TARGA

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August 9, 2023

North Dakota Department of Environmental Quality
Division of Air Quality
918 E. Divide Ave., 2nd Floor
Bismarck, ND 58501

RE: Hawkeye Compressor Station
Targa Badlands LLC
Permit to Construct Application
McKenzie County, North Dakota

To Whom It May Concern:

Targa Badlands LLC (Targa) owns and operates the Hawkeye Compressor Station (Hawkeye) in the NE quarter of the NW quarter of Section 24 T152N R95W in McKenzie County, North Dakota. Hawkeye currently operates under Major Air Permit to Operate (PTO) Number AOP-28410 v1.0, issued by the North Dakota Department of Environmental Quality (NDDEQ) on April 20, 2022.

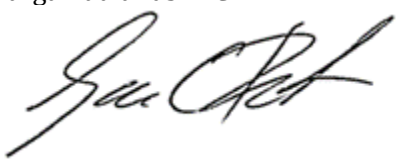
Targa is herein submitting this Permit to Construct (PTC) application for a proposed project to increase compression operations at the site by adding three (3) new onsite compressor engines, and adjusting the potential throughputs for other existing emission units accordingly.

This application is being submitted online via Combined Environmental Regulatory Information System (CERIS) and the required PTC application fee will be paid online.

If you have any questions or comments about the information presented in this application, please do not hesitate to call me at (713) 584-1172.

Sincerely,

Targa Badlands LLC



Spencer Roberts
Environmental Specialist

PERMIT TO CONSTRUCT APPLICATION

Targa Badlands LLC > Hawkeye Compressor Station
McKenzie County, ND

TARGA

Prepared By:

TRINITY CONSULTANTS
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Denver, CO 80204
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August 2023

Project 230601.0127

Trinity Consultants

Environmental solutions delivered uncommonly well

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1. EXECUTIVE SUMMARY

Targa Badlands LLC (Targa) owns and operates the Hawkeye Compressor Station located in Keene, North Dakota (Hawkeye). Hawkeye currently operates under Major Air Permit to Operate (PTO) Number AOP-28410 v1.0, issued by the North Dakota Department of Health (NDDH) on April 20, 2022. Hawkeye is currently a minor source with respect to the Prevention of Significant Deterioration (PSD) program, and will remain a minor source with respect to the PSD program after the submittal of this application as described in Section 4.1, below. As part of this project, Hawkeye will remain an area source of hazardous air pollutant (HAP) emissions, as outlined in Section 4, below.

With this PTC application, Targa is proposing to expand operations at Hawkeye by adding the following units:

- Three (3) additional natural gas-fired reciprocating compressor engines (EU TBD);

Additionally, Targa is proposing updates to the potential annual throughputs and associated emissions for the following existing units:

- Two (2) condensate tanks (TK 1, TK 7);
- Two (2) vapor combustors (V 1, V 2)
- One (1) produced water storage tank (TK 2);
- Fugitive emissions from loading of condensate and produced water to tank trucks (FS 1);
- Fugitive emissions from the equipment leak components associated with the new equipment (FS 2); and
- Fugitive emissions from blowdowns of the new compressor engines (FS 6).

A summary of the post-project facility-wide potential to emit (PTE) is provided in Table 1-1.

Table 1-1. Summary of Facility-Wide Potential to Emit

Pollutant	Post-Project Emissions [a] (tpy)
NO_X	77.7
CO	209.1
VOC	137.7
SO_2	0.3
$PM/PM_{10}/PM_{2.5}$	7.4
Benzene	1.1
Formaldehyde	3.2
Total HAP	20.8

[a] Summary of total facility emissions includes fugitive emissions, which are not included in later PSD applicability tables.

This application includes all necessary emission calculations and permit application forms, and provides a thorough analysis of applicable state and federal regulations. The $325 PTC application fee has been paid online as part of the CERIS-ND submittal of this application. The following supplemental information is included in the appendices of this application:

- Appendix A: Required PTC application forms
- Appendix B: Supporting emission calculations
- Appendix C: ProMax output files
- Appendix D: Vendor specification sheets for the proposed equipment

1.1. GENERAL APPLICANT INFORMATION

Listed below are the points of contact for this Hawkeye PTC application. This information is also included in the application forms provided in Appendix A.

Project Site: Targa Badlands LLC – Hawkeye Compressor Station
NE/4 NW/4 S24 T152N R95W
Keene, McKenzie County, North Dakota

Applicant Contact: Spencer Roberts
Environmental Specialist
Targa Badlands LLC
811 Louisiana Street, Suite 2100
Houston, TX 77002
(713) 584-1172

2. PROJECT DESCRIPTION

Hawkeye is a natural gas compressor station. At the current operations at the site, incoming field gas is fed through pipe inspection gauge (PIG) receivers to an inlet separator that removes condensate and produced water from the gas stream. Condensate and produced water streams are stored in two 400 barrel storage tanks on site that are controlled by vapor combustor units (VCU) (V 1, V 2). The condensate and water are stored in tanks before being loaded onto trucks for sale or disposal. The remaining gas stream is compressed by the existing compressor engines and sent to the triethylene glycol (TEG) dehydration unit for water removal. The rich glycol is first directed to a flash tank to remove entrained hydrocarbons before being sent to the glycol reboiler. Emissions from the glycol reboiler still vent are released to the atmosphere and the flash vent vapors are recycled to the inlet of the station. Methanol is injected at different points in the process using pneumatic pumps to prevent hydrates from forming. The natural gas engines provide power to the facility.

In this project, Targa proposes to increase compression operations at the site by adding three (3) new onsite compressor engines, and adjusting the potential throughputs for other existing units accordingly. Table 2-1 gives a summary of the existing and new equipment at the site. A facility diagram detailing the updated site layout is included at the end of this section.

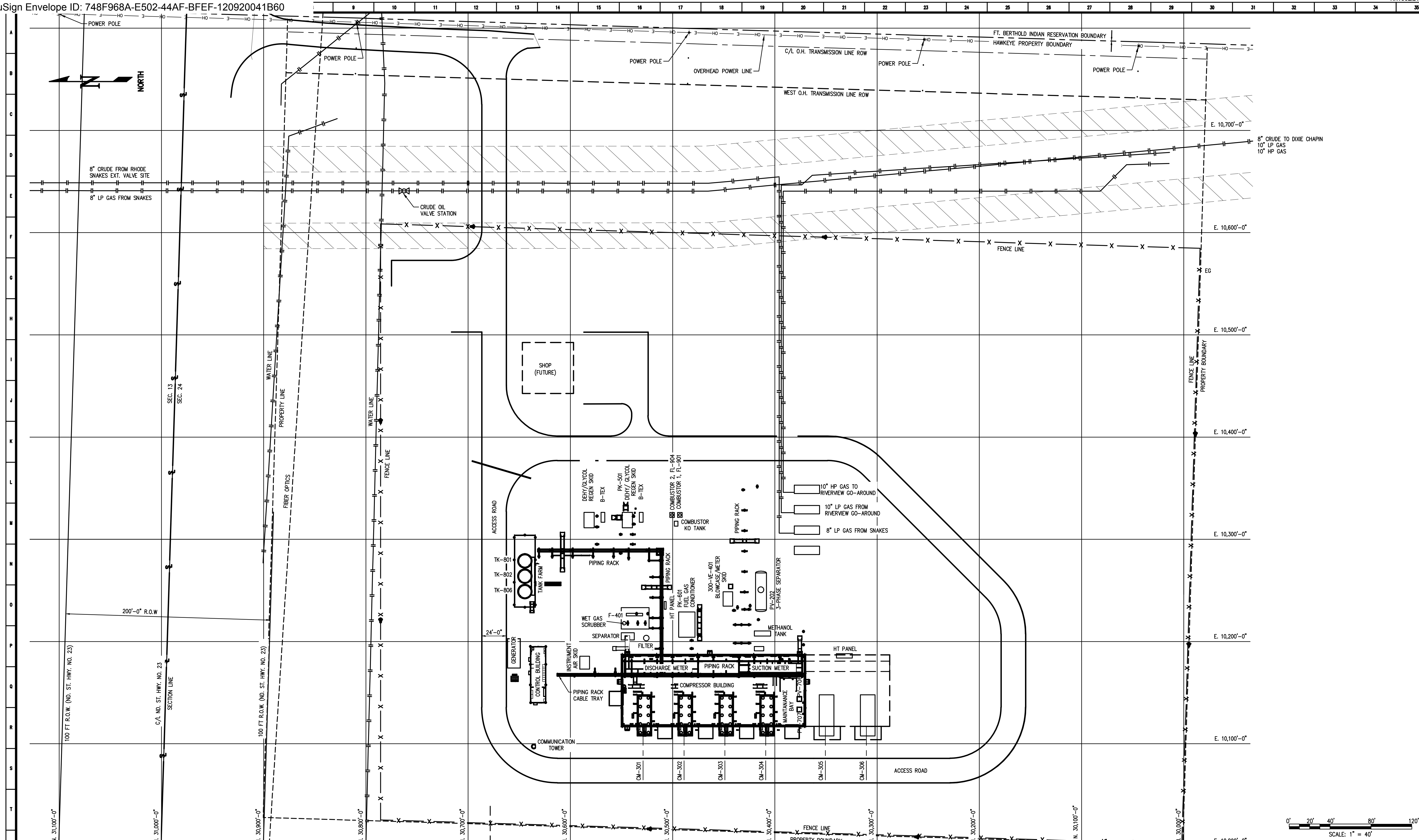
Table 2-1. Existing and Proposed Emission Units at the Hawkeye Compressor Station

Source ID	Description	Notes
Equipment from Permit O15016		
EU 1	Compressor Engine 1 – Cat G3516B	-
EU 2	Compressor Engine 2 – Cat G3516B	-
EU 3	Compressor Engine 3 – Cat G3516B	-
EU 4	Compressor Engine 4 – Cat G3516B	-
EU 5	Glycol Reboiler 1 – 0.675 MMBtu/hr	-
EU 6	Glycol Dehydration Unit 1 – 22 MMscfd	-
TK 1	Condensate Tank 1 – 400 bbl	Updated throughput and emissions.
TK 2	Produced Water Tank 1 – 400 bbl	Updated throughput and emissions.
TK 3	Coolant Tank 1 – 200 bbl	-
TK 4	Glycol Tank – 1,000 gal	-
TK 5	Methanol Tank 1 – 1,050 gal	-
TK 6	Lube Oil Storage Tank 1 – 200 bbl	-
TK 7	Condensate Tank 2 – 400 bbl	Updated throughput and emissions.
FS 1	Truck Loading	Updated throughput and emissions.
FS 2	Fugitive Emissions 1	Modified by adding additional components.
FS 3	Pigging Emissions 1	-
V 1	Vapor Combustor 1	Updated throughput and emissions.
V 2	Vapor Combustor 2	Updated throughput and emissions.
EU 7	Compressor Engine 5 - Waukesha L7042GSI S5	-
EU 8	Compressor Engine 6 - Waukesha L7042GSI S5	-
FS 6	Compressor Blowdowns	Modified to include events for new units.
EU 11	Glycol Reboiler 2 – 0.975 MMBtu/hr	-
EU 12	Glycol Dehydration Unit 2 - 24 MMscfd	-
EU 13	Emergency Generator G910 - Cummins SQT30-G3	-

EU 14	Filter (Dehy) Blowdowns	-
EU 15	Liquid-Liquid Separator Blowdowns	-
TK 12	Methanol Storage Tank 2 – 2,000 gal	-
TK 13	Lube Oil Tank 2 – 500 gal	-
TK 14	Lube Oil Tank 3 – 500 gal	-
TK 15	Lube Oil Tank 4 – 500 gal	-
TK 16	Lube Oil Tank 5 – 500 gal	-
TK 17	Coolant Tank 2 – 500 gal	-
TK 18	Coolant Tank 3 – 500 gal	-
TK 19	Coolant Tank 4 – 500 gal	-
TK 20	Coolant Tank 5 – 500 gal	-
TK 21	TEG Makeup Tank – 500 gal	-
Proposed Equipment		
EU TBD	Compressor Engine 7 - Waukesha L5794GSI	New Unit
EU TBD	Compressor Engine 8 - Waukesha L7042-S5	New Unit
EU TBD	Compressor Engine 9 - Waukesha L7044-S5	New Unit

2.1. FACILITY DIAGRAM

HK100E.DWG


NORTH
POWER POLE
POWER POLE
POWER POLE
OVERHEAD POWER LINE
POWER POLE
POWER POLE
FT. BERTHOLD INDIAN RESERVATION BOUNDARY
HAWKEYE PROPERTY BOUNDARY
C/L O.H. TRANSMISSION LINE ROW
WEST O.H. TRANSMISSION LINE ROW
E. 10,700'-0"
8" CRUDE TO DIXIE CHAPIN
10" LP GAS
10" HP GAS
8" CRUDE FROM RHODE
SNAKES EXT. VALVE SITE
8" LP GAS FROM SNAKES
CRUDE OIL
VALVE STATION
E. 10,600'-0"
FENCE LINE
EG
E. 10,500'-0"
SHOP
(FUTURE)
WATER LINE
PROPERTY LINE
SEC. 13
SEC. 24
WATER LINE
FENCE LINE
FENCE LINE
PROPERTY BOUNDARY
E. 10,400'-0"
FIBER OPTICS
ACCESS ROAD
DEHY/GLYCOL
REGEN SKID
B-TEX
PK-501
DEHY/ GLYCOL
REGEN SKID
B-TEX
COMBUSTOR 2, FL-904
COMBUSTOR 1, FL-901
COMBUSTOR
KO TANK
PIPING RACK
10" HP GAS TO
RIVERVIEW GO-AROUND
10" LP GAS FROM
RIVERVIEW GO-AROUND
8" LP GAS FROM SNAKES
E. 10,300'-0"
TK-801
TK-802
TK-806
TANK FARM
PIPING RACK
PIPING RACK
HT PANEL
PK-601
FUEL GAS
CONDITIONER
300-VE-401
BLOWCASE/METER
SKID
PV-202
3-PHASE SEPARATOR
200'-0" R.O.W
WET GAS
SCRUBBER
F-401
SEPARATOR
FILTER
METHANOL
TANK
24'-0"
E. 10,200'-0"
GENERATOR
CONTROL BUILDING
INSTRUMENT
AIR SKID
DISCHARGE METER
PIPING RACK
SUCTION METER
HT PANEL
COMPRESSOR BUILDING
PIPING RACK
CABLE TRAY
MAINTANANCE
BAY
100 FT R.O.W. (ND. ST. HWY. NO. 23)
C/L ND. ST. HWY. NO. 23
SECTION LINE
100 FT R.O.W. (ND. ST. HWY. NO. 23)
COMMUNICATION
TOWER
E. 10,100'-0"
CM-301
CM-302
CM-303
CM-304
CM-305
CM-306
ACCESS ROAD
N. 31,100'-0"
N. 31,000'-0"
N. 30,900'-0"
N. 30,800'-0"
N. 30,700'-0"
N. 30,600'-0"
N. 30,500'-0"
N. 30,400'-0"
N. 30,300'-0"
N. 30,200'-0"
N. 30,100'-0"
N. 30,000'-0"
E. 10,000'-0"
0' 20' 40' 80' 120'
SCALE: 1" = 40'

REFERENCE DWGS.	REV	DESCRIPTION	DWN	CHKD	DATE	REV	DESCRIPTION	DWN	CHKD	DATE
						3	REVISED PER PROJECT ADDITIONS	TK		6/6/22
						2	REVISED PER MARKUP	TK		1/28/21
						1	UPDATED XREF MODELS	FRD		7/30/18
						0	ISSUED FOR CONSTRUCTION	RZ	JR	1/30/15

PREPARED BY:

PROJECT NUMBER:

SCALE: 1"=40'-0"	DATE
DWN BY: D. SANTJER	7/21/14
CHKD BY: G. NELSON	7/21/14
FINAL CK:	
ENGR.: K. HEERSINK	7/21/14
APPRV: M. FORTNEY	7/21/14
APPRV:	

PLANT NAME
HAWKEYE COMPRESSOR STATION
McKENZIE CO., ND

TARGA

DRAWING NUMBER
413-100-E

CAD FILE NAME
HK100E

REVISION
3

OVERALL SITE PLAN
HAWKEYE COMPRESSOR STATION

PLOT DATE:

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TKE35 - 6/6/2022

3. EMISSION CALCULATIONS

Sections 3.1 through 3.6, below, detail the calculation methodology used in determining the emissions from the proposed project at Hawkeye. The primary emissions from this source include volatile organic compounds (VOC), nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter (PM), particulate matter with an aerodynamic diameter of 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$), sulfur dioxide (SO_2), and hazardous air pollutants (HAPs). Appendix B contains the detailed emission calculations for the proposed units. A summary of the emission increase and facility wide emissions is provided in Tables 3-1 and 3-2.

3.1. ENGINES

Emissions from the three (3) proposed natural gas-fired compressor engines (EU TBD), each of which will be controlled by a non-selective catalytic reduction (NSCR) catalyst, are calculated using emission factors provided by the catalyst vendor and engine manufacturers. If emission factors for certain pollutants are unavailable from the vendor or manufacturer, emission factors from the United States Environmental Protection Agency (U.S. EPA) AP-42 Section 3.2, *Natural Gas-fired Reciprocating Engines* (July 2000) were used. Annual emission rates are based on a maximum operation of 8,760 hours per year. The vendor and manufacturer guarantees are included in Appendix C of this application.

3.2. STORAGE TANKS AND VAPOR COMBUSTION UNITS

Working, breathing, and flash emissions for the condensate tanks (TK 1, TK 7) are determined using a ProMax 4.0 simulation. The program uses the Peng-Robinson equation of state to predict flashing emissions and the equations of AP-42 Chapter 7.1, Organic Liquid Storage Tanks, to predict working and breathing losses. The methodology utilized within the Promax environment has been updated to reflect the 2019 changes to AP-42 Chapter 7.1.

Targa has calculated the flash emissions by using the composition from a representative sample of condensate from the Smokey Compressor Station off the bottom of the scrubber before dumping into the atmospheric tank at the facility. ProMax is ran using this composition information and dropping the pressure to atmospheric pressure. For hourly emission rates, the stream temperature is set to 86°F to estimate worst-case flash loss emissions, as this is a representative temperature for the ambient air during the summer months. From the ProMax output file, Targa used the vapor lb/hr emission rate from each run to calculate short term and long term flash emission rates. Flash emission rates were speciated to obtain total VOC and HAP flash emissions.

ProMax calculations for the produced water tank are calculated using the total produced water throughput with condensate properties. Output of the ProMax simulation and the liquid analyses are included in Appendix C.

Although Targa is proposing increased condensate and produced water throughputs as part of this modification application, the change in the Promax AP-42 calculation environment described above has resulted in a net decrease in potential VOC and HAP emissions from TK 1, TK 7, and TK 2.

Vapor combustor units (VCU) (V 1, V 2) are used to control emissions from the condensate tanks and from the BTEX condenser on the glycol dehydration unit. The uncontrolled portion of the emissions (flashing, working and standing losses from ProMax 4.0 runs) from the condensate tanks and the emissions generated from combusting the condensate and BTEX vapors and pilot gas were summed to calculate the VOC and HAP emissions from the vapor combustors. The pilot VOC and HAP emissions were calculated using a speciated fuel gas analysis, heat content from fuel gas analysis, pilot gas flowrate and applying a 98% control efficiency. CO and NO_x emissions were also calculated for the vapor combustor using emission factors from U.S. EPA AP-42 Section

13.5, *Industrial Flares* (December 2016). SO_2 emissions were calculated for the pilot by applying a flare efficiency fraction and fuel sulfur content to the total pilot fuel that was burned. Variables for the equations including molecular weight, vapor pressure and vapor content were taken from the ProMax 4.0 vapor phase of the condensate tanks. The heating value for this unit has been updated to more accurately reflect operations at the facility. The specification sheet for the vapor combustor can be found in Appendix D.

