



*SUBMITTED VIA CERIS-ND*

February 1, 2024

Mr. Jim Semerad  
North Dakota Department of Environmental Quality  
Division of Air Quality  
4201 Normandy Street, 2<sup>nd</sup> Floor  
Bismarck, ND 58503-1324

**ONEOK ROCKIES MIDSTREAM, L.L.C.  
EAST FORK COMPRESSOR STATION  
PERMIT TO CONSTRUCT APPLICATION**

Dear Mr. Semerad:

ONEOK Rockies Midstream, L.L.C. (ORM) operates the East Fork Compressor Station, located in Williams County, pursuant to Permit No. AOP-28485 v1.0. ORM submits this Permit to Construct application to authorize the addition of two (2) 1,680-hp Waukesha L7044 GSI compressor engines, one (1) 60 mmscf/d Glycol Dehydration Unit, one (1) 1.0 mmBtu/hr Glycol Reboiler, and one (1) BTEX Flare at the facility. Please note no other new equipment has been added or proposed.

Enclosed with this letter are required application forms, emissions calculations and supporting documents, as well as a check in the amount of \$325.00 for the application fee. If you need additional information or have any questions, please contact me at 918-588-7862 or [Joshua.Hills@oneok.com](mailto:Joshua.Hills@oneok.com).

Sincerely,

Joshua Hills  
Environmental Specialist

Enclosures

xc: K. Rudningen/V. Danzeisen/L. Weltikol/D. Vande Bossche/B. Haider/G. Roe/B. Beck/W. Phelps/K. Hanner/R. Brown (.pdf)  
Tulsa Environmental Files – East Fork Compressor Station – Permit Actions

# **Permit to Construct Application**

**East Fork Compressor Station**

**ONEOK Rockies Midstream, L.L.C.**



**Submitted to NDDEQ Division of Air Quality  
February 2024**

## Table of Contents

<b>Table of Contents</b> .....	<b>i</b>
<b>Introduction</b> .....	<b>1</b>
<b>Facility Equipment</b> .....	<b>1</b>
<b>Process Description</b> .....	<b>1</b>
<b>Regulatory Applicability</b> .....	<b>1</b>
<b>Application Forms</b> .....	<b>5</b>
Form SFN 8516 – Permit Application for Air Contaminant Sources .....	5
Form SFN 8891 – Permit Application for Internal Combustion Engines and Turbines .....	8
Form SFN 8532 – Permit Application for Air Pollution Control Equipment .....	10
Form SFN 58923 – Glycol Dehydration Units.....	11
Form SFN 8518 – Fuel Burning Equipment for Indirect Heating .....	13
Form SFN 59652– Flares .....	16
<b>Appendix A – Maps and Drawings</b> .....	<b>18</b>
Figure 1 – Area Map .....	18
Figure 2 – Process Flow Diagram .....	19
<b>Appendix B – Emissions Calculations</b> .....	<b>20</b>
<b>Appendix C – Support Documents</b> .....	<b>34</b>
Engine Specifications.....	34
GLYCalc Results.....	36

## Introduction

ONEOK Rockies Midstream, L.L.C. (ORM) operates the East Fork Compressor Station, located in Williams County, pursuant to Permit No. AOP-28485 v1.0. ORM submits this Permit to Construct application to authorize the addition of two (2) 1,680-hp Waukesha L7044 GSI compressor engines, one (1) 60 mmscf/d Glycol Dehydration Unit, one (1) 1.0 mmBtu/hr Glycol Reboiler, and one (1) BTEX Flare at the facility.

## Facility Equipment

After construction, East Fork Compressor Station will consist of six (6) electrically driven compressors, two (2) 1,680-hp Waukesha L7044 GSI compressor engines, six (6) 400-bbl condensate tanks, two (2) 400-bbl produced water tank, one (1) 400-bbl LACT divert tank, one (1) 400-bbl methanol tank, one (1) 60 mmscf/d Glycol Dehydration Unit, one (1) 1.0 mmBtu/hr Glycol Reboiler, one (1) BTEX Flare, and one (1) emergency/process flare for controlling emergency relief from all equipment. Associated emission sources include condensate truck loading, fugitive emissions and miscellaneous vents and blowdowns. A vapor recovery unit (VRU) will control emissions from the condensate and water tanks.

