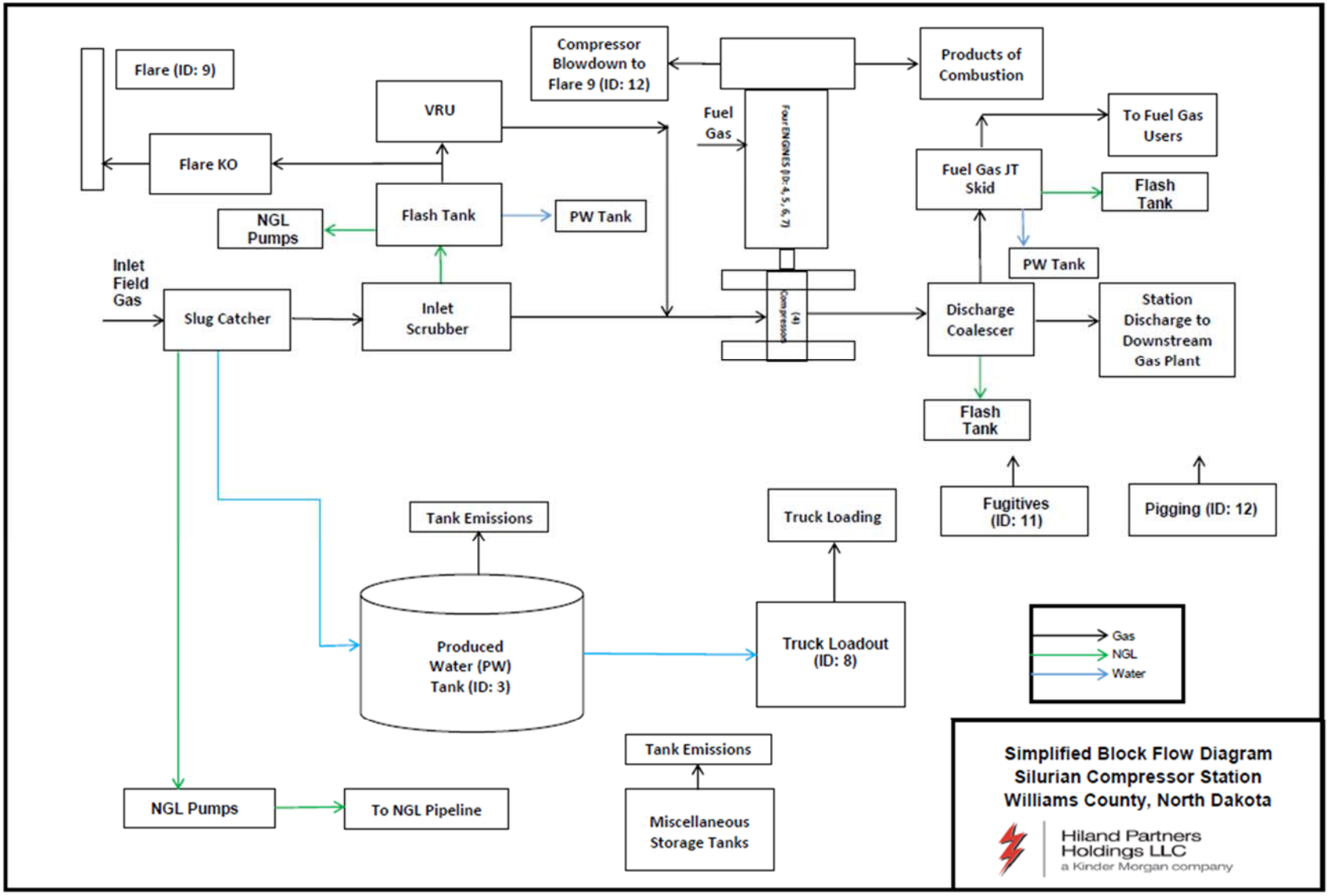


2.0 Process Description

The Silurian CS receives incoming field gas for separation and compression. The gas enters the site through an inlet separator where liquid portions are separated from the gas fraction. The natural gas liquids (NGL) portion from the slug catcher is sent offsite via pipeline. The water portions of the liquids from the slug catcher, flash tank, and fuel gas JT skid are routed to a produced water tank (Unit ID: 3). Liquids from the produced water storage tank are periodically removed from the site by truck loadout (Unit ID: 8). Four (4) compressors driven by four (4) natural gas-fired reciprocating internal combustion engines (RICE) (Unit IDs: 4, 5, 6, and 7) provide compression for pipeline transmission of the gas entering the site. NGL liquids from the inlet scrubber, discharge coalescer, and fuel gas JT skid are routed to a flash tank and then to the NGL liquids pipeline. The vapors from the flash tank are either collected by an electric driven Vapor Recovery Unit (VRU) compressor and routed to the compressor suction line or the flare (Unit ID: 9) for combustion. Other emission sources at the site include fugitive equipment components (Unit ID: 11), miscellaneous storage tanks (Unit ID: 10) and MSS activities (Unit ID: 12). MSS activities include blowdowns from compressors routed to the flare (Unit ID 9) and pigging operations that vent to atmosphere. Miscellaneous tanks include one (1) methanol tank, four (4) lube oil tanks, and four (4) antifreeze tanks.

A simplified process flow diagram illustrating the site process at the Silurian CS is provided as Figure 2-1.

Figure 2-1 Silurian Compressor Station Process Flow Diagram



3.0 Emission Estimates

Air pollutants emitted from Silurian CS include nitrogen oxides (NO_X), particulate matter (PM), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), volatile organic compounds (VOCs), carbon monoxide (CO), and various hazardous air pollutants (HAPs).

This application contains potential to emit (PTE) calculations for the proposed Silurian CS emission sources and associated fugitive emissions. Detailed emissions calculations are found in Appendix A. The proposed facility-wide emissions summary is in Table 3-1.

3.1 Storage Tanks – Unit IDs 3 and 10

The 400 barrel (bbl) fixed roof API Tank (Unit ID 3) stores produced water and drain water received from the slug catcher, fuel gas JT skid, and flash tank. The content is predominately water, and the tank emissions are routed to atmosphere. Hourly and annual working and breathing losses are calculated using a ProMax model per the United States (US) Environmental Protection Agency's (EPA) AP-42 Ch. 7.1. The total emissions from the tank sums working and breathing losses.

Miscellaneous tanks (Unit ID 10) are fixed roof tanks that include one (1) 2,000 gallons methanol tank, four (4) 500 gallons lube oil tanks, and four (4) 500 gallons antifreeze tanks. As these tanks are of small volume storing low vapor pressure liquids, these tanks are grouped as one Unit ID 10. The calculation methodology from the AP-42, Section 7.1 Organic Liquids Storage Tanks (October 2024) is used to estimate the VOC emissions. The total emissions from the tank sums working and breathing losses. The worst-case hourly emissions assume a maximum fill rate of one (1) tank in one (1) hour for each tank. There are no flashing losses from these tanks. For lube oil, the properties of diesel are used, and for anti-freeze, properties of ethylene glycol are used. The vapor pressures of the material stored are determined by using a maximum liquid surface temperature of 95 degrees Fahrenheit (°F).

3.2 Compressor Engines – Unit IDs 4, 5, 6, and 7

The proposed engines' emission rates of NO_X, CO, VOC, and formaldehyde are based on the engine manufacturer, catalyst vendor data, and permit or regulatory limitations. The emission factors used are higher than the emission factors provided by the catalyst vendor to accommodate

flexibility in the field operations. The calculations of PM, PM_{10}, $PM_{2.5}$, SO_2, and other HAP PTE are based on emission factors in AP-42 , Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Section 3.2 Natural Gas Fired Reciprocating Engines Table 3.2-3 (October 2024) for rich burn engines. Short term (lb/hr) emissions are based on the emissions factors (g/hp-hr) and maximum design horse power (HP). Annual emissions are based on the 8,760 hours per year of operation.

3.3 Truck Loading – Unit ID 8

Emissions from produced water truck loadout are estimated using US EPA's AP-42 Ch. 5.2 and assumes dedicated normal service trucks and submerged loading; therefore, a saturation factor of 0.6 is used for the truck loading calculations. The liquid vapor pressure and molecular weight are calculated by the ProMax model. Short term emissions are based on the worst case (highest) temperature and vapor pressure. Annual emissions are based on average temperature and vapor pressure. Produced water is assumed to be 99% water and 1% VOC.

3.4 Flare – Unit ID 9

Routine flare emissions (Unit ID 9) are from the venting of flash tank vapors to the flare when the VRU is not in operation. MSS emissions (Unit ID 12) are from compressor blow down vents that are controlled by the flare (Unit ID 9).

The flare utilizes field gas as the pilot combustion fuel. Fuel combustion emissions are calculated based on a pilot volumetric flow rate of 90 standard cubic feet per hour (scf/hr) and pollutant emission factors outlined in US EPA AP-42, Volume I, Fifth Edition - July 1998, Tables 1.4-1 through 1.4-3.

The flash tank vapor and compressor blowdown flow rates are based on an engineering estimate. VOC, H_2S, and SO_2 emissions are based on the stream composition and material balance. The emission factors (lb/MMBtu) for NO_X and CO were taken from "TCEQ Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers" for high British Thermal Units (BTU) streams. Based on the flare vendor, the flare has a VOC destruction efficiency of at least 98%.

3.5 Fugitives – Unit ID 11

Fugitive component counts are estimated based on the equipment at the facility. Emissions are calculated based on the emission factors from EPA's "Protocol for Equipment Leak Emission Estimates" EPA-453/R-95-017, 11/1995, Table 2-4. The VOC emissions from the fugitive components in gas service are based on the inlet gas composition. The VOC emissions from components in light liquid service are based on assuming 100% VOC in light liquid.

3.6 MSS Activities – Unit ID 12

MSS emissions are associated with compressor blowdowns and pigging operations. Compressor blowdown vents are routed to flare whereas pigging operations are vented to atmosphere.

Compressor blowdown emissions are discussed in the flare emissions section above. The compressor blowdown rates are based on an engineering estimate, and each blowdown is estimated to occur only for a few minutes. The short-term emissions are based on one (1) blowdown in any hour, and annual emissions are based on 50 blowdowns for each compressor for a total of 200 blowdowns in a year. VOC emissions are based on the blowdown vent gas composition. The controlled emissions are based on 98% control efficiency.

Pigging operations emissions are based on the estimated pigging vent rates at the pigging operating condition’s pressure and temperature. VOC emissions are based on the inlet gas composition. Annual emissions are based on 12 events at each high pressure receiver and launcher and 52 events at each low pressure receiver and launcher.

Emission calculations details for all the emissions sources at the site are in Appendix A..

Table 3-1 Emissions Summary

Emission Unit	Emission Unit Description	PM (tpy)	SO_2 (tpy)	NOx (tpy)	CO (tpy)	VOC (tpy)	CO_2e (tpy)	Largest HAP (Formaldehyde) (tpy)	HAP (tpy)
3	API Tank 400 bbls	--	--	--	--	0.004	--	--	--
4	Waukesha L7044GSI	1.33	0.04	18.35	18.35	13.76	8,038.52	0.92	1.69
5	Waukesha L7044GSI	1.33	0.04	18.35	18.35	13.76	8,038.52	0.92	1.69
6	Waukesha L5794GSI	0.99	0.03	13.33	13.33	9.86	6,001.29	0.53	1.31
7	Waukesha L5794GSI	0.99	0.03	13.33	13.33	9.86	6,001.29	0.53	1.31
8	Produced Water Truck Loading	--	--	--	--	0.0003	--	--	--
9	Flare	0.003	0.05	12.58	25.11	14.29	10,673.32	--	0.54
10[1]	Miscellaneous Storage Tanks	--	--	--	--	0.034	--	--	--
11	Fugitives	--	--	--	--	4.70	--	--	0.04
12[2]	MSS	--	0.001	0.33	0.65	1.06	276.49	--	0.01
Total Sitewide Emissions:		**4.66**	**0.19**	**76.25**	**89.11**	**67.33**	**39,029.43**	**2.90**	**6.59**
Project Increases:		**4.66**	**0.19**	**76.25**	**89.11**	**67.33**	**39,029.43**	**2.90**	**6.59**
Emissions Less Than Title V Thresholds?		Yes	Yes	Yes	Yes	Yes	N/A	Yes	Yes

Notes:
1. Miscellaneous tanks include one methanol tank, four lube oil tanks, and four antifreeze tanks.
2. MSS includes blowdowns from compressors and pigging.

4.0 Regulatory Applicability

There are numerous federal and NDDEQ regulations and requirements applicable to the Silurian CS. All potentially applicable requirements are addressed in this section.

4.1 Federal Regulatory Requirements

This section includes a discussion of potentially applicable federal regulations.

4.1.1 40 CFR 60, Subpart A – General Provisions

Sources at the Silurian CS are subject to subparts in 40 CFR 60; therefore, Hiland will comply with the applicable requirements of this subpart.

4.1.2 40 CFR 60, Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984, and On or Before October 4, 2023

Storage vessels are subject to Subpart Kb if they were constructed, modified, or reconstructed after July 23, 1984 and on or before October 4, 2023, store volatile organic liquids (VOL), and have a capacity greater than or equal to 75 cubic meters (m^3). The API Tank (Unit ID 3) was constructed in August 2013 and is not modified in this proposed project. It has a capacity of less than 75 m^3; therefore, it is not subject to this subpart.

4.1.3 40 CFR 60, Subpart Kc – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After October 4, 2023

Storage vessels are subject to Subpart Kc if they were constructed, modified, or reconstructed after October 4, 2023, store volatile organic liquids (VOL), and have a capacity greater than or equal to 20,000 gallons. The Miscellaneous Tanks (Unit ID 10) are constructed after October 4, 2023. Their capacities are less than 20,000 gallons each; therefore, they are not subject to this subpart.

4.1.4 40 CFR 60, Subpart JJJJ – Standards for Stationary Spark Ignition Internal Combustion Engines

Owners and operators are subject to 40 CFR 60 Subpart JJJJ if construction, reconstruction, or modification of the spark ignition internal combustion engine (SI ICE) commenced after June 12, 2006, and if manufactured

- On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 hp (except lean-burn engines with a maximum engine power greater than or equal to 500 hp and less than 1,350 hp);
- On or after January 1, 2008, for lean-burn engines with a maximum engine power greater than or equal to 500 hp and less than 1,350 hp;
- On or after July 1, 2008, for engines with a maximum engine power less than 500 hp; or
- On or after January 1, 2009, for emergency engines with a maximum engine power greater than 19 KW (25 hp).

The four (4) proposed rich burn compressor engines (Unit IDs 4, 5, 6, and 7) will be constructed after June 12, 2006, and manufactured after July 1, 2007. Therefore, Subpart JJJJ is applicable, and Hiland will comply with the applicable NSPS Subpart JJJJ requirements for these engines.

4.1.5 40 CFR 60, Subpart OOOO – Standards of Performance for Crude Oil and Natural Gas Facilities for Which Construction, Modification, or Reconstruction Commenced After August 23, 2011, and on or Before September 18, 2015

Owners and operators are subject to Subpart OOOO if they commence construction, modification or reconstruction of an affected facility after August 23, 2011 and on or before September 18, 2015. For a compressor station, affected facilities include centrifugal compressors, reciprocating compressors, storage vessels, and pneumatic controllers.

The API Tank (Unit ID 3), storing produced water, was constructed in August 2013. However, in this proposed project, it will be considered modified per 40 CFR 60.5365b(e)(3)(ii)(D).

4.1.6 40 CFR 60, Subpart OOOOa – Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction Commenced after September 18, 2015

Owners and operators are subject to Subpart OOOOa if they commence construction, modification or reconstruction of an affected facility after September 18, 2015, and on or before December 6, 2022. For a compressor station, affected facilities include centrifugal compressors, reciprocating compressors, storage vessels, pneumatic controllers, and equipment leaks.

The proposed construction at Silurian CS is not subject to NSPS Subpart OOOOa rules as the site's affected facilities are not constructed after September 15, 2015 and on or before December 6, 2022.

4.1.7 40 CFR 60, Subpart OOOOb – Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction Commenced after December 6, 2022

Owners and operators are subject to Subpart OOOOb if they commence construction, modification or reconstruction of an affected facility after December 6, 2022. For a compressor station, affected facilities include centrifugal compressors, reciprocating compressors, storage vessels, pneumatic controllers, pumps, and equipment leaks.

The proposed construction and modification at Silurian CS is after December 16, 2022, therefore, Subpart OOOOb is applicable to affected facilities at Silurian CS. The applicable requirements under the Subpart OOOOb (per §60.5365b) are discussed below.

The VOC and methane emissions from the API Tank (Unit ID 3) are below the 6 tons per year (tpy) and 20 tpy respectively; therefore, it is not an affected facility per 60.5365b(e). The miscellaneous tanks do not store crude oil, condensate, intermediate hydrocarbons, or produced water; therefore, they are not affected facilities.

The reciprocating compressors at this compressor station are affected facilities and will comply with the requirements of this subpart.

The collection of fugitive emission components at this compressor station is an affected facility and will comply with the requirements of this subpart.

There are no centrifugal compressors, natural gas driven pneumatic controllers, or natural gas driven pumps at Silurian CS.

Silurian CS will maintain compliance with applicable requirements within the required timeframes outlined in this subpart.

4.1.8 40 CFR 63, Subpart A – General Provisions

Sources at the Silurian CS are subject to subparts in 40 CFR 63; therefore, Hiland will comply with the applicable requirements of this subpart.

4.1.9 40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

This regulation applies to any RICE located at a major or area source of HAP emissions. All four compressor engines (Unit IDs 4, 5, 6, and 7) were manufactured after July 1, 2007, and the Silurian CS is an area source of HAPs; therefore, all four (4) engines (Unit IDs 4, 5, 6, and 7) must meet the requirements in Maximum Achievable Control Technology (MACT) Subpart ZZZZ by meeting the requirements in New Source Performance Standard (NSPS) Subpart JJJJ.

4.2 North Dakota Regulatory Requirements

This section includes a discussion of applicable state regulations as it applies to Silurian CS.

4.2.1 NDAC 33.1-15-01 - General Provisions

This facility is subject to all general requirements of this section (i.e., inspection, circumvention, shutdown/malfunction, compliance, enforcement, confidentiality of records, etc.).

4.2.2 NDAC 33.1-15-02 - Ambient Air Quality Standards

The air quality of the area is classified as "Better than National Standards" or unclassifiable/attainment of the NAAQS for criteria pollutants (40 CFR 81.335). There are no nonattainment areas within a reasonable distance of the site. The emission units included in this

application are located at a facility that is subject to ambient air quality standards; therefore, Hiland will abide by all standards set forth in this regulation.

4.2.3 NDAC 33.1-15-03 - Restriction of Emission of Visible Air Contaminants

NDAC 33.1-15-03 contains regulations governing particulate matter and opacity limits from new and existing sources. The proposed engines (Unit IDs 4, 5, 6, and 7) and the flare (Unit ID 9) are subject to 33.1-15-03-02 relating to restrictions applicable to new installations which states: No person may discharge into the ambient air from any single source of emission whatsoever any air contaminant which exhibits an opacity greater than twenty percent except that a maximum of forty percent opacity is permissible for not more than one (1) six-minute period per hour. These engines and the flare will meet the requirements of this regulation.

4.2.4 NDAC 33.1-15-04 – Open Burning Restrictions

Hiland will not perform open burning of refuse, trade waste, or other combustible material except as provided for in Section 33.1-15-04-02 or 33.1-15-10-02, and will not conduct, cause, or permit the conduct of a salvage operation by open burning.

4.2.5 NDAC 33.1-15-05 - Emissions of Particulate Matter Restricted

The proposed natural gas-fired stationary combustion engines (Unit IDs 4, 5, 6, and 7) and flare (Unit ID 9) will comply with the provisions of Sections 33.1-15-05-01 and 33.1-15-05-04. These engines and flare combust fuel that generates particulate matter; therefore, they are subject to allowable rate limitations that no person shall cause, suffer, allow, or permit the emission of particulate matter in any one (1) hour from any source in excess of the amount shown in 33.1-15-05-01(2)(b) Table 3: Maximum Allowable Rates of Emission of Particulate Matter from Industrial Processes. The flare is a smokeless flare; however, the particulate matter emissions are estimated for pilot fuel combustion only.

4.2.6 NDAC 33.1-15-06 - Emissions of Sulfur Compounds Restricted

The proposed engines (Unit IDs 4, 5, 6, and 7) and the flare (Unit ID 9) combust natural gas with a sulfur content meeting the requirements for pipeline quality natural gas. Per Section 33.1-15-06-01, these are not subject to the regulations of this section.

4.2.7 NDAC 33.1-15-07 - Control of Organic Compounds Emissions

There are no water separators at this facility. All applicable storage tanks will be equipped with submerged fill pipes. There are no truck loading facilities that handle 20,000 gallons per day or more. All rotating pumps and compressors will be equipped and will operate with properly maintained seals designed for its specific product service and operating conditions. The flare (Unit ID 9) is used to combust the vent from the flash tank when the VRU is not in operation and the compressor blowdown vents. The flare meets the requirements of this Section 33.1-15-07-02, as applicable.

4.2.8 NDAC 33.1-15-08 - Control of Air Pollution from Vehicles and Other Internal Combustion Engines

The proposed engines (Unit IDs 4, 5, 6, and 7) are natural gas-fired internal combustion engines and will comply with the restricted emissions regulation of Section 33.1-15-08-01.

4.2.9 NDAC 33.1-15-10 - Control of Pesticides

Hiland will comply with the provisions of NDAC 33.1-15-10 should pesticides be used at this facility.

4.2.10 NDAC 33.1-15-11 – Prevention of Air Pollution Emergency Episodes

Hiland will comply with any applicable source curtailment regulations when notified by the Department of an Air Pollution Emergency Episode.

4.2.11 NDAC 33.1-15-12 - Standards of Performance for New Stationary Sources

The applicability of NSPS rules is discussed in Section 4.1.

4.2.12 NDAC 33.1-15-13 – Emission Standards for Hazardous Air Pollutants

This proposed facility is not an affected facility per 40 CFR 61 – NESHAP as incorporated by NDAC Chapter 33.1-15-13. HAP emission calculations indicate that potential HAP emissions at the Silurian CS do not exceed the major source thresholds of 10 tpy any individual HAP or 25 tpy of any combination of HAPs.

4.2.13 NDAC 33.1-15-14 - Designated Air Contaminant Sources, Permit to Construct, Minor Source Permit to Operate, Title V Permit to Operate

Hiland is submitting this application per the Permit to Construct requirements of this section to request construction authorization for the proposed emission sources as listed in Table 3-1, Emissions Summary. As shown in Table 3-1, the total facility emissions of all the criteria pollutants are less than the Title V permitting threshold of 100 tpy. Therefore, this facility is subject to the minor source operating permit program per NDAC 33.1-15-14-03. Silurian CS will comply with the applicable minor source permitting authorization requirements to operate.

4.2.14 NDAC 33.1-15-15 - Prevention of Significant Deterioration of Air Quality

Prevention of Significant Deterioration (PSD) permitting regulations apply to major stationary sources. A major stationary source is defined as a listed facility with the Potential To Emit (PTE) 100 tpy or more of any regulated pollutant or a non-listed facility with the PTE 250 tpy or more of any regulated pollutant and the PTE 100,000 tpy of carbon dioxide equivalents (CO_2e). Since the Silurian CS is not a listed facility and does not have the PTE greater than 250 tpy of any regulated pollutant or 100,000 tpy of CO_2e, PSD permitting is not applicable.

In addition, the changes in potential emissions from the existing facility do not exceed the thresholds listed in the Criteria Pollutant Modeling Requirements for a PTC memorandum; therefore, modeling is not required for this project.

4.2.15 NDAC 33.1-15-16 - Restriction of Odorous Air Contaminants

Hiland will comply with all requirements concerning odorous air contaminants at the Silurian CS as applicable to sources outside a city or outside the area over which a city has exercised extraterritorial zoning as defined in North Dakota Century Code Section 40-47-01.1.

4.2.16 NDAC 33.1-15-17- Restriction of Fugitive Emissions

Hiland will comply with all requirements by taking reasonable precautions to prevent fugitive emissions causing air pollution as defined in NDAC 33.1-15-01-04. Hiland will comply with the fugitive emissions standards in 40 CFR 60 Subpart OOOOb as applicable.

4.2.17 NDAC 33.1-15-18 - Stack Heights

Hiland will utilize good engineering practices relating to the installation of proposed emission sources. Emissions from engines (Unit IDs 4, 5, 6, and 7) and flare (Unit ID 9) are vented from a stack height greater than or equal to 1.5 times the nearest building height.

4.2.18 NDAC 33.1-15-22- Emissions Standards for Hazardous Air Pollutants

The applicability of 40 CFR 63 – MACT for Source Categories is discussed in Section 4.1.

4.2.19 Policy for the Control of Hazardous Air Pollutant Emissions in North Dakota (Air Toxics Policy)

Proposed engines (Unit IDs 4, 5, 6, and 7) are a listed source in NDAC 33.1-15-14-01. Therefore, per the applicability section of the North Dakota Air Toxics Policy, these engines are subject to these regulations. The Dispersion Modeling Requirements, Compressor Engines and Glycol Dehydration Memorandum was rescinded on December 18, 2023.

5.0 NDDEQ Forms

The following forms are included in this application:

- FORM 8516 - Permit Application for Air Contaminant Sources
- FORM 8891 - Permit Application for Internal Combustion Engines and Turbines (Unit IDs 4, 5, 6, and 7)
- FORM 8532 - Permit Application for Air Pollution Control Equipment (Unit IDs 4, 5, 6, 7, and 9)
- FORM 8329 - Permit Application for HAP Sources (Unit IDs 4, 5, 6, 7, 9, 11, and 12)
- FORM 8535 - Permit Application for Volatile Organic Compounds Storage Tanks (Unit ID 3)
- FORM 59652 - Permit Application for Flares (Unit ID 9)

PERMIT APPLICATION FOR AIR CONTAMINANT SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8516 (9-2021)

SECTION A - FACILITY INFORMATION

Name of Firm or Organization Hiland Partners Holdings LLC		
Applicant's Name Alex Schmidt		
Title Director of Operations	Telephone Number (701) 833-9361	E-mail Address alex_schmidt@kindermorgan.com
Contact Person for Air Pollution Matters Brittany Brumley		
Title EHS Manager	Telephone Number (713) 420-6314	E-mail Address brittany_brumley@kindermorgan.com
Mailing Address (Street & No.) 1001 Louisiana Street		
City Houston	State TX	ZIP Code 77002
Facility Name Silurian Compressor Station		
Facility Address (Street & No.) 7 Miles South of Tioga		
City Tioga	State ND	ZIP Code 58852

County Williams	Coordinates NAD 83 in Decimal Degrees (to forth decimal degree) Latitude 48.29448500	 Longitude -102.95585700

Legal Description of Facility Site

Quarter	Quarter	Section	Township	Range
Lot 2		31	156	95

Land Area at Facility Site 6.2 Acres (or) _____ Sq. Ft.	MSL Elevation at Facility 2350

SECTION B – GENERAL NATURE OF BUSINESS

Describe Nature of Business	North American Industry Classification System Number	Standard Industrial Classification Number (SIC)
Compressor Station	211112	1321

SECTION C – GENERAL PERMIT INFORMATION

Type of Permit? ☒ Permit to Construct (PTC) ☐ Permit to Operate (PTO)

If application is for a Permit to Construct, please provide the following data:

Planned Start Construction Date	Planned End Construction Date
12/2025	06/2026

SECTION D – SOURCE IDENTIFICATION AND CATEGORY OF EACH SOURCE INCLUDED ON THIS PERMIT APPLICATION

		Permit to Construct				Minor Source Permit to Operate						
Your Source ID Number	Source or Unit (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.)	New Source	Existing Source Modification	Existing Source Expansion	Existing Source Change of Location	New Source	Existing Source Initial Application	Existing Source After Modification	Existing Source After Expansion	Existing Source After Change of Location	Existing Source After Change of Ownership	Other
3	API Tank, 400 bbls	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
4-5	Waukesha L7044GSI	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6-7	Waukesha L5794GSI	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8	Produced Water Truck Loading	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
9	Flare	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10	Miscellaneous Storage Tanks	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
11	Fugitives	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
12	MSS	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Add additional pages if necessary

SECTION D2 – APPLICABLE REGULATIONS

Source ID No.	Applicable Regulations (NSPS/MACT/NESHAP/etc.)
Facility-wide	NSPS OOOOb - Fugitives
4-7	NSPS OOOOb - Reciprocating Compressors
4-7	NSPS JJJJ and MACT ZZZZ - Compressor Engines

SECTION E – TOTAL POTENTIAL EMISSIONS

Pollutant	Amount (Tons Per Year)
NO_x	76.25
CO	89.11
PM	4.66

Pollutant	Amount (Tons Per Year)
PM_{10} (filterable and condensable)	4.66
$PM_{2.5}$ (filterable and condensable)	4.66
SO_2	0.19
VOC	67.33
GHG (as CO_2e)	39029.43
Largest Single HAP	2.90
Total HAPS	6.59

*If performance test results are available for the unit, submit a copy of test with this application. If manufacturer guarantee is used provide spec sheet.

SECTION F1 – ADDITIONAL FORMS

Indicate which of the following forms are attached and made part of the application

■ Air Pollution Control Equipment (SFN 8532)	☐ Fuel Burning Equipment Used for Indirect Heating (SFN 8518)
☐ Construct/Operate Incinerators (SFN 8522)	■ Hazardous Air Pollutant (HAP) Sources (SFN 8329)
☐ Natural Gas Processing Plants (SFN 11408)	☐ Manufacturing or Processing Equipment (SFN 8520)
☐ Glycol Dehydration Units (SFN 58923)	■ Volatile Organic Compounds Storage Tank (SFN 8535)
■ Flares (SFN 59652)	■ Internal Combustion Engines and Turbines (SFN 8891)
☐ Grain, Feed, and Fertilizer Operations (SFN 8524)	☐ Oil/Gas Production Facility Registration (SFN 14334)

SECTION F2 – OTHER ATTACHMENTS INCLUDED AS PART OF THIS APPLICATION

1.	Application Report	4.	ProMax Report
2.	Emissions Calculations	5.	
3.	Spec Sheets	6.	

I, the undersigned applicant, am fully aware that statements made in this application and the attached exhibits and statements constitute the application for Permit(s) to Construct and/or Operate Air Contaminant sources from the North Dakota Department of Environmental Quality and certify that the information in this application is true, correct and complete to the best of my knowledge and belief. Further, I agree to comply with the provisions of Chapter 23.1-06 of the North Dakota Century Code and all rules and regulations of the Department, or revisions thereof. I also understand the permit is nontransferable and, if granted a permit, I will promptly notify the Department upon sale or legal transfer of this permitted establishment.

Signature	Date
Alex Schmidt	7/23/25

PERMIT APPLICATION FOR INTERNAL COMBUSTION ENGINES AND TURBINES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8891 (9-2021)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must include SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Hiland Partners Holdings LLC	Silurian Compressor Station

SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516)
4

Type of Unit (check all that apply)		
	☒ Stationary Natural Gas-Fired Engine	☐ Emergency Use Only
	☐ Stationary Diesel and Dual Fuel Engine	☒ Non-Emergency Use
	☐ Stationary Gasoline Engine	☐ Peaking
	☐ Stationary Natural Gas-Fired Turbine	☐ Demand Response
	☐ Other – Specify:	

SECTION C – MANUFACTURER DATA

Make	Model	Date of Manufacture
Waukesha	L7044 GSI	

Reciprocating Internal Combustion Engine

☒ Spark Ignition ☐ Compression Ignition ☐ Lean Burn
☒ 4 Stroke ☐ 2 Stroke ☒ Rich Burn

Maximum Rating (BHP @ rpm)	Operating Capacity (BHP @ rpm)
1900 HP @ 1200 RPM	1900 HP @ 1200 RPM

Engine Subject to:
- ☐ 40 CFR 60, Subpart IIII
- ☒ 40 CFR 60, Subpart JJJJ
- ☒ 40 CFR 63, Subpart ZZZZ
- ☐ 40 CFR 60, Subpart OOOO (for compressors)
- ☐ 40 CFR 60, Subpart OOOOa (for compressors)

Turbine
Dry Low Emissions? ☐ Yes ☐ No

Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)	Efficiency

Turbine Subject to:
☐ 40 CFR 60, Subpart GG ☐ 40 CFR 60, Subpart KKKK

SECTION D – FUELS USED

Natural Gas (10^6 cu ft/year)	Percent Sulfur	Percent H_2S
109.49	Negligible	Negligible
Oil (gal/year)	Percent Sulfur	Grade No.
LP Gas (gal/year)	Other – Specify:	

SECTION E – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year	Peak Production Season (if any)
24	7	52	8760	

SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet)	
4		1.5 x Building Height (approximately 45 feet)	
Stack Diameter (feet at top)	Gas Discharged (SCFM)	Exit Temp (°F)	Gas Velocity (FPS)
1.33	2941	1143	104.89

SECTION G – EMISSION CONTROL EQUIPMENT

Is any emission control equipment installed on this unit?

☐ No ■ Yes – Complete and attach form SFN 8532

SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
NO_x	4.19	18.35	Vendor Data
CO	4.19	18.35	Vendor Data
PM	0.30	1.33	AP-42, Table 3.2-3
PM_{10} (filterable and condensable)	0.30	1.33	AP-42, Table 3.2-3
$PM_{2.5}$ (filterable and condensable)	0.30	1.33	AP-42, Table 3.2-3
SO_2	0.01	0.04	AP-42, Table 3.2-3
VOC	3.14	13.76	Vendor Data
GHG (as CO_2e)	1,835	8,039	AP-42, Table 3.2-3
Largest Single HAP	0.21	0.92	AP-42, Table 3.2-3
Total HAPS	0.39	1.69	Vendor Data/AP-42, Table 3.2-3

* If performance test results are available for the unit, submit a copy of test with this application, if manufacture data used, submit manufacturers specification sheets.

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

■ YES ☐ NO

If "NO" a Compliance Schedule (SFN 61008) must be completed and attached.

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR INTERNAL COMBUSTION ENGINES AND TURBINES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8891 (9-2021)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must include SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Hiland Partners Holdings LLC	Silurian Compressor Station

SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516)
5

Type of Unit (check all that apply)		
	☒ Stationary Natural Gas-Fired Engine	☐ Emergency Use Only
	☐ Stationary Diesel and Dual Fuel Engine	☒ Non-Emergency Use
	☐ Stationary Gasoline Engine	☐ Peaking
	☐ Stationary Natural Gas-Fired Turbine	☐ Demand Response
	☐ Other – Specify:	

SECTION C – MANUFACTURER DATA

Make	Model	Date of Manufacture
Waukesha	L7044 GSI	

Reciprocating Internal Combustion Engine

☒ Spark Ignition ☐ Compression Ignition ☐ Lean Burn
☒ 4 Stroke ☐ 2 Stroke ☒ Rich Burn

Maximum Rating (BHP @ rpm)	Operating Capacity (BHP @ rpm)
1900 HP @ 1200 RPM	1900 HP @ 1200 RPM

Engine Subject to:
- ☐ 40 CFR 60, Subpart IIII
- ☒ 40 CFR 60, Subpart JJJJ
- ☒ 40 CFR 63, Subpart ZZZZ
- ☐ 40 CFR 60, Subpart OOOO (for compressors)
- ☐ 40 CFR 60, Subpart OOOOa (for compressors)

Turbine
Dry Low Emissions? ☐ Yes ☐ No

Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)	Efficiency

Turbine Subject to:
☐ 40 CFR 60, Subpart GG ☐ 40 CFR 60, Subpart KKKK

SECTION D – FUELS USED

Natural Gas (10^6 cu ft/year)	Percent Sulfur	Percent H_2S
109.49	Negligible	Negligible
Oil (gal/year)	Percent Sulfur	Grade No.
LP Gas (gal/year)	Other – Specify:	

SECTION E – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year	Peak Production Season (if any)
24	7	52	8760	

SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet)	
5		1.5 x Building Height (approximately 45 feet)	
Stack Diameter (feet at top)	**Gas Discharged (SCFM)**	**Exit Temp (°F)**	**Gas Velocity (FPS)**
1.33	2941	1143	104.89

SECTION G – EMISSION CONTROL EQUIPMENT

Is any emission control equipment installed on this unit?

☐ No ■ Yes – Complete and attach form SFN 8532

SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
NO_x	4.19	18.35	Vendor Data
CO	4.19	18.35	Vendor Data
PM	0.30	1.33	AP-42, Table 3.2-3
PM_{10} (filterable and condensable)	0.30	1.33	AP-42, Table 3.2-3
$PM_{2.5}$ (filterable and condensable)	0.30	1.33	AP-42, Table 3.2-3
SO_2	0.01	0.04	AP-42, Table 3.2-3
VOC	3.14	13.76	Vendor Data
GHG (as CO_2e)	1,835	8,039	AP-42, Table 3.2-3
Largest Single HAP	0.21	0.92	AP-42, Table 3.2-3
Total HAPS	0.39	1.69	Vendor Data/AP-42, Table 3.2-3

* If performance test results are available for the unit, submit a copy of test with this application, if manufacture data used, submit manufacturers specification sheets.

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

■ YES ☐ NO

If "NO" a Compliance Schedule (SFN 61008) must be completed and attached.