The net decrease in potential VOC and HAP emissions from the tanks, as described above, has resulted in a decrease in estimated tank vapors directed to VC 1 and VC 2. Net potential combustion emissions from these units have decreased in this application.

3.3. LOADING

U.S. EPA AP-42 Section 5.2, *Transportation and Marketing of Petroleum Liquids* (June 2008) emission factors are used to estimate emissions from produced water and condensate loading (FS 1). Submerged loading, dedicated normal service was the method used in calculations. The following equation calculated the loading loss emission factors

$$L_L = \frac{12.46\ x\ SPM}{T}$$

Where:

L_L = loading loss (lb/1,000 gal loaded)
S = saturation factor (from AP-42, Section 5.2, Table 5.2-1)
P = true vapor pressure of loaded liquid (psia)
M = molecular weight of vapor (lb/lb-mol)
T = temperature of bulk liquid (°R = °F + 460)

The resultant emission factors were multiplied by the maximum hourly loading rate and the annual production rates to determine hourly and annual emissions, respectively. The VOC emission estimates take into account the VOC content of the produced water and condensate. Speciated emissions were based on the working and breathing losses for the produced water and condensate tanks. The VOC and HAP emissions from the produced water tank were conservatively assumed to be 1% of the condensate tank.

Loadout emissions from both condensate and produced water loading to trucks have increased, due to the proposed increases in condensate and produced water throughput at this facility.

3.4. FUGITIVE COMPONENTS

Potential emissions from fugitive equipment leak components (FS 2) were calculated using emission factors for each component type taken from Table 2-4 of the EPA Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017). Components in each service are based on the equipment at the facility, including the proposed equipment.

3.5. COMPRESSOR BLOWDOWNS

Equipment blowdowns are typically required to purge hydrocarbon vapors from onsite equipment, prior to conducting any needed maintenance activities. Emissions associated with these blowdowns are calculated from an estimated scf/event blowdown volume, coupled with an estimated number of potential annual blowdowns associated with each individual compressor onsite.

The methodology behind these calculations has not changed in this application. However, Targa has updated these calculations to reflect the three (3) additional compressor engines proposed in this application.

Overall blowdown emissions have thus increased in this application, to reflect additional potential blowdowns from these new sources.

Table 3-1. Facility-Wide Emission Summary

Emission Source	Description	Annual Emissions (tpy)								
		VOC	NO_x	CO	$PM/PM_{10}/PM_{2.5}$	SO_2	n-Hexane	Benzene	CH_2O	Total HAP
EU 1	Compressor Engine 1 – Cat G3516B	3.68	6.66	13.29	0.50	0.03	-	0.01	0.47	0.95
EU 2	Compressor Engine 2 – Cat G3516B	3.68	6.66	13.29	0.50	0.03	-	0.01	0.47	0.95
EU 3	Compressor Engine 3 – Cat G3516B	3.68	6.66	13.29	0.50	0.03	-	0.01	0.47	0.95
EU 4	Compressor Engine 4 – Cat G3516B	3.68	6.66	13.29	0.50	0.03	-	0.01	0.47	0.95
EU 5	Gycol Reboiler Heater	0.01	0.21	0.18	0.02	1.26E-03	-	4.42E-06	1.58E-04	3.96E-03
EU 6	22 MMscfd Glycol Dehydrator (Regen)	0.67	-	-	-	-	0.02	0.06	-	0.08
	22 MMscfd Glycol Dehydrator (Blowdowns)	0.53	-	-	-	-	3.20E-03	4.82E-05	-	0.19
TK 1	Condensate Tank 1 – 400 bbl	3.05	-	-	-	-	0.06	4.68E-03	-	0.07
TK 7	Condensate Tank 2 – 400 bbl									
TK 2	Produced Water Tank 1 – 400 bbl	0.01	-	-	-	-	2.63E-04	2.11E-05	-	3.16E-04
TK 3	Coolant Tank – 200 bbl	0.01	-	-	-	-	-	-	-	-
TK 4	TEG Makeup Tank	0.01	-	-	-	-	-	-	-	-
TK 5	Methanol Tank 1 – 1,050 gal	6.30E-03	-	-	-	-	-	-	-	6.30E-03
TK 6	Lube Oil Tank 1 – 200 bbl	0.01	-	-	-	-	-	-	-	-
FS 1	Loading Emissions - Compressor Station	31.76	-	-	-	-	0.61	0.05	-	0.73
FS 2	Fugitive Emissions - Compressor Station	49.83	-	-	-	-	4.50	-	-	10.64
FS 3	Pigging Emissions	0.15	-	-	-	-	2.63E-03	2.70E-04	-	2.95E-03
V 1	Vapor Combustor 1	0.04	1.36	6.18	-	1.83E-04	-	-	3.29E-05	3.29E-05
V 2	Vapor Combustor 2									
EU 7	Compressor Engine 5 - Waukesha L7042GSI S5	10.14	7.24	28.97	0.92	0.03	-	0.07	0.10	0.66
EU 8	Compressor Engine 6 - Waukesha L7042GSI S5	10.14	7.24	28.97	0.92	0.03	-	0.07	0.10	0.66
EU 1-4, EU 7-10	Compressor Blowdowns	7.53	-	-	-	-	0.13	0.01	-	0.15
EU 11	Gycol Reboiler Heater	0.02	0.42	0.35	0.03	2.51E-03	7.54E-03	8.79E-06	3.14E-04	7.88E-03
EU 12	24 MMscfd Glycol Dehydrator (Regen)	3.64	-	-	-	-	0.13	0.41	-	0.62
	24 MMscfd Glycol Dehydrator (Blowdowns)	0.19	-	-	-	-	3.20E-03	3.29E-04	-	3.59E-03
EU 13	Generator Engine G910 - Cummins SQT30-G3	0.19	6.60	1.75	0.14	3.12E-03	-	1.60E-03	1.63E-04	3.25E-03
TK 12	Methanol Tank 2 - 2,000 gal	0.01	-	-	-	-	-	-	-	0.01
TK 13	Lube Oil Tank 2 - 500 gal	0.01	-	-	-	-	-	-	-	-
TK 14	Lube Oil Tank 3 - 500 gal	0.01	-	-	-	-	-	-	-	-
TK 15	Lube Oil Tank 4 - 500 gal	0.01	-	-	-	-	-	-	-	-

Emission Source	Description	Annual Emissions (tpy)								
		VOC	NO_x	CO	$PM/PM_{10}/PM_{2.5}$	SO_2	n-Hexane	Benzene	CH_2O	Total HAP
TK 16	Lube Oil Tank 5 - 500 gal	0.01	-	-	-	-	-	-	-	-
TK 17	Coolant Tank 2 – 500 gal	0.01	-	-	-	-	-	-	-	-
TK 18	Coolant Tank 3 – 500 gal	0.01	-	-	-	-	-	-	-	-
TK 19	Coolant Tank 4 – 500 gal	0.01	-	-	-	-	-	-	-	-
TK 20	Coolant Tank 5 – 500 gal	0.01	-	-	-	-	-	-	-	-
TK 21	TEG Makeup Tank	0.01	-	-	-	-	-	-	-	-
EU TBD	Compressor Engine 7 - Waukesha L5794GSI	8.29	8.13	26.01	1.02	0.03	-	0.08	0.33	0.88
EU TBD	Compressor Engine 8 - Waukesha L7042-S5	2.53	9.05	28.97	1.08	0.03	-	0.09	0.36	0.95
EU TBD	Compressor Engine 9 - Waukesha L7044-S5	2.16	10.80	34.57	1.27	0.04	-	0.10	0.43	1.13
Project Total		**27.48**	**27.83**	**88.85**	**3.37**	**0.10**	**0.25**	**0.29**	**1.12**	**3.50**
Facility Total		**137.65**	**77.71**	**209.13**	**7.38**	**0.28**	**5.47**	**1.11**	**3.18**	**20.84**
Title V PTE Total**		**96.04**	**77.71**	**209.13**	**7.38**	**0.28**	**5.47**	**1.11**	**3.18**	**20.84**
Title V Permit Required?		**No**	**No**	**Yes**	**No**	**No**	**No**	**No**	**No**	**No**

** Title V Potential to Emit Total does not include fugitive criteria pollutant emissions, as fugitive non-HAP emissions are not included in major source applicability.

The Hawkeye Compressor Station is subject to federal and state air quality regulations. This section of the permit application summarizes the air permitting requirements and the key air quality regulations that apply to the proposed activities covered by this permit application, specifically the applicability of the Prevention of Significant Deterioration (PSD) program, New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAPs), as well as other North Dakota air regulations.

4.1. PREVENTION OF SIGNIFICANT DETERIORATION

The Hawkeye Compressor Station is located in McKenzie County, North Dakota, which is designated as attainment or unclassifiable for all criteria pollutants per 40 CFR 81.335. Compressor stations are not included on the 28 listed source categories in 40 CFR 52.21(b)(1)(i)(a) with a 100 tons per year (tpy) "major" source PSD threshold (PSD MST); therefore, the PSD MST for Hawkeye is 250 tpy. The facility wide potential emissions of individual regulated pollutants after the construction of the proposed project are below the 250 tpy threshold; as such, the source will remain a minor source under PSD. Since the facility is not on the list of the 28 sources, fugitive emissions were not included in determining if the source is above the 250 tpy threshold. Post-project potential emissions, excluding fugitive emissions, are detailed in Table 4-1.

Table 4-1. Summary of Facility-Wide Potential Emissions*

	Emissions (tpy)				
	VOC	**NO_x**	**CO**	**$PM/PM_{10}/PM_{2.5}$**	**SO_2**
Facility Wide Emissions Post Construction **	96.0	76.1	209.1	7.4	0.28
PSD Threshold	250	250	250	250	250
PSD Review Required?	No	No	No	No	No

*PSD does not apply to the facility's greenhouse gas (GHG) emissions because the facility is not subject to PSD for any other pollutant.

**Fugitive emissions are not included in facility wide total emissions when comparing to PSD thresholds.

4.2. TITLE V AND COMPLIANCE ASSURANCE MONITORING (CAM) APPLICABILITY

As shown in Tables 3-1 and 4-1, the facility-wide potential to emit after the proposed operations will exceed 100 tpy of certain criteria pollutants. Therefore, the site will be required to obtain a Title V air permit. Targa will submit a Title V PTO application after the startup of the sources as required by NDAC 33-15-14-06 (4)(a)(1).

The CAM rule applies to each pollutant-specific emission unit (PSEU) at a major source that meets the applicability criteria outlined in 40 CFR Part 64.2(a) that:

- Is subject to a federally enforceable emission limit or standard for a regulated air pollutant;
  - Per §64.2(b)(1)(i), emission limitations or standards in NSPS or NESHAP sections proposed after November 15, 1990 are exempt to CAM.
- Uses a control device to comply with that federally enforceable emission limit or standard; and
- Has a PTE for the applicable regulated pollutant, without taking into account the control device, in an amount equal to or greater than 100 percent of the amount, in tons per year, required to be classified as a major source.

While the proposed additional compressor units at Hawkeye will each meet at least one of the requirements above, none of the proposed units are subject to all three requirements, or are subject to all three requirements but the enforceable emission limit or standard for a regulated air pollutant is exempt from CAM. As such, none of the proposed emission units are subject to CAM.

4.3. NEW SOURCE PERFORMANCE STANDARDS (NSPS)

New Source Performance Standards (NSPS) are nationwide regulations that regulate air pollution from new, modified, and reconstructed stationary source categories that are determined to cause, or contribute significantly, to air pollution and that may reasonably be anticipated to endanger public health. The NSPS assessed for applicability to the proposed equipment at Hawkeye include:

- Subpart A – General Provisions;
- Subpart KKK - Standards of Performance for Equipment Leaks from Onshore Natural Gas Processing Plants;
- Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
- Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines; and
- Subpart OOOOa - Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction Commenced after September 18, 2015.

4.3.1. 40 CFR Part 60, Subpart A – General Provisions

Any source subject to a source specific NSPS is also subject to the general provisions of NSPS Subpart A. Unless specifically excluded by the source specific NSPS, Subpart A generally requires initial construction notification, initial startup notification, performance tests, performance test date initial notification, flare requirements, general monitoring requirements, general recordkeeping requirements, and semiannual monitoring and/or excess emissions reports.

4.3.2. 40 CFR Part 60, Subpart KKK – Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants

40 CFR Part 60, Subpart KKK (NSPS KKK) applies to equipment leaks from natural gas processing plants that are constructed after June 20, 1984 and before August 23, 2011. The Hawkeye Compressor Station is not a natural gas processing plant as defined by this subpart and, therefore, NSPS KKK is not applicable.

4.3.3. 40 CFR Part 60, Subpart IIII – Standards of Performance for Stationary Combustion Ignition Internal Combustion Engines

40 CFR Part 60, Subpart IIII (NSPS IIII) applies to various stationary combustion ignition internal combustion engines, including those that commenced construction or modification after July 11, 2005 and were manufactured after April 1, 2006 and are not fire pump engines.

The three (3) compressor engines covered in this application are natural gas-fired spark-ignition engines, and are not subject to the requirements detailed under this subpart.

4.3.4. 40 CFR Part 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

40 CFR Part 60, Subpart JJJJ (NSPS JJJJ) applies to various stationary spark ignition internal combustion engines, including those that commenced construction or modification after June 12, 2006 and were manufactured after July 1, 2007 with rated capacities greater than 500 hp.

The three (3) compressor engines will have capacities greater than 500 hp, but the specific engines proposed to be installed at the site have not yet been identified. If they were manufactured after July 1, 2007, they will be subject to the provisions of NSPS JJJJ.

The proposed compressor engines are rich burn stationary spark ignition internal combustion engines with horsepower greater than 500. Therefore, if manufactured after July 1, 2007, the new engines will be subject to emission standards in §60.4233(e) and Table 1 to NSPS JJJJ with emission standards for NO_X of 1.0 g/hp-hr, CO of 2.0 g/hp-hr, and VOC of 0.7 g/hp-hr (non-emergency SI natural gas engines ≥ 500 HP and manufactured after July 1, 2010). Additionally, the engines will be subject to performance testing, notification, reports, and recordkeeping requirements. Targa will identify and comply with the requirements under NSPS JJJJ.

4.3.5. 40 CFR Part 60, Subpart OOOOa – Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction Commenced After September 18, 2015

40 CFR Part 60, Subpart OOOOa (NSPS OOOOa) applies to owners and operators of natural gas wells, centrifugal compressors, reciprocating compressors, pneumatic controllers, storage vessels, natural gas sweetening units, pneumatic pumps, and fugitive emissions which commence construction, modification, or reconstruction after September 18, 2015. The units that are potentially subject to this subpart are as follows:

- Hawkeye is not proposing to install natural gas wells, centrifugal compressors, pneumatic controllers, natural gas sweetening units, or pneumatic pumps as part of the proposed expansion project.
- As outlined in NSPS OOOOa, a reciprocating compressor affected facility is each single reciprocating compressor, other than those reciprocating compressors located at a well site, or an adjacent well site and servicing more than one well site per §60.5365a(c). The three (3) new reciprocating compressors that will be installed at the facility will meet this criteria and will be subject to Subpart OOOOa requirements. Per §60.5385a, reciprocating compressors are required to replace the rod packing before the compressor has operated for 26,000 hours, or prior to 36 months from the date of the most recent rod packing replacement or the date of startup of the new reciprocating compressor. Alternatively, Targa could collect the methane and VOC emissions from the rod packing using a rod packing emission collection system that operates under negative pressure and route the rod packing emissions to a process through a closed vent system. Targa will comply with one of these requirements. In addition, Targa will comply with the applicable initial compliance, continuous compliance standards, reporting, and recordkeeping requirements of NSPS OOOOa.
- Per 40 CFR §60.5400a and §60.5401a, equipment leak components are subject to monitoring and leak detection programs. Targa will comply with the LDAR requirements associated with the proposed equipment leak component additions specified by NSPS OOOOa.

4.4. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS)

The Hawkeye site will remain an area source of HAPs after the completion of the proposed expansion project as potential total HAP emissions will not exceed 25 tpy. The following NESHAPS that are potentially applicable to the new units are addressed below:

- Subpart A – General Provisions;
- Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines;

4.4.1. 40 CFR Part 63, Subpart A – General Provisions

Any source subject to a source specific NESHAP is also subject to the general provisions of NESHAP Subpart A. Unless specifically excluded by the source specific NESHAP, Subpart A generally requires initial construction notification, initial startup notification, performance tests, a performance test date initial notification, general monitoring requirements, general recordkeeping requirements, and semiannual monitoring and/or excess emission reports.

4.4.2. 40 CFR Part 63, Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

40 CFR Part 63, Subpart ZZZZ (MACT ZZZZ) applies to all stationary reciprocating internal combustion engines (RICE) at a major or area source of HAP emissions. After completion of the proposed modifications, Hawkeye will remain an area source for HAPs. The three (3) proposed engines will be considered new engines at an area source under MACT ZZZZ. In accordance with §63.6590(c)(1), the new compressor engines will be required to meet the requirements of 40 CFR Part 60, Subpart JJJJ.

4.5. NORTH DAKOTA STATE AIR REGULATIONS

This project is being permitted under the regulations contained in the North Dakota Administrative Code (NDAC) Air Pollution Control Rules in Article 33-15. North Dakota air rules fall under two main categories: those regulations that are generally applicable (e.g., permitting requirements) and those that have specific applicability (e.g., PM standards for processes). The generally applicable requirements are straightforward (e.g., filing of emission statements, permit fees, etc.) and, as such, are not discussed in further detail. Similar to Section 4.1, only regulations applicable or potentially applicable to the proposed modification are discussed below; regulations applicable to unchanged units have been addressed in previous applications, and thus are not discussed in this application.

4.5.1. 33-15-02 – Ambient Air Quality Standards

North Dakota Department of Health (NDDOH) policy requires facilities to demonstrate compliance with the Ambient Air Quality Standards (AAQS) in NDAC Chapter 33-15-02-06 Table 1 and Table 2. Additionally, facilities must comply with the Air Toxics Policy as outlined in NDAC Chapter 33-15-02- 04.3.

According to an NDDOH Memorandum, Criteria Pollutant Modeling Requirements for a Permit to Construct, dated October 6, 2014, modeling is not required for projects that are not subject to PSD unless the project's PTE for the pollutants shown in the following table exceed the applicable threshold.

Table 4-2. Modeling Thresholds

Pollutant	All emissions vent from stacks with height >1.5 times nearby building height	All emissions vent from stacks with height <1.5 times nearby building height
Nitrogen Oxides	100 tons/yr	40 tons/yr
Sulfur Dioxide	100 tons/yr	40 tons/yr
PM_{10}	40 tons/yr	15 tons/yr
$PM_{2.5}$	25 tons/yr	10 tons/yr

As shown below and in Table 3-1, the facility's change in PTE is below the thresholds for pollutants potentially subject to dispersion modeling. The new compressor engines will have exhaust stacks at least 1.5 times the peak height of the building (note that even if they were below that height, the total PTE would also be below the associated threshold). Dispersion modeling to demonstrate compliance with the AAQS is not required.