## Process Description

A pipeline gathering system transports field natural gas from wells through an inlet separator where free liquids are removed and stored in the condensate tanks. Natural gas then passes through a suction header and is routed to the compressors, which boost gas pressure. After the gas passes through the compressors, it enters a TEG dehydration unit before exiting the facility. The dehydration unit is used to remove water from the gas. In the dehydration process, gas passes through a contactor vessel where water is absorbed by the glycol. The "rich" glycol containing water goes to the glycol dehydrator reboiler where heat is used to boil off the water. The heat is supplied by a natural gas-fired reboiler that exhausts to the atmosphere. Still vent vapors from the dehydration unit are controlled by an air-cooled condenser. Non-condensables from the condenser vent stream are routed to the combustor. A burner management system ensures that there is a constant flame present to destroy the vapors at the required destruction efficiency. Flash tank off-gases are directed to the reboiler to be used as fuel with excess routed to the facility fuel system to be used in the compressors. From the dehydration unit, natural gas enters a pipeline for transmission off-site, or is routed to a fuel scrubber and used as fuel for the compressor engines and the reboiler. Condensate is transported off-site via tank truck for sales. Emissions from fugitive components and miscellaneous vents and blowdowns also occur at the facility.

## Regulatory Applicability

The facility is a natural gas compressor station that falls under the North American Industrial Classification System (NAICS) code 211130 (formerly Standard Industrial Classification (SIC) 1311).

**New Source Performance Standards 40 CFR Part 60 Subpart JJJJ**, Stationary Spark Ignition Internal Combustion Engines (SI-ICE) promulgates emission standards for all new SI engines ordered after June 12, 2006, and all SI engines modified or reconstructed after June 12, 2006, regardless of size. The specific emission standards (either in g/hp-hr or as a concentration limit) vary based on engine class, engine power rating, lean-burn or rich-burn, fuel type, duty (emergency or non-emergency), and various manufacture dates. The compressor engines were manufactured after July 1, 2010; therefore, are subject to the Stage 2 emissions limitations of this subpart.

**New Source Performance Standards 40 CFR Part 60 Subpart OOOO**, Crude Oil and Natural Gas Production, Transmission and Distribution, establishes emission standards for the following equipment that

commences construction, modification, or reconstruction after August 23, 2011 and on or before September 18, 2015 at crude oil and natural gas production, transmission or distribution facilities:

1. Each single gas well;
2. Single centrifugal compressors using wet seals located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment;
3. Single reciprocating compressors located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment;
4. Single continuous bleed natural gas driven pneumatic controllers with a natural gas bleed rate greater than 6 SCFH, located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment and not located at a natural gas processing plant;
5. Single continuous bleed natural gas driven pneumatic controllers located at a natural gas processing plant;
6. Single storage vessels located in the oil and natural gas production segment, natural gas processing segment, or natural gas transmission and storage segment with the potential for VOC emissions equal to or greater than 6 tons per year;
7. All equipment, except compressors, within a process unit at an onshore natural gas processing plant;
8. Sweetening units located at onshore natural gas processing plants.

All potentially affected equipment at East Fork Compressor Station was constructed after September 18, 2015 and is not subject to this subpart.

**New Source Performance Standards 40 CFR Part 60 Subpart OOOOa**, Crude Oil and Natural Gas Facilities, establishes emission standards for the following equipment that commences construction, modification or reconstruction after September 18, 2015 at crude oil and natural gas production, transmission or distribution facilities:

1. Each single oil or gas well that conducts a completion following hydraulic fracturing or refracturing;
2. Single centrifugal compressors using wet seals that are not located at a well site;
3. Single reciprocating compressors not located at a well site;
4. Single continuous bleed natural gas driven pneumatic controllers with a natural gas bleed rate greater than 6 SCFH, not located at a natural gas processing plant;
5. Single continuous bleed natural gas driven pneumatic controllers located at a natural gas processing plant;
6. Single storage vessels with the potential for VOC emissions equal to or greater than 6 tons per year;
7. The group of all equipment within a process unit;
8. The group of fugitive emissions equipment at a compressor station;
9. The group of fugitive emissions equipment at a well site;
10. Sweetening units located at onshore natural gas processing plants;
11. Pneumatic pumps at natural gas processing plants and well sites.