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR INTERNAL COMBUSTION ENGINES AND TURBINES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8891 (9-2021)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must include SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Hiland Partners Holdings LLC	Silurian Compressor Station

SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516)
6

Type of Unit (check all that apply)		
	☒ Stationary Natural Gas-Fired Engine	☐ Emergency Use Only
	☐ Stationary Diesel and Dual Fuel Engine	☒ Non-Emergency Use
	☐ Stationary Gasoline Engine	☐ Peaking
	☐ Stationary Natural Gas-Fired Turbine	☐ Demand Response
	☐ Other – Specify:	

SECTION C – MANUFACTURER DATA

Make	Model	Date of Manufacture
Waukesha	L5794 GSI	

Reciprocating Internal Combustion Engine

☒ Spark Ignition	☐ Compression Ignition	☐ Lean Burn
☒ 4 Stroke	☐ 2 Stroke	☒ Rich Burn

Maximum Rating (BHP @ rpm)	Operating Capacity (BHP @ rpm)
1380 HP @ 1200 RPM	1380 HP @ 1200 RPM

Engine Subject to:
- ☐ 40 CFR 60, Subpart IIII
- ☒ 40 CFR 60, Subpart JJJJ
- ☒ 40 CFR 63, Subpart ZZZZ
- ☐ 40 CFR 60, Subpart OOOO (for compressors)
- ☐ 40 CFR 60, Subpart OOOOa (for compressors)

Turbine
Dry Low Emissions? ☐ Yes ☐ No

Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)	Efficiency

Turbine Subject to:
☐ 40 CFR 60, Subpart GG ☐ 40 CFR 60, Subpart KKKK

SECTION D – FUELS USED

Natural Gas (10^6 cu ft/year)	Percent Sulfur	Percent H_2S
81.74	Negligible	Negligible
Oil (gal/year)	Percent Sulfur	Grade No.
LP Gas (gal/year)	Other – Specify:	

SECTION E – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year	Peak Production Season (if any)
24	7	52	8760	

SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet)	
6		1.5 x Building Height (approximately 45 feet)	
Stack Diameter (feet at top)	Gas Discharged (SCFM)	Exit Temp (°F)	Gas Velocity (FPS)
1	2181	1176	138.3

SECTION G – EMISSION CONTROL EQUIPMENT

Is any emission control equipment installed on this unit?

☐ No ■ Yes – Complete and attach form SFN 8532

SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
NO_x	3.04	13.33	Vendor Data
CO	3.04	13.33	Vendor Data
PM	0.23	0.99	AP-42, Table 3.2-3
PM_{10} (filterable and condensable)	0.23	0.99	AP-42, Table 3.2-3
$PM_{2.5}$ (filterable and condensable)	0.23	0.99	AP-42, Table 3.2-3
SO_2	0.01	0.03	AP-42, Table 3.2-3
VOC	2.25	9.86	Vendor Data
GHG (as CO_2e)	1370.2	6001.3	AP-42, Table 3.2-3
Largest Single HAP	0.12	0.53	AP-42, Table 3.2-3
Total HAPS	0.30	1.31	Vendor Data/AP-42, Table 3.2-3

* If performance test results are available for the unit, submit a copy of test with this application, if manufacture data used, submit manufacturers specification sheets.

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

■ YES ☐ NO

If "NO" a Compliance Schedule (SFN 61008) must be completed and attached.

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

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4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR INTERNAL COMBUSTION ENGINES AND TURBINES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8891 (9-2021)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must include SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Hiland Partners Holdings LLC	Silurian Compressor Station

SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516): 7

Type of Unit (check all that apply)		
	■ Stationary Natural Gas-Fired Engine	☐ Emergency Use Only
	☐ Stationary Diesel and Dual Fuel Engine	■ Non-Emergency Use
	☐ Stationary Gasoline Engine	☐ Peaking
	☐ Stationary Natural Gas-Fired Turbine	☐ Demand Response
	☐ Other – Specify:	

SECTION C – MANUFACTURER DATA

Make	Model	Date of Manufacture
Waukesha	L5794 GSI	

Reciprocating Internal Combustion Engine

■ Spark Ignition ☐ Compression Ignition ☐ Lean Burn
■ 4 Stroke ☐ 2 Stroke ■ Rich Burn

Maximum Rating (BHP @ rpm)	Operating Capacity (BHP @ rpm)
1380 HP @ 1200 RPM	1380 HP @ 1200 RPM

Engine Subject to:
- ☐ 40 CFR 60, Subpart IIII
- ■ 40 CFR 60, Subpart JJJJ
- ■ 40 CFR 63, Subpart ZZZZ
- ☐ 40 CFR 60, Subpart OOOO (for compressors)
- ☐ 40 CFR 60, Subpart OOOOa (for compressors)

Turbine
Dry Low Emissions? ☐ Yes ☐ No

Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)	Efficiency

Turbine Subject to:
☐ 40 CFR 60, Subpart GG ☐ 40 CFR 60, Subpart KKKK

SECTION D – FUELS USED

Natural Gas (10^6 cu ft/year)	Percent Sulfur	Percent H_2S
81.74	Negligible	Negligible
Oil (gal/year)	Percent Sulfur	Grade No.
LP Gas (gal/year)	Other – Specify:	

SECTION E – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year	Peak Production Season (if any)
24	7	52	8760	

SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet)	
7		1.5 x Building Height (approximately 45 feet)	
Stack Diameter (feet at top)	Gas Discharged (SCFM)	Exit Temp (°F)	Gas Velocity (FPS)
1	2181	1176	138.3

SECTION G – EMISSION CONTROL EQUIPMENT

Is any emission control equipment installed on this unit?

☐ No ■ Yes – Complete and attach form SFN 8532

SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
NO_x	3.04	13.33	Vendor Data
CO	3.04	13.33	Vendor Data
PM	0.23	0.99	AP-42, Table 3.2-3
PM_{10} (filterable and condensable)	0.23	0.99	AP-42, Table 3.2-3
$PM_{2.5}$ (filterable and condensable)	0.23	0.99	AP-42, Table 3.2-3
SO_2	0.01	0.03	AP-42, Table 3.2-3
VOC	2.25	9.86	Vendor Data
GHG (as CO_2e)	1370.2	6001.3	AP-42, Table 3.2-3
Largest Single HAP	0.12	0.53	AP-42, Table 3.2-3
Total HAPS	0.30	1.31	Vendor Data/AP-42, Table 3.2-3

* If performance test results are available for the unit, submit a copy of test with this application, if manufacture data used, submit manufacturers specification sheets.

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

■ YES ☐ NO

If "NO" a Compliance Schedule (SFN 61008) must be completed and attached.

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8532 (9-2021)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must also include forms SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Hiland Partners Holdings LLC	Silurian Compressor Station

Source ID No. of Equipment being Controlled
5

SECTION B – EQUIPMENT

Type: ☐ Cyclone ☐ Multiclone ☐ Baghouse ☐ Electrostatic Precipitator
☐ Wet Scrubber ☐ Spray Dryer ☐ Flare/Combustor
☒ Other – Specify: NSCR

Name of Manufacturer	Model Number	Date to Be Installed
Waukesha	L7044 GSI	2025

Application:
☐ Boiler ☐ Kiln ☒ Engine ☐ Other – Specify:

Pollutants Removed	NOx	CO	VOC	
Design Efficiency (%)	91.50%	89.8%	0.00%	
Operating Efficiency (%)	TBD	TBD	TBD	

Describe method used to determine operating efficiency:

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)				2941
Gas Temperature (°F)				1143
Gas Pressure (in. H_2O)				
Gas Velocity (ft/sec)				104.89
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	g/hp-hr	11.70	1.00
	CO	g/hp-hr	9.80	1.00
	VOC	g/hp-hr	0.05	0.70
	HCHO	g/hp-hr	0.05	0.05

Pressure Drop Through Gas Cleaning Device (in. H_2O)
TBD

PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8532 (9-2021)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must also include forms SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Hiland Partners Holdings LLC	Silurian Compressor Station

Source ID No. of Equipment being Controlled
6

SECTION B – EQUIPMENT

Type: ☐ Cyclone ☐ Multiclone ☐ Baghouse ☐ Electrostatic Precipitator
☐ Wet Scrubber ☐ Spray Dryer ☐ Flare/Combustor
☒ Other – Specify: NSCR

Name of Manufacturer	Model Number	Date to Be Installed
Waukesha	L5794 GSI	2025

Application:
☐ Boiler ☐ Kiln ☒ Engine ☐ Other – Specify:

Pollutants Removed	NOx	CO	VOC	
Design Efficiency (%)	92.60%	90.50%	0.00%	
Operating Efficiency (%)	TBD	TBD	TBD	

Describe method used to determine operating efficiency:

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)				2181
Gas Temperature (°F)				1176
Gas Pressure (in. H_2O)				
Gas Velocity (ft/sec)				138.3
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	g/hp-hr	13.5	1.00
	CO	g/hp-hr	10.5	1.00
	VOC	g/hp-hr	0.28	0.70
	HCHO	g/hp-hr	0.04	0.04

Pressure Drop Through Gas Cleaning Device (in. H_2O)
TBD

PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8532 (9-2021)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must also include forms SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Hiland Partners Holdings LLC	Silurian Compressor Station

Source ID No. of Equipment being Controlled
7

SECTION B – EQUIPMENT

Type: ☐ Cyclone ☐ Multiclone ☐ Baghouse ☐ Electrostatic Precipitator
☐ Wet Scrubber ☐ Spray Dryer ☐ Flare/Combustor
☒ Other – Specify: NSCR

Name of Manufacturer	Model Number	Date to Be Installed
Waukesha	L5794 GSI	2025

Application:
☐ Boiler ☐ Kiln ☒ Engine ☐ Other – Specify:

Pollutants Removed	NOx	CO	VOC	
Design Efficiency (%)	92.60%	90.50%	0.00%	
Operating Efficiency (%)	TBD	TBD	TBD	

Describe method used to determine operating efficiency:

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)				2181
Gas Temperature (°F)				1176
Gas Pressure (in. H_2O)				
Gas Velocity (ft/sec)				138.3
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	g/hp-hr	13.5	1.00
	CO	g/hp-hr	10.5	1.00
	VOC	g/hp-hr	0.28	0.70
	HCHO	g/hp-hr	0.04	0.04

Pressure Drop Through Gas Cleaning Device (in. H_2O)
TBD

PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8532 (9-2021)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must also include forms SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Hiland Partners Holdings LLC	Silurian Compressor Station
Source ID No. of Equipment being Controlled 9,12	

SECTION B – EQUIPMENT

Type: ☐ Cyclone ☐ Multiclone ☐ Baghouse ☐ Electrostatic Precipitator
☐ Wet Scrubber ☐ Spray Dryer ■ Flare/Combustor
☐ Other – Specify:

Name of Manufacturer	Model Number	Date to Be Installed
Cimarron	Sonic Flare w/ Model XD-1000 Duraspark Retractable Ignition System	2025

Application:
☐ Boiler ☐ Kiln ☐ Engine ☐ Other – Specify:

Pollutants Removed	VOC			
Design Efficiency (%)	98%			
Operating Efficiency (%)	TBD			

Describe method used to determine operating efficiency:
Manufacturer specification

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)				261.5
Gas Temperature (°F)				1832
Gas Pressure (in. H_2O)				
Gas Velocity (ft/sec)				22.2
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	lb/MMBTU		0.138
	CO	lb/MMBTU		0.2755
	VOC			See Calcs
	PM	lb/MMscf		

Pressure Drop Through Gas Cleaning Device (in. H_2O)
TBD

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8329 (9-2021)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization Hiland Partners Holdings LLC		
Applicant's Name Alex Schmidt		
Title Director of Operations	Telephone Number (701) 833-9361	E-mail Address alex_schmidt@kindermorgan.com
Mailing Address (Street & No.) 1667 Cole Blvd. Suite 300		
City Lakewood	State CO	ZIP Code 80401

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters Brittany Brumley		
Title EHS Manager	Telephone Number (713) 420-6314	E-mail Address brittany_brumley@kindermorgan.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 7 Miles South of Tioga		
City Tioga	State ND	ZIP Code 58852
County Williams	Number of Employees at Location 2	
Land Area at Plant Site 6.2 Acres (or) Sq. Ft.	MSL Elevation at Plant 2350	

Describe Nature of Business/Process

Compressor Station

SECTION B – STACK DATA

Inside Diameter (ft) 1.33	Height Above Grade (ft) 1.5 x Building Height (approximately 45 feet)	
Gas Temperature at Exit (°F) 1143	Gas Velocity at Exit (ft/sec) 104.89	Gas Volume (scfm) 2941
Basis of any Estimates (attach separate sheet if necessary)		
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐ No		
Nearest Residences or Building Residence	Distance (ft) 4000	Direction SE
Nearest Property Line Property Line	Distance (ft) 100	Direction

SECTION C – EMISSION STREAM DATA

Source ID Number SFN 8516 4	Mean Particle Diameter (um) Unknown
Flow Rate (scfm) 2941	Drift Velocity (ft/sec) Unknown
Stream Temperature (°F) 1143	Particulate Concentration (gr/dscf) Unknown
Moisture Content (%) Unknown	Halogens or Metals Present? Unknown
Pressure (in. Hg) 749.9	Organic Content (ppmv) Unknown
Heat Content (Btu/scfm) Unknown	O_2 Content (%) Unknown

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted Formaldehyde	Chemical Abstract Services (CAS) Number 50-00-0
Proposed Emission Rate (lb/hr) 0.21	Emission Source (describe) 1900 HP Compressor Engine #4
Source Classification (process point, process fugitive, area fugitive) Process point	Pollutant Class and Form (organic/inorganic - particulate/vapor) Organic - Vapor
Concentration in Emission Stream (ppmv) Unknown	Vapor Pressure (in. Hg @ °F) Unknown
Solubility Unknown	Molecular Weight (lb/lb-mole) 30.04
Absorptive Properties Unknown	

Pollutant Emitted See calculation tables for other HAPs	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

(Add additional pages if necessary)

Signature of Applicant Alex Schmidt	Date 7/23/25

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8329 (9-2021)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization Hiland Partners Holdings LLC		
Applicant's Name Alex Schmidt		
Title Director of Operations	Telephone Number (701) 833-9361	E-mail Address alex_schmidt@kindermorgan.com
Mailing Address (Street & No.) 1667 Cole Blvd. Suite 300		
City Lakewood	State CO	ZIP Code 80401

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters Brittany Brumley		
Title EHS Manager	Telephone Number (713) 420-6314	E-mail Address brittany_brumley@kindermorgan.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 7 Miles South of Tioga		
City Tioga	State ND	ZIP Code 58852
County Williams	Number of Employees at Location 2	
Land Area at Plant Site 6.2 Acres (or) Sq. Ft.	MSL Elevation at Plant 2350	

Describe Nature of Business/Process

Compressor Station

SECTION B – STACK DATA

Inside Diameter (ft) 1.33	Height Above Grade (ft) 1.5 x Building Height (approximately 45 feet)	
Gas Temperature at Exit (°F) 1143	Gas Velocity at Exit (ft/sec) 104.89	Gas Volume (scfm) 2941
Basis of any Estimates (attach separate sheet if necessary)		
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐ No		
Nearest Residences or Building Residence	Distance (ft) 4000	Direction SE
Nearest Property Line Property Line	Distance (ft) 100	Direction

SECTION C – EMISSION STREAM DATA

Source ID Number SFN 8516 5	Mean Particle Diameter (um) Unknown
Flow Rate (scfm) 2941	Drift Velocity (ft/sec) Unknown
Stream Temperature (°F) 1143	Particulate Concentration (gr/dscf) Unknown
Moisture Content (%) Unknown	Halogens or Metals Present? Unknown
Pressure (in. Hg) 749.9	Organic Content (ppmv) Unknown
Heat Content (Btu/scfm) Unknown	O_2 Content (%) Unknown

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted Formaldehyde	Chemical Abstract Services (CAS) Number 50-00-0
Proposed Emission Rate (lb/hr) 0.21	Emission Source (describe) 1900 HP Compressor Engine #5
Source Classification (process point, process fugitive, area fugitive) Process point	Pollutant Class and Form (organic/inorganic - particulate/vapor) Organic - Vapor
Concentration in Emission Stream (ppmv) Unknown	Vapor Pressure (in. Hg @ °F) Unknown
Solubility Unknown	Molecular Weight (lb/lb-mole) 30.04
Absorptive Properties Unknown	

Pollutant Emitted See calculation tables for other HAPs	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

(Add additional pages if necessary)

Signature of Applicant	Date

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8329 (9-2021)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization Hiland Partners Holdings LLC		
Applicant's Name Alex Schmidt		
Title Director of Operations	Telephone Number (701) 833-9361	E-mail Address alex_schmidt@kindermorgan.com
Mailing Address (Street & No.) 1667 Cole Blvd. Suite 300		
City Lakewood	State CO	ZIP Code 80401

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters Brittany Brumley		
Title EHS Manager	Telephone Number (713) 420-6314	E-mail Address brittany_brumley@kindermorgan.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 7 Miles South of Tioga		
City Tioga	State ND	ZIP Code 58852
County Williams	Number of Employees at Location 2	
Land Area at Plant Site 6.2 Acres (or) Sq. Ft.	MSL Elevation at Plant 2350	

Describe Nature of Business/Process Compressor Station

SECTION B – STACK DATA

Inside Diameter (ft) 1	Height Above Grade (ft) 1.5 x Building Height (approximately 45 feet)	
Gas Temperature at Exit (°F) 1176	Gas Velocity at Exit (ft/sec) 138.3	Gas Volume (scfm) 2181
Basis of any Estimates (attach separate sheet if necessary)		
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ■ Yes ☐ No		
Nearest Residences or Building Residence	Distance (ft) 4000	Direction SE
Nearest Property Line Property Line	Distance (ft) 100	Direction

SECTION C – EMISSION STREAM DATA

Source ID Number SFN 8516 6	Mean Particle Diameter (um) Unknown
Flow Rate (scfm) 2181	Drift Velocity (ft/sec) Unknown
Stream Temperature (°F) 1176	Particulate Concentration (gr/dscf) Unknown
Moisture Content (%) Unknown	Halogens or Metals Present? Unknown
Pressure (in. Hg) 749.9	Organic Content (ppmv) Unknown
Heat Content (Btu/scfm) Unknown	O_2 Content (%) Unknown

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted Formaldehyde	Chemical Abstract Services (CAS) Number 50-00-0
Proposed Emission Rate (lb/hr) 0.12	Emission Source (describe) 1380 HP Compressor Engine #6
Source Classification (process point, process fugitive, area fugitive) Process point	Pollutant Class and Form (organic/inorganic - particulate/vapor) Organic - Vapor
Concentration in Emission Stream (ppmv) Unknown	Vapor Pressure (in. Hg @ °F) Unknown
Solubility Unknown	Molecular Weight (lb/lb-mole) 30.04
Absorptive Properties Unknown	

Pollutant Emitted See calculation tables for other HAPs	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

(Add additional pages if necessary)

Signature of Applicant	Date

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8329 (9-2021)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization Hiland Partners Holdings LLC		
Applicant's Name Alex Schmidt		
Title Director of Operations	Telephone Number (701) 833-9361	E-mail Address alex_schmidt@kindermorgan.com
Mailing Address (Street & No.) 1667 Cole Blvd. Suite 300		
City Lakewood	State CO	ZIP Code 80401

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters Brittany Brumley		
Title EHS Manager	Telephone Number (713) 420-6314	E-mail Address brittany_brumley@kindermorgan.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 7 miles south of Tioga		
City Tioga	State ND	ZIP Code 58852
County Williams	Number of Employees at Location 2	
Land Area at Plant Site 6.2 Acres (or) Sq. Ft.	MSL Elevation at Plant 2350	

Describe Nature of Business/Process Compressor Station

SECTION B – STACK DATA

Inside Diameter (ft) 1	Height Above Grade (ft) 1.5 x Building Height (approximately 45 feet)	
Gas Temperature at Exit (°F) 1176	Gas Velocity at Exit (ft/sec) 138.3	Gas Volume (scfm) 2181
Basis of any Estimates (attach separate sheet if necessary)		
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ■ Yes ☐ No		
Nearest Residences or Building Residence	Distance (ft) 4000	Direction SE
Nearest Property Line Property Line	Distance (ft) 100	Direction

SECTION C – EMISSION STREAM DATA

Source ID Number SFN 8516 7	Mean Particle Diameter (um) Unknown
Flow Rate (scfm) 2181	Drift Velocity (ft/sec) Unknown
Stream Temperature (°F) 1176	Particulate Concentration (gr/dscf) Unknown
Moisture Content (%) Unknown	Halogens or Metals Present? Unknown
Pressure (in. Hg) 749.9	Organic Content (ppmv) Unknown
Heat Content (Btu/scfm) Unknown	O_2 Content (%) Unknown

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted Formaldehyde	Chemical Abstract Services (CAS) Number 50-00-0
Proposed Emission Rate (lb/hr) 0.12	Emission Source (describe) 1380 HP Compressor Engine #7
Source Classification (process point, process fugitive, area fugitive) Process point	Pollutant Class and Form (organic/inorganic - particulate/vapor) Organic - Vapor
Concentration in Emission Stream (ppmv) Unknown	Vapor Pressure (in. Hg @ °F) Unknown
Solubility Unknown	Molecular Weight (lb/lb-mole) 30.04
Absorptive Properties Unknown	

Pollutant Emitted See calculation tables for other HAPs	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

(Add additional pages if necessary)

Signature of Applicant Alex Schmidt	Date 7/23/25

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8329 (9-2021)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization Hiland Partners Holdings LLC		
Applicant's Name Alex Schmidt		
Title Director of Operations	Telephone Number (701) 833-9361	E-mail Address alex_schmidt@kindermorgan.com
Mailing Address (Street & No.) 1667 Cole Blvd. Suite 300		
City Lakewood	State CO	ZIP Code 80401

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters Brittany Brumley		
Title EHS Manager	Telephone Number (713) 420-6314	E-mail Address brittany_brumley@kindermorgan.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 7 miles south of Tioga		
City Tioga	State ND	ZIP Code 58852
County Williams	Number of Employees at Location 2	
Land Area at Plant Site 6.2 Acres (or) Sq. Ft.	MSL Elevation at Plant 2350	

Describe Nature of Business/Process Compressor Station

SECTION B – STACK DATA

Inside Diameter (ft) 0.5	Height Above Grade (ft) 30	
Gas Temperature at Exit (°F) 1832	Gas Velocity at Exit (ft/sec) 22.2	Gas Volume (scfm) 261.5
Basis of any Estimates (attach separate sheet if necessary)		
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ■ Yes ☐ No		
Nearest Residences or Building Residence	Distance (ft) 4000	Direction SE
Nearest Property Line Property Line	Distance (ft) 100	Direction

SECTION C – EMISSION STREAM DATA

Source ID Number SFN 8516 9	Mean Particle Diameter (um) Unknown
Flow Rate (scfm) 261.5	Drift Velocity (ft/sec) Unknown
Stream Temperature (°F) 1832	Particulate Concentration (gr/dscf) Unknown
Moisture Content (%) Unknown	Halogens or Metals Present? Unknown
Pressure (in. Hg) Unknown	Organic Content (ppmv) Unknown
Heat Content (Btu/scfm) Unknown	O_2 Content (%) Unknown

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted n-hexane	Chemical Abstract Services (CAS) Number 110-54-3
Proposed Emission Rate (lb/hr) 0.08	Emission Source (describe) Flare
Source Classification (process point, process fugitive, area fugitive) Process point	Pollutant Class and Form (organic/inorganic - particulate/vapor) Organic - Vapor
Concentration in Emission Stream (ppmv) Unknown	Vapor Pressure (in. Hg @ °F) Unknown
Solubility Unknown	Molecular Weight (lb/lb-mole) 86.18
Absorptive Properties Unknown	

Pollutant Emitted See calculation tables for other HAPs	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

(Add additional pages if necessary)

Signature of Applicant Alex Schmidt	Date 7/23/25

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8329 (9-2021)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization Hiland Partners Holdings LLC		
Applicant's Name Alex Schmidt		
Title Director of Operations	Telephone Number (701) 833-9361	E-mail Address alex_schmidt@kindermorgan.com
Mailing Address (Street & No.) 1667 Cole Blvd. Suite 300		
City Lakewood	State CO	ZIP Code 80401

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters Brittany Brumley		
Title EHS Manager	Telephone Number (713) 420-6314	E-mail Address brittany_brumley@kindermorgan.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 7 miles south of Tioga		
City Tioga	State ND	ZIP Code 58852
County Williams	Number of Employees at Location 2	
Land Area at Plant Site 6.2 Acres (or) Sq. Ft.	MSL Elevation at Plant 2350	

Describe Nature of Business/Process Compressor Station

SECTION B – STACK DATA

Inside Diameter (ft) 0.001	Height Above Grade (ft) 3	
Gas Temperature at Exit (°F) Ambient	Gas Velocity at Exit (ft/sec) 0.001	Gas Volume (scfm)
Basis of any Estimates (attach separate sheet if necessary)		
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ■ Yes ☐ No		
Nearest Residences or Building Residence	Distance (ft) 4000	Direction SE
Nearest Property Line Property Line	Distance (ft) 100	Direction

SECTION C – EMISSION STREAM DATA

Source ID Number SFN 8516 11	Mean Particle Diameter (um) Unknown
Flow Rate (scfm) Unknown	Drift Velocity (ft/sec) Unknown
Stream Temperature (°F) Ambient	Particulate Concentration (gr/dscf) Unknown
Moisture Content (%) Unknown	Halogens or Metals Present? Unknown
Pressure (in. Hg) Unknown	Organic Content (ppmv) Unknown
Heat Content (Btu/scfm) Unknown	O_2 Content (%) Unknown

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted n-hexane	Chemical Abstract Services (CAS) Number 110-54-3
Proposed Emission Rate (lb/hr) 0.006	Emission Source (describe) Fugitives
Source Classification (process point, process fugitive, area fugitive) area fugitive	Pollutant Class and Form (organic/inorganic - particulate/vapor) Organic - Vapor
Concentration in Emission Stream (ppmv) Unknown	Vapor Pressure (in. Hg @ °F) Unknown
Solubility Unknown	Molecular Weight (lb/lb-mole) 86.18
Absorptive Properties Unknown	

Pollutant Emitted See calculation tables for other HAPs	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

(Add additional pages if necessary)

Signature of Applicant Alex Schmidt	Date 7/23/25

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8329 (9-2021)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization Hiland Partners Holdings LLC		
Applicant's Name Alex Schmidt		
Title Director of Operations	Telephone Number (701) 833-9361	E-mail Address alex_schmidt@kindermorgan.com
Mailing Address (Street & No.) 1667 Cole Blvd. Suite 300		
City Lakewood	State CO	ZIP Code 80401

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters Brittany Brumley		
Title EHS Manager	Telephone Number (713) 420-6314	E-mail Address brittany_brumley@kindermorgan.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 7 miles south of Tioga		
City Tioga	State ND	ZIP Code 58852
County Williams	Number of Employees at Location 2	
Land Area at Plant Site 6.2 Acres (or) Sq. Ft.	MSL Elevation at Plant 2350	

Describe Nature of Business/Process

Compressor Station

SECTION B – STACK DATA

Inside Diameter (ft) Vary	Height Above Grade (ft) Vary	
Gas Temperature at Exit (°F) Vary	Gas Velocity at Exit (ft/sec) Vary	Gas Volume (scfm) Vary

Basis of any Estimates (attach separate sheet if necessary)

Compressor blowdowns are controlled by the flare (Source ID: 9). Pigging activities are released to the atmosphere.

Are Emission Control Devices in Place? If YES – Complete SFN 8532 ■ Yes ☐ No

Nearest Residences or Building Residence	Distance (ft) 4000	Direction SE
Nearest Property Line Property Line	Distance (ft) 100	Direction

SECTION C – EMISSION STREAM DATA

Source ID Number SFN 8516 12	Mean Particle Diameter (um) Unknown
Flow Rate (scfm) Vary	Drift Velocity (ft/sec) Unknown
Stream Temperature (°F) Vary	Particulate Concentration (gr/dscf) Unknown
Moisture Content (%) Unknown	Halogens or Metals Present? Unknown
Pressure (in. Hg) Unknown	Organic Content (ppmv) Unknown
Heat Content (Btu/scfm) Unknown	O_2 Content (%) Unknown

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted Formaldehyde	Chemical Abstract Services (CAS) Number 110-54-3
Proposed Emission Rate (lb/hr) 0.003	Emission Source (describe) MSS
Source Classification (process point, process fugitive, area fugitive) Process point	Pollutant Class and Form (organic/inorganic - particulate/vapor) Organic - Vapor
Concentration in Emission Stream (ppmv) Unknown	Vapor Pressure (in. Hg @ °F) Unknown
Solubility Unknown	Molecular Weight (lb/lb-mole) 86.18
Absorptive Properties Unknown	

Pollutant Emitted See calculation tables for other HAPs	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

(Add additional pages if necessary)

Signature of Applicant Alex Schmidt	Date 7/23/25

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8535 (9-2021)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must include SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Hiland Partners Holdings LLC	Silurian Compressor Station

SECTION B – TANK DATA

Source ID Number (From SFN 8516): 3

Capacity	Barrels: 400		Gallons: 16,800	
Dimensions	Diameter: 12	Height: 20	Length	Width

Shape: ■ Cylindrical ☐ Spherical ☐ Other – Specify:

Materials of Construction (i.e., steel): Steel

Construction: ☐ Riveted ■ Welded ☐ Other – Specify:

Color: Tan

Condition: ☐ Good ■ Fair ☐ Poor

Status: ☐ New Construction ☐ Alteration ■ Existing (Give Date Constructed): 01/12/2012

Type of Tank:
- ■ Fixed Roof
- ☐ Variable Vapor Space
- ☐ Pressure (low or high)
- ☐ External Floating
- ☐ Internal Floating
- ☐ Other – Specify:

Type of Roof: ☐ Pan ☐ Double Deck ☐ Pontoon ■ Other – Specify: N/A

Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal
	☐ Primary Seal Only ☐ With Rim Mounted Seal ☐ With Shoe Mounted Secondary Seal	☐ Primary Seal Only ☐ With Rim Mounted Seal ☐ With Weather Shield	☐ Primary Seal Only ☐ With Rim Mounted Seal ☐ With Weather Shield

SECTION C – TANK CONTENTS

Name all liquids, vapors, gases, or mixtures of such materials to be stored in the tank.
Give density (lbs per gal) or A.P.I.

Produced Water

SECTION D – VAPOR DISPOSAL

■ Atmosphere ☐ Vapor Recovery Unit ☐ Flare ☐ Enclosed Combustor ☐ Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure 13.72	Maximum Reid Vapor Pressure

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) 16.5 bbls/hr	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) 10.125 feet
Average Throughput (barrels per day or gallons per day) 396 bbls/day	Tank Turnovers per Year 1

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent	Name of Material Dissolved
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal)	

SECTION H – AIR CONTAMINANATS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
VOC	0.001	0.004	AP-42, Section 7.1

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to: ☐ 40 CFR 60, Subpart K ☐ 40 CFR 60, Subpart Ka ☐ 40 CFR 60, Subpart Kb

☐ 40 CFR 60, Subpart OOOO ☐ 40 CFR 60, Subpart OOOOa

Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb, OOOO, OOOOa being adhered to, where applicable?

■ Yes ☐ No – Explain:

This 400 barrel (16,800 gallons) storage tank was constructed in August 2013. This tank is storing produced water with negligible emissions (0.004 TPY).

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701) 328-5188

PERMIT APPLICATION FOR FLARES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 59652 (9-2021)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must include SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Hiland Partners Holdings LLC	Silurian Compressor Station

SECTION B - FLARE INFORMATION

Use: ☐ Emergency ☐ Process ■ Both	Subject to NSPS (40 CFR 60.18) ○ Yes ◉ No	
Emission Point ID 9	Height Above Ground Level (ft.) 30	Diameter at Top (ft.) 0.50
Flame Monitor: ■ Thermocouple ☐ Infrared ☐ Ultraviolet ☐ Acoustic ☐ Other:		
Ignition: ■ Automatic ■ Continuous Burning Pilot ☐ Other:		
Average Btu/1000 scf 1,326,000	Percent H_2S 0.0004	Maximum Hourly Flow Rate to Flare 15,690 SCFH
List source ID numbers controlled by this unit, if any: 9, 12		

SECTION C – AIR CONTAMINANTS EMITTED

Pollutant	Amount (Tons Per Year)	Basis of Estimate*
NO_x	12.58	TCEQ Technical Guidance for Flares and Vapor Combustors
CO	25.11	TCEQ Technical Guidance for Flares and Vapor Combustors
PM	0.003	AP-42, Table 1.4-2 (07/98)
PM_{10} (filterable and condensable)	0.003	AP-42, Table 1.4-2 (07/98)
$PM_{2.5}$ (filterable and condensable)	0.003	AP-42, Table 1.4-2 (07/98)
SO_2	0.05	Mass Balance
VOC	14.29	Mass Balance
GHG (as CO_2e)	10,673	40 CFR 98, Subpart C
Largest Single HAP	0.33	Mass Balance
Total HAPS	0.54	Mass Balance

*If performance test results are available for the unit, submit a copy of test with this application. If manufacturer guarantee are used provide spec sheet.

Will flaring of gas comply with applicable Ambient Air Quality Standards? ■ Yes ☐ No

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION CONTROL RULES AND REGULATIONS?

■ YES ☐ NO

If "NO" a Compliance Schedule (SFN 61008) must be completed and attached.

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, ND 58503-1324
(701)328-5188

6.0 Appendices

- Appendix A – Supporting Emission Calculations
- Appendix B – Manufacturer Specifications

APPENDIX A

Silurian Compressor Station
API Tank 400 bbls
Produced Water Storage Tank Emissions

Equipment Data:

Emission Unit (EU):	**3**
Emission Unit Name:	API Tank 400 bbls

Emissions Data:

Tank Contents =	Produced Water	
Tank Type =	Vertical Fixed Roof	
Tank Capacity =	16,800	gallons
Annual Throughput =	396	bbl/year per tank
Annual Throughput =	16,632	gallons/year per tank

Emission Unit	Standing Losses (lb/hr)	Working Losses (lb/hr)	Total Losses + 20 % (lb/hr)	Standing Losses (ton/yr)	Working Losses (ton/yr)	Total Losses + 20 % (ton/yr)
3	0.001	0.0001	0.0009	0.0029	0.0003	0.0039

Notes:
1. Emissions calculated using ProMax model.
2. The liquid stored is essentially water. To be conservative, an additional 20 % safety factor was added to the emissions calculated via ProMax.

Silurian Compressor Station
Engine 4 Emissions

Equipment Data:

Emission Unit (EU):	**4**
Emission Unit Name:	Waukesha L7044GSI
Engine Type:	4SRB

Emissions Data:

Fuel Usage =	109.49	MMscf/yr (Calculated value based on max fuel combustion rate)
Horsepower =	1,900	bhp
Speed =	1,200	rpm
Hours of Operation =	8,760	hr/yr
Max. Fuel Combustion Rate (HHV) =	8,249	Btu/bhp-hr
Fuel Heating Value (HHV) =	1,254	MMBtu/MMscf
Max. Heat Rate (HHV) =	15.67	MMBtu/hr

Pollutant	Emission Factor	Units	Emission Factor Reference	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
PM_{10} [2]	0.01941	lb/MMBtu	AP-42	0.30	1.33
NOx[1]	1.0	g/bhp-hr	Vendor Data	4.19	18.35
CO[1]	1.0	g/bhp-hr	Vendor Data	4.19	18.35
SO_2	5.88E-04	lb/MMBtu	AP-42	0.01	0.04
VOC[1,3]	0.70	g/bhp-hr	Vendor Data	3.14	13.76
Total HAPs			AP-42	0.39	1.69
Formaldehyde	0.05	g/bhp-hr	Vendor Data	0.21	0.92

Pollutant	Emission Factor	Units	Emission Factor Reference	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
CO_2e	--	--	--	1,835	8,039
GHG	--	--	--	1,833	8,030
CO_2	117	lb/MMBtu	AP-42	1,833	8,030
CH_4	0.0022	lb/MMBtu	AP-42	0.03	0.15
N_2O	0.0002	lb/MMBtu	AP-42	0.0035	0.02

Notes:

1. NO_x, CO, and VOC emissions based on data from the catalyst vendor indicating a post-catalyst emission rate which meets 40 CFR 60 Subpart JJJJ standards. Formaldehyde emissions are based on manufacturer data. PM/PM_{10} and SO_2 emissions based on AP-42 Table 3.2-3.
2. Per AP-42, all particulate is considered to be less than 1.0 micrometer in diameter.
3. VOC emissions include formaldehyde.

Sample Calculation:

PM_{10} Emissions (ton/yr) = (Emission Factor, lb/MMBtu) x (Max Heat Input Rate (HHV), MMBtu/hr) x (Hours of Operation, hr/yr) / (2,000 lb/ton)
PM_{10} Emissions (ton/yr) = (0.01941 lb/MMBtu) x (15.67 MMBtu/hr) x (8,760 hr/yr) / (2,000 lb/ton) = 1.33 ton/yr

VOC Emissions (ton/yr) = (Emission Factor, g/bhp-hr) x (Horsepower, bhp) x (Hours of Operation, hr/yr) / (2,000 lb/ton) / (453.59 grams/1 lb)
VOC Emissions (ton/yr) = (0.7 g/bhp-hr) x (1900 bhp) x (8,760 hr/yr) / (2,000 lb/ton) / (453.59 g/lb) = 13.76 ton/yr

CO_2e Emissions (ton/yr) = (CO_2 emissions x 1) + (CH_4 emissions x 25) + (N_2O emissions x 298)
CO_2e Emissions (ton/yr) = ((8030.27 ton/yr x 1) + (0.15 ton/yr x 28) + (0.02 ton/yr x 265)) = 8038.52 ton/yr

GHG Emissions (ton/yr) = (CO_2 emissions) + (CH_4 emissions) + (N_2O emissions)
GHG Emissions (ton/yr) = (8030.27 ton/yr) + (0.15 ton/yr) + (0.02 ton/yr) = 8030.43 ton/yr

Silurian Compressor Station
Engine 4 HAP Emissions

Engine	Horsepower (hp)	Operating Hours	Heat Input (MMBtu/hr)	Heat Input (MMBtu/yr)	Fuel Input (MMScf/yr)
4	1,900	8,760	16	137,296	109.487

HAP	Emission Factor (lb/MMBtu)[1]	Emission Factor (g/bhp-hr)	Control Efficiency (%)	Total Emissions (lb/hr)	Total Emissions (tpy)
1,3-Butadiene	6.63E-04	--	0	0.0104	0.0455
Acetaldehyde	2.79E-03	--	0	0.0437	0.1915
Acrolein	2.63E-03	--	0	0.0412	0.1805
Benzene	1.58E-03	--	0	0.0248	0.1085
Formaldehyde[2]	--	0.05	0	0.2094	0.9173
Methanol	3.06E-03	--	0	0.0480	0.2101
Toluene	5.58E-04	--	0	0.0087	0.0383
Total HAP Emissions				**0.39**	**1.69**

Notes:

1. Emission factors from AP-42 Table 3.2-3, Uncontrolled Emission Factors for 4-Stroke Rich-Burn Engines (July 2000).
2. Formaldehyde emission factor is from manufacturer's information.