Table 4-3. Project Emissions

Net Project Potential Emissions	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Aggregated Project Increases (tpy)	27.8	0.10	3.4	3.4
Threshold for stacks with height > 1.5 times nearby building height	100	100	40	25
Exceeds modeling Thresholds?	NO	NO	NO	NO

The facility's PTE of total HAPs is 20.3 tpy, of which 5.47 tpy is n-hexane. Historically, this level and type of HAP emissions have not triggered an air toxics assessment; therefore, further analysis to demonstrate compliance with the Air Toxics Policy (August 25, 2010) was not included with this application.

4.5.2. 33-15-03 – Restriction of Emissions and Visible Contaminants

NDAC Article 33-15-03 establishes standards for visible air contaminants from new and existing installations, fugitive emissions, and flares. As noted in NDAC 33-15-01, "new" means equipment, machines, devices, articles, contrivances, or installations built or installed on or after July 1, 1970. The engines will comply with the opacity requirements in NDAC 33-15-03-02, and will not emit any air contaminant which exhibits an opacity greater than twenty percent, except one six-minute period per hour of up to forty percent is permissible. In addition, the fugitive emissions associated with the additional equipment leak components will comply with the restrictions applicable to fugitive emissions listed in 33-15-03-03 and will limit the opacity to less than or equal to forty percent for no more than one six minute period per hour.

4.5.3. 33-15-05 – Emissions of Particulate Matter Restricted

This rule contains emissions limits for process equipment and liquid fuel burning equipment. All heating taking place at the facility will be indirect heating and use a gaseous fuel as the source. As such, pursuant to 33-15-05-02, the facility is exempt from the emission limitations of subsection 2. As all fuel burning equipment will be combusting pipeline quality gaseous fuel only, pursuant to 33-15-06-01(e), the facility will continue to be exempt to the emission limits in this rule.

4.5.4. 33-15-06 – Emissions of Sulfur Compounds Restricted

This rule contains emission limits for fuel burning equipment used for heating where sulfur emissions are dependent upon the sulfur content of the fuel. Units that combust pipeline-quality natural gas are exempt from this rule per 33-15-06-01(1)(e). All Hawkeye combustion units will combust pipeline-quality natural gas, and therefore are exempt from this rule.

4.5.5. 33-15-07 – Control of Organic Compounds Emissions

This rule establishes requirements for the following operations:

- Water separation from petroleum products
- Loading of storage tanks storing VOCs
- VOC truck/railcar loading operations
- Pumps and compressors in VOC service

Water separation from petroleum products
The requirements for water separation from petroleum products apply to water separators that receive 200 gallons or more of water effluent. As the facility does not have any water effluent to be separated, these requirements do not apply.

Loading of storage tanks storing VOCs
Requirements for storage tanks apply to VOC tanks with a capacity of 1,000 gallons or more. All VOC tanks with a capacity greater than 1,000 gallons are equipped with submerged fill pipes.

VOC truck/railcar loading operations
All truck/railcar loading that handle 20,000 gallons VOC per day or more will have submerged fill pipes.

Pumps and compressors in VOC service
All pumps and compressors in VOC service will be equipped and operated with properly maintained seals designed for their specific product service and operating conditions.

Flaring regulations
NDAC 33-15-07-02 requires the flare to take all precautions necessary to minimize emissions and maintain compliance during emergency, malfunction, or maintenance. There are no flares associated with Hawkeye.

4.5.6. NDAC 33-15-08-01 – Other Internal Combustion Engines

Internal combustion engines will not operate with unreasonable and excessive smoke, obnoxious or noxious gases, fumes or vapors.

4.5.7. NDAC 33-15-12 - Standards of Performance for New Stationary Sources

This rule incorporates by reference the NSPS subparts presented in 40 CFR 60. The applicability of this section is described in Section 4.3, above.

4.5.8. NDAC 33-15-14 – Designated Air Contaminant Sources, Permit to Construct, Minor Source Permit to Operate, Title V Permit to Operate

This rule establishes rules for various permit types. This permit application addresses the requirement to submit an application for a Permit to Construct prior to constructing a new installation or source. Targa will not

commence construction on the proposed equipment until a Permit to Construct has been issued by the North Dakota Department of Health.

As noted in Section 4.1, the facility will remain a major source under the Title V Program after the installation of the proposed equipment, and a revised Title V permit application will be submitted to include the new sources after the expansion as required by 33-15-14-06(4)(a)(1).

4.5.9. NDAC 33-15-15 – Prevention of Significant Deterioration of Air Quality

This rule incorporates by reference the PSD requirements listed in 40 CFR Part 52. The applicability of this section is described in Section 4.1, above.

4.5.10. NDAC 33-15-16 - General Odor Restrictions

This rule restricts the release of objectionable odors, including hydrogen sulfide. Targa will take measures to minimize objectionable odors at the site.

4.5.11. NDAC 33-15-17 - Restriction of Fugitive Emissions

This rule establishes standards for fugitive emissions. The fugitive emissions associated with the additional equipment leak components will comply with the general provisions of 33-15-16-01, as well as the restriction of fugitive gaseous emissions listed in 33-15-17-04. As the fugitive emissions will not contain particulate matter, they will not be subject to the restrictions listed in 33-15-17-02 or -03.

4.5.12. NDAC 33-15-22 – Emissions Standards for Hazardous Air Pollutants for Source Categories

This rule incorporates by reference the NESHAP subparts listed in 40 CFR 63. The applicability of this section is described in Section 4.4, above.

APPENDIX A: PERMIT APPLICATION FORMS

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 Targa Badlands LLC		
Applicant's Name Dwayne Burks		
Title Vice President, Operations	Telephone Number (918) 574-3862	E-mail Address hburks@targaresources.com
Contact Person for Air Pollution Matters Spencer Roberts		
Title Environmental Specialist	Telephone Number (713) 584-1172	E-mail Address spencer.roberts@targaresources.com
Mailing Address (Street & No.) 811 Louisiana Street, Suite 2100		
City Houston	State TX	ZIP Code 77002
Facility Name Hawkeye Compressor Station		
Facility Address (Street & No.) See Legal Description Below		
City Keene	State ND	ZIP Code 58847

County McKenzie	Coordinates NAD 83 in Decimal Degrees (to forth decimal degree)	
	Latitude 47.97610000	Longitude -102.78716000

Legal Description of Facility Site

Quarter	Quarter	Section	Township	Range
NE	NW	24	152N	95W

Land Area at Facility Site 16 Acres (or) _____ Sq. Ft.	MSL Elevation at Facility 2,200

SECTION B – GENERAL NATURE OF BUSINESS

Describe Nature of Business	North American Industry Classification System Number	Standard Industrial Classification Number (SIC)
Natural Gas Compressor Station	211111	1311

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

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
EU TBD	Recip. Compressor Engine	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
EU TBD	Recip. Compressor Engine	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
EU TBD	Recip. Compressor Engine	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
TK 1, TK 7	Condensate Tanks	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
TK 2	Produced Water Tank	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
V 1, V 2	Vapor Combustors	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
FS 1	Loadout	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
FS 2	Fugitives	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
FS 6	Compressor Blowdowns	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐

Add additional pages if necessary

SECTION D2 – APPLICABLE REGULATIONS

Source ID No.	Applicable Regulations (NSPS/MACT/NESHAP/etc.)
Facility-wide	See Included Regulatory Summary

SECTION E – TOTAL POTENTIAL EMISSIONS

Pollutant	Amount (Tons Per Year)
NO_x	77.71
CO	209.13
PM	7.38

Pollutant	Amount (Tons Per Year)
PM_{10} (filterable and condensable)	7.38
$PM_{2.5}$ (filterable and condensable)	7.38
SO_2	0.28
VOC	137.65
GHG (as CO_2e)	66,360
Largest Single HAP	5.47 (n-Hexane)
Total HAPS	20.84

*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.	Emission Calculations	4.	
2.	Promax Output Files	5.	
3.	Vendor 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
DocuSigned by: Dwayne Burks 66949D23B6AA47A...	8/10/2023

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
Targa Badlands LLC	Hawkeye Compressor Station

SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516)
EU TBD (1)

Type of Unit (check all that apply)

- ☒ Stationary Natural Gas-Fired Engine
- ☐ Stationary Diesel and Dual Fuel Engine
- ☐ Stationary Gasoline Engine
- ☐ Stationary Natural Gas-Fired Turbine
- ☐ Emergency Use Only
- ☒ Non-Emergency Use
- ☐ Peaking
- ☐ Demand Response
- ☐ Other – Specify:

SECTION C – MANUFACTURER DATA

Make	Model	Date of Manufacture
Waukesha	L5794GSI	

Reciprocating Internal Combustion Engine

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

Maximum Rating (BHP @ rpm)	Operating Capacity (BHP @ rpm)
1,347	1,347

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) 78.20	Percent Sulfur 0.002 gr/scf	Percent H_2S
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	8,760	

SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet)	
EU TBD		TBD	
Stack Diameter (feet at top)	**Gas Discharged (SCFM)**	**Exit Temp (°F)**	**Gas Velocity (FPS)**
TBD	6,657 (ACFM)	1,191	TBD

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	1.86	8.13	EMIT Catalyst Specs
CO	5.94	26.01	EMIT Catalyst Specs
PM	0.23	1.02	AP-42 Tbl. 3.2-3
PM_{10} (filterable and condensable)	0.23	1.02	AP-42 Tbl. 3.2-3
$PM_{2.5}$ (filterable and condensable)	0.23	1.02	AP-42 Tbl. 3.2-3
SO_2	7.03E-03	0.03	AP-42 Tbl. 3.2-3
VOC	1.89	8.29	EMIT Catalyst Specs
GHG (as CO_2e)	1,384.68	6,064.91	AP-42 Tbl. 3.2-3
Largest Single HAP	0.07	0.33	EMIT Catalyst Specs (HCHO)
Total HAPS	0.22	0.95	AP-42 Tbl. 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
Targa Badlands LLC	Hawkeye Compressor Station

Source ID No. of Equipment being Controlled
EU TBD (1)

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
EMIT Technologies	RT-2415-T	TBD

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

Pollutants Removed	NOx	CO	VOC	HCHO
Design Efficiency (%)	96.9%	83.5%		60%
Operating Efficiency (%)	96.9%	83.5%		60%

Describe method used to determine operating efficiency:
Manufacturer's Guarantee

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			TBD	6,657 (ACFM)
Gas Temperature (°F)			TBD	1,191
Gas Pressure (in. H_2O)			TBD	TBD
Gas Velocity (ft/sec)			TBD	TBD
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	g/hp-hr	16.00	< 0.50
	CO	g/hp-hr	12.10	< 2.00
	VOC	g/hp-hr	0.51	< 0.51
	HCHO	g/hp-hr	0.05	< 0.02

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

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
Targa Badlands LLC	Hawkeye Compressor Station

SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516)
EU TBD (2)

Type of Unit (check all that apply)

- ☒ Stationary Natural Gas-Fired Engine
- ☐ Stationary Diesel and Dual Fuel Engine
- ☐ Stationary Gasoline Engine
- ☐ Stationary Natural Gas-Fired Turbine
- ☐ Other – Specify:
- ☐ Emergency Use Only
- ☒ Non-Emergency Use
- ☐ Peaking
- ☐ Demand Response

SECTION C – MANUFACTURER DATA

Make	Model	Date of Manufacture
Waukesha	L7042-S5	

Reciprocating Internal Combustion Engine

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

Maximum Rating (BHP @ rpm)	Operating Capacity (BHP @ rpm)
1,500	1,500

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) 83.05	Percent Sulfur 0.002 gr/scf	Percent H_2S
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	8,760	

SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet)	
EU TBD		TBD	
Stack Diameter (feet at top)	Gas Discharged (SCFM)	Exit Temp (°F)	Gas Velocity (FPS)
TBD	7,061 (ACFM)	1,130	TBD

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	2.07	9.05	EMIT Catalyst Specs
CO	6.61	28.97	EMIT Catalyst Specs
PM	0.25	1.08	AP-42 Tbl. 3.2-3
PM_{10} (filterable and condensable)	0.25	1.08	AP-42 Tbl. 3.2-3
$PM_{2.5}$ (filterable and condensable)	0.25	1.08	AP-42 Tbl. 3.2-3
SO_2	7.47E-03	0.03	AP-42 Tbl. 3.2-3
VOC	0.58	2.53	EMIT Catalyst Specs
GHG (as CO_2e)	1,470.43	6,440.48	AP-42 Tbl. 3.2-3
Largest Single HAP	0.08	0.36	EMIT Catalyst Specs (HCHO)
Total HAPS	0.23	1.03	AP-42 Tbl. 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
Targa Badlands LLC	Hawkeye Compressor Station

Source ID No. of Equipment being Controlled
EU TBD (2)

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
EMIT Technologies	RT-2415-T	TBD

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

Pollutants Removed	NOx	CO	VOC	HCHO
Design Efficiency (%)	96.2%	80.2%		86.7%
Operating Efficiency (%)	96.2%	80.2%		86.7%

Describe method used to determine operating efficiency:
Manufacturer's Guarantee

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			TBD	7,061 (ACFM)
Gas Temperature (°F)			TBD	1,130
Gas Pressure (in. H_2O)			TBD	TBD
Gas Velocity (ft/sec)			TBD	TBD
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	g/hp-hr	13.10	< 0.50
	CO	g/hp-hr	10.10	< 2.00
	VOC	g/hp-hr	0.14	< 0.14
	HCHO	g/hp-hr	0.15	< 0.02

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

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
Targa Badlands LLC	Hawkeye Compressor Station

SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516)
EU TBD (3)

Type of Unit (check all that apply)

- ☒ Stationary Natural Gas-Fired Engine
- ☐ Stationary Diesel and Dual Fuel Engine
- ☐ Stationary Gasoline Engine
- ☐ Stationary Natural Gas-Fired Turbine
- ☐ Other – Specify:
- ☐ Emergency Use Only
- ☒ Non-Emergency Use
- ☐ Peaking
- ☐ Demand Response

SECTION C – MANUFACTURER DATA

Make	Model	Date of Manufacture
Waukesha	L7044-S5	

Reciprocating Internal Combustion Engine

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

Maximum Rating (BHP @ rpm)	Operating Capacity (BHP @ rpm)
1,790	1,790

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) 97.92	Percent Sulfur 0.002 gr/scf	Percent H_2S
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	8,760	

SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet)	
EU TBD		TBD	
Stack Diameter (feet at top)	Gas Discharged (SCFM)	Exit Temp (°F)	Gas Velocity (FPS)
TBD	8,440 (ACFM)	1,152	TBD

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	2.47	10.80	EMIT Catalyst Specs
CO	7.89	34.57	EMIT Catalyst Specs
PM	0.29	1.27	AP-42 Tbl. 3.2-3
PM_{10} (filterable and condensable)	0.29	1.27	AP-42 Tbl. 3.2-3
$PM_{2.5}$ (filterable and condensable)	0.29	1.27	AP-42 Tbl. 3.2-3
SO_2	8.81E-03	0.04	AP-42 Tbl. 3.2-3
VOC	0.49	2.16	EMIT Catalyst Specs
GHG (as CO_2e)	1,733.79	7,593.99	AP-42 Tbl. 3.2-3
Largest Single HAP	0.10	0.43	EMIT Catalyst Specs (HCHO)
Total HAPS	0.28	1.21	AP-42 Tbl. 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
Targa Badlands LLC	Hawkeye Compressor Station

Source ID No. of Equipment being Controlled
EU TBD (3)

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
EMIT Technologies	RT-2415-T	TBD

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

Pollutants Removed	NOx	CO	VOC	HCHO
Design Efficiency (%)	95.9%	80.2%		60%
Operating Efficiency (%)	95.9%	80.2%		60%

Describe method used to determine operating efficiency:
Manufacturer's Guarantee

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			TBD	8,440 (ACFM)
Gas Temperature (°F)			TBD	1,152
Gas Pressure (in. H_2O)			TBD	TBD
Gas Velocity (ft/sec)			TBD	TBD
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	g/hp-hr	12.10	< 0.50
	CO	g/hp-hr	10.10	< 2.00
	VOC	g/hp-hr	0.10	< 0.10
	HCHO	g/hp-hr	0.05	< 0.02

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

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
Targa Badlands LLC	Hawkeye Compressor Station

SECTION B – TANK DATA

Source ID Number (From SFN 8516)
TK 1, TK 7

Capacity	Barrels: 400		Gallons	
Dimensions	Diameter: 12	Height: 20	Length: N/A	Width: N/A

Shape: ☒ Cylindrical ☐ Spherical ☐ Other – Specify:

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

Construction: ☐ Riveted ☒ Welded ☐ Other – Specify:

Color: Shale Green

Condition: ☐ Good ☒ Fair ☐ Poor

Status: ☐ New Construction ☐ Alteration ☒ Existing (Give Date Constructed): 01/01/2014

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:

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.

Condensate - Liquid Analysis included in application

SECTION D – VAPOR DISPOSAL

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

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure 14.3	Maximum Reid Vapor Pressure

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) 65 bbl/hr	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) 10.125
Average Throughput (barrels per day or gallons per day) 501	Tank Turnovers per Year 458

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)
See Attached Emission Calcs			

* 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:

N/A

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
Targa Badlands LLC	Hawkeye Compressor Station
Source ID No. of Equipment being Controlled TK 1, TK 7, TK 2	

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
LEED Fabrication	L30-0018-00	2014 (V 1), 2019 (V 2)

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

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

Describe method used to determine operating efficiency:
Manufacturer's Guarantee

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)				
Gas Temperature (°F)				
Gas Pressure (in. H_2O)				
Gas Velocity (ft/sec)				
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
Pressure Drop Through Gas Cleaning Device (in. H_2O)				

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
Targa Badlands LLC	Hawkeye Compressor Station

SECTION B – TANK DATA

Source ID Number (From SFN 8516): TK 2

Capacity	Barrels: 400		Gallons	
Dimensions	Diameter: 12	Height: 20	Length: N/A	Width: N/A

Shape	☒ Cylindrical	☐ Spherical	☐ Other – Specify:
Materials of Construction	(i.e., steel) Steel		
Construction	☐ Riveted	☒ Welded	☐ Other – Specify:
Color: Shale Green			
Condition	☐ Good	☒ Fair	☐ Poor
Status	☐ New Construction	☐ Alteration	☒ Existing (Give Date Constructed): 01/01/2014
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:

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 (Assumed ~99% Water, ~1% Condensate)

SECTION D – VAPOR DISPOSAL

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

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure 14.3	Maximum Reid Vapor Pressure

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) 65 bbl/hr	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) 10.125
Average Throughput (barrels per day or gallons per day) 162 BPD	Tank Turnovers per Year 148

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)
See Attached Emission Calcs			

* 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:

N/A

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

APPENDIX B: EMISSION CALCULATIONS

STORAGE TANKS
TARGA BADLANDS LLC
HAWKEYE COMPRESSOR STATION
Rev. 7/24/2023

Tank No.	Tank Contents	Tank Size		Tank Type	Uncontrolled VOC lb/hr	Uncontrolled VOC tpy	Control Device	Control DRE	VOC PTE lb/hr	VOC PTE tpy	Notes
TK 1	Condensate	400	bbl	Vertical Fixed Roof	34.80	152.41	Combustor	98%	0.70	3.05	1
TK 7	Condensate	400	bbl	Vertical Fixed Roof							
TK 2	Produced Water	400	bbl	Vertical Fixed Roof	0.16	0.69	Combustor	98%	0.00	0.01	1

Notes

1 Promax results provided the uncontrolled working, breathing, and flashing losses (tpy). Hourly emissions based on 8,760 hr/yr.