Facility is subject to OOOOa and this PTC adds two additional compressors to the rod packing requirements.

**National Emission Standards for Hazardous Air Pollutants 40 CFR Part 63 Subpart HH**, Oil and Natural Gas Production Facilities, applies to affected emission points that are located at facilities that are major and area sources of HAP, and either process, upgrade, or store natural gas prior to entering the natural gas transmission and storage source category. The only affected unit at an area source is a triethylene glycol (TEG) dehydration unit. Although the TEG dehydration unit at this facility is considered an affected area source, it is exempt from the requirements of § 63.764(d)(2) since the actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 Mg (1.0 TPY), as determined by the procedures specified in § 63.772(b)(2). However, the facility must maintain records of the de minimis determination as required in § 63.774(d)(1).

**National Emission Standards for Hazardous Air Pollutants 40 CFR Part 63 Subpart ZZZZ**, Reciprocating Internal Combustion Engines (RICE), affects any existing, new or reconstructed stationary RICE located at a major or area source of HAP emissions. Owners and operators of new or reconstructed engines at area sources must meet the requirements of Subpart ZZZZ by complying with either 40 CFR Part 60 Subpart IIII (for CI engines) or 40 CFR Part 60 Subpart JJJJ (for SI engines). Based on emission calculations, this facility is a minor source of HAP. Since the compressor engines are subject to 40 CFR Part 60 Subpart JJJJ, they automatically satisfy the requirements of Subpart ZZZZ by complying with NSPS Subpart JJJJ. There are no further requirements under Subpart ZZZZ for these engines.

## **State Requirements**

Applicability of regulations within Article 15 - Air Pollution Control Rules under the North Dakota Administrative Code were evaluated for the facility.

### **33.1-15-03 Restriction of Emission of Visible Air Contaminants**

The facility will operate in a manner to not discharge into the ambient air from any single source of emission whatsoever any air contaminant which exhibits an opacity greater than twenty percent except that a maximum of forty percent opacity which is permissible for not more than one six-minute period per hour (33.1-15-03-02). Additionally, the facility will not discharge into the ambient air from any source of fugitive emissions any air contaminant which exhibits an opacity greater than forty percent for more than one six-minute period per hour (33.1-15-03-03).

### **33.1-15-05 Emissions of Particulate Matter Restricted**

The facility is an insignificant source of particulate matter emissions and does not fall within the source categorizations listed in this subpart.

### **33.1-15-06 Emissions of Sulfur Compounds Restricted**

The facility combusts pipeline quality natural gas and is therefore exempt from this subpart (33.1-15-06-01.1.e).

### **33.1-15-07 Control of Organic Compounds Emissions**

Storage tanks at the facility will be equipped with submerged fill pipes or applicable control (33.1-15-07-01.3). Any loading of volatile organic compounds will not exceed 20,000 gallons per day (33.1-15-07-01.4). With the exception of emergency vapor blowdowns or safety relief valves, emissions of organic compounds will be routed to flare or an equally effective control device (33.1-15-07-02.1). Any flares located at the facility will be equipped with an automatic igniter or a continuous burning pilot (33.1-15-07-02.3). Any storage tanks in excess of 6 ton per year of VOC at the facility will be controlled and therefore meets the requirements of the May 27, 2015 NDDH guidance memorandum for storage vessels at oil and gas non-production facilities.

### **33.1-15-08 Control of Air Pollution From Vehicles and Other Internal Combustion Engines**

Any internal combustion engines located at the facility will not emit any unreasonable and excessive smoke, obnoxious or noxious gases, fumes or vapor (33.1-15-08-01). The facility will not intentionally remove, alter, or otherwise render inoperative, exhaust emission control, crankcase ventilation, or any other air pollution control device which has been installed as a requirement of federal law or regulation (33.1-15-08-02.1).

### **33.1-15-11 Prevention of Air Pollution Emergency Episodes**

The facility is not a source category listed in Table 7 of this subpart. The facility will comply with any requirements that are instituted during an air pollution emergency issued by the Department.

### **33.1-15-12 Standards of Performance for New Stationary Sources**

### **33.1-15-13 Emission Standards for Hazardous Air Pollutants**

### **33.1-15-22 Emission Standards for Hazardous Air Pollutants for Source Categories**

NSPS and NESHAP applicability is addressed above in the Federal Requirements.