Silurian Compressor Station
Engine 5 Emissions

Equipment Data:

Emission Unit (EU):	**5**
Emission Unit Name:	Waukesha L7044GSI
Engine Type:	4SRB

Emissions Data:

Fuel Usage =	109.49	MMscf/yr (Calculated value based on max fuel combustion rate)
Horsepower =	1,900	bhp
Speed =	1,200	rpm
Hours of Operation =	8,760	hr/yr
Max. Fuel Combustion Rate (HHV) =	8,249	Btu/bhp-hr
Fuel Heating Value (HHV) =	1,254	MMBtu/MMscf
Max. Heat Rate (HHV) =	15.67	MMBtu/hr

Pollutant	Emission Factor	Units	Emission Factor Reference	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
PM_{10} [2]	0.01941	lb/MMBtu	AP-42	0.30	1.33
NOx[1]	1.0	g/bhp-hr	Vendor Data	4.19	18.35
CO[1]	1.0	g/bhp-hr	Vendor Data	4.19	18.35
SO_2	5.88E-04	lb/MMBtu	AP-42	0.01	0.04
VOC[1,3]	0.70	g/bhp-hr	Vendor Data	3.14	13.76
Total HAPs			AP-42	0.39	1.69
Formaldehyde	0.05	g/bhp-hr	Vendor Data	0.21	0.92

Pollutant	Emission Factor	Units	Emission Factor Reference	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
CO_2e	--	--	--	1,835	8,039
GHG	--	--	--	1,833	8,030
CO_2	117	lb/MMBtu	AP-42	1,833	8,030
CH_4	0.0022	lb/MMBtu	AP-42	0.03	0.15
N_2O	0.0002	lb/MMBtu	AP-42	0.0035	0.02

Notes:

1. $NO_{x,\ CO,}$ and VOC emissions based on data from the catalyst vendor indicating a post-catalyst emission rate which meets 40 CFR 60 Subpart JJJJ standards. Formaldehyde emissions are based on manufacturer data. PM/PM_{10} and SO_2 emissions based on AP-42 Table 3.2-3.
2. Per AP-42, all particulate is considered to be less than 1.0 micrometer in diameter.
3. VOC emissions include formaldehyde.

Sample Calculation:

PM_{10} Emissions (ton/yr) = (Emission Factor, lb/MMBtu) x (Max Heat Input Rate (HHV), MMBtu/hr) x (Hours of Operation, hr/yr) / (2,000 lb/ton)

PM_{10} Emissions (ton/yr) = (0.01941 lb/MMBtu) x (15.67 MMBtu/hr) x (8,760 hr/yr) / (2,000 lb/ton) = 1.33 ton/yr

VOC Emissions (ton/yr) = (Emission Factor, g/bhp-hr) x (Horsepower, bhp) x (Hours of Operation, hr/yr) / (2,000 lb/ton) / (453.59 grams/1 lb)

VOC Emissions (ton/yr) = (0.7 g/bhp-hr) x (1900 bhp) x (8,760 hr/yr) / (2,000 lb/ton) / (453.59 g/lb) = 13.76 ton/yr

CO_2e Emissions (ton/yr) = (CO_2 emissions x 1) + (CH_4 emissions x 25) + (N_2O emissions x 298)

CO_2e Emissions (ton/yr) = ((8030.27 ton/yr x 1) + (0.15 ton/yr x 28) + (0.02 ton/yr x 265)) = 8038.52 ton/yr

GHG Emissions (ton/yr) = (CO_2 emissions) + (CH_4 emissions) + (N_2O emissions)

GHG Emissions (ton/yr) = (8030.27 ton/yr) + (0.15 ton/yr) + (0.02 ton/yr) = 8030.43 ton/yr

Silurian Compressor Station
Engine 5 HAP Emissions

Engine	Horsepower (hp)	Operating Hours	Heat Input (MMBtu/hr)	Heat Input (MMBtu/yr)	Fuel Input (MMScf/yr)
5	1,900	8,760	16	137,296	109.487

HAP	Emission Factor (lb/MMBtu)[1]	Emission Factor (g/bhp-hr)	Control Efficiency (%)	Total Emissions (lb/hr)	Total Emissions (tpy)
1,3-Butadiene	6.63E-04	--	0	0.0104	0.0455
Acetaldehyde	2.79E-03	--	0	0.0437	0.1915
Acrolein	2.63E-03	--	0	0.0412	0.1805
Benzene	1.58E-03	--	0	0.0248	0.1085
Formaldehyde[2]	--	0.05	0	0.2094	0.9173
Methanol	3.06E-03	--	0	0.0480	0.2101
Toluene	5.58E-04	--	0	0.0087	0.0383
Total HAP Emissions					**1.69**

Notes:

1. Emission factors from AP-42 Table 3.2-3, Uncontrolled Emission Factors for 4-Stroke Rich-Burn Engines (July 2000).

2. Formaldehyde emission factor is from manufacturer's information.

Silurian Compressor Station
Engine 6 Emissions

Equipment Data:

Emission Unit (EU):	**6**
Emission Unit Name:	Waukesha L5794GSI
Engine Type:	4SRB

Emissions Data:

Fuel Usage =	81.74	MMscf/yr (Calculated value based on max fuel combustion rate)
Horsepower =	1,380	bhp
Speed =	1,200	rpm
Hours of Operation =	8,760	hr/yr
Max. Fuel Combustion Rate (HHV) =	8,479	Btu/bhp-hr
Fuel Heating Value (HHV) =	1,254	MMBtu/MMscf
Max. Heat Rate (HHV) =	11.70	MMBtu/hr

Pollutant	Emission Factor	Units	Emission Factor Reference	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
PM_{10} [2]	0.01941	lb/MMBtu	AP-42	0.23	0.99
NO_x[1]	1.0	g/bhp-hr	Vendor Data	3.04	13.33
CO[1]	1.0	g/bhp-hr	Vendor Data	3.04	13.33
SO_2	5.88E-04	lb/MMBtu	AP-42	0.01	0.03
VOC[1,3]	0.70	g/bhp-hr	Vendor Data	2.25	9.86
Total HAPs			AP-42	0.30	1.31
Formaldehyde	0.04	g/bhp-hr	Vendor Data	0.12	0.53
Pollutant	**Emission Factor**	**Units**	**Emission Factor Reference**	**Hourly Emissions (lb/hr)**	**Annual Emissions (tpy)**
CO_2e	--	--	--	1,370	6,001
GHG	--	--	--	1,369	5,995
CO_2	117	lb/MMBtu	AP-42	1,369	5,995
CH_4	0.0022	lb/MMBtu	AP-42	0.03	0.11
N_2O	0.0002	lb/MMBtu	AP-42	0.003	0.01

Notes:

1. NO_x, CO, and VOC emissions based on data from the catalyst vendor indicating a post-catalyst emission rate which meets 40 CFR 60 Subpart JJJJ standards. Formaldehyde emissions are based on manufacturer data. PM/PM_{10} and SO_2 emissions based on AP-42 Table 3.2-3.
2. Per AP-42, all particulate is considered to be less than 1.0 micrometer in diameter.
3. VOC emissions include formaldehyde.

Sample Calculation:

PM_{10} Emissions (ton/yr) = (Emission Factor, lb/MMBtu) x (Max Heat Input Rate (HHV), MMBtu/hr) x (Hours of Operation, hr/yr) / (2,000 lb/ton)
PM_{10} Emissions (ton/yr) = (0.01941 lb/MMBtu) x (11.7 MMBtu/hr) x (8,760 hr/yr) / (2,000 lb/ton) = 0.99 ton/yr

VOC Emissions (ton/yr) = (Emission Factor, g/bhp-hr) x (Horsepower, bhp) x (Hours of Operation, hr/yr) / (2,000 lb/ton) / (453.59 grams/1 lb)
VOC Emissions (ton/yr) = (0.7 g/bhp-hr) x (1380 bhp) x (8,760 hr/yr) / (2,000 lb/ton) / (453.59 g/lb) = 9.86 ton/yr

CO_2e Emissions (ton/yr) = (CO_2 emissions x 1) + (CH_4 emissions x 25) + (N_2O emissions x 298)
CO_2e Emissions (ton/yr) = ((5995.13 ton/yr x 1) + (0.11 ton/yr x 28) + (0.01 ton/yr x 265)) = 6001.29 ton/yr

GHG Emissions (ton/yr) = (CO_2 emissions) + (CH_4 emissions) + (N_2O emissions)
GHG Emissions (ton/yr) = (5995.13 ton/yr) + (0.11 ton/yr) + (0.01 ton/yr) = 5995.26 ton/yr

Silurian Compressor Station
Engine 6 HAP Emissions

Engines	Horsepower (hp)	Operating Hours	Heat Input (MMBtu/yr)	Heat Input (MMBtu/yr)	Fuel Input (MMScf/yr)
6	1,380	8,760	16	137,296	81.739

HAP	Emission Factor (lb/MMBtu)[1]	Emission Factor (g/bhp-hr)	Control Efficiency (%)	Total Emissions (lb/hr)	Total Emissions (tpy)
1,3-Butadiene	6.63E-04	--	0	0.0104	0.0455
Acetaldehyde	2.79E-03	--	0	0.0437	0.1915
Acrolein	2.63E-03	--	0	0.0412	0.1805
Benzene	1.58E-03	--	0	0.0248	0.1085
Formaldehyde[2]	--	0.04	0	0.1217	0.5330
Methanol	3.06E-03	--	0	0.0480	0.2101
Toluene	5.58E-04	--	0	0.0087	0.0383
Total HAP Emissions					**1.31**

Notes:

1. Emission factors from AP-42 Table 3.2-3, Uncontrolled Emission Factors for 4-Stroke Rich-Burn Engines (July 2000).

2. Formaldehyde emission factor is from manufacturer's information.

Silurian Compressor Station
Engine 7 Emissions

Equipment Data:

Emission Unit (EU):	**7**
Emission Unit Name:	Waukesha L5794GSI
Engine Type:	4SRB

Emissions Data:

Fuel Usage =	81.74	MMscf/yr (Calculated value based on max fuel combustion rate)
Horsepower =	1,380	bhp
Speed =	1,200	rpm
Hours of Operation =	8,760	hr/yr
Max. Fuel Combustion Rate (HHV) =	8,479	Btu/bhp-hr
Fuel Heating Value (HHV) =	1,254	MMBtu/MMscf
Max. Heat Rate (HHV) =	11.70	MMBtu/hr

Pollutant	Emission Factor	Units	Emission Factor Reference	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
PM_{10} [2]	0.01941	lb/MMBtu	AP-42	0.23	0.99
NO_x[1]	1.0	g/bhp-hr	Vendor Data	3.04	13.33
CO[1]	1.0	g/bhp-hr	Vendor Data	3.04	13.33
SO_2	5.88E-04	lb/MMBtu	AP-42	0.01	0.03
VOC[1,3]	0.70	g/bhp-hr	Vendor Data	2.25	9.86
Total HAPs			AP-42	0.30	1.31
Formaldehyde	0.04	g/bhp-hr	Vendor Data	0.12	0.53
Pollutant	**Emission Factor**	**Units**	**ission Factor Referer**	**Hourly Emissions**	**Annual Emissions**
CO_2e	--	--	--	1,370.2	6,001.3
GHG	--	--	--	1,369	5,995
CO_2	117	lb/MMBtu	AP-42	1,369	5,995
CH_4	0.0022	lb/MMBtu	AP-42	0.026	0.11
N_2O	0.0002	lb/MMBtu	AP-42	0.003	0.0113

Notes:

1. NO_x, CO, and VOC emissions based on data from the catalyst vendor indicating a post-catalyst emission rate which meets 40 CFR 60 Subpart JJJJ standards. Formaldehyde emissions are based on manufacturer data. PM/PM_{10} and SO_2 emissions based on AP-42 Table 3.2-3.
2. Per AP-42, all particulate is considered to be less than 1.0 micrometer in diameter.
3. VOC emissions include formaldehyde.

Sample Calculation:

PM_{10} Emissions (ton/yr) = (Emission Factor, lb/MMBtu) x (Max Heat Input Rate (HHV), MMBtu/hr) x (Hours of Operation, hr/yr) / (2,000 lb/ton)

PM_{10} Emissions (ton/yr) = (0.01941 lb/MMBtu) x (11.7 MMBtu/hr) x (8,760 hr/yr) / (2,000 lb/ton) = 0.99 ton/yr

VOC Emissions (ton/yr) = (Emission Factor, g/bhp-hr) x (Horsepower, bhp) x (Hours of Operation, hr/yr) / (2,000 lb/ton) / (453.59 grams/1 lb)

VOC Emissions (ton/yr) = (0.7 g/bhp-hr) x (1380 bhp) x (8,760 hr/yr) / (2,000 lb/ton) / (453.59 g/lb) = 9.86 ton/yr

CO_2e Emissions (ton/yr) = (CO_2 emissions x 1) + (CH_4 emissions x 25) + (N_2O emissions x 298)

CO_2e Emissions (ton/yr) = ((5995.13 ton/yr x 1) + (0.11 ton/yr x 28) + (0.01 ton/yr x 265)) = 6001.29 ton/yr

GHG Emissions (ton/yr) = (CO_2 emissions) + (CH_4 emissions) + (N_2O emissions)

GHG Emissions (ton/yr) = (5995.13 ton/yr) + (0.11 ton/yr) + (0.01 ton/yr) = 5995.26 ton/yr

Silurian Compressor Station
Engine 7 HAP Emissions

Engine	Horsepower (hp)	Operating Hours	Heat Input (MMBtu/yr)	Heat Input (MMBtu/yr)	Fuel Input (MMScf/yr)
7	1,380	8,760	16	137,296	81.739

HAP	Emission Factor (lb/MMBtu)[1]	Emission Factor (g/bhp-hr)	Control Efficiency (%)	Total Emissions (lb/hr)	Total Emissions (tpy)
1,3-Butadiene	6.63E-04	--	0	0.0104	0.0455
Acetaldehyde	2.79E-03	--	0	0.0437	0.1915
Acrolein	2.63E-03	--	0	0.0412	0.1805
Benzene	1.58E-03	--	0	0.0248	0.1085
Formaldehyde[2]	--	0.04	0	0.1217	0.5330
Methanol	3.06E-03	--	0	0.0480	0.2101
Toluene	5.58E-04	--	0	0.0087	0.0383
Total HAP Emissions					**1.31**

Notes:

1. Emission factors from AP-42 Table 3.2-3, Uncontrolled Emission Factors for 4-Stroke Rich-Burn Engines (July 2000).

2. Formaldehyde emission factor is from manufacturer's information.

Silurian Compressor Station

Produced Water Truck Loading

Parameter	EU 8	
Product	Produced Water	
Saturation Factor, S [1]	0.6	
Vapor MW [2]	18.05	lb/lb-mol
Maximum Vapor Pressure	13.72	psia
Average Vapor Pressure	12.37	psia
Max Temperature	85.0	°F
Average Temperature	75.3	°F
Short-Term Loading Loss Factor [4, 5]	3.40	lb/1000 gal
Annual Loading Loss Factor [4, 5]	3.12	lb/1000 gal
Hourly Throughput	1,000	gal/hr
Annual Throughput	16,632	gal/yr
Water Content Reduction (%) [7]	99%	

Fugitive Losses		
Hourly Losses	3.40	lb/hr
Annual Losses	0.03	tpy
Hourly Losses (minus water)	0.03	lb/hr
Annual Losses (minus water)	0.0003	tpy

Notes:

1. Saturation factor is from EPA's AP-42, 5th Edition, Section 5.2, Table 5.2-1; for submerged loading; dedicated normal service.
2. Molecular weight of vapors was taken from ProMax model.
3. Vapor pressures were from the ProMax model.
4. Losses are based on the loading losses equation from EPA's AP-42, Section 2, 5th Edition, June, 2008, Equation 1:

$$L = \frac{12.46 * S * P * M}{T}$$

where:

L = Loading Losses, lb/1000 gallons
S = Saturation Factor, see Table 5.2-1 in AP-42, Section 5.2.
P = True vapor pressure, psia
M = Molecular weight of vapors, lb/lb-mol
T = Temperature of bulk liquid loaded, R (F + 460)

5. Short-term loading loss factor is calculated based on the worst-case (highest) temperature and vapor pressure.
6. Annual loading loss factor is calculated based on the average temperature and vapor pressure.
7. The volume of liquids loaded are estimated to be 99% water; therefore, overall fugitive losses from loading are assumed to be 1% of the total emissions.

Silurian Compressor Station
Flare
Flash Tank Vent

Equipment Data:

Emission Unit (EU):	**9**
Emission Unit Name:	Flare

Pilot Gas =	90.00	scf/hr =	0.7884	MMscf/yr
Volume of Vent Gas =	136.656	MMscf/yr	Based on the engineering estimate plus 20%.	
	15,690	scf/hr		
Gas Heating Value =	1,326	Btu/scf	LHV of vent gas analysis	
Total Vent Rate =	137,444,400	scf/yr =	137.4444	MMscf/Yr
	15,690	scf/hr		
Hours of Operation =	8,760	hr/yr		
H_2S Percent:	0.0004	mole %		
Heat Input =	20.8	MMBtu/hr		
	182,298.4	MMBtu/yr		

Component	Flow									Efficiency	Emissions	
	MW	Wt %	Mol%	lb/hr	tpy	scf/hr	MMscf/yr	mol/hr	mol/yr	%	(lb/hr)	(tpy)
Methane	16.04	32.66%	52.98%	351.34	1,538.89	8,312.22	72.82	21.904	191,881.06	99%	3.5134	15.3889
Ethane	33.07	39.68%	31.22%	426.82	1,869.46	4,897.76	42.90	12.91	113,060.89	99%	4.2682	18.6946
Propane	44.10	19.23%	11.35%	206.91	906.29	1,780.50	15.60	4.69	41,101.38	99%	2.0691	9.0629
Iso-butane	58.12	1.30%	0.58%	13.99	61.27	91.33	0.80	0.24	2,108.39	98%	0.2798	1.2254
N-butane	58.12	3.11%	1.39%	33.51	146.76	218.77	1.92	0.58	5,050.20	98%	0.6701	2.9352
Iso-pentane	72.15	0.26%	0.09%	2.75	12.04	14.46	0.13	0.04	333.86	98%	0.0550	0.2409
N-pentane	72.15	0.27%	0.10%	2.93	12.85	15.43	0.14	0.04	356.27	98%	0.0587	0.2570
Dimethylpropane	72.15	0.00%	0.00%	0.03	0.15	0.18	0.00	0.00	4.24	98%	0.0007	0.0031
n-Hexane	86.18	0.35%	0.11%	3.76	16.49	16.57	0.15	0.04	382.59	98%	0.0753	0.3297
Hexanes	86.18	0.03%	0.01%	0.34	1.50	1.50	0.01	0.00	34.73	98%	0.0068	0.0299
Heptane (C7+)	100.2	0.00%	0.00%	0.00	0.02	0.01	0.00	0.00	0.31	98%	0.0001	0.0003
Octane (C8+)	114.23	0.00%	0.00%	0.00	0.00	0.00	0.00	0.00	0.08	98%	0.0000	0.0001
Benzene	78.11	0.10%	0.03%	1.03	4.51	5.00	0.04	0.01	115.50	98%	0.0206	0.0902
Toluene	92.14	0.08%	0.02%	0.91	3.99	3.75	0.03	0.01	86.62	98%	0.0182	0.0798
Ethylbenzene	106.17	0.00%	0.00%	0.04	0.19	0.16	0.00	0.00	3.61	98%	0.0009	0.0038
Xylenes (M, P, O)	106.17	0.03%	0.01%	0.35	1.53	1.25	0.01	0.00	28.87	98%	0.0070	0.0307
Methanol	32.042	0.01%	0.00%	0.06	0.28	0.75	0.01	0.00	17.25	98%	0.0013	0.0055
CO_2	44.01	1.68%	1.00%	18.12	79.39	156.28	1.37	0.41	3,607.67	0%	18.1248	79.3868
N_2	28.01	1.19%	1.11%	12.84	56.25	173.99	1.52	0.46	4,016.45	0%	12.8425	56.2504
H_2S	34.08	0.00%	0.00%	0.01	0.02	0.06	0.00	0.0002	1.45	98%	0.0001	0.0005
SO_2	64.00	-	-	-	-	-	-	-	-	0%	0.0106	0.0464
TOTAL		100.0%	100.00%	1,075.77	4,711.88	15,690	137.44	41.35	362,191.42	**VOC Total**	**3.2636**	**14.2945**
										HAP Total	**0.1232**	**0.5398**

Pollutant	Emission Factor	Units	Emissions (lb/hr)	Emissions (ton/yr)
PM Total Filterable	7.6	lb/MMscf	0.0007	0.0030
PM Filterable	1.9	lb/MMscf	0.0002	0.0007
PM Condensable	5.7	lb/MMscf	0.0005	0.0022
NOx	0.138	lb/MMBtu	2.8718	12.5786
CO	0.2755	lb/MMBtu	5.7332	25.1116

1. PM emission factors are from AP-42 Table 1.4-2 (07/98), per AP-42, all particulate is considered to be less than 1.0 micrometer in diameter.
2. NOx and CO emission factors are from TCEQ Technical Guidance for Flares and Vapor Combustors for high BTU streams (>1,000 Btu/scf)
3. Gas Mol% composition based on engineering estimate.

Sample Calculation:

PM Total Emissions (lb/hr) = (Emission Factor, lb/MMscf) x (Processed Gas Volume, MMscf/yr) / (Hours of Operation, hr/yr)
PM Total Emissions (lb/hr) = (7.6 lb/MMscf) x (136.656 MMscf/yr) / (8760 hr/yr) = 0 lb/hr

NOx Emissions (lb/hr) = (Emission Factor, lb/MMscf) x (Processed Gas, MMscf/yr) x Gas Heating Value (MMBtu/MMscf) / (Hours of Operation, hr/yr)
NOx Emissions (lb/hr) = (0.138 lb/MMBtu) x (136.656 MMscf/yr) x (1326 MMBtu/MMscf / (8760 hr/yr) = 2.87 lb/hr

SO2 Emissions (lb/hr) = (Processed Gas, scf/hr) x (SO2 Molecular Weight, lb/lb-mole gas) x
[1/(Molar volume of Ideal Gas, 379.48 scf/lb-mole @ 60 deg F)] x (mole %H2S/100)
SO2 Emissions (lb/hr) = (15,690 scf/hr) x (64.0000 lb/lb-mole SO2) x [1/(379.48 scf/lb-mole @ 68 deg F)] x (0.0004%/100)
0.010 lb/hr

Pollutant	Emission Factor	Units	Emission Factor Reference	Emissions (lb/hr)	Emissions (tpy)
CO_2e	--	--	--	2,437	10,673
GHG	--	--	--	2,434	10,663
CO_2	117	lb/MMBtu	AP-42	2,434	10,662
CH_4	0.0022	lb/MMBtu	AP-42	0.0459	0.2009
N_2O	0.0002	lb/MMBtu	AP-42	0.0046	0.0201

Silurian Compressor Station
Miscellaneous Storage Tanks

Fixed Roof Tank Routine Emissions *in the city of:* Williston, ND

Tank Name		Methanol Tank	Lube Oil Tank No. 1	Lube Oil Tank No. 2	Lube Oil Tank No. 3	Lube Oil Tank No. 4	Antifreeze Tank No. 1	Antifreeze Tank No. 2	Antifreeze Tank No. 3	Antifreeze Tank No. 4
Product Name		**Methanol Tank**	**Lube Oil**	**Lube Oil**	**Lube Oil**	**Lube Oil**	**Antifreeze**	**Antifreeze**	**Antifreeze**	**Antifreeze**
General Tank Information	**AP-42 Reference**									
Tank Type - Vertical or Horizontal		Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Tank Type - Uninsulated, Shell Insulated, or Shell & Roof Insulated		Uninsulated	Uninsulated	Uninsulated	Uninsulated	Uninsulated	Uninsulated	Uninsulated	Uninsulated	Uninsulated
Height, H_S or Length, L (ft)		7.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Diameter, D (ft)		7.00	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Length of Side 1, L1 (ft) (Only Rectangular)										
Length of Side 2, L2 (ft) (Only Rectangular)										
Length of Square Sides, L (Only Square)										
Tank Capacity (bbl)		47.62	11.90	11.90	11.90	11.90	11.90	11.90	11.90	11.90
Effective Height, H_E (ft)	Eq. 7.1-15	5.50	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
Effective Diameter, D_E (ft)	Eq. 7.1-14, 1-16, 1-	7.90	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72
Maximum Liquid Temperature, T_{BX} (°R) (Only Shell & Roof Insulated)										
Minimum Liquid Temperature, T_{BN} (°R) (Only Shell & Roof Insulated)										
Liquid Height, H_L (ft)		2.75	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Maximum Liquid Height, H_{LX} (ft)	Eq. 7.1-38 footnote	5.50	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
Dome Roof Radius, R_R (ft) (D default) (Only Vertical)										
Cone Roof Slope, S_R (ft/ft) (0.0625 default) (Only Vertical)										
Tank Shell Radius, R_S (ft)		3.50	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Cone Roof Height, H_R (ft)	Eq. 7.1-20	0.22	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Cone Roof Outage, H_{RO} (ft)	Eq. 7.1-19	0.07	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Dome Roof Height, H_R (ft)	Eq. 7.1-21									
Dome Roof Outage, H_{RO} (ft)	Eq. 7.1-21									
Shell Color (White default)		White	White	White	White	White	White	White	White	White
Shell Condition (Average default)		Average	Average	Average	Average	Average	Average	Average	Average	Average
Average Tank Shell Surface Solar Absorptance, α_S	Tbl. 7.1-6	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Roof Color (White default)		White	White	White	White	White	White	White	White	White
Roof Condition (Average default)		Average	Average	Average	Average	Average	Average	Average	Average	Average
Average Tank Roof Surface Solar Absorptance, α_R	Tbl. 7.1-6	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Vent Pressure Setting, P_{BP} (psig) (0.03 psig default)		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Vent Vacuum Setting, P_{BV} (psig) (-0.03 psig default)		-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03
Breather Vent Pressure Range, ΔP_B (psi)	Eq. 7.1-10	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Normal Operating Conditions Vapor Space Pressure, P_I (psig) (0 psig default)		0	0	0	0	0	0	0	0	0
Vent Setting Correction Factor, K_B (dimensionless)	Eq. 7.1-42, 1-43	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Vapor Space Outage, H_{VO} (ft)	Eq. 7.1-18	2.75	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Vapor Space Volume, V_V (ft^3)	Eq. 7.1-3	135	24	24	24	24	24	24	24	24
Throughput	**AP-42 Reference**									
Throughput (gal/yr)		12,000.00	6,000.00	6,000.00	6,000.00	6,000.00	300.00	300.00	300.00	300.00
Maximum Fill Rate (gal/hr)		2,000.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
Vapor Balanced or Flashing Occurs?		No	No	No	No	No	No	No	No	No
Annual Liquid Level Increases, ΣH_{QI} (ft/yr)	Eq. 7.1-39	32.73	45.83	45.83	45.83	45.83	2.29	2.29	2.29	2.29
Turnovers, N (/year)	Eq. 7.1-38	5.95	16.67	16.67	16.67	16.67	0.83	0.83	0.83	0.83
Turnover Factor, K_N	Eq. 7.1-37 footnote	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Net Working Loss Throughput, V_Q (ft^3/yr)	Eq. 7.1-40	1,604	802	802	802	802	40	40	40	40

Tank Name		Methanol Tank	Lube Oil Tank No. 1	Lube Oil Tank No. 2	Lube Oil Tank No. 3	Lube Oil Tank No. 4	Antifreeze Tank No. 1	Antifreeze Tank No. 2	Antifreeze Tank No. 3	Antifreeze Tank No. 4
Product Name		**Methanol Tank**	**Lube Oil**	**Lube Oil**	**Lube Oil**	**Lube Oil**	**Antifreeze**	**Antifreeze**	**Antifreeze**	**Antifreeze**
Meteorological Data	**AP-42 Reference**									
Origin of Meteorological Data		Climate Database	Climate Database	Climate Database	Climate Database	Climate Database	Climate Database	Climate Database	Climate Database	Climate Database
Annual Average Solar Insolation Factor, I (Btu/ft^2-d)	Tbl.7.1-7	1,193	1,193	1,193	1,193	1,193	1,193	1,193	1,193	1,193
Annual Average Max Ambient Temp, T_{AX} (°F)	Tbl.7.1-7	82.9	82.9	82.9	82.9	82.9	82.9	82.9	82.9	82.9
Annual Average Min Ambient Temp, T_{AN} (°F)	Tbl.7.1-7	56.6	56.6	56.6	56.6	56.6	56.6	56.6	56.6	56.6
Annual Average Ambient Pressure, P_A (psia)	Tbl.7.1-7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
User-Entered Annual Average Solar Insolation Factor, I (Btu/ft^2-d)										
User-Entered Annual Average Max Ambient Temp, T_{AX} (°F)										
User-Entered Annual Average Min Ambient Temp, T_{AN} (°F)										
User-Entered Annual Average Ambient Pressure, P_A (psia)										
Annual Average Daily Ambient Temp Change, ΔT_A (°F/°R)	Eq. 7.1-11	26.30	26.30	26.30	26.30	26.30	26.30	26.30	26.30	26.30
Annual Average Daily Avg Ambient Temp, T_{AA} (°R)	Eq. 7.1-32	529.42	529.42	529.42	529.42	529.42	529.42	529.42	529.42	529.42
Annual Average Liquid Bulk Temp, T_B (°R)	Eq. 7.1-33	530.31	530.31	530.31	530.31	530.31	530.31	530.31	530.31	530.31
Annual Average Daily Temp Range, ΔT_V (°F/°R)	Eq. 7.1-6 or 1-8[a]	25.39	25.04	25.04	25.04	25.04	25.04	25.04	25.04	25.04
Maximum Liquid Surface Temperature		TCEQ Default (≥ 95°F)	TCEQ Default (≥ 95°F)	TCEQ Default (≥ 95°F)	TCEQ Default (≥ 95°F)	TCEQ Default (≥ 95°F)	TCEQ Default (≥ 95°F)	TCEQ Default (≥ 95°F)	TCEQ Default (≥ 95°F)	TCEQ Default (≥ 95°F)
Annual Average Vapor Temp, T_V (°R)	Eq. 7.1-34 or 1-36[b]	532.24	532.32	532.32	532.32	532.32	532.32	532.32	532.32	532.32
Annual Average Daily Avg Liquid Surface Temp, T_{LA} (°R)	Eq. 7.1-29 or 1-31[c]	531.28	531.32	531.32	531.32	531.32	531.32	531.32	531.32	531.32
Annual Average Daily Max Liquid Surface Temp, T_{LX} (°R)	Fig. 7.1-17	537.63	537.58	537.58	537.58	537.58	537.58	537.58	537.58	537.58
Annual Average Daily Min Liquid Surface Temp, T_{LN} (°R)	Fig. 7.1-17	524.93	525.06	525.06	525.06	525.06	525.06	525.06	525.06	525.06

[a]Uninsulated: Eq. 7.1-6, Shell Insulated: Eq. 7.1-8, Shell/Roof Insulated=T_{BX}-T_{BN}

[b]Uninsulated: Eq. 7.1-34, Shell Insulated: Eq. 7.1-36, Shell/Roof Insulated=T_B

[c]Uninsulated: Eq. 7.1-29, Shell Insulated: Eq. 7.1-31, Shell/Roof Insulated=T_B

Product Data	**AP-42 Reference**									
Product Stored		Methanol	Lube Oil	Lube Oil	Lube Oil	Lube Oil	Antifreeze	Antifreeze	Antifreeze	Antifreeze
Product Type		Other	Refined	Refined	Refined	Refined	Other	Other	Other	Other
Vapor Pressure Methodology		Antoine Equation	Antoine Equation	Antoine Equation	Antoine Equation	Antoine Equation	Antoine Equation	Antoine Equation	Antoine Equation	Antoine Equation
Vapor Molecular Wt., M_V (lb/lb-mole)		32.04	130	130	130	130	62.08	62.08	62.08	62.08
Reid Vapor Pressure		0	0.022	0.022	0.022	0.022	0	0	0	0
Stock ASTM-ID86 Distillation Slope at 10 vol% Evaporation, S (°F/vol %)		0	0	0	0	0	0	0	0	0
Chemical Used for Antoine Constants[f]		Methanol	Diesel	Diesel	Diesel	Diesel	Ethylene Glycol	Ethylene Glycol	Ethylene Glycol	Ethylene Glycol
Antoine Constant A		8.0724	7.12	7.12	7.12	7.12	8.7945	8.7945	8.7945	8.7945
Antoine Constant B (°C)		1574.99	2209	2209	2209	2209	2615.4	2615.4	2615.4	2615.4
Antoine Constant C (°C)		238.87	273.15	273.15	273.15	273.15	244.91	244.91	244.91	244.91
Vapor Pressure at T_{max}, P_{Vmax} (psia)	Fig 7.1-13b, 14b, Eq. 7.1-28	4.05	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Vapor Pressure at T_{LA}, P_{VA} (psia)		2.10	0.01	0.01	0.01	0.01	1.92E-03	1.92E-03	1.92E-03	1.92E-03
Vapor Pressure at T_{LX}, P_{VX} (psia)		2.52	0.01	0.01	0.01	0.01	2.57E-03	2.57E-03	2.57E-03	2.57E-03
Vapor Pressure at T_{LN}, P_{VN} (psia)		1.73	0.01	0.01	0.01	0.01	1.42E-03	1.42E-03	1.42E-03	1.42E-03
Daily Vapor Pressure Range, ΔP_V (psi)	Eq. 7.1-9	0.79	3.41E-03	3.41E-03	3.41E-03	3.41E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03
Working Loss Product Factor, K_P	Eq. 7.1-39	1	1	1	1	1	1	1	1	1
Vented Vapor Sat. Factor, K_S	Eq. 7.1-23	0.766	0.999	0.999	0.999	0.999	1.000	1.000	1.000	1.000
Vapor Density, W_V (lb/ft^3)	Eq. 7.1-24	1.18E-02	1.90E-04	1.90E-04	1.90E-04	1.90E-04	2.09E-05	2.09E-05	2.09E-05	2.09E-05
Vapor Space Expansion Factor Equation		Equation 1-5	Equation 1-5	Equation 1-5	Equation 1-5	Equation 1-5	Equation 1-5	Equation 1-5	Equation 1-5	Equation 1-5
Vapor Space Expansion Factor, K_E	Eq. 7.1-5 or 1-12[d]	0.1107	0.0430	0.0430	0.0430	0.0430	0.0428	0.0428	0.0428	0.0428

[d]Eq.1-5 (TVP>0.1 psia or ΔP_B>±0.03), Eq.1-12 (TVP<0.1 psia and ΔP_B<±0.03)

Emissions Rates	**AP-42 Reference**									
Standing Loss, L_S (lb/yr)	Eq. 7.1-2	49.00	0.07	0.07	0.07	0.07	0.01	0.01	0.01	0.01
Working Loss, L_W (lb/yr)	Eq. 7.1-37	18.86	0.15	0.15277334	0.15	0.15	8.36E-04	8.36E-04	8.36E-04	8.36E-04
Total Loss, L_T (lb/yr)	Eq. 7.1-1	67.87	0.22	0.22	0.22	0.22	0.01	0.01	0.01	0.01
Uncontrolled Total Loss (lb/hr)	[e]	5.83	0.03	0.03	0.03	0.03	3.81E-03	3.81E-03	3.81E-03	3.81E-03
Uncontrolled Total Loss (tpy)		0.03	1.12E-04	1.12E-04	1.12E-04	1.12E-04	4.34E-06	4.34E-06	4.34E-06	4.34E-06

[e]TCEQ APDG 6250v3 (Rev 2/20) Equation 1

[f] Diesel fuel is used to conservatively represent emissions from storage of lube oil. Ethylene Glycol is used to conservatively represent emissions from antifreeze tank.