Uncontrolled HAP Emissions

					n-hexane		Benzene		Ethylbenzene		Toluene		Xylenes		224 TMP		Notes
					Wt%	1.91%	Wt%	0.15%	Wt%	0.009%	Wt%	0.12%	Wt%	0.01%	Wt%	0.09%	5
Tank No.	**Tank Contents**	**Tank Size**		**Tank Type**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	
TK 1	Condensate	400	bbl	Vertical Fixed Roof	0.66	2.91	0.05	0.23	0.00	0.01	0.04	0.18	0.00	0.02	0.03	0.03	
TK 7	Condensate	400	bbl	Vertical Fixed Roof													
TK 2	Produced Water	400	bbl	Vertical Fixed Roof	<0.01	0.01	<0.01	0.001	<0.01	0.0001	<0.01	0.001	<0.01	0.000	<0.01	0.001	

HAP PTE

					n-hexane		Benzene		Ethylbenzene		Toluene		Xylenes		224 TMP		Notes
Tank No.	**Tank Contents**	**Tank Size**		**Tank Type**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	
TK 1	Condensate	400	bbl	Vertical Fixed Roof	0.01	0.06	<0.01	0.00	<0.01	<0.01	<0.01	0.00	<0.01	<0.01	<0.01	<0.01	
TK 7	Condensate	400	bbl	Vertical Fixed Roof													
TK 2	Produced Water	400	bbl	Vertical Fixed Roof	<0.01	0.000	<0.01	0.000	<0.01	0.0000	<0.01	0.000	<0.01	0.0000	<0.01	0.0000	

Notes

5 Wt% HAP estimated from Promax Flowsheet1 Pstreams Report, Stream 101 (Vapor phase), corrected for VOC fraction.

VAPOR COMBUSTORS EMISSIONS
TARGA BADLANDS LLC
HAWKEYE COMPRESSOR STATION
Rev. 7/24/2023

Emission Points V-1 V-2
Emission Units TK-1, TK-7, TK-2, EU 12

Emissions from VCU[1]

Pollutant	(lb/hr)	(tpy)
NOx	0.310	1.36
CO	1.412	6.18
VOC	8.89E-03	0.04
Total HAPs	7.50E-06	3.29E-05
CO_2e	632.81	2771.70

1. Emissions from two vapor combustors includes emissions from combustion of pilot gas and combustion of gas vented from the condensate and produced water tanks. VOC emissions are from pilot only. Controlled VOC emissions from tanks and dehydrators are shown under those units.

Heat Released by Combustion of Tank Vapors (Flashing, Working, and Breathing)

Parameters [1]	Hourly	Annual	Unit
Gross heating value	19307	19307	Btu/lbm
Flow rate	49	431,799	lbm
Heat Released	0.95	8,336.92	MMBtu

Heat Released by Combustion of Uncondensed Dehydrator Vapors EU 05

Parameters [2]	Hourly	Annual	Unit
Gross heating value	2449.75	2449.75	Btu/scf
Flow rate	820.00	7,183,200.00	scf
Heat Released	2.01	17,597.05	MMBtu

Heat Released by Combustion of Uncondensed Dehydrator Vapors EU 13

Parameters [2]	Hourly	Annual	Unit
Gross heating value	1819.58	1819.58	Btu/scf
Flow rate	799.00	6,999,240.00	scf
Heat Released	1.45	12,735.66	MMBtu

Pollutant	Emission Factor (lb/MMbtu)	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
NOx [3, 4]	0.068	0.300	1.31
CO [3, 4]	0.31	1.368	5.99

1. Vapor heating values and mass flow are obtained from the ProMax output for condensate tanks. Vapor volumetric flow is total flow from both condensate tanks.

2. The vapor volumetric flow for the vapor stream from the hourly and annual ProMax outputs represent the volumetric flow from flash losses from each tank. The volumetric flow from working and breathing losses is included by multiplying the working emission rates by the 379.5 scf/mol and dividing by the vapor molecular weight.
3. Emission Factors from AP-42 Table 13.5-1, Chapter 13.5 (Industrial Flares, 04/2015).

4. Emissions are calculated as (Emission Factor)*(Gross Heating Value)*(Vapor Volumetric Flow)/(1,000,000 Btu/MMBtu). Annual emission are converted to tons per year.
5. VOC emissions are calculated based on ProMax outputs and are calculated as [(Working and Breathing Losses)+(Flash Losses)]*(1-98% control efficiency) from each of the two condensate tanks.
6. Formaldehyde emissions are calculated as (Emission Factor)*(Vapor Volumetric Flow)*(1 MMscf/1,000,000 scf)
7. Formaldehyde emission factor is based on AP-42 Chapter 1.4 (Natural Gas Combustion, 7/1998), Table 1.4-3.
8. HAP weight percent was taken from the vapor stream from the hourly ProMax output file and was used to speciate both hourly and annual emission rates. The HAP emission rate is calculated as (Weight %)*(VOC emission rate)

VAPOR COMBUSTORS EMISSIONS
TARGA BADLANDS LLC
HAWKEYE COMPRESSOR STATION
Rev. 7/24/2023

Emission Points V-1 V-2
Emission Units TK-1, TK-7, TK-2, EU 12

Calculations of Pilot Gas Combustion Emissions

VCU Information[1]		
VOC DRE [1]	98	%
Pilot Gas Flow [1]	100	SCFH
Heat Content [2]	1406	Btu/scf

Pollutant	Emission Factor [3, 6]		Emissions (lb/hr)	Emissions (tpy)
NO_x [4]	0.068	lb/MMBtu	9.56E-03	0.04
CO [4]	0.31	lb/MMBtu	0.04	0.19
CH_2O [5]	0.075	lb/MMScf	7.50E-06	3.29E-05

1. Information from vendor specification sheet. Two pilots at 50 scfh each.
2. Heat Content from fuel gas analysis.
3. Emission Factors from AP-42 Table 13.5-1, Chapter 13.5 (Industrial Flares, 04/2015).
4. Emissions calculated as (Emission Factor)(Pilot Gas Heat Content)(Pilot gas Flow)(1 MMBtu/ 1,000,000 Btu). Annual emission include conversion factors to convert to tons per year.
5. Emissions calculated as (Emission Factor)(Pilot gas Flow)(1 MMscf/ 1,000,000 scf). Annual emission include conversion factors to convert to tons per year.
6. Formaldehyde emission factor is based on AP-42 Chapter 1.4 (Natural Gas Combustion, 7/1998), Table 1.4-3.

Calculations of Pilot Gas VOC Emissions

$$M=\frac{60(MW)PV}{RT}$$

Where
m=mass flow rate in lb/hr
MW=molecular weight in lb/lbmole
P=standard pressure=14.7 psia
V=flow rate in scfm
R=gas constant=10.73 psia · ft$^{3.}$ lbmol$^{-1.}$ ºR^{-1}, and
T=standard temperature=528ºR

Constituent[1]	Federal HAP?	Molecular Weight (lb/lb-mole)	Mole %[1] (%)	Volume Flow Rate (scf/hr)	Mass Flow Rate (lb/hr)	Pilot Gas Emissions (lb/hr)	Pilot Gas Emissions (tpy)
Methane	No	16.043	75.536%	7.55E+01	3.14E+00	6.29E-02	2.75E-01
Ethane	No	30.070	16.555%	1.66E+01	1.29E+00	2.58E-02	1.13E-01
Propane	No	44.097	3.473%	3.47E+00	3.97E-01	7.95E-03	3.48E-02
i-Butane	No	58.123	0.124%	1.24E-01	1.87E-02	3.74E-04	1.64E-03
n-Butane	No	58.123	0.178%	1.78E-01	2.68E-02	5.37E-04	2.35E-03
i-Pentane	No	72.150	0.004%	4.00E-03	7.49E-04	1.50E-05	6.56E-05
n-Pentane	No	72.150	0.002%	2.00E-03	3.74E-04	7.49E-06	3.28E-05
n-Hexane	Yes	86.177	0%	0.00E+00	0.00E+00	0.00E+00	0.00E+00
n-Heptane	No	100.210	0%	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H_2O	No	18.015	0%	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CO_2	No	44.010	0.79900%	7.99E-01	9.12E-02	1.82E-03	7.99E-03
N_2	No	28.013	3.32800%	3.33E+00	2.42E-01	4.84E-03	2.12E-02
					Total Emissions	1.04E-01	4.57E-01
					Total VOC Emissions	8.88E-03	3.89E-02
					Total HAP Emissions	7.50E-06	3.29E-05

1. Constituents and Mol % from Fuel Gas Analysis.

VAPOR COMBUSTORS EMISSIONS
TARGA BADLANDS LLC
HAWKEYE COMPRESSOR STATION
Rev. 7/24/2023

Emission Points	V-1	V-2
Emission Units	TK-1, TK-7, TK-2, EU 12	

Calculations of Pilot Gas SO_2 Emissions

SO_2 is based on a material balance with 100% flare efficiency and a maximum 4 ppm fuel Sulfur content.

Gas Stream	Flare Efficiency Fraction	Fuel Burned (lbs/hr)	SO_2 [1] (lb/hr)	SO_2 [1] (TPY)
Fuel Gas	1.00	5.21	4.17E-05	1.83E-04

1. Emissions calculated are equal to (Flare Efficiency Fraction)*(Pilot Fuel Burned)*(Fuel Sulfur Content)*(Mole Wt. of SO2)/(Mole Wt. of Sulfur). Annual emission are converted to tons per year.

ATMOSPHERIC LOADING EMISSIONS
TARGA BADLANDS LLC
HAWKEYE COMPRESSOR STATION
Rev. 7/24/2023

Equation[1]:

$$L_L = \frac{12.46 * SPM}{T}$$

Variables[1]:

L_L - Loading Loss (lbs/1000 gal loaded)
S - Saturation Factor (From Table 5.2-1 of AP-42, Section 5.2)
P - True Vapor Pressure of Loaded Liquid (psia)
M - Molecular Weight of Vapor (lb/lb mol)
T- Temperature of Bulk Liquid (°R = [°F + 460])

EU	EP	Material Loaded	Loading Method	S	P_{max}[2] (psia)	M (lb/lbmol)	T (°R)	L_L (lbs/1000 gal)	Max Hourly Throughput[4] (gal/hr)	Max Hourly Emissions (lb/hr)	Total Hourly Emissions (lb/hr)
FS-1	FS-1	Condensate	Submerged	0.60	15.08	59	546	12.08	10,500	126.825	128.094
		Produced Water	Submerged	0.60	15.08	59	546	12.08	10,500	1.268	

EU	EP	Material Loaded	Loading Method	S	P_{max}[3] (psia)	M (lb/lbmol)	T (°R)	L_L (lbs/1000 gal)	Total Annual Throughput[4] (gallons/yr)	Annual Emissions (tpy)	Total Annual Emissions (tpy)
FS-1	FS-1	Condensate	Submerged	0.60	9.74	59	517	8.25	7,677,375	31.657	31.759
		Produced Water	Submerged	0.60	9.74	59	517	8.25	2,481,024	0.102	

1. Loading Loss Equation and Variables are from AP-42, Section 5.2, Transportation and Marketing of Petroleum Liquids.
2. The true vapor pressure is used to calculate the hourly emission rate and is based on a maximum temperature of 86.2 °F.
3. The annual emissions rate is calculated using the true vapor pressure and an average annual temperature of 56.7 °F
4. The maximum hourly throughput is based on the loading of one 250 barrel tank truck in one-hour. The total annual throughput is based on the total annual throughput for condensate and produced water storage tanks from ProMax Flowsheet 1 and/or Flowsheet 1 PStreams

HAP Emission Calculations

EU	EP	Components	Wt %[1]	Total Hourly Emissions[2] (lb/hr)	Total Annual Emissions[2] (tpy)
FS-1	FS-1	Hexane	1.91%	2.45	0.61
		Benzene	0.15%	0.20	0.05
		Toluene	0.12%	0.15	0.04
		Ethylbenzene	0.01%	0.01	0.003
		Xylene	0.01%	0.02	0.004
		2,2,4-Trimethylpentane	0.09%	0.12	0.03
			Total	**2.94**	**0.73**

1. The component wt % is based on the component speciation from the ProMax working and breathing losses report for the condensate tank.
2. Hourly and annual emissions are calculated by multiplying the total VOC emission rate by the component wt%.

FUGITIVE EMISSIONS
TARGA BADLANDS LLC
HAWKEYE COMPRESSOR STATION
Rev. 7/24/2023

Stream (Service Type)	Equipment Type	Emission Factor[1] (kg/hr/comp.)	Count[2]	LDAR Control Factor	Wt% VOC	Total VOC Emissions[3] (lb/hr)	Total VOC Emissions[4] (tpy)	n-Hexane Content (wt %)	n-Hexane Emissions[3] (lb/hr)	n-Hexane Emissions[4] (tpy)	Total HAP Content (wt %)	Total HAP Emissions[3] (lb/hr)	Total HAP Emissions[4] (tpy)	CO_2 Content (wt %)
Inlet Gas (Gas)	Valves	4.50E-03	793	0%	34.8%	2.7367	11.9866	0.60%	0.0471	0.2064	0.67%	0.0529	0.2315	1.31%
	Pump Seals	2.40E-03	0	0%		--	--		--	--		--	--	
	Others	8.80E-03	243	0%		1.6399	7.1829		0.0282	0.1237		0.0282	0.1237	
	Connectors	2.00E-04	1925	0%		0.2953	1.2932		0.0051	0.0223		0.0051	0.0223	
	Flanges	3.90E-04	968	0%		0.2895	1.2681		0.0050	0.0218		0.0050	0.0218	
	Open-Ended	2.00E-03	30	0%		0.0460	0.2015		0.0008	0.0035		0.0008	0.0035	
Tank Vapors (Gas)	Valves	4.50E-03	260	0%	70.6%	1.8208	7.9753	1.90%	0.0491	0.2150	2.3%	0.0590	0.2586	--
	Pump Seals	2.40E-03	0	0%		--	--		--	--		--	--	
	Others	8.80E-03	34	0%		0.4656	2.0395		0.0126	0.0550		0.0151	0.0661	
	Connectors	2.00E-04	660	0%		0.2054	0.8998		0.0055	0.0243		0.0067	0.0292	
	Flanges	3.90E-04	188	0%		0.1140	0.4994		0.0031	0.0135		0.0037	0.0162	
	Open-Ended	2.00E-03	0	0%		--	--		--	--		--	--	
Condensate (Light Oil)	Valves	2.50E-03	281	0%	100%	1.5434	6.7602	11.71%	0.5387	2.3597	19.38%	0.3002	1.3149	--
	Pump Seals	1.30E-02	0	0%		--	--		--	--		--	--	
	Others	7.50E-03	36	0%		0.5932	2.5982		0.2071	0.9069		0.1154	0.5054	
	Connectors	2.10E-04	665	0%		0.3068	1.3439		0.1071	0.4691		0.0597	0.2614	
	Flanges	1.10E-04	205	0%		0.0495	0.2168		0.0173	0.0757		0.0096	0.0422	
	Open-Ended	1.40E-03	0	0%		--	--		--	--		--	--	
Methanol (Light Oil)	Valves	2.50E-03	144	0%	100%	0.7937	3.4762	--	--	--	100%	0.7937	3.4762	--
	Pump Seals	1.30E-02	20	0%		--	--		--	--		0.5732	2.5106	
	Others	7.50E-03	16	0%		--	--		--	--		0.2646	1.1587	
	Connectors	2.10E-04	292	0%		--	--		--	--		0.1352	0.5921	
	Flanges	1.10E-04	0	0%		--	--		--	--		--	--	
	Open-Ended	1.40E-03	0	0%		--	--		--	--		--	--	
Produced Water (Oil/Water)	Valves	9.80E-05	52	0%	1%	0.0112	0.0492	0.1%	0.0000	0.0001	0.19%	0.0000	0.0001	--
	Pump Seals	2.40E-05	0	0%		--	--		--	--		--	--	
	Others	1.40E-02	14	0%		0.4321	1.8926		0.0005	0.0022		0.0008	0.0037	
	Connectors	1.10E-04	123	0%		0.0298	0.1306		0.0000	0.0002		0.0001	0.0003	
	Flanges	2.90E-06	20	0%		0.0001	0.0005		0.0000	0.0000		0.0000	0.0000	
	Open-Ended	2.50E-04	0	0%		--	--		--	--		--	--	
Triethylene Glycol (Heavy Oil)	Valves	8.40E-06	42	0%	100%	0.0008	0.0034	--	--	--	--	--	--	--
	Pump Seals	NA	0	0%		--	--		--	--		--	--	
	Others	3.20E-05	10	0%		0.0007	0.0031		--	--		--	--	
	Connectors	7.50E-06	136	0%		0.0022	0.0098		--	--		--	--	
	Flanges	3.90E-07	21	0%		0.0000	0.0001		--	--		--	--	
	Open-Ended	1.40E-04	0	0%		--	--		--	--		--	--	
Total							49.8			4.5			10.6	

1. Factors for Oil and Gas Production Operations taken from Table 2-4 from the EPA Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017 (http://www.epa.gov/ttnchie1/efdocs/equiplks.pdf).
2. For gas, condensate, and produced water service: Based on component counts used in original permit application for the Hawkeye facility plus engineering estimates for valves & connectors associated with the expansion project. Pump seals, open-ended valves, and represented in the original permit application. Flanges estimated based on the original ratio of flanges/connectors for each service type, using the updated connector count estimate.
For methanol and TEG service, component counts estimated to be double the number previously represented in the original permit application.
3. Hourly Emissions calculated as follows: Emission Factor * 2.20462 lb/kg * Component Count * (1- Reduction Allowed for LDAR) * Percent Content in Stream.
4. Annual Emissions calculated as follows: Hourly Emissions * 8760 hours/year * (1ton/2000 pounds).

COMPRESSOR BLOWDOWN EMISSIONS
TARGA BADLANDS LLC
HAWKEYE COMPRESSOR STATION
Rev. 7/24/2023

Basis of Calculation:
Emissions from blowdowns are calculated based on a mass balance as follows:

Maximum Uncontrolled Hourly Emissions (lb/hr) = [Volume of blowdown (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# compressors blowndown simultaneously (units)] / [event duration (hr/event/unit)] / [379.5 (scf/lb-mol)]

Maximum Uncontrolled Annual Emissions (tpy) = [Volume of blowdown (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x total annual frequency of events (events/yr)] /

Compressor Blowdown Emissions

Estimated Gas Vented per Blowdown Event [1] =	3,600	scf/event
Compressors at Site =	9	units
Compressors Blowndown Simultaneously =	9	units
Assumed Blowdown Duration =	1	hrs/event/compressor
Blowdowns per compressor =	20	events/yr/compressor
Total Compressor Blowdowns in One Year =	180	events/yr
Molecular Weight of Stream =	25	lb/lb-mol
Control Type =	None	

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
Carbon Dioxide	1.31	28.34	0.28
Oxygen	0.01	0.26	2.56E-03
Nitrogen	2.33	50.46	0.50
Methane	38.60	835.37	8.35
Ethane	22.96	496.76	4.97
Hydrogen Sulfide	--	--	--
Propane	17.01	368.14	3.68
Isobutane	2.46	53.22	0.53
n-Butane	8.18	177.09	1.77
Isopentane	1.98	42.93	0.43
n-Pentane	2.94	63.72	0.64
Cyclopentane	0.02	0.35	3.47E-03
n-Hexane	0.60	12.96	0.13
Cyclohexane	0.07	1.50	0.02
Methylcyclohexane	0.11	2.32	0.02
Other Hexanes	1.11	23.99	0.24
Heptanes	0.22	4.74	0.05
Octane +	9.01E-03	0.20	1.95E-03
Benzene	0.06	1.33	0.01
Toluene	9.82E-03	0.21	2.12E-03
Ethylbenzene	--	--	--
Xylenes	1.26E-03	0.03	2.72E-04
Total	100.00	2163.93	21.64
VOC Totals	34.79	752.74	7.53
HAP Totals	0.67	14.54	0.15
CO_2e	-	20,913	209

[1] This is a representative estimate of the amount of gas vented per blowdown event.