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

Through submittal of this application for a permit, the facility is complying with this subpart.

### **33.1-15-15 Prevention of Significant Deterioration of Air Quality**

The facility is a minor source of emissions and is therefore not subject to this subpart.

### **33.1-15-16 Restriction of Odorous Air Contaminants**

The facility will comply with the general provisions of the Department's odor restrictions (33.1.15-16-01) and will not exceed the maximum hydrogen sulfide concentrations to be considered a violation (33.1-15-16-02.1).

### **33.1-15-17 Restriction of Fugitive Emissions**

The facility will take reasonable precautions to prevent fugitive emissions as defined under 33.1-15-17-04 in regards to ambient air quality standards and opacity limitations.

### **33.1-15-18 Stack Heights**

Stack heights at the facility will not exceed good engineering practice (GEP) stack heights as defined under 33.1-15-18-01.2.d.

### **33.1-15-19 Visibility Protection**

The visibility protection standards are only applicable to major sources and therefore not applicable to the facility.

### **33.1-15-21 Acid Rain Program**

The acid rain provisions of the Air Pollution Control Rules are not applicable to the facility.

### **33.1-15-24 Standards for Lead-Based Paint Activities**

There will be no lead-based paint utilized at the facility and therefore not applicable to the facility.

### **33.1-15-25 Regional Haze Requirements**

The facility is currently not subject to regulation under a regional haze program. Therefore, this subpart is not applicable.



**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 ONEOK Rockies Midstream, L.L.C.				
Applicant's Name Dick Vande Bossche				
Title Vice President - ONEOK Rockies Midstream Operations		Telephone Number (406) 433-8710		E-mail Address dick.vandebossche@oneok.com
Contact Person for Air Pollution Matters Joshua Hills				
Title Environmental Specialist		Telephone Number (918) 588-7862		E-mail Address Joshua.Hills@oneok.com
Mailing Address (Street & No.) 100 W Fifth St.				
City Tulsa		State Oklahoma		ZIP Code 74102
Facility Name East Fork Compressor Station				
Facility Address (Street & No.)				
City Springbrook		State North Dakota		ZIP Code 58801
County <b>Williams</b>		Coordinates NAD 83 in Decimal Degrees (to fourth decimal degree)		
		Latitude 48.28556000	Longitude -103.56039000	
Legal Description of Facility Site				
Quarter SW	Quarter SW	Section 33	Township 156N	Range 100W
Land Area at Facility Site 12 Acres (or) _____ Sq. Ft.		MSL Elevation at Facility ~1,906'		

**SECTION B – GENERAL NATURE OF BUSINESS**

Describe Nature of Business	North American Industry Classification System Number	Standard Industrial Classification Number (SIC)
Natural Gas Compression	211130	1311

**SECTION C – GENERAL PERMIT INFORMATION**

Type of Permit? <input checked="" type="checkbox"/> Permit to Construct (PTC) <input type="checkbox"/> Permit to Operate (PTO)	
If application is for a Permit to Construct, please provide the following data:	
Planned Start Construction Date 03/2024	Planned End Construction Date 05/2024



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

Your Source ID Number	Source or Unit (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.)	Permit to Construct				Minor Source Permit to Operate						
		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
C-1	1,680-hp Waukesha L7044 GSI Engine	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C-2	1,680-hp Waukesha L7044 GSI Engine	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D-1	Glycol Dehydration Unit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H-1	Glycol Reboiler	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FL-2	BTEX Flare	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Add additional pages if necessary

**SECTION D2 – APPLICABLE REGULATIONS**

Source ID No.	Applicable Regulations (NSPS/MACT/NESHAP/etc.)
Facility-wide	NSPS 0000a
C-1, C-2	NSPS JJJJ, NESHAP ZZZZ
D-1	MACT HH

**SECTION E – TOTAL POTENTIAL EMISSIONS**

Pollutant	Amount (Tons Per Year)
NO <sub>x</sub>	33.60
CO	66.57
PM	2.51

Pollutant	Amount (Tons Per Year)
PM <sub>10</sub> (filterable and condensable)	2.51
PM <sub>2.5</sub> (filterable and condensable)	2.51
SO <sub>2</sub>	0.08
VOC	90.78
GHG (as CO <sub>2</sub> e)	16,770.20
Largest Single HAP	1.29
Total HAPS	7.27

\*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.