Total VOC, all tanks, tpy = 0.03

Hiland Partners Holdings LLC
Silurian Compressor Station
Fugitives

Equipment Data:

Emission Unit (EU):	**11**
Emission Unit Name:	Fugitives

Component Type	Service	Emission Factor [1] (lb/hr/comp)	Component Count	Total Loss (lb/hr)	Total Loss (tpy)
Valves	Gas/Vapor	0.00992	84	0.83	3.65
	Light Liquid	0.0055	29	0.16	0.70
Pumps	Gas Vapor	0.00529	0	0.00	0.00
	Light Liquid	0.02866	5	0.14	0.63
Flanges [2]	Gas/Vapor	0.00086	1003	0.86	3.78
	Light Liquid	0.000243	82	0.02	0.09
Connectors	Gas/Vapor	0.00044	0	0.00	0.00
	Light Liquid	0.000463	0	0.00	0.00
Open Ended Lines	Gas/Vapor	0.00441	0	0.00	0.00
	Light Liquid	0.00309	0	0.00	0.00
Other [3]	Gas/Vapor	0.0194	0	0.00	0.00
	Light Liquid	0.0165	0	0.00	0.00
Compressors	Gas/Vapor	0.0194	4	0.08	0.34
	Light Liquid	0.0165	0	0.00	0.00
Component Emission Total Losses				2.10	9.18
Gas/Vapor Emissions				1.77	7.77
Light Liquid Emissions				0.32	1.41

Component	Gas (wt%)	Gas/Vapor Emissions		Total Emissions [4]	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
CO_2	1.056	0.019	0.082	0.019	0.082
Nitrogen	2.009	0.036	0.156	0.036	0.156
H_2S	0.0005	0	0	0.000	0.000
Methane	31.131	0.552	2.418	0.552	2.418
Ethane	23.535	0.417	1.828	0.417	1.828
Propane	21.775	0.386	1.691	0.386	1.691
i-Butane	3.259	0.058	0.253	0.058	0.253
n-Butane	10.335	0.183	0.803	0.183	0.803
i-Pentane	2.107	0.037	0.164	0.037	0.164
n-Pentane	2.886	0.051	0.224	0.051	0.224
Dimethylpropane	0.014	0.000	0.001	0.000	0.001
Benzene	0.091	0.002	0.007	0.002	0.007
n-Hexane	0.332	0.006	0.026	0.006	0.026
Methanol	0.006	0.000	0.000	0.000	0.000
Hexanes	1.281	0.023	0.099	0.023	0.099
Toluene	0.080	0.001	0.006	0.001	0.006
Heptanes	0.032	0.001	0.002	0.001	0.002
Ethylbenzene	0.004	0.000	0.000	0.000	0.000
Xylenes	0.031	0.001	0.002	0.001	0.002
Octanes	0.037	0.001	0.003	0.001	0.003
Nonanes	0.000	0.000	0.000	0.000	0.000
C10+	0.000	0.000	0.000	0.000	0.000
Total	**100.000**	**1.773**	**7.768**	**1.773**	**7.768**
Total VOC	**42.268**	**0.750**	**3.283**	**1.072**	**4.697**
Total HAPs	**0.543**	**0.010**	**0.042**	**0.010**	**0.042**

Notes:

1. Emission factors are from EPA's "Protocol for Equipment Leak Emission Estimates" EPA-453/R-95-017, 11/1995, Table 2-4.

2. Maintenance Plugs & Blind Flanges are treated as screwed connectors. Per TCEQ's "Air Permit Technical Guidance for Chemical Sources: Equipment Leak Fugitives" dated October 2000, screwed fittings should be estimated as flanges.

3. For Oil and Gas Production Operations, "Other" includes compressors, diaphrams, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents.

4. The total emissions include the light liquid emissions assuming 100% VOC of light liquid.

Silurian Compressor Station
Pigging Emissions (EU 12)

Pig Launcher/Pig Receiver	Designation	Pigging Volume	Pig Receiver or Launcher Pressure	Number of Events	Gas VOC Weight %	Gas MW	Average Gas Temperature	Estimated MCF per event	Estimated SCF per event	Estimated SCF per year	Potential VOC Emissions			
		(ft^3)	(psig)	(#/ per Year)	(%)	(lb/lb-mol)	(°F)				lb/scf	lb/hr	lb/year	(tpy)
High Pressure	Pigging	7	1,250	12	42.27	27.49	60	1.353	1353	16236	0.031	41	497	0.25
High Pressure	Pigging	7	1,250	12	42.27	27.49	60	1.353	1353	16236	0.031	41	497	0.25
Low Pressure	Pigging	12	250	52	42.27	27.49	60	0.238	238	12376	0.031	7	379	0.19
Low Pressure	Pigging	12	250	52	42.27	27.49	60	0.238	238	12376	0.031	7	379	0.19
											Total Losses	**41**		**0.88**

Notes:
1. Assume 12 events per year for each high pressure (HP) launcher/receiver and 52 events per year for each low pressure (LP) launcher/receiver.
2. Emissions from pigging operations are reported under EU 12.
VOC weight percentage is from the ProMax model.
Molecular Weight of
Gas = 27.49

VOC Weight Percent = 42.27
Universal Gas Content = 379.5 ft^3/lb-mol @ 60 F and 14.696 psia
Calculation:
Pound " X"/ scf = Wt Fraction (wt%) * MW of Gas * 1 lb mol/379.5 scf

lbs NM/E VOC/scf = 0.031

Estimated MCF per event from using Blowdown Volumes Compressibility Spreadsheet
Emissions (tpy) = (Estimated scf/event * number of events per year * lb/scf)/2000 (lb/ton)

Silurian Compressor Station
Compressor Blowdown Emissions (EU 12)

Emission Unit	Designation	Compressor Volume	Compressor Pressure	Number of Events	Gas VOC Weight %	Gas MW	Average Gas Temperature	Estimated SCF per event	Estimated SCF per year	Estimated VOC Emissions				Control Efficiency %	Emissions	
		(scf)	(psig)	(#/ per Year)	(%)	(lb/lb-mol)	(°F)	SCFH	SCF/Yr	lb/scf	lb/hr	lb/year	tpy		lb/hr	tpy
12	Compressor Blowdowns	19,501.20	1,168	200	30.29%	23.2	84	19,501.20	3,900,240	0.019	361.8	72,368	36.18	98%	7.24	0.72
														Total		**0.72**

Notes:
1. Assumes 50 blowdowns/year released to flare at 1168 psig per engine.
2. Emissions from compressor blowdowns are reported under EU 13 (Flare MSS).

VOC weight percentage is from ProMax model.
Molecular Weight of Gas = 23.25
VOC Weight Percent = 30.29% From engineering estimate
Universal Gas Content = 379.5 ft^3/lb-mol @ 60 F and 14.696 psia

Calculation:

VOC Emission Estimates:
lb/hr = Mass rates per hour x VOC weight % x (1- flare control efficiency)
= 294.8 lb/hr x 24.79 % VOC x (100-98%) = 1.46 lb/hr

Gas Heating Value = 1,211 Btu/scf LHV of vent gas analysis
Heat Input = 23.6 MMBtu/hr
4,722.4 MMBtu/yr

tpy = Mass rates per year x VOC weight % x (1- flare control efficiency)
= 29.48 tpy x 24.79 % VOC x (100-98%) = 0.15 tpy
Pound " X"/ scf = Wt Fraction (wt%) * MW of Gas * 1 lb mol/379.5 scf

lbs NM/E VOC/scf = 0.019
lbs/scf = 0.061
Estimated MCF per event from using Blowdown Compressibility Calc Spreadsheet
Emissions (tpy) = (Estimated scf/event * number of events per year * lb/scf)/2000 (lb/ton)

Pollutant	Emission Factor	Units	Emissions (lb/hr)	Emissions (ton/yr)
SO_2	0.6	lb/MMscf	0.0117	0.0012
NO_X	0.138	lb/MMBtu	3.2584	0.3258
CO	0.2755	lb/MMBtu	6.5051	0.6505

1. SO_2 emission factors are from AP-42 Table 1.4-2 (07/98).
2. NO_X and CO emission factors are from TCEQ Technical Guidance for Flares and Vapor Combustors for high BTU streams (>1,000 Btu/scf)
3. Gas Mol% composition based on engineering estimate.

Component	MW (g/mol)	Mol%	Gas Weight (lb/lbmol)	Wt %		Emissions (tpy)	Emissions (lb/hr)
methane (C1)	16.042	65.32%	10.4792	45.07%		0.326	3.26
ethane (C2)	30.069	19.05%	5.7290	24.64%		0.178	1.78
propane (C3)	44.096	8.55%	3.7715	16.22%		0.117	1.17
iso-butane (C4)	58.122	0.70%	0.4079	1.75%		0.013	0.13
nor-butane (C4)	58.122	1.97%	1.1445	4.92%		0.036	0.36
iso-pentane (C5)	72.149	0.22%	0.1584	0.68%		0.005	0.05
nor-pentane (C5)	72.149	0.27%	0.1962	0.84%		0.006	0.06
Dimethylpropane	72.149	0.002%	0.0013	0.01%		0.000	0.00
n-hexane	86.180	0.001	0.0910	0.39%		0.003	0.03
hexanes (C6+)	86.180	0.001	0.0459	0.20%		0.001	0.01
heptane (C7+)	100.200	0.001%	0.0011	0.00%		0.000	0.00
octane (C8+)	114.230	0.001%	0.0006	0.00%		0.000	0.00
benzene	78.110	0.03%	0.0249	0.11%		0.001	0.01
toluene	92.140	0.02%	0.0220	0.09%		0.001	0.01
Ethylbenzene	106.170	0.001%	0.0011	0.00%		0.000	0.00
xylenes (M, P, O)	106.170	0.01%	0.0085	0.04%		0.000	0.00
Methanol	32.042	0.0003%	0.0001	0.00%		0.000	0.00
CO2	44.010	0.84%	0.3708	1.59%		0.012	0.12
Nitrogen	28.013	2.84%	0.7956	3.42%		0.025	0.25
H2S	34.082	0.0004%	0.0001	0.00%		0.000	0.00
SO2	64.000		0.0000	0.00%		0.001	0.013
Total		100.00%	23.25	100.00%	**Total**	0.725	7.25
Vapor MW (lb/lb-mol)		**23.25**			**VOC Total**	0.183	1.83
VOC Weight (%)		30.29%		30.29%	**HAPs Total**	0.005	0.05

Pollutant	Emission Factor	Units	Emission Factor Reference	Emissions (lb/hr)	Emissions (tpy)
CO_2e	--	--	--	2,765	276.49
GHG	--	--	--	2,762	276.21
CO_2	117	lb/MMBtu	AP-42	2,762	276.21
CH_4	0.0022	lb/MMBtu	AP-42	0.0521	0.0052
N_2O	0.0002	lb/MMBtu	AP-42	0.0052	0.0005

Silurian Compressor Station
Inlet Gas Analysis (1)

Sample temperature and pressure	85 °F, 1000 psig			
Component	**MW (g/mol)**	**Mole %**	**Gas Weight (lb/lbmol)**	**Weight %**
Carbon Dioxide	44.010	0.6596	0.290	1.0561
Hydrogen Sulfide	34.082	0.0004	0.000	0.0005
Nitrogen	28.013	1.9710	0.552	2.0087
Methane (C1)	16.042	53.3396	8.557	31.1314
Ethane (C2)	30.069	21.5137	6.469	23.5349
Propane (C3)	44.096	13.5734	5.985	21.7752
Iso-Butane (C4)	58.122	1.5411	0.896	3.2587
Nor-Butane (C4)	58.122	4.8877	2.841	10.3352
Iso-Pentane (C5)	72.149	0.8027	0.579	2.1070
n-Pentane	72.149	1.0994	0.793	2.8858
Dimethylpropane	72.149	0.0053	0.004	0.0140
n-Hexane	86.180	0.1058	0.091	0.3317
Methanol	32.042	0.0048	0.002	0.0056
Other Hexanes	86.180	0.4085	0.352	1.2808
Heptane (C7+)	100.200	0.0088	0.009	0.0321
Methylcyclohexane	86.180	0.0000	0.000	0.0000
2,2,4 Trimethyl Pentane	72.149	0.0000	0.000	0.0000
Benzene	78.110	0.0319	0.025	0.0908
Toluene	92.140	0.0240	0.022	0.0803
Ethylbenzene	106.170	0.0010	0.001	0.0039
Xylenes (M, P, O)	106.170	0.0080	0.008	0.0308
Octane (C8+)	114.230	0.0088	0.010	0.0366
Nonane (C9+)	128.260	0	0.000	0.0000
Decane (C10+)	142.290	0	0.000	0.0000
Total		100.0	27.4867	100.0000
Vapor MW (lb/lb-mol)		**27.487**		
VOC Weight (%)		**42.2684**		
HAPs Weight (%)		**0.5431**		

Specific Gravity = 0.94

(1) From ProMax model, inlet stream with NGL (conservative), and corrected to include representative HAPs.

Simulation Report

Project: 06904.28 KM Silurian Compressor Station Rev. D.pmx

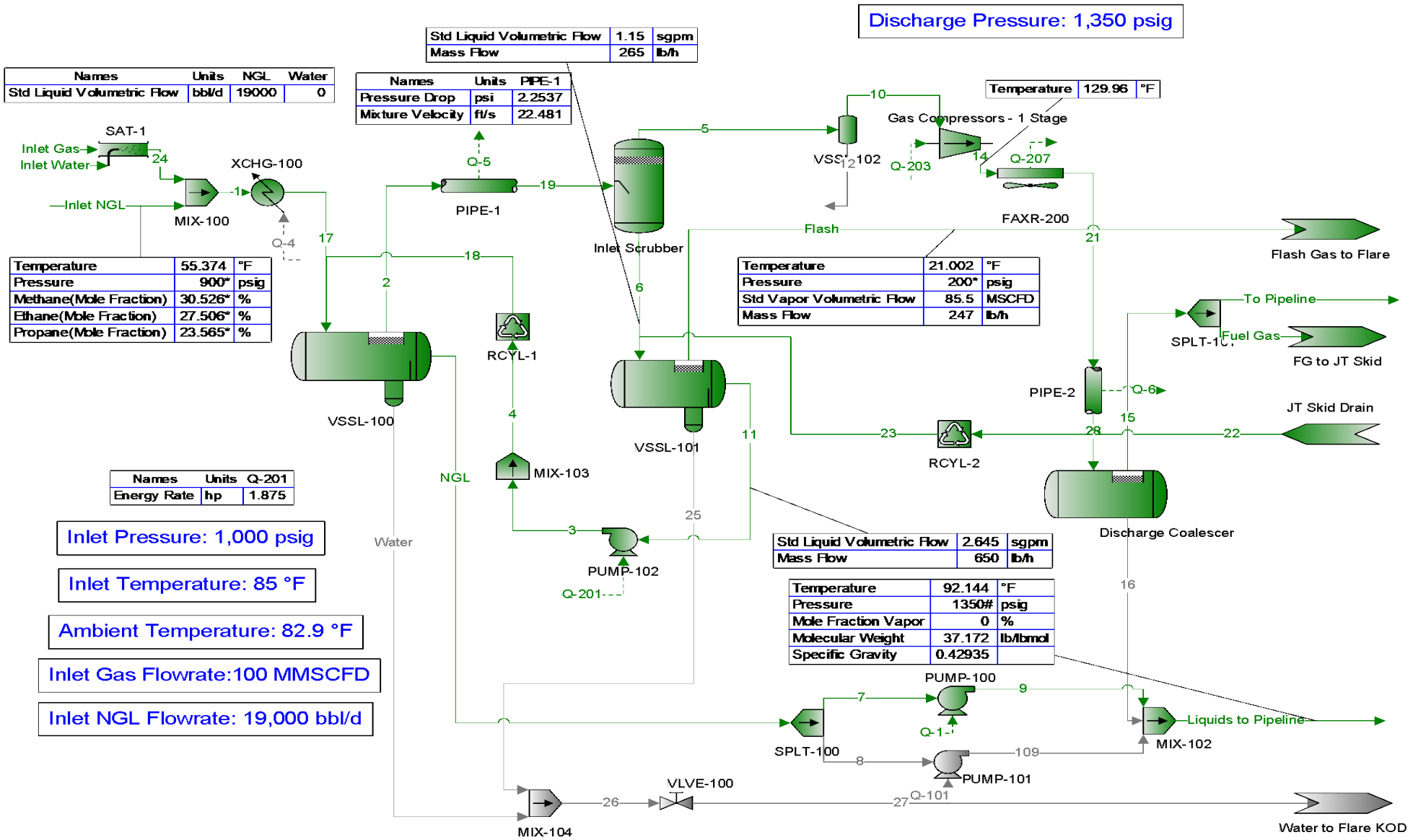
Licensed to Spirit Environmental, LLC and Affiliates

Client Name: Kinder Morgan
Location: Williams County, North Dakota
Job: 06904.28 KM Silurian Compressor Station

ProMax Filename: W:\06904.28 KM Silurian Compressor Station Rev. D.pmx
ProMax Version: 6.0.24302.0
Simulation Initiated: 6/11/2025 1:28:52 PM

Bryan Research & Engineering, LLC
Chemical Engineering Consultants
P.O. Box 4747 Bryan, Texas 77805
Office: (979) 776-5220
FAX: (979) 776-4818
mailto:sales@bre.com
http://www.bre.com/

Report Navigator can be activated via the ProMax Navigator Toolbar.
An asterisk (*), throughout the report, denotes a user specified value.
A question mark (?) after a value, throughout the report, denotes an extrapolated or approximate value.


Discharge Pressure: 1,350 psig
Inlet Pressure: 1,000 psig
Inlet Temperature: 85 °F
Ambient Temperature: 82.9 °F
Inlet Gas Flowrate:100 MMSCFD
Inlet NGL Flowrate: 19,000 bbl/d
Names | Units | NGL | Water
Std Liquid Volumetric Flow | bbl/d | 19000 | 0
Temperature | 55.374 | °F
Pressure | 900* | psig
Methane(Mole Fraction) | 30.526* | %
Ethane(Mole Fraction) | 27.506* | %
Propane(Mole Fraction) | 23.565* | %
Std Liquid Volumetric Flow | 1.15 | sgpm
Mass Flow | 265 | lb/h
Names | Units | PIPE-1
Pressure Drop | psi | 2.2537
Mixture Velocity | ft/s | 22.481
Temperature | 129.96 | °F
Temperature | 21.002 | °F
Pressure | 200* | psig
Std Vapor Volumetric Flow | 85.5 | MSCFD
Mass Flow | 247 | lb/h
Names | Units | Q-201
Energy Rate | hp | 1.875
Std Liquid Volumetric Flow | 2.645 | sgpm
Mass Flow | 650 | lb/h
Temperature | 92.144 | °F
Pressure | 1350# | psig
Mole Fraction Vapor | 0 | %
Molecular Weight | 37.172 | lb/lbmol
Specific Gravity | 0.42935
SAT-1
Inlet Gas
Inlet Water
Inlet NGL
MIX-100
XCHG-100
PIPE-1
Q-5
Q-4
Q-203
Q-207
Gas Compressors - 1 Stage
FAXR-200
Inlet Scrubber
VSSL-102
VSSL-100
VSSL-101
RCYL-1
RCYL-2
MIX-103
PUMP-102
Q-201
PUMP-100
Q-1
SPLT-100
PUMP-101
Q-101
MIX-102
MIX-104
VLVE-100
PIPE-2
Q-6
SPLT-101
Discharge Coalescer
Flash
NGL
Water
Flash Gas to Flare
To Pipeline
Fuel Gas
FG to JT Skid
JT Skid Drain
Liquids to Pipeline
Water to Flare KOD
1
2
3
4
5
6
7
8
9
10
11
12
14
15
16
17
18
19
21
22
23
24
25
26
27
28
109

Process Streams		Flash	Fuel Gas	Inlet Gas	Inlet NGL	Inlet Water	Liquids to Pipeline	NGL	To Pipeline	Water	1	2	3	4	5	6	7	8	9
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Total**	From Block:	VSSL-101	SPLT-101	--	--	--	MIX-102	VSSL-100	SPLT-101	VSSL-100	MIX-100	VSSL-100	PUMP-102	MIX-103	Inlet Scrubber	Inlet Scrubber	SPLT-100	SPLT-100	PUMP-100
	To Block:	Flash Gas to Flare	FG to JT Skid	SAT-1	MIX-100	SAT-1	--	SPLT-100	--	MIX-104	XCHG-100	PIPE-1	MIX-103	RCYL-1	VSSL-102	VSSL-101	PUMP-100	PUMP-101	MIX-102
Mole Fraction																			
Methane		0.466033	0.611164	0.688767*	0.305257*	0*	0.280228	0.280228	0.611164		0.534363	0.610954	0.0542537	0.0542537	0.611164	0.279669	0.280228	0.280228	0.280228
Ethane		0.353843	0.207189	0.175432*	0.275063*	0*	0.243119	0.243119	0.207189		0.215526	0.207212	0.268952	0.268952	0.207189	0.243134	0.243119	0.243119	0.243119
Propane		0.136130	0.105314	0.0687507*	0.235648*	0*	0.237523	0.237523	0.105314		0.135926	0.105397	0.396569	0.396569	0.105314	0.237805	0.237523	0.237523	0.237523
i-Butane		0.00635256	0.00944963	0.00521005*	0.0306220*	0*	0.0352506	0.0352506	0.00944963		0.0154386	0.00946594	0.0516458	0.0516458	0.00944963	0.0353084	0.0352506	0.0352506	0.0352506
n-Butane		0.0139833	0.0273928	0.0136501*	0.101387*	0*	0.120225	0.120225	0.0273928		0.0489651	0.0274515	0.155187	0.155187	0.0273928	0.120423	0.120225	0.120225	0.120225
2,2-Dimethylpropane		4.44324E-06	2.76478E-05	0*	0.000133000*	0*	0.000138542	0.000138542	2.76478E-05		5.35349E-05	2.77179E-05	6.38559E-05	6.38559E-05	2.76478E-05	0.000138771	0.000138542	0.000138542	0.000138542
i-Pentane		0.000787287	0.00331410	0.00150002*	0.0177520*	0*	0.0236250	0.0236250	0.00331410		0.00804166	0.00332694	0.0236575	0.0236575	0.00331410	0.0236561	0.0236250	0.0236250	0.0236250
n-Pentane		0.000844387	0.00415797	0.00199002*	0.0244090*	0*	0.0336095	0.0336095	0.00415797		0.0110140	0.00417658	0.0327691	0.0327691	0.00415797	0.0336445	0.0336095	0.0336095	0.0336095
2,2-Dimethylbutane		0	0	0*	0*	0*	0	0	0		0	0	0	0	0	0	0	0	0
2,3-Dimethylbutane		0	0	0*	0*	0*	0	0	0		0	0	0	0	0	0	0	0	0
i-C6		0	0	0*	0*	0*	0	0	0		0	0	0	0	0	0	0	0	0
3-Methylpentane		0	0	0*	0*	0*	0	0	0		0	0	0	0	0	0	0	0	0
Hexane		6.18538E-05	0.000928472	0.000295000*	0.00972899*	0*	0.0144994	0.0144994	0.000928472		0.00409234	0.000937018	0.00941854	0.00941854	0.000928472	0.0144728	0.0144994	0.0144994	0.0144994
C7		4.31939E-06	1.26163E-05	0.000147500*	0*	0*	0.000344168	0.000344168	1.26163E-05		8.81211E-05	1.28239E-05	0.00199620	0.00199620	1.26163E-05	0.000341601	0.000344168	0.000344168	0.000344168
C8		6.39870E-07	7.01281E-06	0.000147500*	0*	0*	0.000358535	0.000358535	7.01281E-06		8.81211E-05	7.23013E-06	0.00106097	0.00106097	7.01281E-06	0.000351452	0.000358535	0.000358535	0.000358535
C9		0	0	0*	0*	0*	0	0	0		0	0	0	0	0	0	0	0	0
C10		0	0	0*	0*	0*	0	0	0		0	0	0	0	0	0	0	0	0
Nitrogen		0.00822561	0.0239304	0.0330503*	0*	0*	0.00592554	0.00592554	0.0239304		0.0197453	0.0239191	0.000284456	0.000284456	0.0239304	0.00590490	0.00592554	0.00592554	0.00592554
Carbon Dioxide		0.0137063	0.00705760	0.0110601*	0*	0*	0.00512027	0.00512027	0.00705760		0.00660766	0.00705637	0.00413657	0.00413657	0.00705760	0.00511558	0.00512027	0.00512027	0.00512027
Water		2.26645E-05	5.51525E-05	0*	0*	1*	3.43410E-05	3.43410E-05	5.51525E-05		5.03385E-05	5.51393E-05	4.44179E-06	4.44179E-06	5.51525E-05	3.42924E-05	3.43410E-05	3.43410E-05	3.43410E-05
Oxygen		0	0	0*	0*	0*	0	0	0		0	0	0	0	0	0	0	0	0
MeOH		0	0	0*	0*	0*	0	0	0		0	0	0	0	0	0	0	0	0

Process Streams		Flash	Fuel Gas	Inlet Gas	Inlet NGL	Inlet Water	Liquids to Pipeline	NGL	To Pipeline	Water	1	2	3	4	5	6	7	8	9
Properties	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Total**	From Block:	VSSL-101	SPLT-101	--	--	--	MIX-102	VSSL-100	SPLT-101	VSSL-100	MIX-100	VSSL-100	PUMP-102	MIX-103	Inlet Scrubber	Inlet Scrubber	SPLT-100	SPLT-100	PUMP-100
	To Block:	Flash Gas to Flare	FG to JT Skid	SAT-1	MIX-100	SAT-1	--	SPLT-100	--	MIX-104	XCHG-100	PIPE-1	MIX-103	RCYL-1	VSSL-102	VSSL-101	PUMP-100	PUMP-101	MIX-102
Property	**Units**																		
Temperature	°F	21.0015	119.316	164.416	55.3737	546.050	92.1443	85	119.316	85	85.0332	85*	31.5138	31.5138	84.8591	84.8591	85	85	92.1443
Pressure	psig	200*	1345.68	1000	900*	1000	1350*	1000	1345.68	1000	1000*	1000	1000*	1000	997.746	997.746	1000	1000	1350
Mole Fraction Vapor		1	1	1	0*	0.817374	0	0	1		0.768412	1	0	0	1	0	0		0
Molecular Weight	lb/lbmol	26.2587	24.4249	22.1738	35.1215	18.0153	37.1724	37.1724	24.4249		27.3853	24.4330	43.8647	43.8647	24.4249	37.1919	37.1724	37.1724	37.1724
Mass Density	lb/ft^3	1.24953	7.70922	3.89126	26.8567	2.65170	26.7779?	26.4590?	7.70922		8.20990?	6.23788	33.7372	33.7372	6.21847	26.4836?	26.4590?		26.7779?
Mass Flow	lb/h	246.618	3218.18	194772	207853	13.3333	127497	127497	272307	0	402638	275790	650.229	650.229	275526	264.874	127497	0	127497
Std Vapor Volumetric Flow	MMSCFD	0.0855377	1.2*	80*	53.8999	0.00674066	31.2382	31.2382	101.539	0	133.907	102.803	0.135007	0.135007	102.739	0.0648627	31.2382	0	31.2382
Std Liquid Volumetric Flow	sgpm	1.31236	17.1831	1084.40	939.384*	0.0266543	554.167	554.167	1453.95	0	2023.81	1472.29	2.64496	2.64496	1471.14	1.15100	554.167	0	554.167
Compressibility		0.874661	0.693666	0.863333	0.216416	0.638723	0.319907?	0.243886?	0.693666		0.579018?	0.679952	0.250285	0.250285	0.680512	0.243308?	0.243886?		0.319907?
Specific Gravity		0.906644	0.843329	0.765605	0.430611		0.429349?	0.424234?	0.843329			0.843607	0.540931	0.540931	0.843329	0.424630?	0.424234?		0.429349?

Process Streams		Flash	Fuel Gas	Inlet Gas	Inlet NGL	Inlet Water	Liquids to Pipeline	NGL	To Pipeline	Water	1	2	3	4	5	6	7	8	9
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Vapor**	From Block:	VSSL-101	SPLT-101	--	--	--	MIX-102	VSSL-100	SPLT-101	VSSL-100	MIX-100	VSSL-100	PUMP-102	MIX-103	Inlet Scrubber	Inlet Scrubber	SPLT-100	SPLT-100	PUMP-100
	To Block:	Flash Gas to Flare	FG to JT Skid	SAT-1	MIX-100	SAT-1	--	SPLT-100	--	MIX-104	XCHG-100	PIPE-1	MIX-103	RCYL-1	VSSL-102	VSSL-101	PUMP-100	PUMP-101	MIX-102
Mole Fraction																			
Methane		0.466033	0.611164	0.688767		0			0.611164		0.610971	0.610954			0.611164				
Ethane		0.353843	0.207189	0.175432		0			0.207189		0.207218	0.207212			0.207189				
Propane		0.136130	0.105314	0.0687507		0			0.105314		0.105348	0.105397			0.105314				
i-Butane		0.00635256	0.00944963	0.00521005		0			0.00944963		0.00946698	0.00946594			0.00944963				
n-Butane		0.0139833	0.0273928	0.0136501		0			0.0273928		0.0274679	0.0274515			0.0273928				
2,2-Dimethylpropane		4.44324E-06	2.76478E-05	0		0			2.76478E-05		2.77970E-05	2.77179E-05			2.76478E-05				
i-Pentane		0.000787287	0.00331410	0.00150002		0			0.00331410		0.00333277	0.00332694			0.00331410				
n-Pentane		0.000844387	0.00415797	0.00199002		0			0.00415797		0.00418456	0.00417658			0.00415797				
2,2-Dimethylbutane		0	0	0		0			0		0	0			0				
2,3-Dimethylbutane		0	0	0		0			0		0	0			0				
i-C6		0	0	0		0			0		0	0			0				
3-Methylpentane		0	0	0		0			0		0	0			0				
Hexane		6.18538E-05	0.000928472	0.000295000		0			0.000928472		0.000940318	0.000937018			0.000928472				
C7		4.31939E-06	1.26163E-05	0.000147500		0			1.26163E-05		1.26169E-05	1.28239E-05			1.26163E-05				
C8		6.39870E-07	7.01281E-06	0.000147500		0			7.01281E-06		7.19115E-06	7.23013E-06			7.01281E-06				
C9		0	0	0		0			0		0	0			0				
C10		0	0	0		0			0		0	0			0				
Nitrogen		0.00822561	0.0239304	0.0330503		0			0.0239304		0.0239114	0.0239191			0.0239304				
Carbon Dioxide		0.0137063	0.00705760	0.0110601		0			0.00705760		0.00705623	0.00705637			0.00705760				
Water		2.26645E-05	5.51525E-05	0		1			5.51525E-05		5.51577E-05	5.51393E-05			5.51525E-05				
Oxygen		0	0	0		0			0		0	0			0				
MeOH		0	0	0		0			0		0	0			0				

Process Streams		Flash	Fuel Gas	Inlet Gas	Inlet NGL	Inlet Water	Liquids to Pipeline	NGL	To Pipeline	Water	1	2	3	4	5	6	7	8	9
Properties	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Vapor**	From Block:	VSSL-101	SPLT-101	--	--	--	MIX-102	VSSL-100	SPLT-101	VSSL-100	MIX-100	VSSL-100	PUMP-102	MIX-103	Inlet Scrubber	Inlet Scrubber	SPLT-100	SPLT-100	PUMP-100
	To Block:	Flash Gas to Flare	FG to JT Skid	SAT-1	MIX-100	SAT-1	--	SPLT-100	--	MIX-104	XCHG-100	PIPE-1	MIX-103	RCYL-1	VSSL-102	VSSL-101	PUMP-100	PUMP-101	MIX-102
Property	**Units**																		
Temperature	°F	21.0015	119.316	164.416		546.050			119.316		85.0332	85			84.8591				
Pressure	psig	200	1345.68	1000		1000			1345.68		1000	1000			997.746				
Mole Fraction Vapor		1	1	1		1			1		1	1			1				

Molecular Weight	lb/lbmol	26.2587	24.4249	22.1738	18.0153			24.4249	24.4333	24.4330			24.4249						
Mass Density	lb/ft^3	1.24953	7.70922	3.89126	2.19039			7.70922	6.23695	6.23788			6.21847						
Mass Flow	lb/h	246.618	3218.18	194772	10.8983			272307	276041	275790			275526						
Std Vapor Volumetric Flow	MMSCFD	0.0855377	1.2	80	0.00550964			101.539	102.895	102.803			102.739						
Std Liquid Volumetric Flow	sgpm	1.31236	17.1831	1084.40	0.0217865			1453.95	1473.62	1472.29			1471.14						
Compressibility		0.874661	0.693666	0.863333	0.773239			0.693666	0.680022	0.679952			0.680512						
Specific Gravity		0.906644	0.843329	0.765605	0.622021			0.843329	0.843619	0.843607			0.843329						

Process Streams		Flash	Fuel Gas	Inlet Gas	Inlet NGL	Inlet Water	Liquids to Pipeline	NGL	To Pipeline	Water	1	2	3	4	5	6	7	8	9
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Nonspecific Liquid**	From Block:	VSSL-101	SPLT-101	--	--	--	MIX-102	VSSL-100	SPLT-101	VSSL-100	MIX-100	VSSL-100	PUMP-102	MIX-103	Inlet Scrubber	Inlet Scrubber	SPLT-100	SPLT-100	PUMP-100
	To Block:	Flash Gas to Flare	FG to JT Skid	SAT-1	MIX-100	SAT-1	--	SPLT-100	--	MIX-104	XCHG-100	PIPE-1	MIX-103	RCYL-1	VSSL-102	VSSL-101	PUMP-100	PUMP-101	MIX-102
Mole Fraction																			
Methane					0.305257		0.280228	0.280228			0.280176		0.0542537	0.0542537		0.279669	0.280228		0.280228
Ethane					0.275063		0.243119	0.243119			0.243092		0.268952	0.268952		0.243134	0.243119		0.243119
Propane					0.235648		0.237523	0.237523			0.237385		0.396569	0.396569		0.237805	0.237523		0.237523
i-Butane					0.0306220		0.0352506	0.0352506			0.0352524		0.0516458	0.0516458		0.0353084	0.0352506		0.0352506
n-Butane					0.101387		0.120225	0.120225			0.120293		0.155187	0.155187		0.120423	0.120225		0.120225
2,2-Dimethylpropane					0.000133000		0.000138542	0.000138542			0.000138934		6.38559E-05	6.38559E-05		0.000138771	0.000138542		0.000138542
i-Pentane					0.0177520		0.0236250	0.0236250			0.0236658		0.0236575	0.0236575		0.0236561	0.0236250		0.0236250
n-Pentane					0.0244090		0.0336095	0.0336095			0.0336741		0.0327691	0.0327691		0.0336445	0.0336095		0.0336095
2,2-Dimethylbutane					0		0	0			0		0	0		0	0		0
2,3-Dimethylbutane					0		0	0			0		0	0		0	0		0
i-C6					0		0	0			0		0	0		0	0		0
3-Methylpentane					0		0	0			0		0	0		0	0		0
Hexane					0.00972899		0.0144994	0.0144994			0.0145508		0.00941854	0.00941854		0.0144728	0.0144994		0.0144994
C7					0		0.000344168	0.000344168			0.000338646		0.00199620	0.00199620		0.000341601	0.000344168		0.000344168
C8					0		0.000358535	0.000358535			0.000356648		0.00106097	0.00106097		0.000351452	0.000358535		0.000358535
C9					0		0	0			0		0	0		0	0		0
C10					0		0	0			0		0	0		0	0		0
Nitrogen					0		0.00592554	0.00592554			0.00592202		0.000284456	0.000284456		0.00590490	0.00592554		0.00592554
Carbon Dioxide					0		0.00512027	0.00512027			0.00511927		0.00413657	0.00413657		0.00511558	0.00512027		0.00512027
Water					0		3.43410E-05	3.43410E-05			3.43484E-05		4.44179E-06	4.44179E-06		3.42924E-05	3.43410E-05		3.43410E-05
Oxygen					0		0	0			0		0	0		0	0		0
MeOH					0		0	0			0		0	0		0	0		0

Process Streams		Flash	Fuel Gas	Inlet Gas	Inlet NGL	Inlet Water	Liquids to Pipeline	NGL	To Pipeline	Water	1	2	3	4	5	6	7	8	9
Properties	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Nonspecific Liquid**	From Block:	VSSL-101	SPLT-101	--	--	--	MIX-102	VSSL-100	SPLT-101	VSSL-100	MIX-100	VSSL-100	PUMP-102	MIX-103	Inlet Scrubber	Inlet Scrubber	SPLT-100	SPLT-100	PUMP-100
	To Block:	Flash Gas to Flare	FG to JT Skid	SAT-1	MIX-100	SAT-1	--	SPLT-100	--	MIX-104	XCHG-100	PIPE-1	MIX-103	RCYL-1	VSSL-102	VSSL-101	PUMP-100	PUMP-101	MIX-102
Property	**Units**																		
Temperature	°F				55.3737		92.1443	85			85.0332		31.5138	31.5138		84.8591	85		92.1443
Pressure	psig				900		1350	1000			1000		1000	1000		997.746	1000		1350
Mole Fraction Vapor					0		0	0			0		0	0		0	0		0
Molecular Weight	lb/lbmol				35.1215		37.1724	37.1724			37.1800		43.8647	43.8647		37.1919	37.1724		37.1724
Mass Density	lb/ft^3				26.8567		26.7779?	26.4590?			26.4627?		33.7372	33.7372		26.4836?	26.4590?		26.7779?
Mass Flow	lb/h				207853		127497	127497			126597		650.229	650.229		264.874	127497		127497
Std Vapor Volumetric Flow	MMSCFD				53.8999		31.2382	31.2382			31.0111		0.135007	0.135007		0.0648627	31.2382		31.2382
Std Liquid Volumetric Flow	sgpm				939.384		554.167	554.167			550.191		2.64496	2.64496		1.15100	554.167		554.167
Compressibility					0.216416		0.319907?	0.243886?			0.243887?		0.250285	0.250285		0.243308?	0.243886?		0.319907?
Specific Gravity					0.430611		0.429349?	0.424234?			0.424294?		0.540931	0.540931		0.424630?	0.424234?		0.429349?