Targa Badlands LLC - Hawkeye Compressor Station
Waukesha L5794GSI Compressor - IC Engine Emissions Calculations
Rev. 7/20/2023

Hawkeye Compressor Station Engine Data (EU TBD)					
IC Engine Make [1]	Waukesha				
IC Engine Model [1]	L5794GSI		Higher Heating Value [2]	1,340.0	Btu/scf
Power Rating [1]	1,347	bhp	Sulfur Content [3]	2.00E-03	gr/scf
Heat Rate (HHV) [1]	8,881	Btu/bhp-hr	Fuel Consumption [1]	8,100	scf/hr
Duty (input)	11.96	MMBtu/hr	Fuel Consumption	78.20	MMscf/yr
Hours per Year	8,760	hr/yr	Exhaust Gas Flow [1]	6,657	acfm

Criteria Pollutant	Emission Factors		Potential to Emit (lb/hr)	Potential to Emit (tpy)	Source of Emission Factors [4]
NO_x	0.63	g/bhp-hr	1.86	8.13	EMIT Catalyst Specification
CO	2.00	g/bhp-hr	5.94	26.01	EMIT Catalyst Specification
VOC	0.64	g/bhp-hr	1.89	8.29	EMIT Catalyst Specification
Formaldehyde [4]	0.025	g/bhp-hr	0.07	0.33	EMIT Catalyst Specification
SO_2 [3]	5.88E-04	lb/MMBtu	7.03E-03	0.03	AP-42 Tbl 3.2-3; 4SRB (7/00)
PM_{10} [5]	0.019	lb/MMBtu	0.23	1.02	AP-42 Tbl 3.2-3; 4SRB (7/00)
$PM_{2.5}$ [5]	0.019	lb/MMBtu	0.23	1.02	AP-42 Tbl 3.2-3; 4SRB (7/00)
TSP	0.019	lb/MMBtu	0.23	1.02	AP-42 Tbl 3.2-3; 4SRB (7/00)
Total HAP	-	-	0.22	0.95	--

GHG	Uncontrolled Emission Factors		GHG Emissions lb/hr	GHG Emissions tpy	Source of Emission Factors
CO_2	110	lb/MMBtu	1,315.90	5,763.63	AP-42 Table 3.2-3, 4SRB Engines
CH_4	0.23	lb/MMBtu	2.75	12.05	AP-42 Table 3.2-3, 4SRB Engines
CO_2e	115.75	lb/MMBtu	1,384.68	6,064.91	--

Sample Calculations:

(bhp) (Btu/bhp-hr) (MM/10^6) = MMBtu/hr; (MMBtu/hr) / (Btu/scf) (10^6/MM) = scf/hr
(g/bhp-hr) (bhp) (lb/453.59 g) = lb/hr; (lb/MMBtu) (MMBtu/hr) = lb/hr
(lb/hr) (hrs/yr) (ton/2000 lb) = tons/yr

1. Information from manufacturer's or catalyst specification sheet.
2. Higher heating value based on site specific data.
3. SO_2 emissions based on AP-42 Section 3.2, Table 3.2-3 footnote e (7/00), which is based on 100% conversion of sulfur to SO_2 at 2,000 grains/MMscf. Sulfur content of fuel at the Baklenko Compressor Station assumed to be 2,000 grains/MMscf.
4. EMIT Catalyst emission factors for NOx, VOC, and HCHO include a 25% buffer, to allow for greater operational flexibility of this unit.
5. Emission factor for TSP, PM_{10} and $PM_{2.5}$ from AP-42 Section 3.2, Table 3.2-3 (7/00); includes PM_{10}/$PM_{2.5}$ filterable (9.50e-03 lb/MMBtu) and PM condensable (9.91e-3 lb/MMBtu) = 0.01941 lb/MMBtu.

HAP	Rich Burn Emission Factors [1] (lb/MMBtu)	HAP Emissions	
		(lb/hr)	(tpy)
1,1,2,2-Tetrachloroethane	2.53E-05	3.03E-04	1.33E-03
1,1,2-Trichloroethane	1.53E-05	1.83E-04	8.02E-04
1,3-Butadiene	6.63E-04	7.93E-03	0.03
1,3-Dichloropropene	1.27E-05	1.52E-04	6.65E-04
Acetaldehyde	2.79E-03	0.03	0.15
Acrolein	2.63E-03	0.03	0.14
Benzene	1.58E-03	0.02	0.08
Carbon Tetrachloride	1.77E-05	2.12E-04	9.27E-04
Chlorobenzene	1.29E-05	1.54E-04	6.76E-04
Chloroform	1.37E-05	1.64E-04	7.18E-04
Ethylbenzene	2.48E-05	2.97E-04	1.30E-03
Ethylene Dibromide	2.13E-05	2.55E-04	1.12E-03
Formaldehyde [2]	-	0.07	0.33
Methanol	3.06E-03	0.04	0.16
Methylene Chloride	4.12E-05	4.93E-04	2.16E-03
Naphthalene	9.71E-05	1.16E-03	5.09E-03
PAH	1.41E-04	1.69E-03	7.39E-03
Styrene	1.19E-05	1.42E-04	6.24E-04
Toluene	5.58E-04	6.68E-03	0.03
Vinyl Chloride	7.18E-06	8.59E-05	3.76E-04
Xylene	1.95E-04	2.33E-03	0.01
Total HAP Emissions		**0.22**	**0.95**

1. HAP emission factors from AP-42 Section 3.2, Table 3.2-3 (7/00).

2. Formaldehyde emission factor from engine manufacturer and EMIT catalytst specification sheets

Targa Badlands LLC - Hawkeye Compressor Station
Waukesha L7042-S5 Compressor - IC Engine Emissions Calculations
Rev. 7/20/2023

Hawkeye Compressor Station Engine Data (EU TBD)					
IC Engine Make [1]	Waukesha				
IC Engine Model [1]	L7042-S5		Higher Heating Value [2]	1,340.0	Btu/scf
Power Rating [1]	1,500	bhp	Sulfur Content [3]	2.00E-03	gr/scf
Heat Rate (HHV) [1]	8,469	Btu/bhp-hr	Fuel Consumption [1]	8,580	scf/hr
Duty (input)	12.70	MMBtu/hr	Fuel Consumption	83.05	MMscf/yr
Hours per Year	8,760	hr/yr	Exhaust Gas Flow [1]	7,061	acfm

Criteria Pollutant	Emission Factors		Potential to Emit (lb/hr)	Potential to Emit (tpy)	Source of Emission Factors [4]
NO_x	0.63	g/bhp-hr	2.07	9.05	EMIT Catalyst Specification
CO	2.00	g/bhp-hr	6.61	28.97	EMIT Catalyst Specification
VOC	0.18	g/bhp-hr	0.58	2.53	EMIT Catalyst Specification
Formaldehyde	0.025	g/bhp-hr	0.08	0.36	EMIT Catalyst Specification
SO_2 [3]	5.88E-04	lb/MMBtu	7.47E-03	0.03	AP-42 Tbl 3.2-3; 4SRB (7/00)
PM_{10} [5]	0.019	lb/MMBtu	0.25	1.08	AP-42 Tbl 3.2-3; 4SRB (7/00)
$PM_{2.5}$ [5]	0.019	lb/MMBtu	0.25	1.08	AP-42 Tbl 3.2-3; 4SRB (7/00)
TSP	0.019	lb/MMBtu	0.25	1.08	AP-42 Tbl 3.2-3; 4SRB (7/00)
Total HAP	-	-	0.23	1.03	--

GHG	Uncontrolled Emission Factors		GHG Emissions lb/hr	GHG Emissions tpy	Source of Emission Factors
CO_2	110	lb/MMBtu	1,397.39	6,120.55	AP-42 Table 3.2-3, 4SRB Engines
CH_4	0.23	lb/MMBtu	2.92	12.80	AP-42 Table 3.2-3, 4SRB Engines
CO_2e	115.75	lb/MMBtu	1,470.43	6,440.48	--

Sample Calculations:

(bhp) (Btu/bhp-hr) (MM/10^6) = MMBtu/hr; (MMBtu/hr) / (Btu/scf) (10^6/MM) = scf/hr
(g/bhp-hr) (bhp) (lb/453.59 g) = lb/hr; (lb/MMBtu) (MMBtu/hr) = lb/hr
(lb/hr) (hrs/yr) (ton/2000 lb) = tons/yr

1. Information from manufacturer's or catalyst specification sheet.
2. Higher heating value based on site specific data.
3. SO_2 emissions based on AP-42 Section 3.2, Table 3.2-3 footnote e (7/00), which is based on 100% conversion of sulfur to SO_2 at 2,000 grains/MMscf. Sulfur content of fuel at the Baklenko Compressor Station assumed to be 2,000 grains/MMscf.
4. EMIT Catalyst emission factors for NOx, VOC, and HCHO include a 25% buffer, to allow for greater operational flexibility of this unit.
5. Emission factor for TSP, PM_{10} and $PM_{2.5}$ from AP-42 Section 3.2, Table 3.2-3 (7/00); includes PM_{10}/$PM_{2.5}$ filterable (9.50e-03 lb/MMBtu) and PM condensable (9.91e-3 lb/MMBtu) = 0.01941 lb/MMBtu.

HAP	Rich Burn Emission Factors [1] (lb/MMBtu)	HAP Emissions	
		(lb/hr)	(tpy)
1,1,2,2-Tetrachloroethane	2.53E-05	3.21E-04	1.41E-03
1,1,2-Trichloroethane	1.53E-05	1.94E-04	8.51E-04
1,3-Butadiene	6.63E-04	8.42E-03	0.04
1,3-Dichloropropene	1.27E-05	1.61E-04	7.07E-04
Acetaldehyde	2.79E-03	0.04	0.16
Acrolein	2.63E-03	0.03	0.15
Benzene	1.58E-03	0.02	0.09
Carbon Tetrachloride	1.77E-05	2.25E-04	9.85E-04
Chlorobenzene	1.29E-05	1.64E-04	7.18E-04
Chloroform	1.37E-05	1.74E-04	7.62E-04
Ethylbenzene	2.48E-05	3.15E-04	1.38E-03
Ethylene Dibromide	2.13E-05	2.71E-04	1.19E-03
Formaldehyde [2]	-	0.08	0.36
Methanol	3.06E-03	0.04	0.17
Methylene Chloride	4.12E-05	5.23E-04	2.29E-03
Naphthalene	9.71E-05	1.23E-03	5.40E-03
PAH	1.41E-04	1.79E-03	7.85E-03
Styrene	1.19E-05	1.51E-04	6.62E-04
Toluene	5.58E-04	7.09E-03	0.03
Vinyl Chloride	7.18E-06	9.12E-05	4.00E-04
Xylene	1.95E-04	2.48E-03	0.01
Total HAP Emissions		**0.23**	**1.03**

1. HAP emission factors from AP-42 Section 3.2, Table 3.2-3 (7/00).

2. Formaldehyde emission factor from engine manufacturer and EMIT catalytst specification sheets

Targa Badlands LLC - Hawkeye Compressor Station
Waukesha L7044-S5 Compressor - IC Engine Emissions Calculations
Rev. 7/20/2023

Hawkeye Compressor Station Engine Data (EU TBD)					
IC Engine Make [1]	Waukesha				
IC Engine Model [1]	L7044-S5		Higher Heating Value [2]	1,340.0	Btu/scf
Power Rating [1]	1,790	bhp	Sulfur Content [3]	2.00E-03	gr/scf
Heat Rate (HHV) [1]	8,368	Btu/bhp-hr	Fuel Consumption [1]	10,080	scf/hr
Duty (input)	14.98	MMBtu/hr	Fuel Consumption	97.92	MMscf/yr
Hours per Year	8,760	hr/yr	Exhaust Gas Flow [1]	8,440	acfm

Criteria Pollutant	Emission Factors		Potential to Emit (lb/hr)	Potential to Emit (tpy)	Source of Emission Factors [4]
NO_x	0.63	g/bhp-hr	2.47	10.80	EMIT Catalyst Specification
CO	2.00	g/bhp-hr	7.89	34.57	EMIT Catalyst Specification
VOC	0.13	g/bhp-hr	0.49	2.16	EMIT Catalyst Specification
Formaldehyde [4]	0.025	g/bhp-hr	0.10	0.43	EMIT Catalyst Specification
SO_2 [3]	5.88E-04	lb/MMBtu	8.81E-03	0.04	AP-42 Tbl 3.2-3; 4SRB (7/00)
PM_{10} [5]	0.019	lb/MMBtu	0.29	1.27	AP-42 Tbl 3.2-3; 4SRB (7/00)
$PM_{2.5}$ [5]	0.019	lb/MMBtu	0.29	1.27	AP-42 Tbl 3.2-3; 4SRB (7/00)
TSP	0.019	lb/MMBtu	0.29	1.27	AP-42 Tbl 3.2-3; 4SRB (7/00)
Total HAP	-	-	0.28	1.21	--

GHG	Uncontrolled Emission Factors		GHG Emissions lb/hr	GHG Emissions tpy	Source of Emission Factors
CO_2	110	lb/MMBtu	1,647.66	7,216.75	AP-42 Table 3.2-3, 4SRB Engines
CH_4	0.23	lb/MMBtu	3.45	15.09	AP-42 Table 3.2-3, 4SRB Engines
CO_2e	115.75	lb/MMBtu	1,733.79	7,593.99	--

Sample Calculations:

(bhp) (Btu/bhp-hr) (MM/10^6) = MMBtu/hr; (MMBtu/hr) / (Btu/scf) (10^6/MM) = scf/hr
(g/bhp-hr) (bhp) (lb/453.59 g) = lb/hr; (lb/MMBtu) (MMBtu/hr) = lb/hr
(lb/hr) (hrs/yr) (ton/2000 lb) = tons/yr

1. Information from manufacturer's or catalyst specification sheet.
2. Higher heating value based on site specific data.
3. SO_2 emissions based on AP-42 Section 3.2, Table 3.2-3 footnote e (7/00), which is based on 100% conversion of sulfur to SO_2 at 2,000 grains/MMscf. Sulfur content of fuel at the Baklenko Compressor Station assumed to be 2,000 grains/MMscf.
4. EMIT Catalyst emission factors for NOx, VOC, and HCHO include a 25% buffer, to allow for greater operational flexibility of this unit.
5. Emission factor for TSP, PM_{10} and $PM_{2.5}$ from AP-42 Section 3.2, Table 3.2-3 (7/00); includes PM_{10}/$PM_{2.5}$ filterable (9.50e-03 lb/MMBtu) and PM condensable (9.91e-3 lb/MMBtu) = 0.01941 lb/MMBtu.

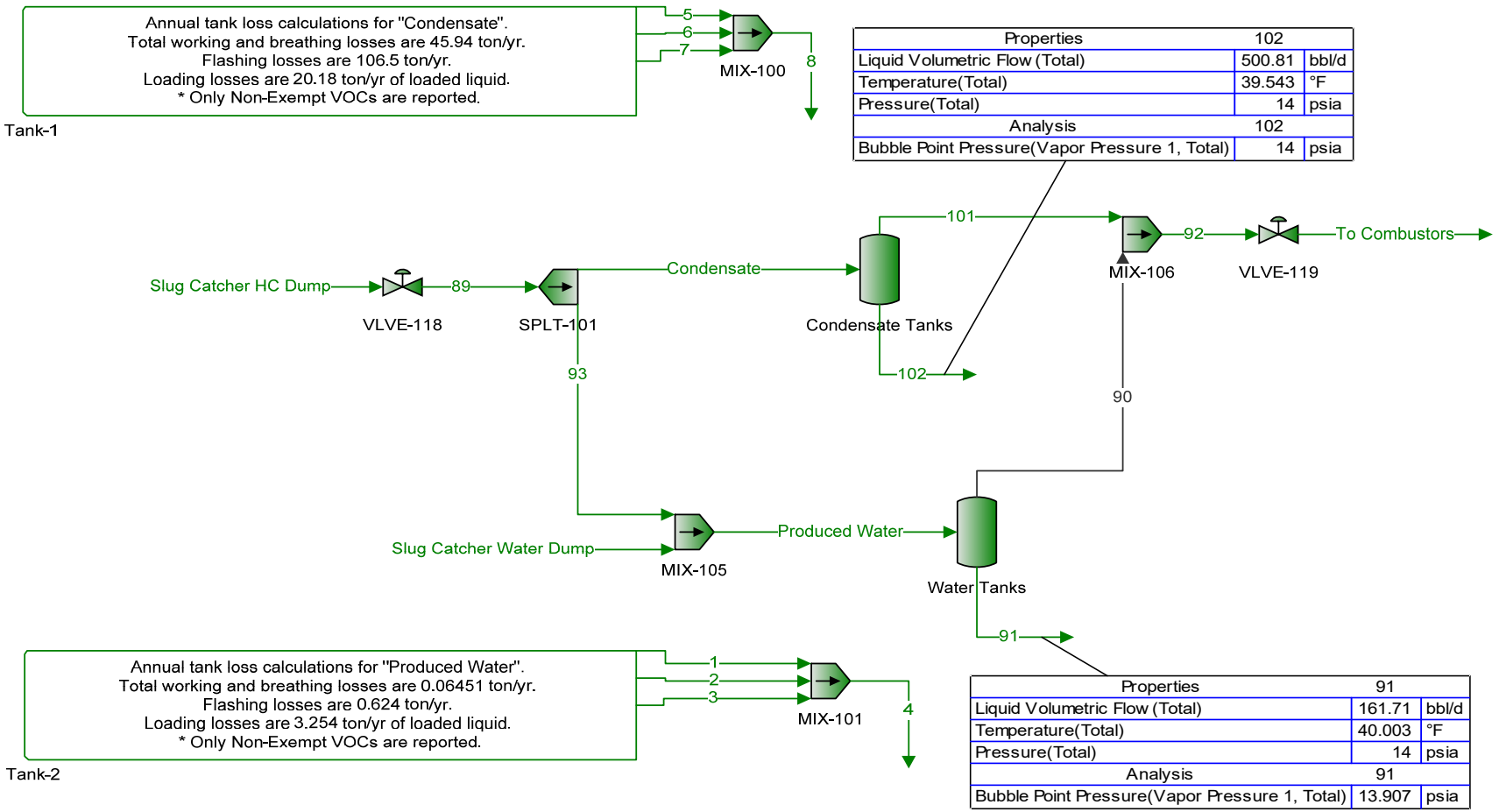
HAP	Rich Burn Emission Factors [1] (lb/MMBtu)	HAP Emissions	
		(lb/hr)	(tpy)
1,1,2,2-Tetrachloroethane	2.53E-05	3.79E-04	1.66E-03
1,1,2-Trichloroethane	1.53E-05	2.29E-04	1.00E-03
1,3-Butadiene	6.63E-04	9.93E-03	0.04
1,3-Dichloropropene	1.27E-05	1.90E-04	8.33E-04
Acetaldehyde	2.79E-03	0.04	0.18
Acrolein	2.63E-03	0.04	0.17
Benzene	1.58E-03	0.02	0.10
Carbon Tetrachloride	1.77E-05	2.65E-04	1.16E-03
Chlorobenzene	1.29E-05	1.93E-04	8.46E-04
Chloroform	1.37E-05	2.05E-04	8.99E-04
Ethylbenzene	2.48E-05	3.71E-04	1.63E-03
Ethylene Dibromide	2.13E-05	3.19E-04	1.40E-03
Formaldehyde [2]	-	0.10	0.43
Methanol	3.06E-03	0.05	0.20
Methylene Chloride	4.12E-05	6.17E-04	2.70E-03
Naphthalene	9.71E-05	1.45E-03	6.37E-03
PAH	1.41E-04	2.11E-03	9.25E-03
Styrene	1.19E-05	1.78E-04	7.81E-04
Toluene	5.58E-04	8.36E-03	0.04
Vinyl Chloride	7.18E-06	1.08E-04	4.71E-04
Xylene	1.95E-04	2.92E-03	0.01
Total HAP Emissions		**0.28**	**1.21**