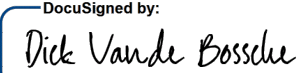
**SECTION F1 – ADDITIONAL FORMS**

Indicate which of the following forms are attached and made part of the application	
<input checked="" type="checkbox"/> Air Pollution Control Equipment (SFN 8532) <input type="checkbox"/> Construct/Operate Incinerators (SFN 8522) <input type="checkbox"/> Natural Gas Processing Plants (SFN 11408) <input checked="" type="checkbox"/> Glycol Dehydration Units (SFN 58923) <input checked="" type="checkbox"/> Flares (SFN 59652) <input type="checkbox"/> Grain, Feed, and Fertilizer Operations (SFN 8524)	<input checked="" type="checkbox"/> Fuel Burning Equipment Used for Indirect Heating (SFN 8518) <input type="checkbox"/> Hazardous Air Pollutant (HAP) Sources (SFN 8329) <input type="checkbox"/> Manufacturing or Processing Equipment (SFN 8520) <input type="checkbox"/> Volatile Organic Compounds Storage Tank (SFN 8535) <input checked="" type="checkbox"/> Internal Combustion Engines and Turbines (SFN 8891) <input type="checkbox"/> Oil/Gas Production Facility Registration (SFN 14334)

**SECTION F2 – OTHER ATTACHMENTS INCLUDED AS PART OF THIS APPLICATION**

1. Process Description and Regulatory Applicability	4. Emission Calculations
2. Area Map	5. Supporting Documentation
3. Process Flow Diagram	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	DocuSigned by:  67B797C4193640F...	Date	2/1/2024
-----------	---	------	----------



# 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 ONEOK Rockies Midstream, L.L.C.	Facility Name East Fork Compressor Station
---	---

## SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516) C-1 - C-2		
Type of Unit (check all that apply)	<input checked="" type="checkbox"/> Stationary Natural Gas-Fired Engine	<input type="checkbox"/> Emergency Use Only
	<input type="checkbox"/> Stationary Diesel and Dual Fuel Engine	<input checked="" type="checkbox"/> Non-Emergency Use
	<input type="checkbox"/> Stationary Gasoline Engine	<input type="checkbox"/> Peaking
	<input type="checkbox"/> Stationary Natural Gas-Fired Turbine	<input type="checkbox"/> Demand Response
	<input type="checkbox"/> Other – Specify:	

## SECTION C – MANUFACTURER DATA

Make Waukesha	Model L7044 GSI	Date of Manufacture 2013	
Reciprocating Internal Combustion Engine			
<input checked="" type="checkbox"/> Spark Ignition	<input type="checkbox"/> Compression Ignition	<input type="checkbox"/> Lean Burn	
<input checked="" type="checkbox"/> 4 Stroke	<input type="checkbox"/> 2 Stroke	<input type="checkbox"/> Rich Burn	
Maximum Rating (BHP @ rpm) 1,680-HP	Operating Capacity (BHP @ rpm) 1,680-HP		
Engine Subject to:			
<input type="checkbox"/> 40 CFR 60, Subpart IIII			
<input checked="" type="checkbox"/> 40 CFR 60, Subpart JJJJ			
<input checked="" type="checkbox"/> 40 CFR 63, Subpart ZZZZ			
<input type="checkbox"/> 40 CFR 60, Subpart OOOO (for compressors)			
<input checked="" type="checkbox"/> 40 CFR 60, Subpart OOOOa (for compressors)			
Turbine			
Dry Low Emissions? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)	Efficiency
Turbine Subject to:			
<input type="checkbox"/> 40 CFR 60, Subpart GG <input type="checkbox"/> 40 CFR 60, Subpart KKKK			

## SECTION D – FUELS USED

Natural Gas (10 <sup>6</sup> cu ft/year) 122.3	Percent Sulfur	Percent H <sub>2</sub> S
Oil (gal/year)	Percent Sulfur	Grade No.
LP Gas (gal/year)	Other – Specify:	

## SECTION E – NORMAL OPERATING SCHEDULE

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

## SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet) 30		
Stack Diameter (feet at top) 1	Gas Discharged (SCFM) 7,429	Exit Temp (°F) 1201	Gas Velocity (FPS) 157.65	