Process Streams		Flash	Fuel Gas	Inlet Gas	Inlet NGL	Inlet Water	Liquids to Pipeline	NGL	To Pipeline	Water	1	2	3	4	5	6	7	8	9
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Aqueous Liquid**	From Block:	VSSL-101	SPLT-101	--	--	--	MIX-102	VSSL-100	SPLT-101	VSSL-100	MIX-100	VSSL-100	PUMP-102	MIX-103	Inlet Scrubber	Inlet Scrubber	SPLT-100	SPLT-100	PUMP-100
	To Block:	Flash Gas to Flare	FG to JT Skid	SAT-1	MIX-100	SAT-1	--	SPLT-100	--	MIX-104	XCHG-100	PIPE-1	MIX-103	RCYL-1	VSSL-102	VSSL-101	PUMP-100	PUMP-101	MIX-102
Mole Fraction																			
Methane						0													
Ethane						0													
Propane						0													
i-Butane						0													
n-Butane						0													
2,2-Dimethylpropane						0													
i-Pentane						0													
n-Pentane						0													
2,2-Dimethylbutane						0													
2,3-Dimethylbutane						0													
i-C6						0													
3-Methylpentane						0													
Hexane						0													
C7						0													
C8						0													
C9						0													
C10						0													
Nitrogen						0													
Carbon Dioxide						0													
Water						1													
Oxygen						0													
MeOH						0													

Process Streams	Flash	Fuel Gas	Inlet Gas	Inlet NGL	Inlet Water	Liquids to Pipeline	NGL	To Pipeline	Water	1	2	3	4	5	6	7	8	9

Properties	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Aqueous Liquid	From Block:	VSSL-101	SPLT-101	--	--	--	MIX-102	VSSL-100	SPLT-101	VSSL-100	MIX-100	VSSL-100	PUMP-102	MIX-103	Inlet Scrubber	Inlet Scrubber	SPLT-100	SPLT-100	PUMP-100
	To Block:	Flash Gas to Flare	FG to JT Skid	SAT-1	MIX-100	SAT-1	--	SPLT-100	--	MIX-104	XCHG-100	PIPE-1	MIX-103	RCYL-1	VSSL-102	VSSL-101	PUMP-100	PUMP-101	MIX-102
Property	**Units**																		
Temperature	°F					546.050													
Pressure	psig					1000													
Mole Fraction Vapor						0													
Molecular Weight	lb/lbmol					18.0153													
Mass Density	lb/ft^3					46.1840													
Mass Flow	lb/h					2.43501													
Std Vapor Volumetric Flow	MMSCFD					0.00123102													
Std Liquid Volumetric Flow	sgpm					0.00486777													
Compressibility						0.0366728													
Specific Gravity						0.740500													

10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	27	28	109
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
VSSL-102	VSSL-101	VSSL-102	Gas Compressors - 1 Stage	Discharge Coalescer	Discharge Coalescer	XCHG-100	RCYL-1	PIPE-1	FAXR-200	JT Skid Drain	RCYL-2	SAT-1	VSSL-101	MIX-104	VLVE-100	PIPE-2	PUMP-101
Gas Compressors - 1 Stage	PUMP-102	--	FAXR-200	SPLT-101	MIX-102	VSSL-100	VSSL-100	Inlet Scrubber	PIPE-2	RCYL-2	VSSL-101	MIX-100	MIX-104	VLVE-100	Water to Flare KOD	Discharge Coalescer	MIX-102
0.611164	0.0542537	0.279669	0.611164	0.611164		0.534363	0.0542517	0.610954	0.611164	0.186585	0.186585	0.688709				0.611164	0.280228
0.207189	0.268952	0.243134	0.207189	0.207189		0.215526	0.268966	0.207212	0.207189	0.326351	0.326351	0.175417				0.207189	0.243119
0.105314	0.396569	0.237805	0.105314	0.105314		0.135926	0.396580	0.105397	0.105314	0.319621	0.319621	0.0687449				0.105314	0.237523
0.00944963	0.0516458	0.0353084	0.00944963	0.00944963		0.0154386	0.0516441	0.00946594	0.00944963	0.0335667	0.0335667	0.00520961				0.00944963	0.0352506
0.0273928	0.155187	0.120423	0.0273928	0.0273928		0.0489651	0.155175	0.0274515	0.0273928	0.0920882	0.0920882	0.0136490				0.0273928	0.120225
2.76478E-05	6.38559E-05	0.000138771	2.76478E-05	2.76478E-05		5.35349E-05	6.37895E-05	2.77179E-05	2.76478E-05	0	0	0				2.76478E-05	0.000138542
0.00331410	0.0236575	0.0236561	0.00331410	0.00331410		0.00804166	0.0236539	0.00332694	0.00331410	0.0110923	0.0110923	0.00149989				0.00331410	0.0236250
0.00415797	0.0327691	0.0336445	0.00415797	0.00415797		0.0110140	0.0327644	0.00417658	0.00415797	0.0148637	0.0148637	0.00198985				0.00415797	0.0336095
0	0	0	0	0		0	0	0	0	0	0	0				0	0
0	0	0	0	0		0	0	0	0	0	0	0				0	0
0	0	0	0	0		0	0	0	0	0	0	0				0	0
0	0	0	0	0		0	0	0	0	0	0	0				0	0
0.000928472	0.00941854	0.0144728	0.000928472	0.000928472		0.00409234	0.00941551	0.000937018	0.000928472	0.00217182	0.00217182	0.000294975				0.000928472	0.0144994
1.26163E-05	0.00199620	0.000341601	1.26163E-05	1.26163E-05		8.81211E-05	0.00199698	1.28239E-05	1.26163E-05	0.00159115	0.00159115	0.000147488				1.26163E-05	0.000344168
7.01281E-06	0.00106097	0.000351452	7.01281E-06	7.01281E-06		8.81211E-05	0.00106143	7.23013E-06	7.01281E-06	0.000773993	0.000773993	0.000147488				7.01281E-06	0.000358535
0	0	0	0	0		0	0	0	0	0	0	0				0	0
0	0	0	0	0		0	0	0	0	0	0	0				0	0
0.0239304	0.000284456	0.00590490	0.0239304	0.0239304		0.0197453	0.000284440	0.0239191	0.0239304	0.00230596	0.00230596	0.0330475				0.0239304	0.00592554
0.00705760	0.00413657	0.00511558	0.00705760	0.00705760		0.00660766	0.00413774	0.00705637	0.00705760	0.00898666	0.00898666	0.0110592				0.00705760	0.00512027
5.51525E-05	4.44179E-06	3.42924E-05	5.51525E-05	5.51525E-05		5.03385E-05	4.44000E-06	5.51393E-05	5.51525E-05	2.01722E-06	2.01722E-06	8.42512E-05				5.51525E-05	3.43410E-05
0	0	0	0	0		0	0	0	0	0	0	0				0	0
0	0	0	0	0		0	0	0	0	0	0	0				0	0

10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	27	28	109
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
VSSL-102	VSSL-101	VSSL-102	Gas Compressors - 1 Stage	Discharge Coalescer	Discharge Coalescer	XCHG-100	RCYL-1	PIPE-1	FAXR-200	JT Skid Drain	RCYL-2	SAT-1	VSSL-101	MIX-104	VLVE-100	PIPE-2	PUMP-101
Gas Compressors - 1 Stage	PUMP-102	--	FAXR-200	SPLT-101	MIX-102	VSSL-100	VSSL-100	Inlet Scrubber	PIPE-2	RCYL-2	VSSL-101	MIX-100	MIX-104	VLVE-100	Water to Flare KOD	Discharge Coalescer	MIX-102
84.8591	21.0015	84.8591	129.955	119.316		85.0332	31.5135	84.8591	120*	34.1988	34.1988	164.416				119.316	
997.746	200	997.746	1350*	1345.68	1345.68	1000	1000	997.746	1350	295	295	1000	200	200	0*	1345.68	
1	0	0	1	1		0.768412	0	0.999369	1	0.278137	0.278137	1				1	
24.4249	43.8647	37.1919	24.4249	24.4249		27.3853	43.8641	24.4330	24.4249	36.9714	36.9714	22.1735				24.4249	37.1724
6.21847	33.5184	26.4836?	7.36228	7.70922		8.20990?	33.7370	6.22304?	7.71428	7.54263	7.54263	3.89120				7.70922	
275526	650.229	0	275526	275526	0	402638	649.997	275790	275526	631.974	631.974	194785	0	0	0	275526	0
102.739	0.135007	0	102.739	102.739	0	133.907	0.134961	102.803	102.739	0.155682	0.155682	80.0067	0	0	0	102.739	0
1471.14	2.64496	0	1471.14	1471.14	0	2023.81	2.64403	1472.29	1471.14	2.80632	2.80632	1084.43	0	0	0	1471.14	0
0.680512	0.0544683		0.715512	0.693666		0.579018?	0.250283	0.680236?	0.694591	0.286420	0.286420	0.863334				0.693666	
0.843329	0.537423		0.843329	0.843329			0.540928		0.843329			0.765593				0.843329	

10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	27	28	109
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
VSSL-102	VSSL-101	VSSL-102	Gas Compressors - 1 Stage	Discharge Coalescer	Discharge Coalescer	XCHG-100	RCYL-1	PIPE-1	FAXR-200	JT Skid Drain	RCYL-2	SAT-1	VSSL-101	MIX-104	VLVE-100	PIPE-2	PUMP-101
Gas Compressors - 1 Stage	PUMP-102	--	FAXR-200	SPLT-101	MIX-102	VSSL-100	VSSL-100	Inlet Scrubber	PIPE-2	RCYL-2	VSSL-101	MIX-100	MIX-104	VLVE-100	Water to Flare KOD	Discharge Coalescer	MIX-102
0.611164			0.611164	0.611164		0.610971		0.611164	0.611164	0.471544	0.471544	0.688709				0.611164	
0.207189			0.207189	0.207189		0.207218		0.207189	0.207189	0.354491	0.354491	0.175417				0.207189	
0.105314			0.105314	0.105314		0.105348		0.105314	0.105314	0.130863	0.130863	0.0687449				0.105314	
0.00944963			0.00944963	0.00944963		0.00946698		0.00944963	0.00944963	0.00585709	0.00585709	0.00520961				0.00944963	
0.0273928			0.0273928	0.0273928		0.0274679		0.0273928	0.0273928	0.0123969	0.0123969	0.0136490				0.0273928	
2.76478E-05			2.76478E-05	2.76478E-05		2.77970E-05		2.76478E-05	2.76478E-05	0	0	0				2.76478E-05	
0.00331410			0.00331410	0.00331410		0.00333277		0.00331410	0.00331410	0.000617673	0.000617673	0.00149989				0.00331410	
0.00415797			0.00415797	0.00415797		0.00418456		0.00415797	0.00415797	0.000664506	0.000664506	0.00198985				0.00415797	
0			0	0		0		0	0	0	0	0				0	
0			0	0		0		0	0	0	0	0				0	
0			0	0		0		0	0	0	0	0				0	
0			0	0		0		0	0	0	0	0				0	
0.000928472			0.000928472	0.000928472		0.000940318		0.000928472	0.000928472	2.84156E-05	2.84156E-05	0.000294975				0.000928472	
1.26163E-05			1.26163E-05	1.26163E-05		1.26169E-05		1.26163E-05	1.26163E-05	7.67933E-06	7.67933E-06	0.000147488				1.26163E-05	
7.01281E-06			7.01281E-06	7.01281E-06		7.19115E-06		7.01281E-06	7.01281E-06	1.18920E-06	1.18920E-06	0.000147488				7.01281E-06	
0			0	0		0		0	0	0	0	0				0	
0			0	0		0		0	0	0	0	0				0	
0.0239304			0.0239304	0.0239304		0.0239114		0.0239304	0.0239304	0.00726205	0.00726205	0.0330475				0.0239304	
0.00705760			0.00705760	0.00705760		0.00705623		0.00705760	0.00705760	0.0162622	0.0162622	0.0110592				0.00705760	
5.51525E-05			5.51525E-05	5.51525E-05		5.51577E-05		5.51525E-05	5.51525E-05	4.34807E-06	4.34807E-06	8.42512E-05				5.51525E-05	
0			0	0		0		0	0	0	0	0				0	
0			0	0		0		0	0	0	0	0				0	

10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	27	28	109
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
VSSL-102	VSSL-101	VSSL-102	Gas Compressors - 1 Stage	Discharge Coalescer	Discharge Coalescer	XCHG-100	RCYL-1	PIPE-1	FAXR-200	JT Skid Drain	RCYL-2	SAT-1	VSSL-101	MIX-104	VLVE-100	PIPE-2	PUMP-101
Gas Compressors - 1 Stage	PUMP-102	--	FAXR-200	SPLT-101	MIX-102	VSSL-100	VSSL-100	Inlet Scrubber	PIPE-2	RCYL-2	VSSL-101	MIX-100	MIX-104	VLVE-100	Water to Flare KOD	Discharge Coalescer	MIX-102
84.8591			129.955	119.316		85.0332		84.8591	120	34.1988	34.1988	164.416				119.316	
997.746			1350	1345.68		1000		997.746	1350	295	295	1000				1345.68	
1			1	1		1		1	1	1	1	1				1	

24.4249			24.4249	24.4249		24.4333		24.4249	24.4249	26.0704	26.0704	22.1735				24.4249	
6.21847			7.36228	7.70922		6.23695		6.21847	7.71428	1.82907	1.82907	3.89120				7.70922	
275526			275526	275526		276041		275526	275526	123.948	123.948	194785				275526	
102.739			102.739	102.739		102.895		102.739	102.739	0.0433008	0.0433008	80.0067				102.739	
1471.14			1471.14	1471.14		1473.62		1471.14	1471.14	0.661891	0.661891	1084.43				1471.14	
0.680512			0.715512	0.693666		0.680022		0.680512	0.694591	0.832874	0.832874	0.863334				0.693666	
0.843329			0.843329	0.843329		0.843619		0.843329	0.843329	0.900145	0.900145	0.765593				0.843329	

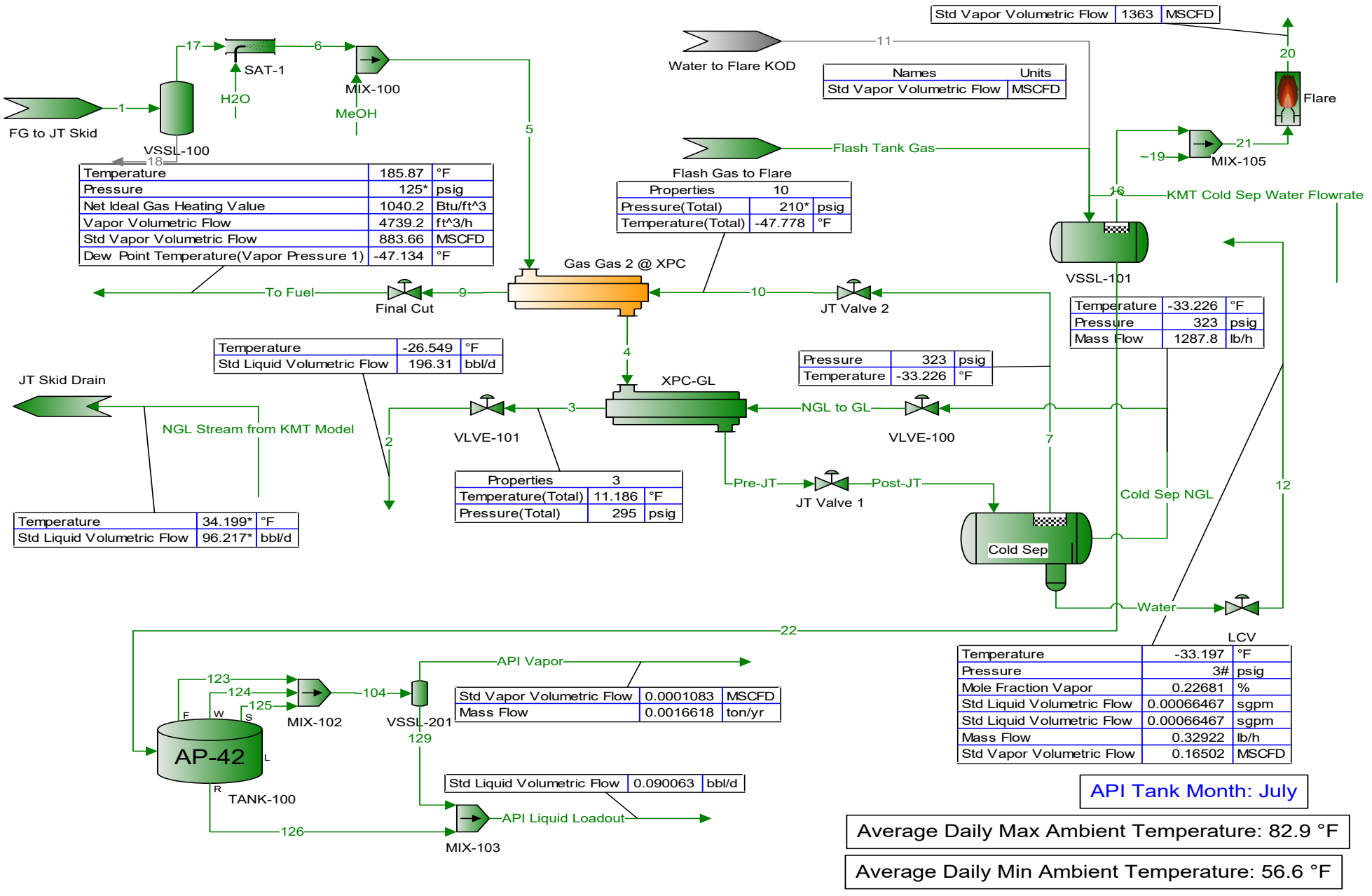
10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	27	28	109
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
VSSL-102	VSSL-101	VSSL-102	Gas Compressors - 1 Stage	Discharge Coalescer	Discharge Coalescer	XCHG-100	RCYL-1	PIPE-1	FAXR-200	JT Skid Drain	RCYL-2	SAT-1	VSSL-101	MIX-104	VLVE-100	PIPE-2	PUMP-101
Gas Compressors - 1 Stage	PUMP-102	--	FAXR-200	SPLT-101	MIX-102	VSSL-100	VSSL-100	Inlet Scrubber	PIPE-2	RCYL-2	VSSL-101	MIX-100	MIX-104	VLVE-100	Water to Flare KOD	Discharge Coalescer	MIX-102
	0.0542537					0.280176	0.0542517	0.279669		0.0767899	0.0767899						
	0.268952					0.243092	0.268966	0.243134		0.315509	0.315509						
	0.396569					0.237385	0.396580	0.237805		0.392350	0.392350						
	0.0516458					0.0352524	0.0516441	0.0353084		0.0442433	0.0442433						
	0.155187					0.120293	0.155175	0.120423		0.122794	0.122794						
	6.38559E-05					0.000138934	6.37895E-05	0.000138771		0	0						
	0.0236575					0.0236658	0.0236539	0.0236561		0.0151282	0.0151282						
	0.0327691					0.0336741	0.0327644	0.0336445		0.0203347	0.0203347						
	0					0	0	0		0	0						
	0					0	0	0		0	0						
	0					0	0	0		0	0						
	0					0	0	0		0	0						
	0.00941854					0.0145508	0.00941551	0.0144728		0.00299769	0.00299769						
	0.00199620					0.000338646	0.00199698	0.000341601		0.00220126	0.00220126						
	0.00106097					0.000356648	0.00106143	0.000351452		0.00107176	0.00107176						
	0					0	0	0		0	0						
	0					0	0	0		0	0						
	0.000284456					0.00592202	0.000284440	0.00590490		0.000396358	0.000396358						
	0.00413657					0.00511927	0.00413774	0.00511558		0.00618337	0.00618337						
	4.44179E-06					3.43484E-05	4.44000E-06	3.42924E-05		1.11914E-06	1.11914E-06						
	0					0	0	0		0	0						
	0					0	0	0		0	0						

10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	27	28	109
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
VSSL-102	VSSL-101	VSSL-102	Gas Compressors - 1 Stage	Discharge Coalescer	Discharge Coalescer	XCHG-100	RCYL-1	PIPE-1	FAXR-200	JT Skid Drain	RCYL-2	SAT-1	VSSL-101	MIX-104	VLVE-100	PIPE-2	PUMP-101
Gas Compressors - 1 Stage	PUMP-102	--	FAXR-200	SPLT-101	MIX-102	VSSL-100	VSSL-100	Inlet Scrubber	PIPE-2	RCYL-2	VSSL-101	MIX-100	MIX-104	VLVE-100	Water to Flare KOD	Discharge Coalescer	MIX-102
	21.0015					85.0332	31.5135	84.8591		34.1988	34.1988						
	200					1000	1000	997.746		295	295						
	0					0	0	0		0	0						
	43.8647					37.1800	43.8641	37.1919		41.1716	41.1716						
	33.5184					26.4627?	33.7370	26.4836?		31.7096	31.7096						
	650.229					126597	649.997	264.874		508.026	508.026						
	0.135007					31.0111	0.134961	0.0648627		0.112381	0.112381						
	2.64496					550.191	2.64403	1.15100		2.14443	2.14443						
	0.0544683					0.243887?	0.250283	0.243308?		0.0758696	0.0758696						
	0.537423					0.424294?	0.540928	0.424630?		0.508421	0.508421						

10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	27	28	109
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
VSSL-102	VSSL-101	VSSL-102	Gas Compressors - 1 Stage	Discharge Coalescer	Discharge Coalescer	XCHG-100	RCYL-1	PIPE-1	FAXR-200	JT Skid Drain	RCYL-2	SAT-1	VSSL-101	MIX-104	VLVE-100	PIPE-2	PUMP-101
Gas Compressors - 1 Stage	PUMP-102	--	FAXR-200	SPLT-101	MIX-102	VSSL-100	VSSL-100	Inlet Scrubber	PIPE-2	RCYL-2	VSSL-101	MIX-100	MIX-104	VLVE-100	Water to Flare KOD	Discharge Coalescer	MIX-102

10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	27	28	109

Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
VSSL-102	VSSL-101	VSSL-102	Gas Compressors - 1 Stage	Discharge Coalescer	Discharge Coalescer	XCHG-100	RCYL-1	PIPE-1	FAXR-200	JT Skid Drain	RCYL-2	SAT-1	VSSL-101	MIX-104	VLVE-100	PIPE-2	PUMP-101
Gas Compressors - 1 Stage	PUMP-102	--	FAXR-200	SPLT-101	MIX-102	VSSL-100	VSSL-100	Inlet Scrubber	PIPE-2	RCYL-2	VSSL-101	MIX-100	MIX-104	VLVE-100	Water to Flare KOD	Discharge Coalescer	MIX-102


Std Vapor Volumetric Flow 1363 MSCFD
Water to Flare KOD
Names Units
Std Vapor Volumetric Flow MSCFD
Flare
FG to JT Skid
VSSL-100
SAT-1
H2O
MIX-100
MeOH
Flash Tank Gas
Flash Gas to Flare
MIX-105
KMT Cold Sep Water Flowrate
VSSL-101
Temperature 185.87 °F
Pressure 125* psig
Net Ideal Gas Heating Value 1040.2 Btu/ft^3
Vapor Volumetric Flow 4739.2 ft^3/h
Std Vapor Volumetric Flow 883.66 MSCFD
Dew Point Temperature(Vapor Pressure 1) -47.134 °F
Properties 10
Pressure(Total) 210* psig
Temperature(Total) -47.778 °F
Gas Gas 2 @ XPC
To Fuel
Final Cut
JT Valve 2
Temperature -33.226 °F
Pressure 323 psig
Mass Flow 1287.8 lb/h
Temperature -26.549 °F
Std Liquid Volumetric Flow 196.31 bbl/d
Pressure 323 psig
Temperature -33.226 °F
JT Skid Drain
XPC-GL
NGL to GL
NGL Stream from KMT Model
VLVE-101
VLVE-100
Properties 3
Temperature(Total) 11.186 °F
Pressure(Total) 295 psig
Pre-JT
Post-JT
JT Valve 1
Cold Sep
Cold Sep NGL
Temperature 34.199* °F
Std Liquid Volumetric Flow 96.217* bbl/d
Water
LCV
Temperature -33.197 °F
Pressure 3# psig
Mole Fraction Vapor 0.22681 %
Std Liquid Volumetric Flow 0.00066467 sgpm
Std Liquid Volumetric Flow 0.00066467 sgpm
Mass Flow 0.32922 lb/h
Std Vapor Volumetric Flow 0.16502 MSCFD
API Vapor
MIX-102
VSSL-201
AP-42
TANK-100
Std Vapor Volumetric Flow 0.0001083 MSCFD
Mass Flow 0.0016618 ton/yr
Std Liquid Volumetric Flow 0.090063 bbl/d
API Liquid Loadout
MIX-103
API Tank Month: July
Average Daily Max Ambient Temperature: 82.9 °F
Average Daily Min Ambient Temperature: 56.6 °F

Process Streams		API Liquid Loadout	API Vapor	Cold Sep NGL	Flash Tank Gas	H2O	KMT Cold Sep Water Flowrate	MeOH	NGL Stream from KMT Model	NGL to GL	Post-JT	Pre-JT	To Fuel	Water	1	2	3	4
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Total**	From Block:	MIX-103	VSSL-201	Cold Sep	Flash Gas to Flare	--	--	--	--	VLVE-100	JT Valve 1	XPC-GL	Final Cut	Cold Sep	FG to JT Skid	VLVE-101	XPC-GL	Gas Gas 2 @ XPC
	To Block:	--	--	VLVE-100	VSSL-101	SAT-1	VSSL-101	MIX-100	JT Skid Drain	XPC-GL	Cold Sep	JT Valve 1	--	LCV	VSSL-100	--	VLVE-101	XPC-GL
Mole Fraction																		
Methane		4.13162E-08	0.195147	0.184000	0.466033	0*	0.00133780	0*	0.186585*	0.184000	0.610508	0.610508	0.763850	0.00133414	0.611164	0.184000	0.184000	0.610508
Ethane		1.36531E-07	0.399120	0.333297	0.353843	0*	0.000775594	0*	0.326351*	0.333297	0.206967	0.206967	0.161620	0.000781949	0.207189	0.333297	0.333297	0.206967
Propane		3.49863E-08	0.125818	0.309627	0.136130	0*	0.000116392	0*	0.319621*	0.309627	0.105201	0.105201	0.0317773	0.000115876	0.105314	0.309627	0.309627	0.105201
i-Butane		1.87662E-09	0.00894561	0.0328808	0.00635256	0*	6.74507E-06	0*	0.0335667*	0.0328808	0.00943948	0.00943948	0.00101962	6.60037E-06	0.00944963	0.0328808	0.0328808	0.00943948
n-Butane		3.44020E-09	0.0117789	0.0974061	0.0139833	0*	6.49197E-06	0*	0.0920882*	0.0974061	0.0273634	0.0273634	0.00220461	6.34008E-06	0.0273928	0.0974061	0.0974061	0.0273634
2,2-Dimethylpropane		4.08394E-13	3.39212E-06	9.96740E-05	4.44324E-06	0*	4.72110E-09	0*	0*	9.96740E-05	2.76182E-05	2.76182E-05	1.73622E-06	4.78854E-09	2.76478E-05	9.96740E-05	9.96740E-05	2.76182E-05
i-Pentane		1.53041E-10	0.000799881	0.0122873	0.000787287	0*	2.90185E-07	0*	0.0110923*	0.0122873	0.00331055	0.00331055	8.61521E-05	2.79077E-07	0.00331410	0.0122873	0.0122873	0.00331055
n-Pentane		1.17946E-11	0.000128990	0.0154865	0.000844387	0*	3.20486E-08	0*	0.0148637*	0.0154865	0.00415351	0.00415351	8.27616E-05	3.06371E-08	0.00415797	0.0154865	0.0154865	0.00415351
2,2-Dimethylbutane		0	0	0	0	0*	0	0*	0*	0	0	0	0	0	0	0	0	0
2,3-Dimethylbutane		0	0	0	0	0*	0	0*	0*	0	0	0	0	0	0	0	0	0
i-C6		0	0	0	0	0*	0	0*	0*	0	0	0	0	0	0	0	0	0
3-Methylpentane		0	0	0	0	0*	0	0*	0*	0	0	0	0	0	0	0	0	0
Hexane		5.18493E-13	9.11945E-06	0.00349895	6.18538E-05	0*	1.31058E-09	0*	0.00217182*	0.00349895	0.000927475	0.000927475	3.81160E-06	1.25411E-09	0.000928472	0.00349895	0.00349895	0.000927475
C7		3.09590E-14	7.61977E-07	4.76473E-05	4.31939E-06	0*	7.50660E-12	0*	0.00159115*	4.76473E-05	1.26028E-05	1.26028E-05	1.48890E-08	5.78990E-12	1.26163E-05	4.76473E-05	4.76473E-05	1.26028E-05
C8		7.71558E-16	3.32382E-08	2.65026E-05	6.39870E-07	0*	2.13103E-13	0*	0.000773993*	2.65026E-05	7.00528E-06	7.00528E-06	1.91650E-09	1.71756E-13	7.01281E-06	2.65026E-05	2.65026E-05	7.00528E-06
C9		0	0	0	0	0*	0	0*	0*	0	0	0	0	0	0	0	0	0
C10		0	0	0	0	0*	0	0*	0*	0	0	0	0	0	0	0	0	0
Nitrogen		1.70573E-10	0.00176125	0.00193742	0.00822561	0*	3.36602E-05	0*	0.00230596*	0.00193742	0.0239047	0.0239047	0.0318013	3.24800E-05	0.0239304	0.00193742	0.00193742	0.0239047
Carbon Dioxide		6.30411E-07	0.189938	0.00572093	0.0137063	0*	0.000493563	0*	0.00898666*	0.00572093	0.00705002	0.00705002	0.00752875	0.000457953	0.00705760	0.00572093	0.00572093	0.00705002
Water		0.997563	0.0419574	5.59502E-06	2.26645E-05	1*	0.987527	0*	2.01722E-06*	5.59502E-06	0.000147286	0.000147286	1.37412E-05	0.987838	5.51525E-05	5.59502E-06	5.59502E-06	0.000147286
Oxygen		0	0	0	0	0*	0	0*	0*	0	0	0	0	0	0	0	0	0
MeOH		0.00243593	0.0245907	0.00367886	0	0*	0.00970261	1*	0*	0.00367886	0.000981354	0.000981354	1.06600E-05	0.00942590	0	0.00367886	0.00367886	0.000981354

Process Streams		API Liquid Loadout	API Vapor	Cold Sep NGL	Flash Tank Gas	H2O	KMT Cold Sep Water Flowrate	MeOH	NGL Stream from KMT Model	NGL to GL	Post-JT	Pre-JT	To Fuel	Water	1	2	3	4
Properties	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	MIX-103	VSSL-201	Cold Sep	Flash Gas to Flare	--	--	--	--	VLVE-100	JT Valve 1	XPC-GL	Final Cut	Cold Sep	FG to JT Skid	VLVE-101	XPC-GL	Gas Gas 2 @ XPC
	To Block:	--	--	VLVE-100	VSSL-101	SAT-1	VSSL-101	MIX-100	JT Skid Drain	XPC-GL	Cold Sep	JT Valve 1	--	LCV	VSSL-100	--	VLVE-101	XPC-GL
Property	**Units**																	
Temperature	°F	85.2769	84.9385	-33.2258	21.0015	582.300	-33.2032	100*	34.1988*	-35.5029	-33.0030	29*	185.872	-33.2258	119.316	-26.5492	11.1864	43*
Pressure	psig	-0.975949	-0.975949	323	200	1340.68	3*	1300*	295*	295.1*	325*	1299.4	125*	323	1345.68	90*	295	1299.5
Mole Fraction Vapor		0	1	0	1	0.770002	0.00228214	0	0.278137	0.0203447	0.735162	0.554281	1	0	1	0.344406	0.169174	0.710225
Molecular Weight	lb/lbmol	18.0495	31.9048	36.9439	26.2587	18.0153	18.1748	32.0419	36.9714	36.9439	24.4318	24.4318	19.9378	18.1701	24.4249	36.9439	36.9439	24.4318
Mass Density	lb/ft^3	62.0776	0.0753793	32.9711	1.24953	3.87662	20.7908	49.3857	7.54263	27.2923	2.82123	13.9430?	0.408181	62.3800	7.70922	2.47649	11.0203	12.2920?
Mass Flow	lb/h	1.31257	0.000379401	1287.76	246.618	0.219068	1.45933	4.1475	631.974	1287.76	3222.54	3222.54	1934.45	0.329223	3218.18	1287.76	1287.76	3222.54
Std Vapor Volumetric Flow	MMSCFD	0.000662310	1.08305E-07	0.317467	0.0855377	0.000110750	0.000731287*	0.00117889	0.155682	0.317467	1.20129	1.20129	0.883658	0.000165021	1.2	0.317467	0.317467	1.20129
Std Liquid Volumetric Flow	sgpm	0.00262683	1.64752E-06	5.72575	1.31236	0.000437932	0.00294662	0.0104167*	2.80632*	5.72575	17.1939	17.1939	11.4675	0.000664666	17.1831	5.72575	5.72575	17.1939
Compressibility		0.000682127	0.993596	0.0826815	0.874661	0.563286	0.00338006	0.142019	0.286420	0.0921250	0.642473	0.439083?	0.984966	0.0214937	0.693666	0.336018	0.205463	0.484226?
Specific Gravity		0.995333	1.10159	0.528648	0.906644			0.791834					0.688402	1.00018	0.843329			

Process Streams		API Liquid Loadout	API Vapor	Cold Sep NGL	Flash Tank Gas	H2O	KMT Cold Sep Water Flowrate	MeOH	NGL Stream from KMT Model	NGL to GL	Post-JT	Pre-JT	To Fuel	Water	1	2	3	4
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Vapor	From Block:	MIX-103	VSSL-201	Cold Sep	Flash Gas to Flare	--	--	--	--	VLVE-100	JT Valve 1	XPC-GL	Final Cut	Cold Sep	FG to JT Skid	VLVE-101	XPC-GL	Gas Gas 2 @ XPC
	To Block:	--	--	VLVE-100	VSSL-101	SAT-1	VSSL-101	MIX-100	JT Skid Drain	XPC-GL	Cold Sep	JT Valve 1	--	LCV	VSSL-100	--	VLVE-101	XPC-GL
Mole Fraction																		
Methane			0.195147		0.466033	0	0.561376		0.471544	0.763950	0.763896	0.688854	0.763850		0.611164	0.469013	0.582273	0.664966
Ethane			0.399120		0.353843	0	0.294444		0.354491	0.166947	0.161529	0.178978	0.161620		0.207189	0.399590	0.302675	0.189967
Propane			0.125818		0.136130	0	0.0447169		0.130863	0.0319894	0.0318001	0.0715182	0.0317773		0.105314	0.103879	0.0839457	0.0816007
i-Butane			0.00894561		0.00635256	0	0.00228069		0.00585709	0.00100124	0.00102243	0.00518844	0.00101962		0.00944963	0.00332912	0.00332204	0.00625012
n-Butane			0.0117789		0.0139833	0	0.00250891		0.0123969	0.00215160	0.00221196	0.0141105	0.00220461		0.0273928	0.00692084	0.00742234	0.0172201
2,2-Dimethylpropane			3.39212E-06		4.44324E-06	0	1.80965E-06		0	1.68868E-06	1.74247E-06	1.34751E-05	1.73622E-06		2.76478E-05	5.45787E-06	5.96467E-06	1.66426E-05
i-Pentane			0.000799881		0.000787287	0	0.00010720		0.000617673	8.22527E-05	8.66119E-05	0.00133779	8.61521E-05		0.00331410	0.000262053	0.000353162	0.00172088
n-Pentane			0.000128990		0.000844387	0	1.37559E-05		0.000664506	7.83194E-05	8.32608E-05	0.00159608	8.27616E-05		0.00415797	0.000238513	0.000348577	0.00206531
2,2-Dimethylbutane			0		0	0	0		0	0	0	0	0		0	0	0	0
2,3-Dimethylbutane			0		0	0	0		0	0	0	0	0		0	0	0	0
i-C6			0		0	0	0		0	0	0	0	0		0	0	0	0
3-Methylpentane			0		0	0	0		0	0	0	0	0		0	0	0	0
Hexane			9.11945E-06		6.18538E-05	0	5.61617E-07		2.84156E-05	3.48268E-06	3.84621E-06	0.000251589	3.81160E-06		0.000928472	9.73640E-06	2.04784E-05	0.000343325
C7			7.61977E-07		4.31939E-06	0	3.18768E-09		7.67933E-06	1.32467E-08	1.50574E-08	2.53901E-06	1.48890E-08		1.26163E-05	3.42904E-08	9.45112E-08	3.57770E-06
C8			3.32382E-08		6.39870E-07	0	9.25508E-11		1.18920E-06	1.65114E-09	1.94356E-09	9.90791E-07	1.91650E-09		7.01281E-06	3.84763E-09	1.50264E-08	1.43603E-06
C9			0		0	0	0		0	0	0	0	0		0	0	0	0
C10			0		0	0	0		0	0	0	0	0		0	0	0	0
Nitrogen			0.00176125		0.00822561	0	0.0144180		0.00726205	0.0259856	0.0318137	0.0306873	0.0318013		0.0239304	0.00545493	0.00905959	0.0281136
Carbon Dioxide			0.189938		0.0137063	0	0.0798087		0.0162622	0.00778565	0.00752630	0.00701648	0.00752875		0.00705760	0.0112525	0.0104932	0.00710714
Water			0.0419574		2.26645E-05	1	0.000229270		4.34807E-06	1.41286E-05	1.38398E-05	8.99685E-05	1.37412E-05		5.51525E-05	1.29260E-05	1.36454E-05	0.000150104
Oxygen			0		0	0	0		0	0	0	0	0		0	0	0	0
MeOH			0.0245907		0	0	9.43120E-05		0	9.81877E-06	1.07532E-05	0.000354640	1.06600E-05		0	3.18341E-05	6.73004E-05	0.000474382