1. HAP emission factors from AP-42 Section 3.2, Table 3.2-3 (7/00).

2. Formaldehyde emission factor from engine manufacturer and EMIT catalytst specification sheets

APPENDIX C: PROMAX OUTPUT FILES

Hawkeye Compressor Station
- (2) 400-bbl Condensate Tanks
- (1) 400-bbl Produced Water Tank



Process Streams		Condensate	Slug Catcher HC Dump	Slug Catcher Water Dump	To Combustors	89
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	SPLT-101	--	--	VLVE-119	VLVE-118
	To Block:	Condensate Tanks	VLVE-118	MIX-105	--	SPLT-101
Mole Fraction		%	%	%	%	%
Carbon Dioxide		0	0*	0*	0	0
Nitrogen		0.0844932	0.0844932*	0*	14.9584	0.0844932
Methane		0.115926	0.115926*	0*	11.7635	0.115926
Ethane		0.992396	0.992396*	0*	20.2410	0.992396
Propane		4.61435	4.61435*	0*	25.6033	4.61435
i-Butane		2.12635	2.12635*	0*	4.17212	2.12635
n-Butane		10.2376	10.2376*	0*	12.7471	10.2376
i-Pentane		6.86357	6.86357*	0*	3.15528	6.86357
n-Pentane		13.7728	13.7728*	0*	4.48123	13.7728
n-Hexane		11.4702	11.4702*	0*	0.913561	11.4702
Heptane		19.9097	19.9097*	0*	0.424668	19.9097
Octane		9.55244	9.55244*	0*	0.0550466	9.55244
Nonane		1.86593	1.86593*	0*	0.00283591	1.86593
Decane		0.518675	0.518675*	0*	0.000230326	0.518675
Water		0	0*	100*	0	0
TEG		0	0*	0*	0	0
EG		0	0*	0*	0	0
2-Methylpentane		8.07616	8.07616*	0*	0.968733	8.07616
3-Methylpentane		3.21948	3.21948*	0*	0.337181	3.21948
2,2,4-Trimethylpentane		1.39794	1.39794*	0*	0.0334565	1.39794
Benzene		0.959923	0.959923*	0*	0.0810422	0.959923
Toluene		2.54505	2.54505*	0*	0.0524284	2.54505
Ethylbenzene		0.612315	0.612315*	0*	0.00347411	0.612315
m-Xylene		0.122622	0.122622*	0*	0.000620907	0.122622
p-Xylene		0.761213	0.761213*	0*	0.00404879	0.761213
o-Xylene		0.180748	0.180748*	0*	0.000813508	0.180748

Process Streams		90	91	92	93	101	102	4	8
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	Water Tanks	Water Tanks	MIX-106	SPLT-101	Condensate Tanks	Condensate Tanks	MIX-101	MIX-100
	To Block:	MIX-106	--	VLVE-119	MIX-105	MIX-106	--	--	--
Mole Fraction			%	%	%	%	%	%	%
Carbon Dioxide			0	0	0	0	0	0	0
Nitrogen			0.000394395	14.9584	0.0844932	14.9584	0.0220630	5.84437	4.89202
Methane			0.000541117	11.7635	0.115926	11.7635	0.0670378	5.13531	5.66006
Ethane			0.00463228	20.2410	0.992396	20.2410	0.911604	15.4248	22.1020
Propane			0.0215387	25.6033	4.61435	25.6033	4.52625	23.9305	30.9600
i-Butane			0.00992532	4.17212	2.12635	4.17212	2.11777	4.19921	5.28487
n-Butane			0.0477868	12.7471	10.2376	12.7471	10.2271	13.1647	16.6778
i-Pentane			0.0320376	3.15528	6.86357	3.15528	6.87914	3.39072	4.21266
n-Pentane			0.0642885	4.48123	13.7728	4.48123	13.8118	4.90734	6.08671
n-Hexane			0.0535405	0.913561	11.4702	0.913561	11.5146	1.06347	1.32264
Heptane			0.0929341	0.424668	19.9097	0.424668	19.9915	0.516869	0.635810
Octane			0.0445886	0.0550466	9.55244	0.0550466	9.59230	0.0697418	0.0835389
Nonane			0.00870973	0.00283591	1.86593	0.00283591	1.87375	0.00378194	0.00447535
Decane			0.00242105	0.000230326	0.518675	0.000230326	0.520851	0.000320590	0.000376815
Water			99.5332	0	0	0	0	20.6736	0
TEG			0	0	0	0	0	0	0
EG			0	0	0	0	0	0	0
2-Methylpentane			0.0376977	0.968733	8.07616	0.968733	8.10599	1.09928	1.36444
3-Methylpentane			0.0150278	0.337181	3.21948	0.337181	3.23157	0.385057	0.478774
2,2,4-Trimethylpentane			0.00652524	0.0334565	1.39794	0.0334565	1.40366	0.0401655	0.0495691
Benzene			0.00448070	0.0810422	0.959923	0.0810422	0.963612	0.0796200	0.101617
Toluene			0.0118797	0.0524284	2.54505	0.0524284	2.55551	0.0600987	0.0700519
Ethylbenzene			0.00285815	0.00347411	0.612315	0.00347411	0.614870	0.00427467	0.00490582
m-Xylene			0.000572372	0.000620907	0.122622	0.000620907	0.123134	0.000766385	0.000873368
p-Xylene			0.00355317	0.00404879	0.761213	0.00404879	0.764391	0.00498372	0.00571321
o-Xylene			0.000843692	0.000813508	0.180748	0.000813508	0.181504	0.000996857	0.00112156

Process Streams		Condensate	Slug Catcher HC Dump	Slug Catcher Water Dump	To Combustors	89
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	SPLT-101	--	--	VLVE-119	VLVE-118
	To Block:	Condensate Tanks	VLVE-118	MIX-105	--	SPLT-101
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Carbon Dioxide		0	0*	0*	0	0
Nitrogen		0.0498788	0.0503826*	0*	0.0369087	0.0503826
Methane		0.0684345	0.0691258*	0*	0.0290256	0.0691258
Ethane		0.585839	0.591757*	0*	0.0499432	0.591757
Propane		2.72398	2.75150*	0*	0.0631742	2.75150
i-Butane		1.25525	1.26792*	0*	0.0102944	1.26792
n-Butane		6.04355	6.10460*	0*	0.0314524	6.10460
i-Pentane		4.05176	4.09269*	0*	0.00778541	4.09269
n-Pentane		8.13050	8.21262*	0*	0.0110571	8.21262
n-Hexane		6.77121	6.83960*	0*	0.00225415	6.83960
Heptane		11.7533	11.8720*	0*	0.00104784	11.8720
Octane		5.63907	5.69603*	0*	0.000135823	5.69603
Nonane		1.10151	1.11264*	0*	6.99740E-06	1.11264
Decane		0.306188	0.309281*	0*	5.68313E-07	0.309281
Water		0	0*	127.150*	0	0
TEG		0	0*	0*	0	0
EG		0	0*	0*	0	0
2-Methylpentane		4.76758	4.81574*	0*	0.00239028	4.81574
3-Methylpentane		1.90055	1.91975*	0*	0.000831971	1.91975
2,2,4-Trimethylpentane		0.825241	0.833577*	0*	8.25515E-05	0.833577
Benzene		0.566670	0.572394*	0*	0.000199966	0.572394
Toluene		1.50241	1.51759*	0*	0.000129363	1.51759
Ethylbenzene		0.361467	0.365118*	0*	8.57211E-06	0.365118
m-Xylene		0.0723874	0.0731185*	0*	1.53204E-06	0.0731185
p-Xylene		0.449366	0.453905*	0*	9.99010E-06	0.453905
o-Xylene		0.106701	0.107779*	0*	2.00727E-06	0.107779

Process Streams		90	91	92	93	101	102	4	8
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	Water Tanks	Water Tanks	MIX-106	SPLT-101	Condensate Tanks	Condensate Tanks	MIX-101	MIX-100
	To Block:	MIX-106	--	VLVE-119	MIX-105	MIX-106	--	--	--
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Carbon Dioxide		0	0	0	0	0	0	0	0
Nitrogen		0	0.000503826	0.0369087	0.000503826	0.0369087	0.0129700	0.000310300	0.0453578
Methane		0	0.000691258	0.0290256	0.000691258	0.0290256	0.0394089	0.000272654	0.0524789
Ethane		0	0.00591757	0.0499432	0.00591757	0.0499432	0.535896	0.000818960	0.204925
Propane		0	0.0275150	0.0631742	0.0275150	0.0631742	2.66081	0.00127056	0.287055
i-Butane		0	0.0126792	0.0102944	0.0126792	0.0102944	1.24495	0.000222952	0.0490002
n-Butane		0	0.0610460	0.0314524	0.0610460	0.0314524	6.01210	0.000698967	0.154633
i-Pentane		0	0.0409269	0.00778541	0.0409269	0.00778541	4.04397	0.000180026	0.0390589
n-Pentane		0	0.0821262	0.0110571	0.0821262	0.0110571	8.11944	0.000260550	0.0564347
n-Hexane		0	0.0683960	0.00225415	0.0683960	0.00225415	6.76895	5.64637E-05	0.0122632
Heptane		0	0.118720	0.00104784	0.118720	0.00104784	11.7522	2.74426E-05	0.00589510
Octane		0	0.0569603	0.000135823	0.0569603	0.000135823	5.63894	3.70286E-06	0.000774555
Nonane		0	0.0111264	6.99740E-06	0.0111264	6.99740E-06	1.10150	2.00798E-07	4.14945E-05
Decane		0	0.00309281	5.68313E-07	0.00309281	5.68313E-07	0.306188	1.70214E-08	3.49375E-06
Water		0	127.150	0	0	0	0	0.00109764	0
TEG		0	0	0	0	0	0	0	0
EG		0	0	0	0	0	0	0	0
2-Methylpentane		0	0.0481574	0.00239028	0.0481574	0.00239028	4.76519	5.83652E-05	0.0126508
3-Methylpentane		0	0.0191975	0.000831971	0.0191975	0.000831971	1.89972	2.04442E-05	0.00443909
2,2,4-Trimethylpentane		0	0.00833577	8.25515E-05	0.00833577	8.25515E-05	0.825158	2.13254E-06	0.000459594
Benzene		0	0.00572394	0.000199966	0.00572394	0.000199966	0.566470	4.22734E-06	0.000942167
Toluene		0	0.0151759	0.000129363	0.0151759	0.000129363	1.50228	3.19088E-06	0.000649507
Ethylbenzene		0	0.00365118	8.57211E-06	0.00365118	8.57211E-06	0.361458	2.26959E-07	4.54857E-05
m-Xylene		0	0.000731185	1.53204E-06	0.000731185	1.53204E-06	0.0723858	4.06903E-08	8.09768E-06
p-Xylene		0	0.00453905	9.99010E-06	0.00453905	9.99010E-06	0.449356	2.64605E-07	5.29716E-05
o-Xylene		0	0.00107779	2.00727E-06	0.00107779	2.00727E-06	0.106699	5.29270E-08	1.03989E-05

Process Streams		Condensate	Slug Catcher HC Dump	Slug Catcher Water Dump	To Combustors	89
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	SPLT-101	--	--	VLVE-119	VLVE-118
	To Block:	Condensate Tanks	VLVE-118	MIX-105	--	SPLT-101
Mass Fraction		%	%	%	%	%
Carbon Dioxide		0	0*	0*	0	0
Nitrogen		0.028	0.028*	0*	10.1311	0.028
Methane		0.022	0.022*	0*	4.56259	0.022
Ethane		0.353	0.353*	0*	14.7148	0.353
Propane		2.407	2.407*	0*	27.2957	2.407
i-Butane		1.462	1.462*	0*	5.86276	1.462
n-Butane		7.039	7.039*	0*	17.9125	7.039
i-Pentane		5.858	5.858*	0*	5.50389	5.858
n-Pentane		11.755	11.755*	0*	7.81682	11.755
n-Hexane		11.693	11.693*	0*	1.90338	11.693
Heptane		23.6	23.6*	0*	1.02880	23.6
Octane		12.908	12.908*	0*	0.152023	12.908
Nonane		2.831	2.831*	0*	0.00879369	2.831
Decane		0.873	0.873*	0*	0.000792312	0.873
Water		0	0*	100*	0	0
TEG		0	0*	0*	0	0
EG		0	0*	0*	0	0
2-Methylpentane		8.233	8.233*	0*	2.01832	8.233
3-Methylpentane		3.282	3.282*	0*	0.702507	3.282
2,2,4-Trimethylpentane		1.889	1.889*	0*	0.0923972	1.889
Benzene		0.887	0.887*	0*	0.153049	0.887
Toluene		2.774	2.774*	0*	0.116792	2.774
Ethylbenzene		0.769	0.769*	0*	0.00891720	0.769
m-Xylene		0.154	0.154*	0*	0.00159372	0.154
p-Xylene		0.956	0.956*	0*	0.0103923	0.956
o-Xylene		0.227	0.227*	0*	0.00208808	0.227

Process Streams		90	91	92	93	101	102	4	8
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	Water Tanks	Water Tanks	MIX-106	SPLT-101	Condensate Tanks	Condensate Tanks	MIX-101	MIX-100
	To Block:	MIX-106	--	VLVE-119	MIX-105	MIX-106	--	--	--
Mass Fraction			%	%	%	%	%	%	%
Carbon Dioxide			0	0	0	0	0	0	0
Nitrogen			0.000602886	10.1311	0.028	10.1311	0.00729578	4.04961	2.95011
Methane			0.000473696	4.56259	0.022	4.56259	0.0126949	2.03774	1.95468
Ethane			0.00760067	14.7148	0.353	14.7148	0.323568	11.4722	14.3065
Propane			0.0518266	27.2957	2.407	27.2957	2.35600	26.1010	29.3887
i-Butane			0.0314793	5.86276	1.462	5.86276	1.45298	6.03699	6.61242
n-Butane			0.151561	17.9125	7.039	17.9125	7.01672	18.9262	20.8672
i-Pentane			0.126132	5.50389	5.858	5.50389	5.85873	6.05105	6.54288
n-Pentane			0.253104	7.81682	11.755	7.81682	11.7631	8.75761	9.45356
n-Hexane			0.251769	1.90338	11.693	1.90338	11.7131	2.26683	2.45363
Heptane			0.508147	1.02880	23.6	1.02880	23.6463	1.28105	1.37147
Octane			0.277930	0.152023	12.908	0.152023	12.9341	0.197051	0.205422
Nonane			0.0609561	0.00879369	2.831	0.00879369	2.83678	0.0119977	0.0123562
Decane			0.0187971	0.000792312	0.873	0.000792312	0.874787	0.00112826	0.00115415
Water			97.8468	0	0	0	0	9.21230	0
TEG			0	0	0	0	0	0	0
EG			0	0	0	0	0	0	0
2-Methylpentane			0.177270	2.01832	8.233	2.01832	8.24574	2.34316	2.53116
3-Methylpentane			0.0706668	0.702507	3.282	0.702507	3.28729	0.820764	0.888173
2,2,4-Trimethylpentane			0.0406733	0.0923972	1.889	0.0923972	1.89268	0.113485	0.121890
Benzene			0.0190986	0.153049	0.887	0.153049	0.888504	0.153833	0.170870
Toluene			0.0597288	0.116792	2.774	0.116792	2.77945	0.136967	0.138945
Ethylbenzene			0.0165578	0.00891720	0.769	0.00891720	0.770558	0.0112252	0.0112118
m-Xylene			0.00331587	0.00159372	0.154	0.00159372	0.154312	0.00201251	0.00199601
p-Xylene			0.0205842	0.0103923	0.956	0.0103923	0.957938	0.0130871	0.0130570
o-Xylene			0.00488768	0.00208808	0.227	0.00208808	0.227461	0.00261773	0.00256323

Process Streams		Condensate	Slug Catcher HC Dump	Slug Catcher Water Dump	To Combustors	89
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	SPLT-101	--	--	VLVE-119	VLVE-118
	To Block:	Condensate Tanks	VLVE-118	MIX-105	--	SPLT-101
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h
Carbon Dioxide		0	0*	0*	0	0
Nitrogen		1.39727	1.41139*	0*	1.03394	1.41139
Methane		1.09786	1.10895*	0*	0.465642	1.10895
Ethane		17.6156	17.7936*	0*	1.50175	17.7936
Propane		120.116	121.329*	0*	2.78570	121.329
i-Butane		72.9576	73.6946*	0*	0.598333	73.6946
n-Butane		351.265	354.813*	0*	1.82808	354.813
i-Pentane		292.330	295.282*	0*	0.561708	295.282
n-Pentane		586.605	592.531*	0*	0.797757	592.531
n-Hexane		583.511	589.405*	0*	0.194252	589.405
Heptane		1177.70	1189.60*	0*	0.104995	1189.60
Octane		644.143	650.650*	0*	0.0155149	650.650
Nonane		141.274	142.701*	0*	0.000897453	142.701
Decane		43.5650	44.0050*	0*	8.08605E-05	44.0050
Water		0	0*	2290.65*	0	0
TEG		0	0*	0*	0	0
EG		0	0*	0*	0	0
2-Methylpentane		410.848	414.998*	0*	0.205983	414.998
3-Methylpentane		163.780	165.435*	0*	0.0716954	165.435
2,2,4-Trimethylpentane		94.2661	95.2182*	0*	0.00942973	95.2182
Benzene		44.2636	44.7107*	0*	0.0156197	44.7107
Toluene		138.430	139.828*	0*	0.0119193	139.828
Ethylbenzene		38.3751	38.7627*	0*	0.000910058	38.7627
m-Xylene		7.68500	7.76263*	0*	0.000162649	7.76263
p-Xylene		47.7069	48.1888*	0*	0.00106060	48.1888
o-Xylene		11.3279	11.4423*	0*	0.000213102	11.4423