**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 <sub>x</sub>	3.70	16.22	NSPS JJJJ
CO	7.41	32.44	NSPS JJJJ
PM	0.28	1.22	AP-42 Table 3.2-2 (7/00)
PM <sub>10</sub> (filterable and condensable)	0.28	1.22	AP-42 Table 3.2-2 (7/00)
PM <sub>2.5</sub> (filterable and condensable)	0.28	1.22	AP-42 Table 3.2-2 (7/00)
SO <sub>2</sub>	0.01	0.04	AP-42 Table 3.2-2 (7/00)
VOC	2.59	11.36	NSPS JJJJ
GHG (as CO <sub>2e</sub> )	1677.27	7346.46	40 CFR Tables C-1 and C-2
Largest Single HAP	0.15	0.64	AP-42 Table 3.2-2 (7/00)
Total HAPS	0.23	1.02	AP-42 Table 3.2-2 (7/00)

\* 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, 2<sup>nd</sup> 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 ONEOK Rockies Midstream, L.L.C.	Facility Name East Fork Compressor Station
Source ID No. of Equipment being Controlled C-1 - C-2 (Each)	

### SECTION B – EQUIPMENT

Type:	<input type="checkbox"/> Cyclone	<input type="checkbox"/> Multiclone	<input type="checkbox"/> Baghouse	<input type="checkbox"/> Electrostatic Precipitator
	<input type="checkbox"/> Wet Scrubber	<input type="checkbox"/> Spray Dryer	<input type="checkbox"/> Flare/Combustor	
	<input checked="" type="checkbox"/> Other – Specify: NSCR			
Name of Manufacturer DCL	Model Number Quicklid w/2DC76-16	Date to Be Installed TBD		
Application:				
<input type="checkbox"/> Boiler				
<input type="checkbox"/> Kiln				
<input checked="" type="checkbox"/> Engine				
<input type="checkbox"/> Other – Specify:				
Pollutants Removed	NOx	CO	VOC	
Design Efficiency (%)				
Operating Efficiency (%)				
Describe method used to determine operating efficiency: Data provided by manufacturer				

### SECTION CD – GAS CONDITIONS

Gas Conditions		Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			
Gas Temperature (°F)			
Gas Pressure (in. H <sub>2</sub> O)			
Gas Velocity (ft/sec)			
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	NOx	g/hp-hr	1.00
	CO	g/hp-hr	2.00
	VOC	g/hp-hr	0.70
Pressure Drop Through Gas Cleaning Device (in. H <sub>2</sub> O)			



## PERMIT APPLICATION FOR GLYCOL DEHYDRATION UNITS

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY  
DIVISION OF AIR QUALITY  
SFN 58923 (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 ONEOK Rockies Midstream, L.L.C.	Facility Name East Fork Compressor Station
---	---

### SECTION B - 40 CFR 63, SUBPART HH APPLICABILITY DETERMINATION

The facility is a (check one):  major, or  area source of hazardous air pollutants (HAP) as defined in §63.761. Attach calculations showing expected HAP emissions in accordance with §63.760(a)(1).

The facility (check all that apply):

- Processes, upgrades or stores hydrocarbon liquids prior to the point of custody transfer.
- Processes, upgrades or stores natural gas prior to the point at which natural gas enters the transmission and storage source category or is delivered to a final end user.

Identify the 40 CFR 63 Subpart HH (MACT HH) affected source:

- Glycol (ethylene, diethylene, or triethylene) dehydration unit & associated equipment (located at a major source), or
- Triethylene glycol (TEG) dehydration unit (located at an area source)

The facility is exempt from MACT HH because it:

- Is a qualifying black oil facility, or
- Is a major source facility, prior to the point of custody transfer, with a facility-wide actual annual average natural gas throughput less than 18.4 thousand standard cubic meters per day and a facility-wide actual annual average hydrocarbon liquid throughput less than 39,700 liters per day.
- The facility is not exempt from MACT HH.