Process Streams		API Liquid Loadout	API Vapor	Cold Sep NGL	Flash Tank Gas	H2O	KMT Cold Sep Water Flowrate	MeOH	NGL Stream from KMT Model	NGL to GL	Post-JT	Pre-JT	To Fuel	Water	1	2	3	4
Properties	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Vapor	From Block:	MIX-103	VSSL-201	Cold Sep	Flash Gas to Flare	--	--	--	--	VLVE-100	JT Valve 1	XPC-GL	Final Cut	Cold Sep	FG to JT Skid	VLVE-101	XPC-GL	Gas Gas 2 @ XPC
	To Block:	--	--	VLVE-100	VSSL-101	SAT-1	VSSL-101	MIX-100	JT Skid Drain	XPC-GL	Cold Sep	JT Valve 1	--	LCV	VSSL-100	--	VLVE-101	XPC-GL
Property	**Units**																	
Temperature	°F		84.9385		21.0015	582.300	-33.2032		34.1988	-35.5029	-33.0030	29	185.872		119.316	-26.5492	11.1864	43
Pressure	psig		-0.975949		200	1340.68	3		295	295.1	325	1299.4	125		1345.68	90	295	1299.5
Mole Fraction Vapor			1		1	1	1		1	1	1	1	1		1	1	1	1
Molecular Weight	lb/lbmol		31.9048		26.2587	18.0153	24.0420		26.0704	19.9526	19.9378	22.1241	19.9378		24.4249	25.4024	23.5392	22.7649
Mass Density	lb/ft^3		0.0753793		1.24953	3.04726	0.0939124		1.82907	1.59083	1.75259	10.3435	0.408181		7.70922	0.619550	1.70958	10.0579
Mass Flow	lb/h		0.000379401		246.618	0.168683	0.00440551		123.948	14.1495	1933.32	1617.48	1934.45		3218.18	304.957	138.810	2132.58
Std Vapor Volumetric Flow	MMSCFD		1.08305E-07		0.0855377	8.52774E-05	1.66890E-06		0.0433008	0.00645875	0.883143	0.665852	0.883658		1.2	0.109338	0.0537072	0.853186
Std Liquid Volumetric Flow	sgpm		1.64752E-06		1.31236	0.000337209	2.34725E-05		0.661891	0.0842101	11.4605	9.05363	11.4675		17.1831	1.67360	0.778540	11.7838
Compressibility			0.993596		0.874661	0.716593	0.989857		0.832874	0.853593	0.843985	0.535976	0.984966		0.693666	0.923541	0.843890	0.551409
Specific Gravity			1.10159		0.906644	0.622021	0.830108		0.900145	0.688911	0.688400	0.763887	0.688402		0.843329	0.877079	0.812747	0.786013

Process Streams	API Liquid Loadout	API Vapor	Cold Sep NGL	Flash Tank Gas	H2O	KMT Cold Sep Water Flowrate	MeOH	NGL Stream from KMT Model	NGL to GL	Post-JT	Pre-JT	To Fuel	Water	1	2	3	4

Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Nonspecific Liquid	From Block:	MIX-103	VSSL-201	Cold Sep	Flash Gas to Flare	--	--	--	--	VLVE-100	JT Valve 1	XPC-GL	Final Cut	Cold Sep	FG to JT Skid	VLVE-101	XPC-GL	Gas Gas 2 @ XPC
	To Block:	--	--	VLVE-100	VSSL-101	SAT-1	VSSL-101	MIX-100	JT Skid Drain	XPC-GL	Cold Sep	JT Valve 1	--	LCV	VSSL-100	--	VLVE-101	XPC-GL
Mole Fraction																		
Methane				0.184000					0.0767899	0.171956	0.184810	0.513151				0.0342732	0.102903	0.477038
Ethane				0.333297					0.315509	0.336751	0.333270	0.241807				0.298470	0.339532	0.248636
Propane				0.309627					0.392350	0.315392	0.309113	0.147108				0.417713	0.355580	0.163045
i-Butane				0.0328808					0.0442433	0.0335428	0.0328214	0.0147280				0.0484053	0.0388996	0.0172566
n-Butane				0.0974061					0.122794	0.0993843	0.0972315	0.0438504				0.144941	0.115729	0.0522245
2,2-Dimethylpropane				9.96740E-05					0	0.000101709	9.94980E-05	4.52124E-05				0.000149169	0.000118755	5.45192E-05
i-Pentane				0.0122873					0.0151282	0.0125407	0.0122662	0.00576462				0.0186045	0.0147173	0.00720681
n-Pentane				0.0154865					0.0203347	0.0158064	0.0154601	0.00733487				0.0234967	0.0185689	0.00927169
2,2-Dimethylbutane				0					0	0	0	0				0	0	0
2,3-Dimethylbutane				0					0	0	0	0				0	0	0
i-C6				0					0	0	0	0				0	0	0
3-Methylpentane				0					0	0	0	0				0	0	0
Hexane				0.00349895					0.00299769	0.00357154	0.00349319	0.00176823				0.00533195	0.00420724	0.00235922
C7				4.76473E-05					0.00220126	4.86366E-05	4.75697E-05	2.51213E-05				7.26602E-05	5.73302E-05	3.47232E-05
C8				2.65026E-05					0.00107176	2.70529E-05	2.64595E-05	1.44867E-05				4.04233E-05	3.18960E-05	2.06555E-05
C9				0					0	0	0	0				0	0	0
C10				0					0	0	0	0				0	0	0
Nitrogen				0.00193742					0.000396358	0.00143801	0.00195127	0.0154724				8.95522E-05	0.000487194	0.0135893
Carbon Dioxide				0.00572093					0.00618337	0.00567806	0.00573067	0.00709270				0.00281502	0.00474920	0.00691010
Water				5.59502E-06					1.11914E-06	5.41781E-06	5.65521E-06	7.98644E-05				1.74382E-06	3.95580E-06	0.000129507
Oxygen				0					0	0	0	0				0	0	0
MeOH				0.00367886					0	0.00375506	0.00367266	0.00175921				0.00559477	0.00441425	0.00222379

Process Streams		API Liquid Loadout	API Vapor	Cold Sep NGL	Flash Tank Gas	H2O	KMT Cold Sep Water Flowrate	MeOH	NGL Stream from KMT Model	NGL to GL	Post-JT	Pre-JT	To Fuel	Water	1	2	3	4
Properties	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Nonspecific Liquid	From Block:	MIX-103	VSSL-201	Cold Sep	Flash Gas to Flare	--	--	--	--	VLVE-100	JT Valve 1	XPC-GL	Final Cut	Cold Sep	FG to JT Skid	VLVE-101	XPC-GL	Gas Gas 2 @ XPC
	To Block:	--	--	VLVE-100	VSSL-101	SAT-1	VSSL-101	MIX-100	JT Skid Drain	XPC-GL	Cold Sep	JT Valve 1	--	LCV	VSSL-100	--	VLVE-101	XPC-GL
Property	**Units**																	
Temperature	°F			-33.2258					34.1988	-35.5029	-33.0030	29				-26.5492	11.1864	43
Pressure	psig			323					295	295.1	325	1299.4				90	295	1299.5
Mole Fraction Vapor				0					0	0	0	0				0	0	0
Molecular Weight	lb/lbmol			36.9439					41.1716	37.2967	36.9165	27.3029				43.0070	39.6733	28.5174
Mass Density	lb/ft^3			32.9711					31.7096	33.2626	32.9463	21.4721?				35.3914	32.2209	21.7400?
Mass Flow	lb/h			1287.76					508.026	1273.61	1288.90	1604.91				982.804	1148.95	1089.96
Std Vapor Volumetric Flow	MMSCFD			0.317467					0.112381	0.311008	0.317982	0.535362				0.208129	0.263759	0.348100
Std Liquid Volumetric Flow	sgpm			5.72575					2.14443	5.64154	5.73278	8.13999				4.05216	4.94721	5.41016
Compressibility				0.0826815					0.0758696	0.0763115	0.0831288	0.318626?				0.0273715	0.0754649	0.319569?
Specific Gravity				0.528648					0.508421	0.533321	0.528250	0.344277?				0.567454	0.516619	0.348572?

Process Streams		API Liquid Loadout	API Vapor	Cold Sep NGL	Flash Tank Gas	H2O	KMT Cold Sep Water Flowrate	MeOH	NGL Stream from KMT Model	NGL to GL	Post-JT	Pre-JT	To Fuel	Water	1	2	3	4
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Aqueous Liquid	From Block:	MIX-103	VSSL-201	Cold Sep	Flash Gas to Flare	--	--	--	--	VLVE-100	JT Valve 1	XPC-GL	Final Cut	Cold Sep	FG to JT Skid	VLVE-101	XPC-GL	Gas Gas 2 @ XPC
	To Block:	--	--	VLVE-100	VSSL-101	SAT-1	VSSL-101	MIX-100	JT Skid Drain	XPC-GL	Cold Sep	JT Valve 1	--	LCV	VSSL-100	--	VLVE-101	XPC-GL
Mole Fraction																		
Methane		4.13162E-08				0	5.67866E-05	0			0.00133662	0.00187086		0.00133414				0.00165746
Ethane		1.36531E-07				0	0.000103867	0			0.000779918	0.000386294		0.000781949				0.000364100
Propane		3.49863E-08				0	1.43745E-05	0			0.000115509	5.78743E-05		0.000115876				6.01508E-05
i-Butane		1.87662E-09				0	1.54374E-06	0			6.56530E-06	2.29574E-06		6.60037E-06				2.33176E-06
n-Butane		3.44020E-09				0	7.68042E-07	0			6.32936E-06	5.22625E-06		6.34008E-06				6.08980E-06
2,2-Dimethylpropane		4.08394E-13				0	5.92568E-10	0			4.76671E-09	2.06468E-09		4.78854E-09				2.26390E-09
i-Pentane		1.53041E-10				0	4.58274E-08	0			2.78226E-07	1.90974E-07		2.79077E-07				2.30422E-07
n-Pentane		1.17946E-11				0	6.57255E-10	0			3.06765E-08	6.17681E-08		3.06371E-08				8.61971E-08
2,2-Dimethylbutane		0				0	0	0			0	0		0				0
2,3-Dimethylbutane		0				0	0	0			0	0		0				0
i-C6		0				0	0	0			0	0		0				0
3-Methylpentane		0				0	0	0			0	0		0				0
Hexane		5.18493E-13				0	2.89591E-11	0			1.25619E-09	3.54875E-09		1.25411E-09				5.16814E-09
C7		3.09590E-14				0	2.32386E-13	0			5.79503E-12	1.62978E-11		5.78990E-12				2.36298E-11
C8		7.71558E-16				0	1.89328E-15	0			1.72397E-13	1.15804E-12		1.71756E-13				1.92556E-12
C9		0				0	0	0			0	0		0				0
C10		0				0	0	0			0	0		0				0
Nitrogen		1.70573E-10				0	7.57940E-07	0			3.25601E-05	6.77079E-05		3.24800E-05				5.48797E-05
Carbon Dioxide		6.30411E-07				0	0.000312140	0			0.000457472	0.000304443		0.000457953				0.000267655
Water		0.997563				1	0.989785	0			0.987836	0.984856		0.987838				0.983985
Oxygen		0				0	0	0			0	0		0				0
MeOH		0.00243593				0	0.00972459	1			0.00942847	0.0124489		0.00942590				0.0136023

Process Streams		API Liquid Loadout	API Vapor	Cold Sep NGL	Flash Tank Gas	H2O	KMT Cold Sep Water Flowrate	MeOH	NGL Stream from KMT Model	NGL to GL	Post-JT	Pre-JT	To Fuel	Water	1	2	3	4
Properties	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Aqueous Liquid	From Block:	MIX-103	VSSL-201	Cold Sep	Flash Gas to Flare	--	--	--	--	VLVE-100	JT Valve 1	XPC-GL	Final Cut	Cold Sep	FG to JT Skid	VLVE-101	XPC-GL	Gas Gas 2 @ XPC
	To Block:	--	--	VLVE-100	VSSL-101	SAT-1	VSSL-101	MIX-100	JT Skid Drain	XPC-GL	Cold Sep	JT Valve 1	--	LCV	VSSL-100	--	VLVE-101	XPC-GL
Property	**Units**																	
Temperature	°F	85.2769				582.300	-33.2032	100			-33.0030	29		-33.2258				43
Pressure	psig	-0.975949				1340.68	3	1300			325	1299.4		323				1299.5
Mole Fraction Vapor		0				0	0	0			0	0		0				0
Molecular Weight	lb/lbmol	18.0495				18.0153	18.1614	32.0419			18.1701	18.2013		18.1701				18.2166
Mass Density	lb/ft^3	62.0776				43.6416	62.4957	49.3857			62.3804	62.2578		62.3800				62.1698
Mass Flow	lb/h	1.31257				0.0503852	1.45492	4.1475			0.329018	0.150709		0.329223				0.00769401
Std Vapor Volumetric Flow	MMSCFD	0.000662310				2.54722E-05	0.000729618	0.00117889			0.000164918	7.54125E-05		0.000165021				3.84671E-06
Std Liquid Volumetric Flow	sgpm	0.00262683				0.00100724	0.00292314	0.0104167			0.000664251	0.000304583		0.000664666				1.55494E-05
Compressibility		0.000682127				0.0500359	0.00112363	0.142019			0.0216096	0.0732582		0.0214937				0.0713842
Specific Gravity		0.995333				0.699735	1.00204	0.791834			1.00019	0.998221		1.00018				0.996810

5	6	7	9	10	11	12	16	17	18	19	20	21	22	104	123	124	125	126	129
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
MIX-100	SAT-1	Cold Sep	Gas Gas 2 @ XPC	JT Valve 2	Water to Flare KOD	LCV	VSSL-101	VSSL-100	VSSL-100	--	Flare	MIX-105	VSSL-101	MIX-102	TANK-100	TANK-100	TANK-100	TANK-100	VSSL-201
Gas Gas 2 @ XPC	MIX-100	JT Valve 2	Final Cut	Gas Gas 2 @ XPC	VSSL-101	--	MIX-105	SAT-1	--	MIX-105	--	Flare	TANK-100	VSSL-201	MIX-102	MIX-102	MIX-102	MIX-103	MIX-103
0.610508	0.611107	0.763850	0.763850	0.763850		0.00133414	0.465670	0.611164		0*	0	0.0298979	3.19476E-05	0.00456760	0.243192	0.000769240	0.000769240	0	6.04743E-06
0.206967	0.207170	0.161620	0.161620	0.161620		0.000781949	0.353565	0.207189		0*	0	0.0227003	6.53922E-05	0.00934922	0.463980	0.00211252	0.00211252	0	1.99840E-05
0.105201	0.105304	0.0317773	0.0317773	0.0317773		0.000115876	0.136021	0.105314		0*	0	0.00873313	2.06061E-05	0.00294609	0.156401	0.000503427	0.000503427	0	5.12093E-06
0.00943948	0.00944876	0.00101962	0.00101962	0.00101962		6.60037E-06	0.00634750	0.00944963		0*	0	0.000407536	1.46447E-06	0.000209378	0.0117810	2.51840E-05	2.51840E-05	0	2.74680E-07
0.0273634	0.0273902	0.00220461	0.00220461	0.00220461		6.34008E-06	0.0139721	0.0273928		0*	0	0.000897067	1.92928E-06	0.000275832	0.0148261	4.42249E-05	4.42249E-05	0	5.03541E-07
2.76182E-05	2.76453E-05	1.73622E-06	1.73622E-06	1.73622E-06		4.78854E-09	4.43970E-06	2.76478E-05		0*	0	2.85047E-07	5.55017E-10	7.93515E-08	4.67302E-06	6.23068E-09	6.23068E-09	0	5.97764E-11
0.00331055	0.00331380	8.61521E-05	8.61521E-05	8.61521E-05		2.79077E-07	0.000786655	0.00331410		0*	0	5.05065E-05	1.30933E-07	1.87196E-05	0.00106014	2.14256E-06	2.14256E-06	0	2.24005E-08
0.00415351	0.00415759	8.27616E-05	8.27616E-05	8.27616E-05		3.06371E-08	0.000843708	0.00415797		0*	0	5.41695E-05	2.11016E-08	3.01692E-06	0.000182445	1.60830E-07	1.60830E-07	0	1.72638E-09
0	0	0	0	0		0	0	0		0*	0	0	0	0	0	0	0	0	0
0	0	0	0	0		0	0	0		0*	0	0	0	0	0	0	0	0	0
0	0	0	0	0		0	0	0		0*	0	0	0	0	0	0	0	0	0
0	0	0	0	0		0	0	0		0*	0	0	0	0	0	0	0	0	0
0.000927475	0.000928386	3.81160E-06	3.81160E-06	3.81160E-06		1.25411E-09	6.18040E-05	0.000928472		0*	0	3.96807E-06	1.49154E-09	2.13247E-07	1.31278E-05	7.67607E-09	7.67607E-09	0	7.58917E-11
1.26028E-05	1.26152E-05	1.48890E-08	1.48890E-08	1.48890E-08		5.78990E-12	4.31592E-06	1.26163E-05		0*	0	2.77100E-07	1.24613E-10	1.78161E-08	1.10814E-06	4.60636E-10	4.60636E-10	0	4.53146E-12
7.00528E-06	7.01216E-06	1.91650E-09	1.91650E-09	1.91650E-09		1.71756E-13	6.39355E-07	7.01281E-06		0*	0	4.10492E-08	5.43518E-12	7.77075E-10	4.90224E-08	9.11841E-12	9.11841E-12	0	1.12933E-13
0	0	0	0	0		0	0	0		0*	0	0	0	0	0	0	0	0	0
0	0	0	0	0		0	0	0		0*	0	0	0	0	0	0	0	0	0
0.0239047	0.0239282	0.0318013	0.0318013	0.0318013		3.24800E-05	0.00821928	0.0239304		0.79*	0.723695	0.739806	2.88134E-07	4.11949E-05	0.00239799	3.68006E-06	3.68006E-06	0	2.49667E-08
0.00705002	0.00705695	0.00752875	0.00752875	0.00752875		0.000457953	0.0136993	0.00705760		0*	0.105796	0.000879548	3.16850E-05	0.00453005	0.0605011	0.00363912	0.00363912	0	9.22730E-05
0.000147286	0.000147430	1.37412E-05	1.37412E-05	1.37412E-05		0.987838	0.000740634	5.51525E-05		0*	0.166364	4.75518E-05	0.997407	0.937622	0.0438794	0.951848	0.951848	0.997828	0.959060
0	0	0	0	0		0	0	0		0.21*	0.00414528	0.196517	0	0	0	0	0	0	0
0.000981354	0	1.06600E-05	1.06600E-05	1.06600E-05		0.00942590	6.40067E-05	0		0*	0	4.10949E-06	0.00243955	0.0404368	0.00177976	0.0410522	0.0410522	0.00217191	0.0408161

5	6	7	9	10	11	12	16	17	18	19	20	21	22	104	123	124	125	126	129
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
MIX-100	SAT-1	Cold Sep	Gas Gas 2 @ XPC	JT Valve 2	Water to Flare KOD	LCV	VSSL-101	VSSL-100	VSSL-100	--	Flare	MIX-105	VSSL-101	MIX-102	TANK-100	TANK-100	TANK-100	TANK-100	VSSL-201
Gas Gas 2 @ XPC	MIX-100	JT Valve 2	Final Cut	Gas Gas 2 @ XPC	VSSL-101	--	MIX-105	SAT-1	--	MIX-105	--	Flare	TANK-100	VSSL-201	MIX-102	MIX-102	MIX-102	MIX-103	MIX-103
116.189	119.027	-33.2258	190.053	-47.7785		-33.1974	-10.8800	119.027		70*	3720.42	55.8884	-10.8800	84.9385	85.2806	85.2806	85.2806	85.2806	84.9385
1300	1340.68	323	205.4	210*	0	3*	3	1340.68	1340.68	200*	0*	3*	3	-0.975949	-0.975949	-0.975949	-0.975949	-0.975949	-0.975949
1	1	1	1	0.999995		0.00226810	1	1		1	1	1	0	0.0233757	1	0.00735111	0.00735111	0	0
24.4318	24.4243	19.9378	19.9378	19.9378		18.1701	26.2531	24.4249		28.8503	28.0589	28.6836	18.0517	18.9018	29.9645	18.7257	18.7257	18.0457	18.5906
7.51193	7.68395	1.74174	0.644005	1.14256		20.8733	0.0976159	7.68424		1.09524	0.00919109	0.0918199	62.6179	1.85496	0.0707585	5.48114	5.48114	62.0828	61.3450
3222.54	3218.39	1934.45	1934.45	1934.45	0	0.329223	246.765	3218.18	0	3952.50	4199.26	4199.26	1.31295	0.00961572	0.000238841	3.15773E-05	0.00934530	1.30333	0.00923632
1.20129	1.20011	0.883658	0.883658	0.883658	0	0.000165021	0.0856066	1.2	0	1.24774	1.36303	1.33335	0.000662419	4.63322E-06	7.25950E-08	1.53582E-08	4.54527E-06	0.000657785	4.52492E-06
17.1939	17.1835	11.4675	11.4675	11.4675	0	0.000664666	1.31268	17.1831	0	9.12269	10.1530	10.4354	0.00262847	2.04470E-05	1.16014E-06	6.49500E-08	1.92220E-05	0.00260803	1.87995E-05
0.691910	0.693719	0.844683	0.977257	0.887049		0.00336578	0.988161	0.693710		0.994938	1.00012	0.999146	0.00105922	0.0239208	0.993485	0.00801495	0.00801495	0.000681926	0.000711410
0.843567	0.843309	0.688402	0.688402				0.906452	0.843329		0.996127	0.968801	0.990370	1.00400		1.03460			0.995415	0.983585

5	6	7	9	10	11	12	16	17	18	19	20	21	22	104	123	124	125	126	129
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
MIX-100	SAT-1	Cold Sep	Gas Gas 2 @ XPC	JT Valve 2	Water to Flare KOD	LCV	VSSL-101	VSSL-100	VSSL-100	--	Flare	MIX-105	VSSL-101	MIX-102	TANK-100	TANK-100	TANK-100	TANK-100	VSSL-201
Gas Gas 2 @ XPC	MIX-100	JT Valve 2	Final Cut	Gas Gas 2 @ XPC	VSSL-101	--	MIX-105	SAT-1	--	MIX-105	--	Flare	TANK-100	VSSL-201	MIX-102	MIX-102	MIX-102	MIX-103	MIX-103
0.610508	0.611107	0.763850	0.763850	0.763854		0.563221	0.465670	0.611164		0	0	0.0298979		0.195147	0.243192	0.104206	0.104206		
0.206967	0.207170	0.161620	0.161620	0.161620		0.298590	0.353565	0.207189		0	0	0.0227003		0.399120	0.463980	0.285439	0.285439		
0.105201	0.105304	0.0317773	0.0317773	0.0317775		0.0447884	0.136021	0.105314		0	0	0.00873313		0.125818	0.156401	0.0681071	0.0681071		
0.00943948	0.00944876	0.00101962	0.00101962	0.00101963		0.00224552	0.00634750	0.00944963		0	0	0.000407536		0.00894561	0.0117810	0.00341166	0.00341166		
0.0273634	0.0273902	0.00220461	0.00220461	0.00220462		0.00246553	0.0139721	0.0273928		0	0	0.000897067		0.0117789	0.0148261	0.00598133	0.00598133		
2.76182E-05	2.76453E-05	1.73622E-06	1.73622E-06	1.73623E-06		1.84631E-06	4.43970E-06	2.76478E-05		0	0	2.85047E-07		3.39212E-06	4.67302E-06	8.45562E-07	8.45562E-07		
0.00331055	0.00331380	8.61521E-05	8.61521E-05	8.61525E-05		0.000103631	0.000786655	0.00331410		0	0	5.05065E-05		0.000799881	0.00106014	0.000290356	0.000290356		
0.00415351	0.00415759	8.27616E-05	8.27616E-05	8.27621E-05		1.32315E-05	0.000843708	0.00415797		0	0	5.41695E-05		0.000128990	0.000182445	2.18385E-05	2.18385E-05		
0	0	0	0	0		0	0	0		0	0	0		0	0	0	0		
0	0	0	0	0		0	0	0		0	0	0		0	0	0	0		
0	0	0	0	0		0	0	0		0	0	0		0	0	0	0		
0	0	0	0	0		0	0	0		0	0	0		0	0	0	0		
0.000927475	0.000928386	3.81160E-06	3.81160E-06	3.81162E-06		5.40730E-07	6.18040E-05	0.000928472		0	0	3.96807E-06		9.11945E-06	1.31278E-05	1.04302E-06	1.04302E-06		
1.26028E-05	1.26152E-05	1.48890E-08	1.48890E-08	1.48890E-08		2.47377E-09	4.31592E-06	1.26163E-05		0	0	2.77100E-07		7.61977E-07	1.10814E-06	6.26113E-08	6.26113E-08		
7.00528E-06	7.01216E-06	1.91650E-09	1.91650E-09	1.91651E-09		7.50564E-11	6.39355E-07	7.01281E-06		0	0	4.10492E-08		3.32382E-08	4.90224E-08	1.23984E-09	1.23984E-09		
0	0	0	0	0		0	0	0		0	0	0		0	0	0	0		
0	0	0	0	0		0	0	0		0	0	0		0	0	0	0		
0.0239047	0.0239282	0.0318013	0.0318013	0.0318014		0.0139973	0.00821928	0.0239304		0.79	0.723695	0.739806		0.00176125	0.00239799	0.000499655	0.000499655		
0.00705002	0.00705695	0.00752875	0.00752875	0.00752879		0.0742517	0.0136993	0.00705760		0	0.105796	0.000879548		0.189938	0.0605011	0.464614	0.464614		
0.000147286	0.000147430	1.37412E-05	1.37412E-05	8.51367E-06		0.000229381	0.000740634	5.51525E-05		0	0.166364	4.75518E-05		0.0419574	0.0438794	0.0424925	0.0424925		
0	0	0	0	0		0	0	0		0.21	0.00414528	0.196517		0	0	0	0		
0.000981354	0	1.06600E-05	1.06600E-05	1.05717E-05		9.18126E-05	6.40067E-05	0		0	0	4.10949E-06		0.0245907	0.00177976	0.0249351	0.0249351		

5	6	7	9	10	11	12	16	17	18	19	20	21	22	104	123	124	125	126	129
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
MIX-100	SAT-1	Cold Sep	Gas Gas 2 @ XPC	JT Valve 2	Water to Flare KOD	LCV	VSSL-101	VSSL-100	VSSL-100	--	Flare	MIX-105	VSSL-101	MIX-102	TANK-100	TANK-100	TANK-100	TANK-100	VSSL-201
Gas Gas 2 @ XPC	MIX-100	JT Valve 2	Final Cut	Gas Gas 2 @ XPC	VSSL-101	--	MIX-105	SAT-1	--	MIX-105	--	Flare	TANK-100	VSSL-201	MIX-102	MIX-102	MIX-102	MIX-103	MIX-103
116.189	119.027	-33.2258	190.053	-47.7785		-33.1974	-10.8800	119.027		70	3720.42	55.8884		84.9385	85.2806	85.2806	85.2806		
1300	1340.68	323	205.4	210		3	3	1340.68		200	0	3		-0.975949	-0.975949	-0.975949	-0.975949		
1	1	1	1	1		1	1	1		1	1	1		1	1	1	1		
24.4318	24.4243	19.9378	19.9378	19.9379		23.9381	26.2531	24.4249		28.8503	28.0589	28.6836		31.9048	29.9645	35.8523	35.8523		
7.51193	7.68395	1.74174	0.644005	1.14256		0.0935076	0.0976159	7.68424		1.09524	0.00919109	0.0918199		0.0753793	0.0707585	0.0845972	0.0845972		
3222.54	3218.39	1934.45	1934.45	1934.44		0.000983752	246.765	3218.18		3952.50	4199.26	4199.26		0.000379401	0.000238841	4.44433E-07	0.000131530		
1.20129	1.20011	0.883658	0.883658	0.883653		3.74283E-07	0.0856066	1.2		1.24774	1.36303	1.33335		1.08305E-07	7.25950E-08	1.12900E-10	3.34128E-08		
17.1939	17.1835	11.4675	11.4675	11.4675		5.27503E-06	1.31268	17.1831		9.12269	10.1530	10.4354		1.64752E-06	1.16014E-06	1.57059E-09	4.64816E-07		
0.691910	0.693719	0.844683	0.977257	0.887054		0.989834	0.988161	0.693710		0.994938	1.00012	0.999146		0.993596	0.993485	0.994248	0.994248		
0.843567	0.843309	0.688402	0.688402	0.688402		0.826522	0.906452	0.843329		0.996127	0.968801	0.990370		1.10159	1.03460	1.23789	1.23789		

5	6	7	9	10	11	12	16	17	18	19	20	21	22	104	123	124	125	126	129

Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
MIX-100	SAT-1	Cold Sep	Gas Gas 2 @ XPC	JT Valve 2	Water to Flare KOD	LCV	VSSL-101	VSSL-100	VSSL-100	--	Flare	MIX-105	VSSL-101	MIX-102	TANK-100	TANK-100	TANK-100	TANK-100	VSSL-201
Gas Gas 2 @ XPC	MIX-100	JT Valve 2	Final Cut	Gas Gas 2 @ XPC	VSSL-101	--	MIX-105	SAT-1	--	MIX-105	--	Flare	TANK-100	VSSL-201	MIX-102	MIX-102	MIX-102	MIX-103	MIX-103

5	6	7	9	10	11	12	16	17	18	19	20	21	22	104	123	124	125	126	129
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
MIX-100	SAT-1	Cold Sep	Gas Gas 2 @ XPC	JT Valve 2	Water to Flare KOD	LCV	VSSL-101	VSSL-100	VSSL-100	--	Flare	MIX-105	VSSL-101	MIX-102	TANK-100	TANK-100	TANK-100	TANK-100	VSSL-201
Gas Gas 2 @ XPC	MIX-100	JT Valve 2	Final Cut	Gas Gas 2 @ XPC	VSSL-101	--	MIX-105	SAT-1	--	MIX-105	--	Flare	TANK-100	VSSL-201	MIX-102	MIX-102	MIX-102	MIX-103	MIX-103

5	6	7	9	10	11	12	16	17	18	19	20	21	22	104	123	124	125	126	129
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
MIX-100	SAT-1	Cold Sep	Gas Gas 2 @ XPC	JT Valve 2	Water to Flare KOD	LCV	VSSL-101	VSSL-100	VSSL-100	--	Flare	MIX-105	VSSL-101	MIX-102	TANK-100	TANK-100	TANK-100	TANK-100	VSSL-201
Gas Gas 2 @ XPC	MIX-100	JT Valve 2	Final Cut	Gas Gas 2 @ XPC	VSSL-101	--	MIX-105	SAT-1	--	MIX-105	--	Flare	TANK-100	VSSL-201	MIX-102	MIX-102	MIX-102	MIX-103	MIX-103
				0.00124370	5.68288E-05								3.19476E-05	6.04743E-06		3.23614E-06	3.23614E-06	0	6.04743E-06
				0.000959787	0.000104956								6.53922E-05	1.99840E-05		1.43307E-05	1.43307E-05	0	1.99840E-05
				0.000166363	1.43241E-05								2.06061E-05	5.12093E-06		2.78460E-06	2.78460E-06	0	5.12093E-06
				1.28035E-05	1.51075E-06								1.46447E-06	2.74680E-07		1.05234E-07	1.05234E-07	0	2.74680E-07
				1.01636E-05	7.49712E-07								1.92928E-06	5.03541E-07		2.57355E-07	2.57355E-07	0	5.03541E-07
				8.64944E-09	6.02290E-10								5.55017E-10	5.97764E-11		1.49776E-11	1.49776E-11	0	5.97764E-11
				5.19860E-07	4.41318E-08								1.30933E-07	2.24005E-08		8.18192E-09	8.18192E-09	0	2.24005E-08
				4.66996E-08	6.28287E-10								2.11016E-08	1.72638E-09		2.95173E-10	2.95173E-10	0	1.72638E-09
				0	0								0	0		0	0	0	0
				0	0								0	0		0	0	0	0
				0	0								0	0		0	0	0	0
				0	0								0	0		0	0	0	0
				2.18663E-09	2.77428E-11								1.49154E-09	7.58917E-11		8.76417E-12	8.76417E-12	0	7.58917E-11
				1.20028E-11	1.79545E-13								1.24613E-10	4.53146E-12		3.75883E-13	3.75883E-13	0	4.53146E-12
				3.76923E-13	1.52454E-15								5.43518E-12	1.12933E-13		4.27142E-15	4.27142E-15	0	1.12933E-13
				0	0								0	0		0	0	0	0
				0	0								0	0		0	0	0	0
				2.93497E-05	7.34531E-07								2.88134E-07	2.49667E-08		7.09168E-09	7.09168E-09	0	2.49667E-08
				0.000479730	0.000290201								3.16850E-05	9.22730E-05		0.000225346	0.000225346	0	9.22730E-05
				0.980510	0.990084								0.997407	0.959060		0.958582	0.958582	0.997828	0.959060
				0	0								0	0		0	0	0	0
				0.0165874	0.00944712								0.00243955	0.0408161		0.0411715	0.0411715	0.00217191	0.0408161

5	6	7	9	10	11	12	16	17	18	19	20	21	22	104	123	124	125	126	129
Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
MIX-100	SAT-1	Cold Sep	Gas Gas 2 @ XPC	JT Valve 2	Water to Flare KOD	LCV	VSSL-101	VSSL-100	VSSL-100	--	Flare	MIX-105	VSSL-101	MIX-102	TANK-100	TANK-100	TANK-100	TANK-100	VSSL-201
Gas Gas 2 @ XPC	MIX-100	JT Valve 2	Final Cut	Gas Gas 2 @ XPC	VSSL-101	--	MIX-105	SAT-1	--	MIX-105	--	Flare	TANK-100	VSSL-201	MIX-102	MIX-102	MIX-102	MIX-103	MIX-103
				-47.7785	-33.1974								-10.8800	84.9385		85.2806	85.2806	85.2806	84.9385
				210	3								3	-0.975949		-0.975949	-0.975949	-0.975949	-0.975949
				0	0								0	0		0	0	0	0
				18.2751	18.1570								18.0517	18.5906		18.5989	18.5989	18.0457	18.5906
				62.2327	62.4988								62.6179	61.3450		61.3388	61.3388	62.0828	61.3450
				0.00945347	0.328239								1.31295	0.00923632		3.11328E-05	0.00921377	1.30333	0.00923632
				4.71125E-06	0.000164646								0.000662419	4.52492E-06		1.52453E-08	4.51186E-06	0.000657785	4.52492E-06
				1.91547E-05	0.000659391								0.00262847	1.87995E-05		6.33794E-08	1.87571E-05	0.00260803	1.87995E-05
				0.0149276	0.00112329								0.00105922	0.000711410		0.000711353	0.000711353	0.000681926	0.000711410
				0.997819	1.00208								1.00400	0.983585		0.983486	0.983486	0.995415	0.983585

Tank Losses Report
TANK-100

Client Name:	Kinder Morgan	**Job:**	06904.28 KM Silurian Compressor Station
Location:	Williams County, North Dakota	**Modified:**	6/10/2025 13:26
Flowsheet:	JT Skid_Combustor	**Status:**	Solved 2:02 PM, 6/10/2025

Stream Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
22	Inlet	VSSL-101	123	Flashing Losses Stream	MIX-102
124	Working Losses Stream	MIX-102	125	Standing Losses Stream	MIX-102
126	Residual Liquid Stream	MIX-103			

Working and Standing Properties : Scalar Data

Tank Geometry	Vertical Cylinder		Roof Type	Cone	
Shell Length	20*	ft	Slope of Coned Roof	0.0625	
Shell Diameter	12*	ft	Breather Vent Pressure	0.03	psi
Number of Storage Tanks	1		Breather Vacuum Pressure	-0.03	psi
Maximum Fraction Fill of Tank	0.9		Location	Williston, ND*	
Average Fraction Fill of Tank	0.5		Time Frame	July*	
Minimum Fraction Fill of Tank	0.1		Known Liquid Bulk Temperature?	FALSE	
Material Category	Light Organics*		Liquid Bulk Temperature	72.9164	°F
Insulation	Uninsulated		Use AP 42 Raoult's Vapor Pressure?	FALSE	
Bolted or Riveted Construction?	FALSE		Flashing Temperature	85.2806	°F
Vapor Balanced Tank?	FALSE		Average Daily Maximum Ambient Temperature	82.9	°F
Known Sum of Increases in Liquid Level?	FALSE		Average Daily Minimum Ambient Temperature	56.6	°F
Sum of Increases in Liquid Level	1.63504	ft/yr	Atmospheric Pressure at Tank Location	13.72	psia
Shell Color	Tan*		Daily Solar Insolation	2154	Btu/(day*ft^2)
Shell Paint Condition	Average		Average Wind Speed	8.3	mph
Roof Color	Tan*		Include Short Term Emissions	FALSE	
Roof Paint Condition	Average				

Composition Subset Properties : Scalar Data

Component Subset	VOCs	Species in Results	Selected Species
Atomic Basis	FALSE	Fraction Denominator	Selected Species

Composition Subset Properties : Tabulated Data

Index	Selected Components
Methane	FALSE
Ethane	FALSE
Propane	TRUE
i-Butane	TRUE
n-Butane	TRUE
2,2-Dimethylpropane	TRUE
i-Pentane	TRUE
n-Pentane	TRUE
2,2-Dimethylbutane	TRUE
2,3-Dimethylbutane	TRUE
i-C6	TRUE
3-Methylpentane	TRUE
Hexane	TRUE
C7	TRUE
C8	TRUE
C9	TRUE
C10	TRUE
Nitrogen	FALSE
Carbon Dioxide	FALSE
Water	FALSE
Oxygen	FALSE
MeOH	TRUE

Details Properties : Scalar Data

Vapor Space Volume	1145.11	ft^3	Liquid Height	10	ft
Vapor Density	0.0639846	lb/ft^3	Roof Outage	0.125	ft

Vapor Space Expansion Factor	1	1/day	Tank Roof Height	0.375	ft
Vented Vapor Saturation Factor	0.130936		Tank Shell Radius	6	ft
Vapor Space Outage	10.125	ft	Vapor Molecular Weight	29.8655	lb/lbmol
Average Daily Vapor Temperature Range	38.6999	°R	Average Vapor Temperature	537.965	°R
Average Daily Vapor Pressure Range	2.64317	psi	Average Daily Ambient Temperature	529.42	°R
Breather Vent Pressure Setting Range	0.06	psi	Net Working Loss Throughput	184.918	ft^3/yr
Vapor Pressure at Average Daily Liquid Surface Temperature	12.3687	psia	Working Loss Turnover (Saturation) Factor	1	
Average Daily Liquid Surface Temperature	535.276	°R	Number of Turnovers per Year	0.102190	
Average Daily Ambient Temperature Range	26.3	°R	Annual Net Throughput	32.9388	bbl/yr
Tank Roof Surface Solar Absorptance	0.49		Maximum Liquid Height	18	ft
Tank Shell Surface Solar Absorptance	0.49		Minimum Liquid Height	2	ft
Vapor Pressure at Maximum Liquid Surface Temperature	13.7200	psia	Working Loss Product Factor	1	
Vapor Pressure at Minimum Liquid Surface Temperature	11.0768	psia	Vent Setting Correction Factor	1	
Maximum Liquid Surface Temperature	544.951	°R	Annual Net Throughput Per Tank	32.9388	bbl/yr
Minimum Liquid Surface Temperature	525.601	°R			

Results Properties : Scalar Data

Flashing Losses	0.00164351	lb/d	Standing Losses per Tank	0.0160713	lb/d
Working Losses	5.43039E-05	lb/d	Flashing Losses per Tank	0.00164351	lb/d
Standing Losses	0.0160713	lb/d	Working and Standing Losses	0.0161256	lb/d
Working Losses per Tank	5.43039E-05	lb/d	Working and Standing Losses per Tank	0.0161256	lb/d

Results Properties : Tabulated Data

Index	Flashing Losses Mass Flows lb/d	Working Losses Mass Flows lb/d	Standing Losses Mass Flows lb/d	/orking and Standing Losses Mass Flows lb/d
Propane	0.00131932	8.98419E-07	0.000265887	0.000266786
i-Butane	0.000130990	5.92398E-08	1.75320E-05	1.75913E-05
n-Butane	0.000164847	1.04029E-07	3.07875E-05	3.08916E-05
2,2-Dimethylpropane	6.44970E-08	1.81933E-11	5.38432E-09	5.40251E-09
i-Pentane	1.46320E-05	6.25619E-09	1.85152E-06	1.85778E-06
n-Pentane	2.51810E-06	4.69617E-10	1.38983E-07	1.39453E-07
2,2-Dimethylbutane	0	0	0	0
2,3-Dimethylbutane	0	0	0	0
i-C6	0	0	0	0
3-Methylpentane	0	0	0	0
Hexane	2.16416E-07	2.67713E-11	7.92297E-09	7.94974E-09
C7	2.12414E-08	1.86802E-12	5.52841E-10	5.54709E-10
C8	1.07123E-09	4.21542E-14	1.24756E-11	1.25177E-11
C9	0	0	0	0
C10	0	0	0	0
MeOH	1.09092E-05	5.32355E-05	0.0157551	0.0158083

Notes:

APPENDIX B

cimarron
CREATING A CLEANER ENVIRONMENT®

Commercial Proposal

Sonic Flare System

with

The Model XD-1000 Duraspark Retractable Ignition System

Project	Silurian Compressor Station
Customer Name	Ross Group
Customer Location	Williams County, North Dakota
Quote	25727 Rev.0

SILVER 2023 ecovadis Sustainability Rating

Customer: Ross Group

I am pleased to offer the following firm proposal for your consideration for the above referenced application. Thank you for considering Cimarron for this project and we are looking forward to working with you.