Process Streams		90	91	92	93	101	102	4	8
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	Water Tanks	Water Tanks	MIX-106	SPLT-101	Condensate Tanks	Condensate Tanks	MIX-101	MIX-100
	To Block:	MIX-106	--	VLVE-119	MIX-105	MIX-106	--	--	--
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Carbon Dioxide		0	0	0	0	0	0	0	0
Nitrogen		0	0.0141139	1.03394	0.0141139	1.03394	0.363334	0.00869256	1.27063
Methane		0	0.0110895	0.465642	0.0110895	0.465642	0.632215	0.00437403	0.841891
Ethane		0	0.177936	1.50175	0.177936	1.50175	16.1139	0.0246253	6.16189
Propane		0	1.21329	2.78570	1.21329	2.78570	117.330	0.0560263	12.6578
i-Butane		0	0.736946	0.598333	0.736946	0.598333	72.3593	0.0129585	2.84800
n-Butane		0	3.54813	1.82808	3.54813	1.82808	349.436	0.0406255	8.98763
i-Pentane		0	2.95282	0.561708	2.95282	0.561708	291.768	0.0129887	2.81805
n-Pentane		0	5.92531	0.797757	5.92531	0.797757	585.808	0.0187984	4.07169
n-Hexane		0	5.89405	0.194252	5.89405	0.194252	583.317	0.00486578	1.05679
Heptane		0	11.8960	0.104995	11.8960	0.104995	1177.60	0.00274980	0.590700
Octane		0	6.50650	0.0155149	6.50650	0.0155149	644.128	0.000422973	0.0884763
Nonane		0	1.42701	0.000897453	1.42701	0.000897453	141.273	2.57533E-05	0.00532188
Decane		0	0.440050	8.08605E-05	0.440050	8.08605E-05	43.5649	2.42183E-06	0.000497096
Water		0	2290.65	0	0	0	0	0.0197743	0
TEG		0	0	0	0	0	0	0	0
EG		0	0	0	0	0	0	0	0
2-Methylpentane		0	4.14998	0.205983	4.14998	0.205983	410.642	0.00502964	1.09019
3-Methylpentane		0	1.65435	0.0716954	1.65435	0.0716954	163.709	0.00176178	0.382540
2,2,4-Trimethylpentane		0	0.952182	0.00942973	0.952182	0.00942973	94.2566	0.000243597	0.0524988
Benzene		0	0.447107	0.0156197	0.447107	0.0156197	44.2480	0.000330205	0.0735944
Toluene		0	1.39828	0.0119193	1.39828	0.0119193	138.418	0.000294002	0.0598445
Ethylbenzene		0	0.387627	0.000910058	0.387627	0.000910058	38.3742	2.40951E-05	0.00482899
m-Xylene		0	0.0776263	0.000162649	0.0776263	0.000162649	7.68484	4.31989E-06	0.000859690
p-Xylene		0	0.481888	0.00106060	0.481888	0.00106060	47.7058	2.80918E-05	0.00562373
o-Xylene		0	0.114423	0.000213102	0.114423	0.000213102	11.3277	5.61899E-06	0.00110400

Process Streams		Condensate	Slug Catcher HC Dump	Slug Catcher Water Dump	To Combustors	89
Composition	**Status:**	Solved	Solved	Solved	Solved	Solved
Phase: **Total**	**From Block:**	SPLT-101	--	--	VLVE-119	VLVE-118
	To Block:	Condensate Tanks	VLVE-118	MIX-105	--	SPLT-101
Temperature	°F	39.5426	40*	40*	39.4510	39.5426
Pressure	psia	14	38.5*	14*	13.5	14*
Mole Fraction Vapor	%	0.417975	0	0	100	0.417975
Mole Fraction Light Liquid	%	99.5820	100	100	0	99.5820
Mole Fraction Heavy Liquid	%	0	0	0	0	0
Molecular Weight	lb/lbmol	84.5337	84.5337	18.0153	41.3615	84.5337
Mass Density	lb/ft^3	23.7379	42.4861	62.5107	0.105711	23.7379
Molar Flow	lbmol/h	59.0328	59.6291	127.150	0.246743	59.6291
Mass Flow	lb/h	4990.26	5040.67	2290.65	10.2056	5040.67
Vapor Volumetric Flow	ft^3/h	210.224	118.643	36.6440	96.5433	212.347
Liquid Volumetric Flow	gpm	26.2097	14.7918	4.56861	12.0366	26.4744
Std Vapor Volumetric Flow	MMSCFD	0.537648	0.543079	1.15804	0.00224724	0.543079
Std Liquid Volumetric Flow	sgpm	15.015	15.1667*	4.57917*	0.0396489	15.1667
Compressibility		0.00930608	0.0142855	0.000752433	0.986148	0.00930608
Specific Gravity			0.681209	1.00228	1.42811	
API Gravity			79.4205	9.99834		
Enthalpy	Btu/h	-4.80318E+06	-4.85170E+06	-1.57081E+07	-9742.15	###########
Mass Enthalpy	Btu/lb	-962.510	-962.510	-6857.51	-954.584	-962.510
Mass Cp	Btu/(lb*°F)	0.502723	0.503305	0.982770	0.375946	0.502723
Ideal Gas CpCv Ratio		1.06854	1.06849	1.33015	1.14765	1.06854
Dynamic Viscosity	cP		0.365903	1.50624	0.00868335	
Kinematic Viscosity	cSt		0.537649	1.50424	5.12800	
Thermal Conductivity	Btu/(h*ft*°F)		0.0715210?	0.332053	0.0104096	
Surface Tension	lbf/ft		0.00134357	0.00525958		
Net Ideal Gas Heating Value	Btu/ft^3	4295.76	4295.76	0	1949.40	4295.76
Net Liquid Heating Value	Btu/lb	19129.5	19129.5	-1059.76	17750.8	19129.5
Gross Ideal Gas Heating Value	Btu/ft^3	4633.00	4633.00	50.3100	2119.01	4633.00
Gross Liquid Heating Value	Btu/lb	20643.6	20643.6	0	19307.4	20643.6

Process Streams		90	91	92	93	101	102	4	8
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	Water Tanks	Water Tanks	MIX-106	SPLT-101	Condensate Tanks	Condensate Tanks	MIX-101	MIX-100
	To Block:	MIX-106	--	VLVE-119	MIX-105	MIX-106	--	--	--
Temperature	°F		40.0027	39.5426	39.5426	39.5426	39.5426	49.8233	51.9522
Pressure	psia	14	14	14	14	14	14	0.266723	13.7200
Mole Fraction Vapor	%		0	100	0.417975	100	0	100	100
Mole Fraction Light Liquid	%		0.462680	0	99.5820	0	100	0	0
Mole Fraction Heavy Liquid	%		99.5373	0	0	0	0	0	0
Molecular Weight	lb/lbmol		18.3258	41.3615	84.5337	41.3615	84.7149	40.4287	46.4533
Mass Density	lb/ft^3		61.8844	0.109662	23.7379	0.109662	42.5067	0.00197273	0.118255
Molar Flow	lbmol/h	0	127.746	0.246743	0.596291	0.246743	58.7861	0.00530939	0.927179
Mass Flow	lb/h	0	2341.05	10.2056	50.4067	10.2056	4980.06	0.214652	43.0705
Vapor Volumetric Flow	ft^3/h	0	37.8294	93.0642	2.12347	93.0642	117.159	108.809	364.218
Liquid Volumetric Flow	gpm	0	4.71640	11.6028	0.264744	11.6028	14.6069	13.5659	45.4089
Std Vapor Volumetric Flow	MMSCFD	0	1.16347	0.00224724	0.00543079	0.00224724	0.535401	4.83559E-05	0.00844439
Std Liquid Volumetric Flow	sgpm	0	4.73083	0.0396489	0.151667	0.0396489	14.9754	0.000782103	0.166114
Compressibility			0.000773143	0.985637	0.00930608	0.985637	0.00520812	0.999724	0.981609
Specific Gravity			0.992234	1.42811		1.42811	0.681539	1.39590	1.60391
API Gravity			11.4890				79.3892		
Enthalpy	Btu/h		-1.57566E+07	-9742.15	-48517.0	-9742.15	-4.79344E+06	-303.493	-42523.8
Mass Enthalpy	Btu/lb		-6730.58	-954.584	-962.510	-954.584	-962.527	-1413.89	-987.306
Mass Cp	Btu/(lb*°F)		0.972512	0.376096	0.502723	0.376096	0.502983	0.388054	0.388651
Ideal Gas CpCv Ratio			1.32436	1.14763	1.06854	1.14763	1.06839	1.14495	1.12475
Dynamic Viscosity	cP		1.47020	0.00868615		0.00868615	0.367502	0.00862854	0.00805410
Kinematic Viscosity	cSt		1.48312	4.94479		4.94479	0.539736	273.054	4.25185
Thermal Conductivity	Btu/(h*ft*°F)		0.323843?	0.0104146		0.0104146	0.0716059?	0.00977009	0.00974980
Surface Tension	lbf/ft		0.00513795?				0.00137635?		
Net Ideal Gas Heating Value	Btu/ft^3		20.0516	1949.40	4295.76	1949.40	4305.61	1831.15	2355.17
Net Liquid Heating Value	Btu/lb		-625.050	17750.8	19129.5	17750.8	19132.3	16956.8	19089.7
Gross Ideal Gas Heating Value	Btu/ft^3		71.7009	2119.01	4633.00	2119.01	4643.55	1998.63	2557.40
Gross Liquid Heating Value	Btu/lb		444.490	19307.4	20643.6	19307.4	20646.3	18529.3	20742.2

APPENDIX D: VENDOR SPECIFICATION SHEETS

Hawkeye CS - Keane ND

Targa Resources Alan Goodall

VHP - L5794GSI

Gas Compression

ENGINE SPEED (rpm):	1200	NOx SELECTION (g/bhp-hr):	Customer Catalyst
DISPLACEMENT (in3):	5788	COOLING SYSTEM:	JW, IC + OC
COMPRESSION RATIO:	8.2:1	INTERCOOLER WATER INLET (°F):	130
IGNITION SYSTEM:	ESM2	JACKET WATER OUTLET (°F):	180
EXHAUST MANIFOLD:	Water Cooled	JACKET WATER CAPACITY (gal):	107
COMBUSTION:	Rich Burn, Turbocharged	AUXILIARY WATER CAPACITY (gal):	11
ENGINE DRY WEIGHT (lbs):	24760	LUBE OIL CAPACITY (gal):	190
AIR/FUEL RATIO SETTING:	0.38% CO	MAX. EXHAUST BACKPRESSURE (in. H2O):	18
ENGINE SOUND LEVEL (dBA)	102	MAX. AIR INLET RESTRICTION (in. H2O):	15
IGNITION TIMING:	ESM2 Controlled	EXHAUST SOUND LEVEL (dBA)	111

SITE CONDITIONS:

FUEL:	Fuel Conditioner Bypased	ALTITUDE (ft):	2005
FUEL PRESSURE RANGE (psig):	30 - 60	MAXIMUM INLET AIR TEMPERATURE (°F):	100
FUEL HHV (BTU/ft3):	1,482.0	FUEL WKI:	49.9
FUEL LHV (BTU/ft3):	1,339.7		

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%	75%	57%
CONTINUOUS ENGINE POWER	BHP		1347	1347	1010	763
OVERLOAD	% 2/24 hr		0	0	-	-
MECHANICAL EFFICIENCY (LHV)	%		31.7	31.7	31.2	29.5
CONTINUOUS POWER AT FLYWHEEL	BHP		1347	1347	1010	763
based on no auxiliary engine driven equipment						
AVAILABLE TURNDOWN SPEED RANGE	RPM	700 - 1200				
FUEL CONSUMPTION						
FUEL CONSUMPTION (LHV)	BTU/BHP-hr		8028	8027	8160	8640
FUEL CONSUMPTION (HHV)	BTU/BHP-hr		8881	8880	9026	9558
FUEL FLOW *based on fuel analysis LHV*	SCFM		135	135	103	82
HEAT REJECTION						
JACKET WATER (JW)	BTU/hr x 1000		3207	3208	2534	2129
LUBE OIL (OC)	BTU/hr x 1000		461	461	408	369
INTERCOOLER (IC)	BTU/hr x 1000		180	180	120	80
EXHAUST	BTU/hr x 1000		3079	3080	2193	1676
RADIATION	BTU/hr x 1000		666	666	578	524
EMISSIONS (ENGINE OUT):						
NOx (NO + NO2)	g/bhp-hr		16.0	16.0	15.9	16.2
CO	g/bhp-hr		12.1	12.1	12.4	13.2
THC	g/bhp-hr		1.4	1.4	1.7	2.2
NMHC	g/bhp-hr		0.87	0.87	1.07	1.35
NM,NEHC (VOC)	g/bhp-hr		0.51	0.51	0.63	0.80
CO2	g/bhp-hr		532	532	540	572
CO2e	g/bhp-hr		545	545	557	593
CH2O	g/bhp-hr		0.050	0.050	0.050	0.050
CH4	g/bhp-hr		0.54	0.54	0.67	0.84
AIR INTAKE / EXHAUST GAS						
INDUCTION AIR FLOW	SCFM		2020	2021	1540	1232
EXHAUST GAS MASS FLOW	lb/hr		9072	9073	6917	5532
EXHAUST GAS FLOW *at exhaust temp, 14.5 psia*	ACFM		6657	6658	4830	3730
EXHAUST TEMPERATURE	°F		1191	1191	1111	1057

HEAT EXCHANGER SIZING[12]			
TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000		3637
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000		727

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	44

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

Data Generated by EngCalc Program Version 4.0 INNIO Waukesha Gas Engines, Inc.

4/6/2023 9:10 AM

Hawkeye CS - Keane ND

Targa Resources Alan Goodall

VHP - L5794GSI

Gas Compression

FUEL COMPOSITION

HYDROCARBONS:		Mole or Volume %
Methane	CH4	58.799
Ethane	C2H6	20.645
Propane	C3H8	10.963
Iso-Butane	I-C4H10	1.186
Normal Butane	N-C4H10	3.523
Iso-Pentane	I-C5H12	0.71
Normal Pentane	N-C5H12	0.7
Hexane	C6H14	0.151
Heptane	C7H16	0.182
Ethene	C2H4	0
Propene	C3H6	0
	SUM HYDROCARBONS	96.859
NON-HYDROCARBONS:		
Nitrogen	N2	2.331
Oxygen	O2	0
Helium	He	0
Carbon Dioxide	CO2	0.807
Carbon Monoxide	CO	0
Hydrogen	H2	0
Water Vapor	H2O	0.003
	TOTAL FUEL	100

FUEL:	Fuel Conditioner Bypased
FUEL PRESSURE RANGE (psig):	30 - 60
FUEL WKI:	49.9
FUEL SLHV (BTU/ft3):	1316.42
FUEL SLHV (MJ/Nm3):	51.77
FUEL LHV (BTU/ft3):	1339.69
FUEL LHV (MJ/Nm3):	52.68
FUEL HHV (BTU/ft3):	1481.96
FUEL HHV (MJ/Nm3):	58.28
FUEL DENSITY (SG):	0.88

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 Cloride	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 Cloride	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, and NMHC 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 158 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.
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

Prepared For:
Allan Goodall
Targa

Date: April 6, 2023

APPLICATION INFORMATION

DRIVER

Make:	WAUKESHA
Model:	L5794GSI
Horsepower:	1,347
RPM:	1,200
Compression Ratio:	8.2
Exhaust Flow Rate:	6,657
Exhaust Temperature:	1,191
Fuel:	Fuel Analysis
Annual Operating Hours:	8,760

UNCONTROLLED EMISSIONS DATA

	g/bhp-hr	lb/hr	Tons/Year
NO_x:	16.00	47.51	208.11
CO:	12.10	35.93	157.38
THC:	1.40	4.16	18.21
NMHC:	0.87	2.58	11.32
NMNEHC:	0.51	1.51	6.63
HCHO:	0.05	0.15	0.65
Oxygen:	0.38%		

CATALYST ELEMENT

Model:	RT-2415-T
Catalyst Type:	NSCR, Standard Precious Metals Group
Substrate Type:	Brazed
Element Size:	Rectangle, 24 x 15 x 3.5
Element Quantity:	3

POST CATALYST EMISSIONS DATA

	g/bhp-hr	lb/hr	Tons/Year
NO_x:	< 0.50	1.48	6.50
CO	< 2.00	5.94	26.01
VOC	< 0.70	2.08	9.10
HCHO	< 0.02	0.06	0.26

Catalyst Temperature: 1041 °F

****POST CATALYST EMISSIONS ARE ONLY GUARANTEED FOR CATALYST ELEMENTS SUPPLIED BY EMIT**

WARRANTY

EMIT Technologies,Inc. warrants that the goods supplied will be free from defects in workmanship by EMIT Technologies, Inc. for a period of one (1) year from date of shipment. EMIT Technologies, Inc. will not be responsible for any defects which result from improper use, neglect, failure to properly maintain or which are attributable to defects, errors or omissions in any drawings, specifications, plans or descriptions, whether written or oral, supplied to EMIT Technologies, Inc. by Buyer.

Catalyst performance using an EMIT Air/Fuel ratio controller is dependent upon properly defined set-points, variable with engine and fuel gas composition. Air/fuel ratio controller performance is guaranteed, but not limited, to fuel gas with an HHV content of 1400 BTU/SCF.

Catalyst performance will be guaranteed for a period of 2 years from installation, or 17,000 operating hours, whichever comes first. The catalyst shall be operated with an automatic air/fuel ratio controller. The performance guarantee shall not cover the effects of excessive ash masking due to operation at low load, improper engine maintenance, or inappropriate lubrication oil. The performance guarantee shall not cover the effects of continuous engine misfires (cylinder or ignition) exposing the catalyst to excessive exothermic reaction temperatures.

Unless otherwise stated the exhaust temperature operating range at the converter inlet is 600°F minimum for oxidation catalyst and 750°F for NSCR catalyst and 1250°F maximum.

If a high temperature shut down switch is not installed, thermal deactivation of catalyst at temperatures above 1300 °F is not covered.

The catalyst conversion efficiencies (% reduction) will be guaranteed for engine loads of 50 to 100 percent.

Engine lubrication oil shall contain less than 0.6% ash (by weight) with a maximum allowable specific oil consumption of 0.01 gal/bhp-hr. The maximum ash loading on the catalyst shall be limited to 350 g/m3. Phosphorous and zinc additives are limited to 0.03% (by weight).

The catalyst must not be exposed to the following known poisoning agents, including: iron, nickel, sodium, chromium, arsenic, zinc, lead, phosphorous, silicon, potassium, magnesium, copper, tin, and mercury. Total poison concentrations in the gas are limited to 0.3 ppm.

Shipment - Promised shipping dates are approximate and are not guaranteed and are from the point of manufacture. EMIT Technologies,Inc. will not be liable for any loss, damage or delay in manufacture or delivery resulting from any cause beyond its control including, but not limited to a period equal to the time lost by reason of that delay. All products will be crated as per best practice to prevent any damage during shipment. Unless otherwise specified, Buyer will pay for any special packing and shipping requirements. Acceptance of goods by common carrier constitutes delivery to Buyer. EMIT Technologies,Inc. shall not be responsible for goods damaged or lost in transit.

PAYMENT TERMS AND ADVANCE PAYMENT REQUIREMENT

Terms: Credit is extended to purchaser for net 30 time period. If payment is not received in the net 30 timeframe, interest on the unpaid balance will accrue at a rate of 1.5% per month from the invoice date.