Headquartered in Houston, TX, with operations worldwide, we offer products and services with the mission of reducing greenhouse gas emissions for all markets as well as enabling our energy customers to safely and responsibly optimize hydrocarbon production, transportation, processing and storage through best-in-class solutions.

Please contact me if you have any questions or require additional information.

Regards,

Bryan Lunger
Director Product Sales

Mobile: 918-607-3667
blunger@cimarron.com

Jose Wilson Torres Junior
Applications Engineering

Mobile: 918-209-2104
jwilson@cimarron.com

Products and Services

Emissions Control	Oil and Gas Processing	Services
Vapor Recovery Units: • Compression-base: Screw, Vane Compressors, Plunger Lift Pumps • Activated Carbon-based Vapor Recovery Systems **Enclosed Combustion:** • Quad O Combustors (98% DRE), Thermal Oxidizers, Vapor Combustion Units (99.9% DRE), CEB™ (99.99% DRE, low NOx) • Biogas/RNG Combustion Units **Smokeless Flares:** • High Efficiency Assisted (air, steam, gas), Utility, Derrick, Ground Flares, DreamDuo.	**Production and processing:** • Modular Production Packages • Separator • Gas Filtration • Glycol Dehydration • BTEX Eliminators • Gas Production Units • Oil and Gas Heaters • Heater Treaters • Vapor Recovery Towers • Plunger Lift Pumps • Engineering Studies	**Field Services:** • Startup & Maintenance • Spare parts • Lease/Rentals • LDAR Detection • Emissions Consultation **Automation:** • Burner Management Systems • Emissions Control Real-time Monitoring • DRE optimization (DRE-Max™) • Sytelink 360 Optilink

Markets

Upstream: Wellhead Oil and Gas Handling Production equipment, Vapor Recovery, Emissions Reduction and Destruction, Monitoring, Service and Preventative Maintenance
Midstream: Gas Processing applications, Dehydration, Fuel Gas Conditioning, Compressor Station, Service
Downstream: Loading Terminal Vapor Combustors, Carbon Vapor Recovery, Refinery
Expanded Focus Areas for Combustion Applications: Biogas, Agricultural, Landfill, Wastewater Treatment, Coal Mines, Industrial, Aerospace

Need Parts? Call the Cimarron Parts Hotline 800-246-8208

1.0 Commercial

1.1 Base Item Pricing/Delivery

Item	Description	Qty	Price (Total)	Delivery (weeks ARO*)
1-6	Flare - Sonic - VMSA-06 Guyed 30' OAH	1	$ 39,300	14
7	Horizontal Knockout Drum (KODH36x120)	1	$ 39,600	14

1.2 Optional Item Pricing/Delivery

Item	Description	Qty	Price (Total)	Delivery (weeks ARO*)
8	XD-1000 1 Pilot 1YR Spares Kit 120VAC	1	$ 1,500	14
9	XD-1000 1 Pilot 2YR Spares Kit 120VAC	1	$ 3,700	14
10	Pilot Gas Fuel Train	1	$ 1,600	14
11	Deflagration Arrestor RF 6" CSxSST	1	$ 4,300	14

1.3 Price Validity

Mar 2025 Update: Due to tariff uncertainty, proposal validity is 2 weeks.

Freight cost is currently estimated, and final cost is to be actual cost + markup, prior to/at time of shipment.

1.4 Terms / Delivery

Delivery Schedule	
Description	Delivery
Documentation Schedule	See Section 4
Fabrication	14 weeks

Terms
Ex-works: Point of Manufacture, New Castle Oklahoma Online T&Cs Link: https://cimarron.com/terms-and-conditions-v16-16-jan-2025/

Progress Payments (See T&C's in Section 7)	
Description	Percent
Upon Order Acceptance	50%
Upon Notification of Readiness to Ship	50%

Additional Notes

1. The quoted delivery is based upon our current production schedule / shop load. An updated delivery schedule will be available at time of order.
2. If Cimarron does not receive approval for construction within 5 days of initial approval drawing submittal, the production schedule will be subject to change based upon shop load.
3. See section 4.0 for list of approval drawings.
4. ARAD, After Receipt of Approved Drawings, is defined as the date the customer has approved all project specific approval drawings for the products purchased as described in this proposal. The customer is allowed five business days to review drawings after submitted by Cimarron for approval before delivery dates are subject to change.
5. ARO, After Receipt of Order is defined as the date where the order has been accepted by both customer and Cimarron. Quoted Lead Time includes five business days for customer to review drawings after submitted by Cimarron for approval before delivery dates are subject to change.
6. Payment terms are only valid as long as client is approved for credit by Cimarron's financial institution. Three credit references and financial statements may be requested for this purpose.

2.0 Technical

2.1 Process Conditions

Gas Composition	Mole %	Comp BD	Flash Gas	-	Maximum Radiation Permitted	
Oxygen	O_2				Total Radiation	1500 BTU/HR.FT2
Nitrogen	N_2	2.84	1.11		Distance from Flare Base	0 FEET
Air	$N_2 + O_2$				Solar Radiation	300 BTU/HR.FT2
Carbon Dioxide	CO_2	0.84	1		**Site Conditions**	
Water	H_2O	0.01			Ambient Temperature	-22.7 / 98 ° F
Hydrogen	H_2				Elevation (above msl)	2355 FEET
Ammonia	NH_3				Humidity	84 %
Carbon Monoxide	CO				Seismic Classification	Risk Category III Site Class D
Methanol	CH_4O				Exp. / Importance Factor	-
Hydrogen Sulfide	H_2S	2 ppm	2 ppm		Wind Speed for Radiation	20 MPH
Methane	CH_4	65.43	53.07		Wind Speed for Structure	118 MPH
Ethane	C_2H_6	19.08	31.27		**Electrical Classification**	
Propane	C_3H_8	8.57	11.4		Outside Sterile Area	Unclassified
I Butane	C_4H_{10}	0.7	0.58		Inside Sterile Area	Unclassified
N Butane	C_4H_{10}	1.97	1.4		**Utilities Required**	
I Pentane	C_5H_{12}	0.22	0.09		Electricity	Solar
N Pentane	C_5H_{12}	0.27	0.1		Pilot Gas Per Pilot	45 SCFH @ 8-10 PSIG/pilot
Hexane	C_6H_{14}	0.05	0.01		Purge Gas	29 SCFH
Heptane	C_7H_{16}					
Octane	C_8H_{18}					
N-Nonane	C_9H_{20}					
N-Decane	$C_{10}H_{22}$				**Type of Flare**	
Ethylene	C_2H_4				☒ Elevated	☐ Offshore
Propylene	C_3H_6				☐ Bio-Gas	☐ Multi-Point
Butene	IC_4H_8				☐ Enclosed Flare	☐ Horizontal Flare
Butylene	NC_4H_8				☐ Rental	☐ Portable
Pentene	C_5H_{10}				**Support of Structure**	
Cyclopentane	C_5H_{10}				☐ Self-Supported	☐ Derrick Supported
Methylcyclopentane	C_6H_{12}				☒ Guyed	☐ Boom Flare
Cyclohexane	C_6H_{12}				**Flame Monitoring System**	
Methylcyclohexane	C_6H_6				☒ Thermocouple	☐ Infra-Red Monitor
Cycloheptane	C_7H_{14}				☐ Ionization Rod	☐ Ultraviolet Monitor
Acetylene	C_2H_2				**Ignition System Features**	
1,2 Butadiene	C_4H_6				☒ Automatic	☒ Manual
1,3 Butadiene	C_4H_6				☒ Electric Spark	☒ Retractable
Benzene	C_6H_6				☐ Flame Front Generator	☐ Self-Inspirating
Toluene	C_7H_8				**Method of Smoke Elimination**	
Styrene	C_8H_8				☐ Steam Assisted	☐ Air Assisted
Max Mass Flow Rate	lb/hr	14,128	856		☒ Sonic Flaring	☐ None
Max Vol. Flow Rate	m				Destruction Efficiency Required > 98%	
Gas Temperature	° F	84	16		**Accessories**	
Required Pressure	psig	50	50		☐ Liquid Seal	☒ Knock-Out Drum
Molecular Weight	-	23.14	24.98		☐ PLC	☒ Deflagration Arrestor
Lower Heating Value	Btu/scf	1204	1319		☐ Molecular Seal	☐ Ladders /Platforms
Smokeless Flow*	%	100	100		☐ Export Packing	☐ ACWL

2.2 Technical Specifications

2.2.1 Base Scope of Supply

Item	Qty	Description
1	1	**VMSA-06 Sonic Flare Tip** • 4 feet x 6 inch Tip • Spring-Actuated, Variable Crown Design • Ultra-Low Radiation Design • 6 inch x 150# RF CS Mating Flange • Tip Material - 304 Stainless Steel

2	1	**26 Foot x 6 Inch (30 ft Total Height) Guyed Flare Riser**
		• 26 feet x 6 inch Main Waste Gas Riser
		  • 6 inch x 150# RFWN Flange Inlet Connection
		  • Inlet Height: 9'-0"
		  • Guywire Eyelet Assembly
		  • Base Plate Assembly
		• Material – API-5LB, A-53B and A-36 Carbon Steel
		• Cimarron Standard On-Shore Paint System

3	1	**XD-1000 Pilot**
		• 24 VDC Power Default (Solar)
		• Continuous Spark & Constant Flame Pilot
		• Fully Retractable to Grade for Ease of Maintenance
		• High Energy Spark Type Pilot
		• Type K Thermocouple (Dual Element)
		• Transformer Enclosure Located at Grade
		• Materials of Construction
		  • Ignitor Head – 310 Stainless Steel
		  • Body – 316 Stainless Steel
		  • Transformer Enclosure – 304 Stainless Steel

4	1	**ARC Control System: (See description below)** • • NEMA 4X Weatherproof Controls Enclosure with UL Certification • • Alarm and Pilot Status Outputs • • Auto-Ignition and temperature monitoring • • Opti Link 1000 Included with a Free 3 month Trial • • Self-Supporting Control Panel Stand for Weatherproof Enclosure
5	1	**Complete Guy-wire Package** • All Required Hardware • Soil Anchors Included
6	1	**Retractability Package for 30 ft Flare** • Allows Pilot to be Maintained from Grade Level • Electrical Wiring Harness with Pilot Gas Hose • Track Assembly • Manual Winch & Pulley Assembly • Winch Cable

7 **1** **HP Independent Horizontal Knockout Drum (KODH36x120):**

- 10 Feet S/S X 36 Inch Diameter
- Horizontal Style With Saddles
- Lift Lugs
- Inlet Deflector and Outlet Diverter
- Rating – per customer vessel data sheet
- 20" Manway Davit
- ASME SEC VIII DIV. 1 Design (Code Stamp)
- 6 INCH X 150#, RF Inlet Nozzle
- 6 INCH X 150#, RF Outlet Nozzle
- 1 Inch 3000# Drain Connection
- 1 Inch 3000# Connection for Relief Valve
- 2 Inch 3000# Liquid Outlet
- 2 Inch 3000# Connection for Level Controller
- 2 Inch 3000# Connection for Level Switch
- (2) 1/2 Inch 3000# Connections for Gauge Glass
- 3/4 Inch 3000# Connection for Temperature Indicator
- 1/2 Inch 3000# Connection for Pressure Indicator
- KOD Material: SA-516-70, SA-105, SA-106B
- Cimarron Standard Paint System

ARControl™ BMS Pilot Control System Option	ARCPilot

ARControl™ Flare XD-1000 Pilot Control Upgrade
• Option upgrades legacy XC-1000 pilot control system with ARC BMS with Flare Firmware. • Includes all necessary modifications for seamless plug and play: j-box, retractability, and wiring. • Increase controller capabilities through firmware upgrades, no need to purchase a new model. • Fully automated direct spark ignition with flame sensing capability for 2 pilots with one ARC box. • Customer PLC compatibility through Modbus RS-485/SCADA communications with data logging capability. • 12 / 24 VDC solar/pilot control valve options available. • Class I Div 1 & Class I Div 2 approved configurations available. For Class 1 Div 1 classifications, controller to be mounted outside classified area using remote stand.

Flare Firmware Features:
Auto-Ignition
Advanced Data Logging
Modbus RTU over RS-485
Temperature Monitoring
Two Pilot Control Capability

Included

Description
ARController BMS with Flare Firmware
Ignitor and Install Kit
ARControl Solar Package 24VDC 180W - PN 150906


ARCONTROL™
DUAL FLARE PILOT CONTROL
This advanced auto-reignition system with flame sensing capability will control up to 2 pilots and keep your equipment environmentally compliant.
QUALITY STANDARD
The ARControl system is proudly manufactured in the USA at our Wheat Ridge, CO facility. Our staff of experienced engineers oversees the design, manufacturing and testing of each product, giving ARControl unrivaled oversight.
STARTUP AND SERVICE
Technical Support
Installation and Setup
Maintenance Application
Support Hardware Support
Guaranteed Warranty
ARCONTROL™ FLARE
more than just...
A DUAL PILOT FLARE CONTROLLER
ARControl™ is proud to introduce our Dual Pilot Flare Controller product firmware:
Up to two high-energy ignition outputs
Up to two hot surface ignition outputs
Dual pilot valve control
Easily navigable user interface
User configurable settings
Alarm and dual pilot status outputs
Modbus RTU over RS-485
Permissive input
Temperature flame detection
Data logging
Integrated solar charging
12 or 24 VDC
-40°C to +60°C (-40°F to +140°F)
Nema 4x Enclosure
ARControl Flare (Dual Pilot Flare Controller) provides automatic electronic or hot surface ignition for two flare pilots.
Utilizing thermocouple temperature flame sensing, ARControl Flare (Dual Pilot Flare Controller) is sure to safely ignite and maintain a pilot flame. Dual pilot valve outputs allow for pilot gas shutdown.
Alarm and dual pilot status outputs, Modbus communication, and data logging ensure that the status of equipment is easily and always known.
Made in USA.

Optilink 1000	PN: 1960-176

A Smart Flare or Combustor with Integrated Continuous Monitoring

- The Cimarron Smart Flare or Combustor is a standalone system that can eliminate fugitive emissions while continuously monitoring its performance.
- Cimarron Smart Flares and Combustors were designed with a control efficiency of 98%+.
- The Cimarron Smart Flare or Combustor is equipped with continuous pilot with pilot auto-reignition (BMS).
- The Cimarron Smart Flare or Combustor is equipped with a thermocouple for flame detection and it monitors the pilot status with digital records saved every 5 minutes or less
- The Cimarron Smart Flare or Combustor is flowmeter ready. An inlet gas flowmeter can be installed, and flow rates monitored and recorded through the Smart Flare. Alerts can be sent for out-of-range flow rates.
- The Cimarron Smart Air-Assisted Flare can use the information of the flowmeters to automatically adjust the VFD frequency and adjust the amount of air mixed with the inlet gas to prevent smoking and venting through overaeration.
- The Cimarron Smart Smart Flare or Combustor can monitor and send alerts to company control room and/or to the cloud for performance monitoring with actionable intelligence.
- Optilink 1000 units have 8 4-20mAmp analog and digital inputs, 2 RS485 Ports, and flexible programmable behavior environments that allow interoperability with boundless applications.
- All monitored data saved on secured Cimarron data cloud storage solution (redundant data storage).
- Performance guarantee requires Preventive Maintenance (PM monthly or quarterly).

Remote Management When You Need It

- Operational and maintenance alerts sent to mobile device or emails giving you latest status when you need it. Temperature and run time status reports sent in a periodicity you can set.
- If you need additional help with any technical matters, rest assured that our advanced remote monitoring and diagnostics capabilities enable us to identify and resolve any problems you may be experiencing quickly. This often eliminates the need for an on-site technician visit.
- Our experienced support team has the ability to monitor your connected devices, identify any that may be malfunctioning, and guide you through a speedy resolution process. We also perform a wide range of diagnostics to ensure you receive optimal service.

OOOOb and OOOOc compliance guarantee

- For emissions control and reduction to become an integral component of a sustainability strategy, it is crucial that your combustor and other emissions control equipment consistently operate at the intended level of performance and compliance, with credible supporting data.
- Cimarron's Sytelink360® Real Time Data Monitoring solution combines software, hardware, and field services support and provides customers with data feeds that enable equipment optimization, data quantification, performance guarantees, and emissions remote monitoring and management.
- Sytelink360® can operate on a standalone basis or as a complement to customers' systems, regulatory compliance, and sustainability programs to provide accurate and reliable data sets that increase production, reduce labor time, lower incident risk, and mitigate hazardous gas emissions.

	Optilink 1000
voltage operation	12 or 24VDC
ON/OFF switch	Yes
licator	RGB LED
	Polycarbonate, Door
	Pole or wall mount
uple input	1 dedicated k-type thermocouple
put channels	8 galvanically isolated 4-20mA
ut channels	8 galvanically isolated digital input
tput	1 galvanically isolated
ts (MODBUS client)	2 Galvanically isolated
toring input voltage and current draw	Yes
datalogging	Yes
er support for cellular network	Yes
rboard	Yes

2.2.2 Optional Items

Item	Qty	Description
8	**1**	**Lot of Spare Parts for Commissioning** • Please see Table 2.4
9	**1**	**Lot of Spare Parts for 2-Year Operation** • Please see Table 2.4
10	**1**	**Pilot Gas Valve Train** • Aluminum Body Regulator • Ball Valve and Strainer • Pressure Gauge
11	**1**	**6" Deflagration Arrestor (Protego)** • Carbon Steel Housing / Stainless Steel Internals • Eccentric Design • 6" Flanged Connections for In-line Installation • To be Installed at Inlet Nozzle • Any Deflagration Arrestor Pressure Drop shall be Additive to the Flare System Pressure Drop

2.3 Shipping Details

☒ Inland Freight Packing
☐ Export Packing *

*Export packing and crating includes wooden box for flare tip and pilots suitable for sea / air freight. Export packing not applicable for non-technology items like flare stacks, structures, service piping and skids.

Shipping Notes:

1. All weights and dimensions are approximate for logistic purpose only. Actual weights and dimensions can be provided during detail engineering.
2. Sourcing locations are as indicated.
3. Flare tip and pilots will be packed in common wooden box.

2.4 Recommended Spares List

ARC-BMS Control System			
No.	**Description**	**Start-Up**	**2 Years**
1	Module, BMS, CL1, DIV1, CSA Certified	0	1
2	Spark, Rod, Assy, 90-1/2", Duraspark	1	2
3	Thermocouple, Dual, Type-K,1/4"OD	1	1
4	Inspirator, 1", CK20, #53, Natural, Gas	0	1
Model XD-1000 Pilot			
5	Pilot Strainer - 1/2" THD SS, MUL	0	1
6	Connector, Male, 5/8" Tube x 3/4" MNPT	0	1
7	Connector, Male, 5/8" Tube x 1/2" MNPT	0	1
8	Ignition Transformer, Pri. 120VAC, Sec 10KVDC	0	1
9	Spark Rod Assembly 90 1/2"	0	1
10	Thermocouple, Type KK, Dual Ele. 1/4" x 116"	1	2
11	Ceramic Thermocouple Connector (Male)	1	2
12	Ceramic Thermocouple Connector (Female)	1	2
13	Pilot Inspirator	0	1

3.0 Scope Responsibility Matrix

Cimarron considers the following responsibility matrix for the scope of supply listed in Section 2 of this proposal.

No.	Description	Cimarron	Customer	Remarks
	SITE WORK / ASSEMBLY			
1	Flare Tip Installation		X	
2	Flare Riser Installation		X	
3	Area Lighting		X	
4	Heat Tracing (If applicable)	N/A	N/A	
5	Erection & Installation		X	
6	Civil work including foundation and anchor bolts		X	
7	Guywires Installation		X	
8	Emission Testing	N/A	N/A	
	FABRICATED EQUIPMENT & ENGINEERING			
9	Flare Stack	X		
10	Flare Tip	X		
11	Pilot Ignitor Assembly	X		
12	Windshield (If applicable)	N/A		
13	Blower Support Skid (If applicable)	N/A		
14	Blower Ducting (If applicable)	N/A		
15	Ladder and Platform(s)	N/A		
16	Fuel Gas Skid (Assembled with Valves & Instruments)	X		
17	Local Control Panel	X		
18	Stack Junction Box	X		
19	Skid Junction Box	N/A		
20	Surface Preparation and Painting	X		Cimarron Standard
21	Interconnecting piping from Skid to Stack		X	
22	Interconnect wiring from J-boxes to Panel		X	
23	Instrument Air from Fuel Control rack to equipment		X	
24	Waste gas piping upstream of Flare Stack Inlet		X	
25	Utility piping on Flare Stack	N/A		
26	Power Supply		X	
27	Power and Multi Core Cables		X	
28	Cables from Control Panel to DCS		X	

Note: Any responsibility not addressed in the above matrix is not included in this proposal unless specifically addressed in scope of supply

4.0 Documentation

Cimarron considered only the following correspondence, documents, or specifications in development of proposed solution as presented in section 2. Any documents, specifications, or correspondence not listed below were not considered in this proposal. Exceptions or clarifications are noted below.

4.1 Quality/ Non-Destructive Testing

Cimarron will conduct the following quality checks/tests on the equipment on this project:

No.	Type	Included	Extent	Notes
1	Visual Inspection	Yes	Complete Package	
2	Dimensional Check	Yes	Complete Package	
3	Factory Acceptance Test	Yes	Complete Package	
4	Dry Film Thickness	Yes	Painted Carbon Steel only	
5	Radiography	Yes	10% for Stack, 100% on buttwelds piping	
6	Dye Penetrant Examination**	No	☐ Lifting lug welds (Standard) ☐ Other (specify --->)	
7	Ultrasonic Testing**	No	☐ Lifting lugs material (Standard) ☐ Other (specify --->)	
8	Magnetic Particle Examination**	No	☐ Lifting lug welds ONLY (Standard) ☐ Other welds (specify --->)	
9	Hydrostatic Testing	No	1.3x MAWP for Pressure Vessels 1.5x MAWP for ASME Code Welded piping ☐ 30 Minutes (Standard) ☐ Other (specify --->)	Threaded piping gets a pneumatic test (See No. 10)
10	Pneumatic Testing* Per ASME B31.3 para 345.8	No	10psig for 15 min for process piping, 10psig for 15 min for utility piping	
11	Pneumatic Testing	Yes	10psig for 15 min for process piping, 10psig for 15 min for utility piping	Pilot gas train Only
12	Hardness / Impact Testing**	No	Welds (Standard) ☐ Raw Material	
13	PMI (XRF Method)**	No	☐ Raw Material ☐ Weld (PMI Weld Map included)	
14	Pickling and Passivation**	No	☐ SS Tip + SS-SS welds ☐ SS Pilot + SS-SS welds ☐ SS Vessel + SS-SS welds ☐ SS Piping + SS-SS welds	
15	Material Test Reports	No	☐ ASME pressure vessel – All Pressure Retaining Components ☐ ASME Piping – Pressure retaining parts ☐ Non-Code piping ☐ Valve bodies ☐ Thermowells ☐ Structural material ☐ Instrument bodies No MTRs provided for fasteners and gaskets.	☐ Heat numbers reference only. ☐ Heat numbers reference + Drawing label identification index by part.

* Performed in assembled state as a complete package where possible.
** Cimarron hires third party specialized contractors. Contractor report, approved by Cimarron QC will be provided.

4.2 Engineering, Project Documentation, Manufacturer's Record Book (MRB)

Cimarron will provide the following engineering and documentation along with the equipment on this project. Manufacturer's Record Book (MRB) will include the items checked "☒ **= Yes**" below:

No.	Type	Customer Review Type	Included in MRB?	Notes
	Drawings, valve/instrument, and controls information			
1.	Piping And Instrumentation Diagram	Information only	☐ Std.	
2.	General Arrangement Drawing	Information only	☐ Std.	
3.	Control Panel Layout	Information only	☐ Std.	
4.	Control Panel Wiring Diagrams	Information only	☐ Std.	
5.	Instrumentation OEM Brochures & Cut Sheets	-	☐ Std.	
6.	Instrument Data Sheets **(Data sheet offered per Cimarron standard template)**	-	☐	
	Analytical study reports			
7.	ASME Code Calculations (Pressure Vessels Only)	-	☐ Std.	
8.	Structural analysis report	-	☐	
9.	Wind analysis report	-	☐	
10.	Lifting Analysis report	-	☐	
11.	Seismic Analysis report	-	☐	
	Quality documentation			
12.	Certificate of Conformance	-	☐ Std.	
13.	ASME Pressure Vessels U1A package	-	☐ Std.	
14.	Inspection and Testing plan (ITP)	-	☐	
15.	Welding Data (WPS/PQRs)	-	☐	
16.	Welder Qualification Records - ASME Code welding	-	☐	
17.	Welder Qualification Records – Structural welding	-	☐	
18.	Weld Maps	-	☐	
19.	Quality Manual	-	☐	
20.	Applicable NDE Procedures	-	☐	
	Non-Destruction Examination Records			
21.	Visual Inspection report[1]	Information only	☐ Std.	
22.	Paint Dry Film Thickness report[1]	Information only	☐ Std.	
23.	ASME Pressure Vessel NDE Report	-	☐	
24.	Material Test Reports (MTRs)	-	☐	See 4.1.14 Above

[1] Provided in Cimarron's iForm or other internal formats.

25.	Hydrostatic Test report	-	☐	
26.	Pneumatic Test report	Information only	☐	
27.	Factory Acceptance Test report	Information only	☐	
28.	Radiography report[2]	-	☐	
29.	Dye Penetrant Examination report[2]	-	☐	
30.	Ultrasonic Testing report[2]	-	☐	
31.	Magnetic Particle Examination report[2]	-	☐	
32.	Hardness / Impact Testing report[2]	-	☐	
33.	Positive Material Identification (PMI) report[2]	-	☐	
34.	Pickling and Passivation report[2]	-	☐	
	Operating Manual			
35.	Operating & Maintenance (O&M) Manual	Information only	☐ Std.	
36.	Control Narrative **(Cimarron standard template for Process Controls in Cimarron Scope of Supply only)**		☐	
37.	Cause & Effect Diagrams **(Cimarron standard template for Process Controls in Cimarron Scope of Supply only)**		☐	

[2] Cimarron hires third party specialized contractors. Contractor report, approved by Cimarron QC will be provided.

5.0 Specifications & Clarifications

5.1 Project Specifications

Cimarron proposal is based on the documents and specifications as listed below which define our proposal requirements for the material, fabrication, testing and inspection of the equipment, except as specifically stated or otherwise clarified in our proposal.

Only the documents/specifications listed below were considered in the proposal preparation. Cross-referenced documents are not considered.

No.	Description	Document No	Rev No.
1	06904.28 F-9000 Flare Datasheet Rev A	-	A
2	06904.28 V-9001 (Flare KOD) Rev A	-	A

5.2 Custom Clarifications

1. None at this time.

5.3 Standard Clarifications

5.3.1 Technical Clarifications

- **Cimarron Standard Paint Clarifications:** On equipment quoted with Cimarron standard paint specifications (CIM-ENG-MECH-001 Rev. 6), the following clarifications are noted:
  - Standard top coat: SW Polane 8890, Color: Enviro Green
  - Standard primer coat: SW 2.8 Epoxy Primer
  - Standard prep/paint: SSPC-SP3
  - The following surfaces shall not be coated or painted, unless otherwise specified: Porcelain, Gauge glasses, Meter faces, Valve stem and threads, Stainless Steel Nameplates, Aluminum and Stainless steel, Insulation or fireproofing, Galvanized steel and Concrete, transit, masonry, stucco, etc.
  - Factory finished equipment, including compressors, pumps, control valves, etc., will keep manufacturer standard coating unless otherwise specified
  - Touch-up paint for any damage to the equipment finish that may occur during shipment or installation is excluded from the scope of supply and pricing. Repair or application of touch-up paint is the responsibility of others unless stated otherwise in this proposal.
  - Painting or coating for stainless steel, internal surfaces of equipment, or galvanized equipment is excluded.
- **Code Clarifications:**
  - Cimarron uses welding processes that produce high quality welds with the metallurgical properties required for Cimarron Energy Systems fabricated equipment. Cimarron weld procedures and welders are qualified in accordance with A.S.M.E. Section IX. Qualifications to other codes and standards have not been considered. Cimarron standard weld procedures apply to our equipment, unless otherwise stated in our proposal. Any request to alter or modify our current weld

procedures based upon clients' internal specifications is currently excluded from our scope of supply. If new procedures are requested by the client, price and delivery impact will apply.
    - Pressure vessels with MAWP in excess of 15psig are designed and fabricated in compliance with ASME Boiler Pressure Vessel Code, Sect VIII Division 1. Piping is designed and fabricated in compliance with ASME B31.3 Process Piping code.
- **Drawings & Documentation:**
    - Plot Plan: Cimarron requests a site plan or layout prior to submission for GA approval to optimize connection and piping orientations.
    - Preliminary Weights: Weights listed on drawings are for reference only and are not 100% accurate, as the weight of the welds required for that specific design are not included in the weights listed on drawings.
    - Proprietary Documentation: Fabrication drawings and proprietary calculations are excluded.
- **Electrical:**
    - Interconnect Wire & Piping: No interconnecting piping, wire, or conduit is included between proposed equipment, unless otherwise indicated in the scope of work section of proposal.
    - PLC Program: If a PLC is provided with this project, the programming is the proprietary property of Cimarron and will remain in the sole ownership of Cimarron.
- **Installation:**
    - Unless specifically listed in scope of supply, installation of equipment, including supply of cranes and/or personnel is excluded. General installation instructions and assembly drawings can be provided in the Installation and Operations Manual (IOM).
    - Bolt kits at battery limit flanged connections are excluded. These can be provided upon request.
- **Material Certifications:** Material certifications as per BSEN 10204, 3.2 (formerly 3.1a and 3.1c) are excluded.
- **Structural Design:**
    - Civil Requirements: Unless specifically requested and addressed as compliant within this proposal, it is under the responsibility of the end user to determine compliance of any Cimarron supplied concrete blocks, pads, or slabs for the end user's specific civil requirements. Civil and foundation design for any equipment including anchor bolts or nuts, design of anchor bolt length or projection are excluded as this is part of civil engineering foundation design.
    - Codes: Unless otherwise noted in this proposal, Cimarron uses the following structural codes in the design of this equipment. Customer specific structural studies and design can be accommodated upon request but may result in price/delivery impact.
        - General structural design standards shall be AISC 360-16.
        - Wind design criteria shall be done in accordance with ASCE 7-16.
        - Fatigue criteria shall be done in accordance with AISC 360-16.
        - Seismic criteria shall be done in accordance with IBC 2021/2018.
    - External Loads: This design is exclusive of all external loadings due to piping or ducting. Wind, seismic and temperature loadings have been considered.
    - Guywire: Deadman design and any additional hardware not listed in the scope of supply is excluded.
    - Deflection: Standard deflection criterion for guyed stacks is L/100 and for self-supported stacks and derricks is L/133. No other deflection criteria are applicable.
    - Special Tools: Special tools, such as Spreader Bars for lifting, are not included in the scope of supply, unless specifically listed.

5.3.2 Project Clarifications

- **Engineering & Design Deliverables:**
    - All datasheets, process calculations, drawings, and any other engineering deliverables will be provided in Cimarron's standard format (e.g., cover sheets, title blocks, drawing symbols, datasheet formatting, etc.) unless noted otherwise in this proposal. Pricing for using CUSTOMER or End User's formatting for documentation has not been considered. If customer specified drawing

or document format is required to be used by Cimarron, additional engineering and administration fees will be assessed. Doing so will also impact to the project schedule. A "change order" will be provided to the customer with those details upon such request.Drawing and Deliverable Review Cycle:

- Schedule includes a client review period not to exceed 1 week after submission of a document agreed upon to be submitted for approval. If Cimarron does not receive approval for construction within 1 week of initial approval drawing submittal, the production schedule will be subject to change based on shop load and change impact. Cimarron reserves the right to levy reasonable disruption charges to the customer which will include engineering, project management hours as a minimum if no procurement has been initiated.
- Approval drawings are sent to the customer with the exclusive intent of communicating the scope of supply included in the proposal and provide information such as mechanical and electrical tie points to the customer. Cimarron reserves the right to address comments received that seek to modify the scope of supply and those that are not related to the scope of supply separately with a "change order."
- All reviews, approvals, and other interface are to be directly with CUSTOMER for the scope of this proposal. If CUSTOMER is acting on the behalf of an end-user, all discussions, support, and assistance with end-user are under CUSTOMER scope. Cimarron can provide technical assistance not included within the scope of this proposal for an additional fee.
- For reviews returned by CUSTOMER as "Approved as Noted", "Approved with Comments", or "Reviewed", CUSTOMER understands that Cimarron will commence manufacturing and sourcing of approved scope not affected by open comments. Cimarron to provide final approved document to CUSTOMER assuming there is no further clarification required. The approval cycle will be defined as complete once Cimarron has returned the final approved document to the customer for information only.
- For reviews returned by CUSTOMER with the words "Rejected" or "Pending", Cimarron will address clarifications with the customer and submit a revised document for approval. This will commence an additional approval cycle.

- If Cimarron has included a preliminary project schedule within or attached to this proposal, the schedule assumes parallel pathing fabrication drawings and long lead material procurement to compress where possible by allowing 1 cycle of approvals between CUSTOMER and Cimarron within the time allotted. Delivery subject to change if assumptions made are not complied to by CUSTOMER. The dates shown in the Project Schedule in are preliminary and subject to change depending on date of Cimarron's acceptance of the PO. However, the indicated durations in the Project Schedule still apply. A revised project schedule will be submitted prior to an officially scheduled kick-off meeting.

- **Free Issued Scope:**
  - In the event CUSTOMER is to free issue scope that is designed or engineered by Cimarron, the following protocol is in effect:
    - Cimarron supplies CUSTOMER with fab level drawings or specifications where applicable.
    - CUSTOMER receives approval from end user where applicable.
    - CUSTOMER procures or fabricates their scope as applicable above. Cimarron assists CUSTOMER with any questions or issues experienced during fabrication. Cimarron does not interface directly with the fabricator.
    - CUSTOMER will supply final end product to Cimarron within time specified in approved project schedule. CUSTOMER responsible for any cost or delivery impact to end user resulting from any issues not under Cimarron's responsibility under CUSTOMER scope.
    - Cimarron has authority to reject equipment supplied by CUSTOMER if it does not fall within Cimarron specification or Cimarron quality standards. Rework, delivery impact, or any other cost impact experienced if supplied scope not in compliance within Cimarron supplied fabrication drawings under CUSTOMER responsibility.

        - Any deviations to drawings/specifications supplied to CUSTOMER for CUSTOMER supplied scope require Cimarron approval.
- **Order of Precedence:**
    - In the event there is a redundancy or inconsistency between any documents attached, referred to, or appended to this proposal, the scope included in this proposal takes overall precedent.
- **Start-Up and Testing Support:**
    - Unless specifically noted, any HAZOP assistance beyond the agreed upon engineering deliverables provided in the scope is not included in the price of this proposal.
    - Any on-site supervision/start-up test and training offered in this proposal is subject to the following clarifications:
        - Customer to supply date for site supervision/Startup to occur. Cimarron to agree on date. After time allotted in the proposal expires, Cimarron will begin charging day rates, regardless of delays or issues experienced outside of Cimarrons control or responsibility. Startup and site supervision is independent of any warranty claims.
    - Offloading and installation of the equipment at the site is not within Cimarron's Scope of Work unless specifically noted in this proposal.
    - Field or emission testing of the unit is not within Cimarron's Scope of Work unless specifically noted in this proposal.
    - Client to schedule Cimarron technician onsite prior to emission test and an engineering test is required to fine tune the equipment.
- **Technical Scope Changes:**
    - All scope change requests made by Customer will be addressed with a "change order." Based on the nature of change requested, Cimarron reserves the right to charge a minimum assessment fee of 8 hours of engineering/project management to evaluate the impact of the request. An exact estimate will be provided to the customer to approve prior to proceeding.
    - A "change order" is defined as a document Cimarron uses to handle changes to the contract. Such document may be used to change any portion of the contract and must be approved by both parties. Unless exclusively noted, all prior agreed upon terms and conditions apply.

6.0 Domestic Field Service rates

Field services rates are not included in base offer. Same shall be chargeable extra at per diem rates as per below details:

Permian/Delaware Field Service Rates (Regular time)	
Field Tech	$155.00
Automation/Lead Tech	$165.00
Mid-Con Service Rates (Regular time)	
Field Tech	$121.00
Lead Tech	$135.00
VRU Tech	$150.00
Automation Tech	$155.00
North East Service Rates (Regular time)	
Field/I&E Tech	$150.00
Rockies Service Rates (Regular time)	
Field Tech	$125.00
Bakken Service Rates (Regular time)	
Field Tech	$145.00
Travel & Per Diem Rates	
Mileage	$1.75 / mile
Overnight	$250.00 / night or Cost+10% GM whichever is greater
IQR Emissions Services (LDAR)	
Direct Measurement (Per test)	$2,000.00
DI&M (Per Hour)	$140.00
H2S Service (Per location)	$200.00
Gas Analysis (per sample)	$350.00

Field Service Rate Clarifications

- **Payment**: All rates are in U.S. Dollars and are exclusive of applicable taxes
- **Regular Time:** Monday through Friday excluding U.S. holidays; between the hours of 7:00 AM to 4:00 PM
- **Overtime Time:** Work in excess of eight (8) hours per day and Saturday. Rates are 1.5x regular time rates.
- **Premium Time**: Sunday and U.S. Holidays. Rates are 2.0x regular time rates.
- **Standby Time**: Charged at applicable rate. Includes waiting on transportation, parts or materials, and delays by customer
- **Travel Time:** Charged at the applicable service rate or actual cost + 10% GM.
- **After Hours Call-Out**: A minimum of four (4) hours will be charged at the applicable service rate
- **Mileage & Hot Shot**: A fee of $1.50 per mile will be charged for the use of Cimarron Energy' service trucks. A fee of $2.25 per mile will be charged for the use of Cimarron Energy' F-550 service trucks. Hotshot will be charged at applicable travel rate.
- **Environmental:** Customer is responsible for proper disposal of all waste generated at the site. If requested, Cimarron will administer proper disposal of waste generated in accordance with applicable regulations at actual cost + 30% GM.
- **Freight & Transport:** Freight and handling charges for parts or equipment and other third-party services provided by Cimarron will be invoiced at cost + 10% GM Services
- **Parts and Materials:** Invoiced at the greater of replacement cost or Cimarron's list price unless otherwise quoted
- **Third Party Services:** Invoiced at actual cost + 10% GM.
- **Rate Validity**: Rates are subject to change without notice
- **Fuel Surcharge**: Up to 3% surcharge applied to all field tickets based on National Fuel Averages
    - Up to $3.50: 1% / $3.51 to $4.00: 2% / $4.01 and up: 3%

VHP - L7044GSI S5

Gas Compression

ENGINE SPEED (rpm):	1200	NOx SELECTION (g/bhp-hr):	Customer Catalyst
DISPLACEMENT (in3):	7040	COOLING SYSTEM:	JW, IC + OC
COMPRESSION RATIO:	9.7:1	INTERCOOLER WATER INLET (°F):	130
IGNITION SYSTEM:	ESM2	JACKET WATER OUTLET (°F):	180
EXHAUST MANIFOLD:	Water Cooled	JACKET WATER CAPACITY (gal):	100
COMBUSTION:	Rich Burn, Turbocharged	AUXILIARY WATER CAPACITY (gal):	11
ENGINE DRY WEIGHT (lbs):	24250	LUBE OIL CAPACITY (gal):	190
AIR/FUEL RATIO SETTING:	0.38% CO	MAX. EXHAUST BACKPRESSURE (in. H2O):	20
ENGINE SOUND LEVEL (dBA)	105	MAX. AIR INLET RESTRICTION (in. H2O):	15
IGNITION TIMING:	ESM2 Controlled	EXHAUST SOUND LEVEL (dBA)	113

SITE CONDITIONS:

FUEL:		ALTITUDE (ft):	2500
FUEL PRESSURE RANGE (psig):	40 - 60	MAXIMUM INLET AIR TEMPERATURE (°F):	100
FUEL HHV (BTU/ft3):	1,273.8	FUEL WKI:	59.8
FUEL LHV (BTU/ft3):	1,151.5		

SITE SPECIFIC TECHNICAL DATA

			MAX RATING AT 100 °F AIR TEMP	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE OF 100 °F		
POWER RATING	**UNITS**			**100%**	**95%**	**50%**
CONTINUOUS ENGINE POWER	BHP		1900	1900	1805	950
OVERLOAD	% 2/24 hr		0	0	-	-
MECHANICAL EFFICIENCY (LHV)	%		34.2	34.2	34.1	31.7
CONTINUOUS POWER AT FLYWHEEL	BHP		1900	1900	1805	950
based on no auxiliary engine driven equipment						
AVAILABLE TURNDOWN SPEED RANGE	RPM		900 - 1200			
FUEL CONSUMPTION						
FUEL CONSUMPTION (LHV)	BTU/BHP-hr		7457	7457	7474	8032
FUEL CONSUMPTION (HHV)	BTU/BHP-hr		8249	8249	8268	8885
FUEL FLOW *based on fuel analysis LHV*	SCFM		205	205	195	110
HEAT REJECTION						
JACKET WATER (JW)	BTU/hr x 1000		3873	3873	3717	2291
LUBE OIL (OC)	BTU/hr x 1000		498	498	491	403
INTERCOOLER (IC)	BTU/hr x 1000		730	730	660	150
EXHAUST	BTU/hr x 1000		3893	3893	3685	1975
RADIATION	BTU/hr x 1000		613	613	605	544
EMISSIONS (ENGINE OUT):						
NOx (NO + NO2)	g/bhp-hr		11.7	11.7	12.1	13.7
CO	g/bhp-hr		9.8	9.8	9.7	9.9
THC	g/bhp-hr		0.3	0.3	0.3	0.7
NMHC	g/bhp-hr		0.122	0.122	0.138	0.311
NM,NEHC (VOC)	g/bhp-hr		0.049	0.049	0.056	0.125
CO2	g/bhp-hr		480	480	481	517
CO2e (Methane GWP: 25)	g/bhp-hr		484	484	485	526
CH2O	g/bhp-hr		0.050	0.050	0.050	0.050
CH4	g/bhp-hr		0.14	0.14	0.16	0.35
AIR INTAKE / EXHAUST GAS						
INDUCTION AIR FLOW	SCFM		2652	2652	2524	1429
EXHAUST GAS MASS FLOW	lb/hr		12328	12328	11737	6643
EXHAUST GAS FLOW *at exhaust temp, 14.5 psia*	ACFM		8783	8783	8331	4538
EXHAUST TEMPERATURE	°F		1143	1143	1137	1077

HEAT EXCHANGER SIZING[12]			
TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000		4392
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000		1393

COOLING SYSTEM WITH ENGINE MOUNTED WATER PUMPS		
JACKET WATER PUMP MIN. DESIGN FLOW	GPM	450
JACKET WATER PUMP MAX. EXTERNAL RESTRICTION	psig	16
AUX WATER PUMP MIN. DESIGN FLOW	GPM	79
AUX WATER PUMP MAX. EXTERNAL RESTRICTION	psig	36

All data provided per the condtions listed in the notes section on page three.

Data Generated by EngCalc Program Version 5.0 INNIO Waukesha Gas Engines, Inc.

7/8/2024 9:24 AM

VHP - L7044GSI S5

Gas Compression

FUEL COMPOSITION

HYDROCARBONS:		Mole or Volume %
Methane	CH4	69.24
Ethane	C2H6	19.311
Propane	C3H8	6.875
Iso-Butane	I-C4H10	0.456
Normal Butane	N-C4H10	0.911
Iso-Pentane	I-C5H12	0.056
Normal Pentane	N-C5H12	0.052
Hexane	C6H14	0.015
Heptane	C7H16	0
Ethene	C2H4	0
Propene	C3H6	0
	SUM HYDROCARBONS	96.916
NON-HYDROCARBONS:		
Nitrogen	N2	2.173
Oxygen	O2	0
Helium	He	0
Carbon Dioxide	CO2	0.912
Carbon Monoxide	CO	0
Hydrogen	H2	0
Water Vapor	H2O	0
	TOTAL FUEL	100

FUEL:

FUEL PRESSURE RANGE (psig):	40 - 60
FUEL WKI:	59.8
FUEL SLHV (BTU/ft3):	1131.47
FUEL SLHV (MJ/Nm3):	44.49
FUEL LHV (BTU/ft3):	1151.51
FUEL LHV (MJ/Nm3):	45.28
FUEL HHV (BTU/ft3):	1273.79
FUEL HHV (MJ/Nm3):	50.09
FUEL DENSITY (SG):	0.75

Standard Conditions per ASTM D3588-91 [60°F and 14.696psia] and ISO 6976:1996-02-01[25, V(0;101.325)].
Based on the fuel composition, supply pressure and temperature, liquid hydrocarbons may be present in the fuel. No liquid hydrocarbons are allowed in the fuel. The fuel must not contain any liquid water. Waukesha recommends both of the following:
1) Dew point of the fuel gas to be at least 20°F (11°C) below the measured temperature of the gas at the inlet of the engine fuel regulator.
2) A fuel filter separator to be used on all fuels except commercial quality natural gas.
Refer to the 'Fuel and Lubrication' section of 'Technical Data' or contact the Waukesha Application Engineering Department for additional information on fuels, or LHV and WKI* calculations.
* Trademark of INNIO Waukesha Gas Engines Inc.

FUEL CONTAMINANTS

Total Sulfur Compounds	0	% volume
Total Halogen as Chloride	0	% volume
Total Ammonia	0	% volume
Siloxanes		
Tetramethyl silane	0	% volume
Trimethyl silanol	0	% volume
Hexamethyldisiloxane (L2)	0	% volume
Hexamethylcyclotrisiloxane (D3)	0	% volume
Octamethyltrisiloxane (L3)	0	% volume
Octamethylcyclotetrasiloxane (D4)	0	% volume
Decamethyltetrasiloxane (L4)	0	% volume
Decamethylcyclopentasiloxane (D5)	0	% volume
Dodecamethylpentasiloxane (L5)	0	% volume
Dodecamethylcyclohexasiloxane (D6)	0	% volume
Others	0	% volume

Total Sulfur Compounds	0 µg/BTU
Total Halogen as Chlorid	0 µg/BTU
Total Ammonia	0 µg/BTU
Total Siloxanes (as Si)	0 µg/BTU

Calculated fuel contaminant analysis will depend on the entered fuel composition and selected engine model.

No water or hydrocarbon condensates are allowed in the engine. Requires liquids removal.

NOTES

1. All data is based on engines with standard configurations unless noted otherwise.

2. Power rating is adjusted for fuel, site altitude, and site air inlet temperature, in accordance with ISO 3046/1 with tolerance of ± 3%.

3. Fuel consumption is presented in accordance with ISO 3046/1 with a tolerance of -0 / +5% at maximum rating. Fuel flow calculation based on fuel LHV and fuel consumption with a tolerance of -0/+5 %. For sizing piping and fuel equipment, it is recommended to include the 5% tolerance.

4. Heat rejection tolerances are ± 30% for radiation, and ± 8% for jacket water, lube oil, intercooler, and exhaust energy.

5. Emission levels for engines with Waukesha supplied 3-way catalyst are given at catalyst outlet flange. For all other engine models, emission levels are given at engine exhaust outlet flange prior to any after treatment. Values are based on a new engine operating at indicated site conditions, and adjusted to the specified timing and air/fuel ratio at rated load. Catalyst out emission levels represent emission levels the catalyst is sized to achieve. Manual adjustment may be necessary to achieve compliance as catalyst/engine age. Catalyst-out emission levels are valid for the duration of the engine warranty. Emissions are at an absolute humidity of 75 grains H2O/lb (10.71 g H2O/kg) of dry air. Emission levels may vary subject to instrumentation, measurement, ambient conditions, fuel quality, and engine variation. Engine may require adjustment on-site to meet emission values, which may affect engine performance and heat output. NOx, CO, THC, NMHC, CO2, and CO2e emission levels are listed as a not to exceed limit, all other emission levels are estimated. CO2 emissions based on EPA Federal Register/Vol. 74, No. 209/Friday, October 30, 2009 Rules and Regulations 56398, 56399 (3) Tier 3 Calculation Methodology, Equation C-5.

6. Air flow is based on undried air with a tolerance of ± 7%.

7. Exhaust temperature given at engine exhaust outlet flange with a tolerance of ± 50°F (28°C).

8. Exhaust gas mass flow value is based on a "wet basis" with a tolerance of ± 7%.

9. Inlet air restrictions based on full rated engine load. Exhaust backpressure based on 178.1 PSI BMEP and 1200 RPM. Refer to the engine specification section of Waukesha's standard technical data for more information.

10. Cooling circuit capacity, lube oil capacity, and engine dry weight values are typical.

11. Fuel must conform to Waukesha's "Gaseous Fuel Specification" S7884-7 or most current version. Fuel may require treatment to meet current fuel specification.

12. Heat exchanger sizing values given as the maximum heat rejection of the circuit, with applied tolerances and an additional 5% reserve factor.

13. Fuel volume flow calculation in english units is based on 100% relative humidity of the fuel gas at standard conditions of 60°F and 14.696 psia (29.92 inches of mercury; 101.325 kPa).

14. Fuel volume flow calculation in metric units is based on 100% relative humidity of the fuel gas at a combustion temperature of 25°C and metering conditions of 0°C and 101.325 kPa (14.696 psia; 29.92 inches of mercury). This is expressed as [25, V(0;101.325)].

15. Engine sound data taken with the microphone at 1 m (3.3 ft) from the side of the engine at the approximate front-to-back centerline. Microphone height was at intake manifold level. Engine sound pressure data may be different at front, back and opposite side locations. Exhaust sound data taken with microphone 1 meter (3.3 ft) away and 1 meter (3.3 ft) to the side of the exhaust outlet.

16. Due to variation between test conditions and final site conditions, such as exhaust configuration and background sound level, sound pressure levels under site conditions may be different than those tabulated above.

17. Cooling system design flow is based on minimum allowable cooling system flow. Cooling system maximum external restriction is defined as the allowable restriction at the minimum cooling system flow.

18. Continuous Power Rating: The highest load and speed that can be applied 24 hours per day, seven days per week, 365 days per year except for normal maintenance at indicated ambient reference conditions and fuel. No engine overload power rating is available.

19. emPact emission compliance available for entire range of operable fuels; however, fuel system and/or O2 set point may need to be adjusted in order to maintain compliance. VHP emPact particulate emissions measured as condensable PM2.5 per 40 CFR Part 1065 gravimetric reference method.

20. In cold ambient temperatures, heating of the engine jacket water, lube oil and combustion air may be required. See Waukesha Technical Data.

21. Available Turndown Speed Range refers to the constant torque speed range available. Reduced power may be available at speeds outside of this range. Contact application engineering.

SPECIAL REQUIREMENTS

VHP - L7044GSI S5

Gas Compression

ENGINE SPEED (rpm):	1200	NOx SELECTION (g/bhp-hr):	0.15 NOx 0.30 CO
DISPLACEMENT (in3):	7040	COOLING SYSTEM:	JW, IC + OC
COMPRESSION RATIO:	9.7:1	INTERCOOLER WATER INLET (°F):	130
IGNITION SYSTEM:	ESM2	JACKET WATER OUTLET (°F):	180
EXHAUST MANIFOLD:	Water Cooled	JACKET WATER CAPACITY (gal):	100
COMBUSTION:	Rich Burn, Turbocharged	AUXILIARY WATER CAPACITY (gal):	11
ENGINE DRY WEIGHT (lbs):	24250	LUBE OIL CAPACITY (gal):	190
AIR/FUEL RATIO SETTING:	0.38% CO	MAX. EXHAUST BACKPRESSURE (in. H2O):	20
ENGINE SOUND LEVEL (dBA)	105	MAX. AIR INLET RESTRICTION (in. H2O):	15
IGNITION TIMING:	ESM2 Controlled	EXHAUST SOUND LEVEL (dBA)	113

SITE CONDITIONS:

FUEL:		ALTITUDE (ft):	2500
FUEL PRESSURE RANGE (psig):	40 - 60	MAXIMUM INLET AIR TEMPERATURE (°F):	100
FUEL HHV (BTU/ft3):	1,273.8	FUEL WKI:	59.8
FUEL LHV (BTU/ft3):	1,151.5		

SITE SPECIFIC TECHNICAL DATA

POWER RATING	UNITS		MAX RATING AT 100 °F AIR TEMP	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE OF 100 °F 100%	95%	75%
CONTINUOUS ENGINE POWER	BHP		1900	1900	1805	1425
OVERLOAD	% 2/24 hr		0	0	-	-
MECHANICAL EFFICIENCY (LHV)	%		34.2	34.2	34.1	33.5
CONTINUOUS POWER AT FLYWHEEL	BHP		1900	1900	1805	1425
based on no auxiliary engine driven equipment						
AVAILABLE TURNDOWN SPEED RANGE	RPM		900 - 1200			
FUEL CONSUMPTION						
FUEL CONSUMPTION (LHV)	BTU/BHP-hr		7457	7457	7474	7600
FUEL CONSUMPTION (HHV)	BTU/BHP-hr		8249	8249	8268	8408
FUEL FLOW *based on fuel analysis LHV*	SCFM		205	205	195	157
HEAT REJECTION						
JACKET WATER (JW)	BTU/hr x 1000		3873	3873	3717	3085
LUBE OIL (OC)	BTU/hr x 1000		498	498	491	457
INTERCOOLER (IC)	BTU/hr x 1000		730	730	660	405
EXHAUST	BTU/hr x 1000		3893	3893	3685	2888
RADIATION	BTU/hr x 1000		613	613	605	577
EMISSIONS (CATALYST OUT):						
NOx (NO + NO2)	g/bhp-hr		0.15	0.15	0.15	0.15
CO	g/bhp-hr		0.30	0.30	0.30	0.30
THC	g/bhp-hr		0.18	0.18	0.21	0.31
NMHC	g/bhp-hr		0.043	0.043	0.048	0.073
NM,NEHC (VOC)	g/bhp-hr		0.012	0.012	0.014	0.021
CO2	g/bhp-hr		495	495	496	504
CO2e (Methane GWP: 25)	g/bhp-hr		497	497	499	508
CH2O	g/bhp-hr		0.001	0.001	0.001	0.001
CH4	g/bhp-hr		0.10	0.10	0.11	0.17
PM2.5/PM10	g/bhp-hr		0.01	0.01	0.01	0.01
AIR INTAKE / EXHAUST GAS						
INDUCTION AIR FLOW	SCFM		2652	2652	2524	2027
EXHAUST GAS MASS FLOW	lb/hr		12328	12328	11737	9423
EXHAUST GAS FLOW *at exhaust temp, 14.5 psia*	ACFM		8783	8783	8331	6575
EXHAUST TEMPERATURE	°F		1143	1143	1137	1110

HEAT EXCHANGER SIZING[12]			
TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000		4392
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000		1393

COOLING SYSTEM WITH ENGINE MOUNTED WATER PUMPS		
JACKET WATER PUMP MIN. DESIGN FLOW	GPM	450
JACKET WATER PUMP MAX. EXTERNAL RESTRICTION	psig	16
AUX WATER PUMP MIN. DESIGN FLOW	GPM	79
AUX WATER PUMP MAX. EXTERNAL RESTRICTION	psig	36

All data provided per the condtions listed in the notes section on page three.

Data Generated by EngCalc Program Version 5.0 INNIO Waukesha Gas Engines, Inc.

7/8/2024 9:23 AM

VHP - L7044GSI S5

Gas Compression

FUEL COMPOSITION

HYDROCARBONS:		Mole or Volume %
Methane	CH4	69.24
Ethane	C2H6	19.311
Propane	C3H8	6.875
Iso-Butane	I-C4H10	0.456
Normal Butane	N-C4H10	0.911
Iso-Pentane	I-C5H12	0.056
Normal Pentane	N-C5H12	0.052
Hexane	C6H14	0.015
Heptane	C7H16	0
Ethene	C2H4	0
Propene	C3H6	0
	SUM HYDROCARBONS	96.916
NON-HYDROCARBONS:		
Nitrogen	N2	2.173
Oxygen	O2	0
Helium	He	0
Carbon Dioxide	CO2	0.912
Carbon Monoxide	CO	0
Hydrogen	H2	0
Water Vapor	H2O	0
	TOTAL FUEL	100

FUEL:

FUEL PRESSURE RANGE (psig):	40 - 60
FUEL WKI:	59.8
FUEL SLHV (BTU/ft3):	1131.47
FUEL SLHV (MJ/Nm3):	44.49
FUEL LHV (BTU/ft3):	1151.51
FUEL LHV (MJ/Nm3):	45.28
FUEL HHV (BTU/ft3):	1273.79
FUEL HHV (MJ/Nm3):	50.09
FUEL DENSITY (SG):	0.75

Standard Conditions per ASTM D3588-91 [60°F and 14.696psia] and ISO 6976:1996-02-01[25, V(0;101.325)].
Based on the fuel composition, supply pressure and temperature, liquid hydrocarbons may be present in the fuel. No liquid hydrocarbons are allowed in the fuel. The fuel must not contain any liquid water. Waukesha recommends both of the following:
1) Dew point of the fuel gas to be at least 20°F (11°C) below the measured temperature of the gas at the inlet of the engine fuel regulator.
2) A fuel filter separator to be used on all fuels except commercial quality natural gas.
Refer to the 'Fuel and Lubrication' section of 'Technical Data' or contact the Waukesha Application Engineering Department for additional information on fuels, or LHV and WKI* calculations.
* Trademark of INNIO Waukesha Gas Engines Inc.

FUEL CONTAMINANTS

Total Sulfur Compounds	0	% volume
Total Halogen as Chloride	0	% volume
Total Ammonia	0	% volume
Siloxanes		
Tetramethyl silane	0	% volume
Trimethyl silanol	0	% volume
Hexamethyldisiloxane (L2)	0	% volume
Hexamethylcyclotrisiloxane (D3)	0	% volume
Octamethyltrisiloxane (L3)	0	% volume
Octamethylcyclotetrasiloxane (D4)	0	% volume
Decamethyltetrasiloxane (L4)	0	% volume
Decamethylcyclopentasiloxane (D5)	0	% volume
Dodecamethylpentasiloxane (L5)	0	% volume
Dodecamethylcyclohexasiloxane (D6)	0	% volume
Others	0	% volume

Total Sulfur Compounds	0 µg/BTU
Total Halogen as Chlorid	0 µg/BTU
Total Ammonia	0 µg/BTU
Total Siloxanes (as Si)	0 µg/BTU

Calculated fuel contaminant analysis will depend on the entered fuel composition and selected engine model.

No water or hydrocarbon condensates are allowed in the engine. Requires liquids removal.

NOTES

1. All data is based on engines with standard configurations unless noted otherwise.

2. Power rating is adjusted for fuel, site altitude, and site air inlet temperature, in accordance with ISO 3046/1 with tolerance of ± 3%.

3. Fuel consumption is presented in accordance with ISO 3046/1 with a tolerance of -0 / +5% at maximum rating. Fuel flow calculation based on fuel LHV and fuel consumption with a tolerance of -0/+5 %. For sizing piping and fuel equipment, it is recommended to include the 5% tolerance.

4. Heat rejection tolerances are ± 30% for radiation, and ± 8% for jacket water, lube oil, intercooler, and exhaust energy.

5. Emission levels for engines with Waukesha supplied 3-way catalyst are given at catalyst outlet flange. For all other engine models, emission levels are given at engine exhaust outlet flange prior to any after treatment. Values are based on a new engine operating at indicated site conditions, and adjusted to the specified timing and air/fuel ratio at rated load. Catalyst out emission levels represent emission levels the catalyst is sized to achieve. Manual adjustment may be necessary to achieve compliance as catalyst/engine age. Catalyst-out emission levels are valid for the duration of the engine warranty. Emissions are at an absolute humidity of 75 grains H2O/lb (10.71 g H2O/kg) of dry air. Emission levels may vary subject to instrumentation, measurement, ambient conditions, fuel quality, and engine variation. Engine may require adjustment on-site to meet emission values, which may affect engine performance and heat output. NOx, CO, THC, NMHC, CO2, and CO2e emission levels are listed as a not to exceed limit, all other emission levels are estimated. CO2 emissions based on EPA Federal Register/Vol. 74, No. 209/Friday, October 30, 2009 Rules and Regulations 56398, 56399 (3) Tier 3 Calculation Methodology, Equation C-5.

6. Air flow is based on undried air with a tolerance of ± 7%.

7. Exhaust temperature given at engine exhaust outlet flange with a tolerance of ± 50°F (28°C).

8. Exhaust gas mass flow value is based on a "wet basis" with a tolerance of ± 7%.

9. Inlet air restrictions based on full rated engine load. Exhaust backpressure based on 178.1 PSI BMEP and 1200 RPM. Refer to the engine specification section of Waukesha's standard technical data for more information.

10. Cooling circuit capacity, lube oil capacity, and engine dry weight values are typical.

11. Fuel must conform to Waukesha's "Gaseous Fuel Specification" S7884-7 or most current version. Fuel may require treatment to meet current fuel specification.

12. Heat exchanger sizing values given as the maximum heat rejection of the circuit, with applied tolerances and an additional 5% reserve factor.

13. Fuel volume flow calculation in english units is based on 100% relative humidity of the fuel gas at standard conditions of 60°F and 14.696 psia (29.92 inches of mercury; 101.325 kPa).

14. Fuel volume flow calculation in metric units is based on 100% relative humidity of the fuel gas at a combustion temperature of 25°C and metering conditions of 0°C and 101.325 kPa (14.696 psia; 29.92 inches of mercury). This is expressed as [25, V(0;101.325)].

15. Engine sound data taken with the microphone at 1 m (3.3 ft) from the side of the engine at the approximate front-to-back centerline. Microphone height was at intake manifold level. Engine sound pressure data may be different at front, back and opposite side locations. Exhaust sound data taken with microphone 1 meter (3.3 ft) away and 1 meter (3.3 ft) to the side of the exhaust outlet.

16. Due to variation between test conditions and final site conditions, such as exhaust configuration and background sound level, sound pressure levels under site conditions may be different than those tabulated above.

17. Cooling system design flow is based on minimum allowable cooling system flow. Cooling system maximum external restriction is defined as the allowable restriction at the minimum cooling system flow.

18. Continuous Power Rating: The highest load and speed that can be applied 24 hours per day, seven days per week, 365 days per year except for normal maintenance at indicated ambient reference conditions and fuel. No engine overload power rating is available.

19. emPact emission compliance available for entire range of operable fuels; however, fuel system and/or O2 set point may need to be adjusted in order to maintain compliance. VHP emPact particulate emissions measured as condensable PM2.5 per 40 CFR Part 1065 gravimetric reference method.

20. In cold ambient temperatures, heating of the engine jacket water, lube oil and combustion air may be required. See Waukesha Technical Data.

21. Available Turndown Speed Range refers to the constant torque speed range available. Reduced power may be available at speeds outside of this range. Contact application engineering.

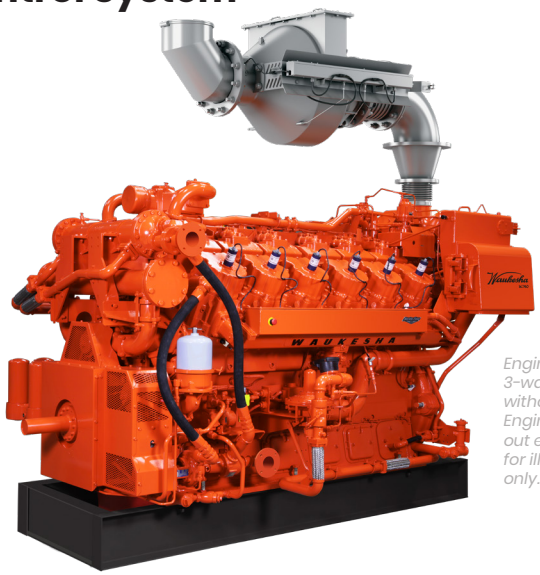
SPECIAL REQUIREMENTS

Requires option code 1008B/1008SB for 0.15 g/bhp-hr NOx 0.30 g/bhp-hr CO catalyst.

VHP Series Four L5794GSI

With ESM2 and emPact Emission Control System

920 - 1380 BHP (686 - 1029 kWb)



Engine supplied with 3-way catalyst but without exhaust piping. Engine-out and catalyst-out exhaust piping shown for illustrative purposes only.

Technical Data

Cylinders	V12
Piston displacement	5788 cu. in. (95 L)
Compression ratio	8.25:1
Bore & stroke	8.5" x 8.5" (216 x 216 mm)
Jacket water system capacity	107 gal. (405 L)
Lube oil capacity	190 gal. (719 L)
Starting system	125 - 150 psi air/gas 24V electric

Dimensions l x w x h inch (mm)
147 (3734) x 85 (2159) x 97.83 (2485)

Weights lb (kg)
24,760 (11,230)

INNIO's Waukesha* VHP* Series Four* are the engines of choice for the harshest and most demanding gas compression, power generation and mechanical drive applications. The Series Four engines can reliably produce more power on hot field gases, at high altitudes, and in remote locations, all while delivering low emissions when paired with a 3-way catalyst (NSCR).

ESM*2 is the next-generation engine controller, adding functionality and benefits to the proven ESM platform.

The ESM2 customer interface is a 12" full-color touch screen display panel that allows users to see all engine parameters, trend data, view manuals, and walk through troubleshooting steps, eliminating the need for a laptop computer.

ESM2 directly reads exhaust and main bearing temperatures sensors and adds crankcase pressure, boost pressure, and an oil pressure permissive for starting the engine to the list of sensors available with the previous version of ESM.

Enhanced misfire detection can capture a single misfire event and an enhanced three-dimensional timing map allows for tighter engine control over the entire range of fuels.

Waukesha's emPact Emission Control System combines an engine, catalyst, and air/fuel ratio control, factory-designed for optimal interaction and maximum performance. It consists of afactory supplied catalyst, pre- and post-catalyst oxygen sensing, and differential temperature and pressure sensors. emPact's closed-loop control system measures the engine exhaust and automatically adjusts the air/fuel ratio to keep the catalyst operating at maximum efficiency, even as speed, load, fuel, and ambient conditions change.

Performance Data

Intercooler Water Temperature 130°F (54°C)		1200 RPM	1000 RPM
	Power bhp (kWb)	1380 (1029)	1150 (858)
	BSFC (LHV) Btu/bhp-hr (kJ/kWh)	7665 (10846)	7496 (10602)
	Fuel Consumption Btu/hr x 1000 (kW)	10578 (3100)	8621 (2527)
emPact Catalyst-Out Emissions	NOx g/bhp-hr (mg/Nm³ @ 5% O_2)	0.5 (185)	
	CO g/bhp-hr (mg/Nm³ @ 5% O_2)	1.0 (370)	
	NMHC g/bhp-hr (mg/Nm³ @ 5% 0_2)	0.14 (58)	
	THC g/bhp-hr (mg/Nm³ @ 5% O_2)	1.26 (477)	
Engine-Out Emissions	NOx g/bhp-hr (mg/Nm³ @ 5% O_2)	13.50 (5011)	14.90 (5508)
	CO g/bhp-hr (mg/Nm³ @ 5% O_2)	10.50 (3770)	10.10 (3734)
	NMHC g/bhp-hr (mg/Nm³ @ 5% 0_2)	0.28 (105)	0.30 (110)
	THC g/bhp-hr (mg/Nm³ @ 5% O_2)	1.80 (682)	2.00 (733)
Heat Balance	Heat to Jacket Water Btu/hr x 1000 (kW)	3037 (890)	2512 (736)
	Heat to Lube Oil Btu/hr x 1000 (kW)	470 (138)	372 (109)
	Heat to Intercooler Btu/hr x 1000 (kW)	132 (39)	74 (22)
	Heat to Radiation Btu/hr x 1000 (kW)	674 (198)	605 (177)
	Total Exhaust Heat Btu/hr x 1000 (kW)	2959 (867)	2298 (674)
Intake/ Exhaust System	Induction Air Flow scfm (Nm³/hr)	2001 (3014)	1638 (2467)
	Exhaust Flow lb/hr (kg/hr)	8984 (4075)	7355 (3336)
	Exhaust Temperature °F (°C)	1136 (613)	1077 (581)

All data according to full load and subject to technical development and modification.

emPact catalyst-out emissions valid from 100% - 75% load and 1200 rpm to 900 rpm and assume proper engine/catalyst maintenance and manual adjustment as necessary.

Consult your local Waukesha representative for system application assistance. The manufacturer reserves the right to change or modify without notice, the design or equipment specifications as herein set forth without incurring any obligation either with respect to equipment previously sold or in the process of construction except where otherwise specifically guaranteed by the manufacturer.

INNIO* is a leading solutions provider of gas engines, power equipment, a digital platform and related services for power generation and gas compression at or near the point of use. With our Jenbacher* and Waukesha* product brands, INNIO pushes beyond the possible and looks boldly toward tomorrow. Our diverse portfolio of reliable, economical and sustainable industrial gas engines generates 200 kW to 10 MW of power for numerous industries globally. We can provide life cycle support to the more than 48,000 delivered gas engines worldwide. And, backed by our service network in more than 100 countries, INNIO connects with you locally for rapid response to your service needs. Headquartered in Jenbach, Austria, the business also has primary operations in Welland, Ontario, Canada, and Waukesha, Wisconsin, US.

Find your local support online:
www.innio.com/en/company/providers

IWK-119012-EN

*Indicates a trademark

Emission Guarantee

Date: **7/2/2025**

Jeremy Horwitz
Archrock
Denver, CO

RE: Kinder Morgan - AROC Opp 150246 (2x 5794GSI) - Project Team Intros

Jeremy,

I am pleased to provide this guarantee based on the following information. If you have any questions or concerns please feel free to contact myself or any of my associates at DCL America.

Please note: This guarantee is subject to DCL's standard terms and conditions of sale attached. Copies of the limited warranty statement are available from DCL upon request (DCL doc. No. X0000-0000-K1).

Best Regards,

Michael Kourkoubes
Regional Sales Manager
DCL America Inc.
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Catalyst Element (Table 1A)		
Application	Gas Compression	
Engine Model	Waukesha L5794GSI	
Engine Mechanical Power	1380 hp	
Fuel	NG (High BTU)	
Exhaust Flowrate	9166 lb/hr	
Exhaust Temperature	1176 deg. F	
Silencer Model	EAS-3550-T-1212F-D2CEE	
Catalyst Model	DCH3 (35.5”)	
Catalyst Part Number	A70YT-01-0426-0H33-01	
Number of Elements	2	
Catalyst Code	26 / 300 cpsi	
Pre-Catalyst Emissions g/bhp-h	NOx	14.5
	CO	10.9
	NMNEHC (VOC)	0.299
Post-Catalyst g/bhp-h	NOx	<1.00
	CO	<1.00
	NMNEHC (VOC)	<0.70
Limited Warranty	(doc. X0000-0000-K1) one year or 8000 hours operation, whichever first	