Advance Payment Requirement: Proposals with a project value of $100,000 or greater, and 60 days or greater time to completion, will require an advance payment of 30% of the total value. The advance payment will be invoiced to the customer upon receipt of the customer's purchase order. Advance payment is due 30 days after the date of the invoice. If payment is not received in the net 30 timeframe, interest on the unpaid balance will accrue at teh rate of 1.5% per month from the invoice date. Failure to pay this invoice may delay completion of the project outlined in this proposal.

Order Cancellation Terms: Upon cancellation of an order once submittal of a Purchase Order has occurred, the customer will pay a 25% restocking fee for Catalyst Housings, Catalyst Elements, and Air/Fuel Ratio Controllers; 50% restocking fee for Cooler Top Solutions,Exhaust System Accessories, and other Custom Built Products; 100% of all associated shipping costs incurred by EMIT; 100% of all project expenses incurred by EMIT for Field Services.

GE Power

Targa Resources - Hawkeye Station

VHP - L7042GSI S5

Bidell Gas Compression Steve Watson 403 816 9335 swatson@bidell.com

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)	101.3	MAX. AIR INLET RESTRICTION (in. H2O):	15
IGNITION TIMING:	ESM2 Controlled	EXHAUST SOUND LEVEL (dBA)	98.5

SITE CONDITIONS:

FUEL:	Fuel Skid Bypassed	ALTITUDE (ft):	2200
FUEL PRESSURE RANGE (psig):	40 - 60	MAXIMUM INLET AIR TEMPERATURE (°F):	105
FUEL HHV (BTU/ft3):	1,482.0	FUEL WKI:	49.9
FUEL LHV (BTU/ft3):	1,339.7		

SITE SPECIFIC TECHNICAL DATA

POWER RATING	UNITS		MAX RATING AT 100 °F AIR TEMP	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE OF 105 °F 100%	75%	50%
CONTINUOUS ENGINE POWER	BHP		1500	1500	1125	757
OVERLOAD	% 2/24 hr		0	0	-	-
MECHANICAL EFFICIENCY (LHV)	%		33.3	33.2	32.2	30.0
CONTINUOUS POWER AT FLYWHEEL	BHP		1500	1500	1125	757
based on no auxiliary engine driven equipment						
AVAILABLE TURNDOWN SPEED RANGE	RPM		900 - 1200			
FUEL CONSUMPTION						
FUEL CONSUMPTION (LHV)	BTU/BHP-hr		7656	7662	7905	8489
FUEL CONSUMPTION (HHV)	BTU/BHP-hr		8469	8476	8745	9391
FUEL FLOW *based on fuel analysis LHV*	SCFM		143	143	111	80
HEAT REJECTION						
JACKET WATER (JW)	BTU/hr x 1000		3241	3262	2628	1999
LUBE OIL (OC)	BTU/hr x 1000		479	477	441	397
INTERCOOLER (IC)	BTU/hr x 1000		447	465	241	65
EXHAUST	BTU/hr x 1000		3124	3110	2341	1644
RADIATION	BTU/hr x 1000		598	582	551	522
EMISSIONS (ENGINE OUT):						
NOx (NO + NO2)	g/bhp-hr		13.1	13.1	13.9	14.1
CO	g/bhp-hr		10.1	10.1	10.1	10.4
THC	g/bhp-hr		0.4	0.4	0.4	0.4
NMHC	g/bhp-hr		0.24	0.24	0.34	0.45
NM,NEHC (VOC)	g/bhp-hr		0.14	0.14	0.20	0.26
CO2	g/bhp-hr		507	507	524	562
CO2e	g/bhp-hr		511	511	529	569
CH2O	g/bhp-hr		0.001	0.001	0.001	0.001
CH4	g/bhp-hr		0.15	0.15	0.21	0.28
AIR INTAKE / EXHAUST GAS						
INDUCTION AIR FLOW	SCFM		2149	2151	1664	1203
EXHAUST GAS MASS FLOW	lb/hr		9992	9999	7737	5594
EXHAUST GAS FLOW *at exhaust temp, 14.5 psia*	ACFM		7061	7062	5361	3801
EXHAUST TEMPERATURE	°F		1130	1129	1099	1069

HEAT EXCHANGER SIZING[12]			
TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000		3699
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000		1071

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 3.7 GE Distributed Power, Inc.

8/5/2018 7:25 AM

GE Power

Targa Resources - Hawkeye Station

VHP - L7042GSI S5

Bidell Gas Compression Steve Watson 403 816 9335 swatson@bidell.com

Gas Compression

FUEL COMPOSITION

HYDROCARBONS:		Mole or Volume %
Methane	CH4	58.799
Ethane	C2H6	20.645
Propane	C3H8	10.963
Iso-Butane	I-C4H10	1.186
Normal Butane	N-C4H10	3.523
Iso-Pentane	I-C5H12	0.71
Normal Pentane	N-C5H12	0.7
Hexane	C6H14	0.151
Heptane	C7H16	0.182
Ethene	C2H4	0
Propene	C3H6	0
	SUM HYDROCARBONS	96.859

NON-HYDROCARBONS:		
Nitrogen	N2	2.331
Oxygen	O2	0
Helium	He	0
Carbon Dioxide	CO2	0.807
Carbon Monoxide	CO	0
Hydrogen	H2	0
Water Vapor	H2O	0.003
	TOTAL FUEL	100

FUEL:	Fuel Skid Bypassed
FUEL PRESSURE RANGE (psig):	40 - 60
FUEL WKI:	49.9
FUEL SLHV (BTU/ft3):	1316.42
FUEL SLHV (MJ/Nm3):	51.77
FUEL LHV (BTU/ft3):	1339.69
FUEL LHV (MJ/Nm3):	52.68
FUEL HHV (BTU/ft3):	1481.96
FUEL HHV (MJ/Nm3):	58.28
FUEL DENSITY (SG):	0.88

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 General Electric Company

FUEL CONTAMINANTS

Total Sulfur Compounds	0	% volume
Total Halogen as Cloride	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 Cloride	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.

GE Power

Targa Resources - Hawkeye Station

VHP - L7042GSI S5

Bidell Gas Compression Steve Watson 403 816 9335 swatson@bidell.com Gas Compression

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 GE 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, and NMHC 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 140.6 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.
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

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

Prepared For:
Steve Watson
Bidell

Date: August 8, 2018

APPLICATION INFORMATION

DRIVER

Make:	Waukesha
Model:	L7042GSI S5
Horsepower:	1500
RPM:	1200
Compression Ratio:	9.7
Exhaust Flow Rate:	7061
Exhaust Temperature:	1130
Reference:	Targa Hawkeye EngCalc
Fuel:	Bypass Fuel
Annual Operating Hours:	8760

UNCONTROLLED EMISSIONS DATA

	g/bhp-hr	lb/hr	Tons/Year
NO_x:	13.10	43.32	189.75
CO:	10.10	33.40	146.29
THC:	0.40	1.32	5.79
NMHC:	0.24	0.79	3.48
NMNEHC:	0.14	0.46	2.03
HCHO:	0.15	0.50	2.17
Oxygen:	0.30%		

CATALYST ELEMENT

Model:	RT-2415-T
Catalyst Type:	NSCR, Standard Precious Metals Group
Substrate Type:	Brazed
Element Size:	Rectangle, 24" x 15" x 3.5"
Element Quantity:	3

POST CATALYST EMISSIONS DATA

	g/bhp-hr	lb/hr
NO_x:	< 0.50	1.65
CO	< 2.00	6.61
VOC	< 0.70	2.31
HCHO	< 0.02	0.05

****POST CATALYST EMISSIONS ARE ONLY GUARANTEED FOR CATALYST ELEMENTS SUPPLIED BY EMIT**

EMIT Technologies, Inc.
мптл {dzNƎIꞏNfIꞏyŘ Dr.
Sheridan, WY. 82801

WARRANTY

EMIT Technologies,Inc. warrants that the goods supplied will be free from defects in workmanship by EMIT Technologies, Inc. for a period of one (1) year from date of shipment. EMIT Technologies, Inc. will not be responsible for any defects which result from improper use, neglect, failure to properly maintain or which are attributable to defects, errors or omissions in any drawings, specifications, plans or descriptions, whether written or oral, supplied to EMIT Technologies, Inc. by Buyer.

Catalyst performance using an EMIT Air/Fuel ratio controller is dependent upon properly defined set-points, variable with engine and fuel gas composition. Air/fuel ratio controller performance is guaranteed, but not limited, to fuel gas with an HHV content of 1400 BTU/SCF.

Catalyst performance will be guaranteed for a period of 1 year from installation, or 8760 operating hours, whichever comes first. The catalyst shall be operated with an automatic air/fuel ratio controller. The performance guarantee shall not cover the effects of excessive ash masking due to operation at low load, improper engine maintenance, or inappropriate lubrication oil. The performance guarantee shall not cover the effects of continuous engine misfires (cylinder or ignition) exposing the catalyst to excessive exothermic reaction temperatures.

Unless otherwise stated the exhaust temperature operating range at the converter inlet is 600°F minimum for oxidation catalyst and 750°F for NSCR catalyst and 1250°F maximum.

If a high temperature shut down switch is not installed, thermal deactivation of catalyst at temperatures above 1300 °F is not covered.

The catalyst conversion efficiencies (% reduction) will be guaranteed for engine loads of 50 to 100 percent.

Engine lubrication oil shall contain less than 0.6% ash (by weight) with a maximum allowable specific oil consumption of 0.01 gal/bhp-hr. The maximum ash loading on the catalyst shall be limited to 350 g/m3. Phosphorous and zinc additives are limited to 0.03% (by weight).

The catalyst must not be exposed to the following known poisoning agents, including: iron, nickel, sodium, chromium, arsenic, zinc, lead, phosphorous, silicon, potassium, magnesium, copper, tin, and mercury. Total poison concentrations in the gas are limited to 0.3 ppm.

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Hawkeye CS - Keane ND

Targa Resources Alan Goodall

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)	102.7	MAX. AIR INLET RESTRICTION (in. H2O):	15
IGNITION TIMING:	ESM2 Controlled	EXHAUST SOUND LEVEL (dBA)	98.9

SITE CONDITIONS:

FUEL:	Fuel Conditioner Bypased	ALTITUDE (ft):	2005
FUEL PRESSURE RANGE (psig):	40 - 60	MAXIMUM INLET AIR TEMPERATURE (°F):	100
FUEL HHV (BTU/ft3):	1,482.0	FUEL WKI:	49.9
FUEL LHV (BTU/ft3):	1,339.7		

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%	75%	53%
CONTINUOUS ENGINE POWER	BHP		1790	1790	1342	950
OVERLOAD	% 2/24 hr		0	0	-	-
MECHANICAL EFFICIENCY (LHV)	%		33.7	33.7	32.9	31.4
CONTINUOUS POWER AT FLYWHEEL	BHP		1790	1790	1342	950
based on no auxiliary engine driven equipment						
AVAILABLE TURNDOWN SPEED RANGE	RPM	900 - 1200				
FUEL CONSUMPTION						
FUEL CONSUMPTION (LHV)	BTU/BHP-hr		7565	7565	7731	8111
FUEL CONSUMPTION (HHV)	BTU/BHP-hr		8368	8368	8552	8973
FUEL FLOW *based on fuel analysis LHV*	SCFM		168	168	129	96
HEAT REJECTION						
JACKET WATER (JW)	BTU/hr x 1000		3722	3722	2979	2316
LUBE OIL (OC)	BTU/hr x 1000		499	499	461	417
INTERCOOLER (IC)	BTU/hr x 1000		643	643	351	144
EXHAUST	BTU/hr x 1000		3761	3761	2789	2011
RADIATION	BTU/hr x 1000		622	622	584	551
EMISSIONS (ENGINE OUT):						
NOx (NO + NO2)	g/bhp-hr		12.1	12.1	13.3	13.7
CO	g/bhp-hr		10.1	10.1	10.0	10.2
THC	g/bhp-hr		0.3	0.3	0.5	0.6
NMHC	g/bhp-hr		0.18	0.18	0.29	0.40
NM,NEHC (VOC)	g/bhp-hr		0.10	0.10	0.17	0.23
CO2	g/bhp-hr		501	501	512	537
CO2e	g/bhp-hr		504	504	516	543
CH2O	g/bhp-hr		0.050	0.050	0.050	0.050
CH4	g/bhp-hr		0.11	0.11	0.18	0.25
AIR INTAKE / EXHAUST GAS						
INDUCTION AIR FLOW	SCFM		2534	2534	1942	1443
EXHAUST GAS MASS FLOW	lb/hr		11781	11781	9030	6708
EXHAUST GAS FLOW *at exhaust temp, 14.5 psia*	ACFM		8440	8440	6325	4606
EXHAUST TEMPERATURE	°F		1152	1152	1116	1085

HEAT EXCHANGER SIZING[12]			
TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000		4221
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000		1295

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 4.0 INNIO Waukesha Gas Engines, Inc.

4/6/2023 9:14 AM

Hawkeye CS - Keane ND

Targa Resources Alan Goodall

VHP - L7044GSI S5

Gas Compression

FUEL COMPOSITION

HYDROCARBONS:		Mole or Volume %
Methane	CH4	58.799
Ethane	C2H6	20.645
Propane	C3H8	10.963
Iso-Butane	I-C4H10	1.186
Normal Butane	N-C4H10	3.523
Iso-Pentane	I-C5H12	0.71
Normal Pentane	N-C5H12	0.7
Hexane	C6H14	0.151
Heptane	C7H16	0.182
Ethene	C2H4	0
Propene	C3H6	0
	SUM HYDROCARBONS	96.859
NON-HYDROCARBONS:		
Nitrogen	N2	2.331
Oxygen	O2	0
Helium	He	0
Carbon Dioxide	CO2	0.807
Carbon Monoxide	CO	0
Hydrogen	H2	0
Water Vapor	H2O	0.003
	TOTAL FUEL	100

FUEL:	Fuel Conditioner Bypased
FUEL PRESSURE RANGE (psig):	40 - 60
FUEL WKI:	49.9
FUEL SLHV (BTU/ft3):	1316.42
FUEL SLHV (MJ/Nm3):	51.77
FUEL LHV (BTU/ft3):	1339.69
FUEL LHV (MJ/Nm3):	52.68
FUEL HHV (BTU/ft3):	1481.96
FUEL HHV (MJ/Nm3):	58.28
FUEL DENSITY (SG):	0.88

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 Cloride	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 Cloride	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, and NMHC 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.
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

Prepared For:
Allan Goodall
Targa

Date: April 6, 2023

APPLICATION INFORMATION

DRIVER

Make:	WAUKESHA
Model:	L7044GSI
Horsepower:	1,790
RPM:	1,200
Compression Ratio:	9.7
Exhaust Flow Rate:	8,440
Exhaust Temperature:	1,152
Fuel:	Fuel Analysis
Annual Operating Hours:	8,760

UNCONTROLLED EMISSIONS DATA

	g/bhp-hr	lb/hr	Tons/Year
NO_x:	12.10	47.75	209.14
CO:	10.10	39.86	174.58
THC:	0.30	1.18	5.19
NMHC:	0.18	0.71	3.11
NMNEHC:	0.10	0.39	1.73
HCHO:	0.05	0.20	0.86
Oxygen:	0.38%		

CATALYST ELEMENT

Model:	RT-2415-T
Catalyst Type:	NSCR, Standard Precious Metals Group
Substrate Type:	Brazed
Element Size:	Rectangle, 24 x 15 x 3.5
Element Quantity:	3

POST CATALYST EMISSIONS DATA

	g/bhp-hr	lb/hr	Tons/Year
NO_x:	< 0.50	1.97	8.64
CO	< 2.00	7.89	34.57
VOC	< 0.70	2.76	12.10
HCHO	< 0.02	0.08	0.35

Catalyst Temperature: 1002 °F

****POST CATALYST EMISSIONS ARE ONLY GUARANTEED FOR CATALYST ELEMENTS SUPPLIED BY EMIT**

WARRANTY

EMIT Technologies,Inc. warrants that the goods supplied will be free from defects in workmanship by EMIT Technologies, Inc. for a period of one (1) year from date of shipment. EMIT Technologies, Inc. will not be responsible for any defects which result from improper use, neglect, failure to properly maintain or which are attributable to defects, errors or omissions in any drawings, specifications, plans or descriptions, whether written or oral, supplied to EMIT Technologies, Inc. by Buyer.

Catalyst performance using an EMIT Air/Fuel ratio controller is dependent upon properly defined set-points, variable with engine and fuel gas composition. Air/fuel ratio controller performance is guaranteed, but not limited, to fuel gas with an HHV content of 1400 BTU/SCF.

Catalyst performance will be guaranteed for a period of 2 years from installation, or 17,000 operating hours, whichever comes first. The catalyst shall be operated with an automatic air/fuel ratio controller. The performance guarantee shall not cover the effects of excessive ash masking due to operation at low load, improper engine maintenance, or inappropriate lubrication oil. The performance guarantee shall not cover the effects of continuous engine misfires (cylinder or ignition) exposing the catalyst to excessive exothermic reaction temperatures.

Unless otherwise stated the exhaust temperature operating range at the converter inlet is 600°F minimum for oxidation catalyst and 750°F for NSCR catalyst and 1250°F maximum.

If a high temperature shut down switch is not installed, thermal deactivation of catalyst at temperatures above 1300 °F is not covered.

The catalyst conversion efficiencies (% reduction) will be guaranteed for engine loads of 50 to 100 percent.

Engine lubrication oil shall contain less than 0.6% ash (by weight) with a maximum allowable specific oil consumption of 0.01 gal/bhp-hr. The maximum ash loading on the catalyst shall be limited to 350 g/m3. Phosphorous and zinc additives are limited to 0.03% (by weight).

The catalyst must not be exposed to the following known poisoning agents, including: iron, nickel, sodium, chromium, arsenic, zinc, lead, phosphorous, silicon, potassium, magnesium, copper, tin, and mercury. Total poison concentrations in the gas are limited to 0.3 ppm.

Shipment - Promised shipping dates are approximate and are not guaranteed and are from the point of manufacture. EMIT Technologies,Inc. will not be liable for any loss, damage or delay in manufacture or delivery resulting from any cause beyond its control including, but not limited to a period equal to the time lost by reason of that delay. All products will be crated as per best practice to prevent any damage during shipment. Unless otherwise specified, Buyer will pay for any special packing and shipping requirements. Acceptance of goods by common carrier constitutes delivery to Buyer. EMIT Technologies,Inc. shall not be responsible for goods damaged or lost in transit.

PAYMENT TERMS AND ADVANCE PAYMENT REQUIREMENT

Terms: Credit is extended to purchaser for net 30 time period. If payment is not received in the net 30 timeframe, interest on the unpaid balance will accrue at a rate of 1.5% per month from the invoice date.

Advance Payment Requirement: Proposals with a project value of $100,000 or greater, and 60 days or greater time to completion, will require an advance payment of 30% of the total value. The advance payment will be invoiced to the customer upon receipt of the customer's purchase order. Advance payment is due 30 days after the date of the invoice. If payment is not received in the net 30 timeframe, interest on the unpaid balance will accrue at teh rate of 1.5% per month from the invoice date. Failure to pay this invoice may delay completion of the project outlined in this proposal.

Order Cancellation Terms: Upon cancellation of an order once submittal of a Purchase Order has occurred, the customer will pay a 25% restocking fee for Catalyst Housings, Catalyst Elements, and Air/Fuel Ratio Controllers; 50% restocking fee for Cooler Top Solutions,Exhaust System Accessories, and other Custom Built Products; 100% of all associated shipping costs incurred by EMIT; 100% of all project expenses incurred by EMIT for Field Services.