### SECTION C – EMISSION UNIT INFORMATION

Emission Unit Description	Emission Unit Identifier (EU)	Emission Point Number (EP)	Pollutant*	Emission Rate		Air Pollution Control Equipment
				lb/hr	ton/yr	
Dehydration Unit	D-1	FL-2	VOC	25.30	4.62	Flash tank/reboiler, Condenser/Flare
Dehydration Unit	D-1	FL-2	Benzene	0.65	0.12	Flash tank/reboiler, Condenser/Flare
Dehydration Unit	D-1	FL-2	Total HAP	1.05	0.19	Flash tank/reboiler, Condenser/Flare
Dehydration Unit	D-1	FL-2	CO <sub>2</sub> e	262.62	48.02	Flash tank/reboiler, Condenser/Flare

\* Includes an estimate of greenhouse gas emissions (CO<sub>2</sub>e).

Complete the following for each glycol and triethylene glycol dehydration unit.								
EU	Design Capacity (MMSCFD)	Actual Throughput (MMSCFD)	Gas Pressure (psig)	Gas Temp (°F)	Water Content (lb/MMSCF)		Glycol Recirc. Rate (gal/min)	VOC Emissions (ton/yr)
					Wet Gas	Dry Gas		
D-1	60	60	1125	110	Saturated	NA	14	4.62

**SECTION D – STACK DATA**

Inside Diameter (ft)	Height Above Grade (ft)	Gas Volume (scfm)
Gas Temperature at Exit (°F)	Gas Velocity at Exit (ft/sec)	
Are Emission Control Devices in Place? If YES – Complete SFN 8532		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Nearest Residence or Building	Distance (ft)	Direction
Nearest Property Line	Distance (ft)	Direction

**SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:**

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



# PERMIT APPLICATION FOR FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY

DIVISION OF AIR QUALITY

SFN 8518 (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 ONEOK Rockies Midstream, L.L.C.	Facility Name East Fork Compressor Station
---	---

## SECTION B - EQUIPMENT

Source ID No. (From form SFN 8516) H-1	Name of Manufacturer Glycol Reboiler
Rated Capacity/Maximum Input 1.0 mmBtu/hr	Model Number
Purpose	Space Heat _____% Process Heat _____%
	Power Generation _____% Other (Specify % if Multi-Purpose) _____%

## SECTION C - TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
<input type="checkbox"/> Pulverized	<input type="checkbox"/> Spreader Stoker with Fly Ash Reinjection
<input type="checkbox"/> General	<input type="checkbox"/> Spreader Stoker without Fly Ash Reinjection
<input type="checkbox"/> Dry Bottom	<input type="checkbox"/> Fluidized Bed
<input type="checkbox"/> Wet Bottom with Fly Ash Reinjection	<input type="checkbox"/> Cyclone
<input type="checkbox"/> Wet Bottom without Fly Ash Reinjection	<input type="checkbox"/> Hand-Fired
<input type="checkbox"/> Other - Specify:	
Fuel Oil	
<input type="checkbox"/> Horizontally Fired	<input checked="" type="checkbox"/> Gas
<input type="checkbox"/> Tangentially Fired	<input type="checkbox"/> Horizontally Fired
<input type="checkbox"/> Other - Specify:	<input type="checkbox"/> Tangentially Fired
	<input type="checkbox"/> Other - Specify:

## SECTION D - NORMAL SCHEDULE OF OPERATION

Hours Per Day 24	Days Per Week 7	Weeks Per Year 52	Hours Per Year Total 8760	Peak Season (Specify Months)
---------------------	--------------------	----------------------	------------------------------	------------------------------

## SECTION E - FUEL USE EXPECTED IN A CALENDAR YEAR

Year 20					
Primary Fuels			Standby Fuels		
Type Natural Gas			Type		
Quantity Per Year 8.54		Units of Measure mmscf/yr	Quantity Per Year		Units of Measure
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum	Maximum	Average	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum	Maximum	Average 1026/scf	Minimum	Maximum	Average



Describe Fuel Transport and Storage Methods:

### SECTION F – COMBUSTION AIR

Natural Draft     Induced     Forced     Other – Specify:

### SECTION G – STACK DATA

Inside Diameter (ft)	Height Above Grade (ft)
Gas Temperature at Exit (Avg. °F)	Gas Velocity at Exit (Avg. ft/sec)
Are Emission Control Devices in Place? If YES – Complete SFN 8532 <input type="checkbox"/> Yes <input type="checkbox"/> No	
Stack Exit Gas Flow Rate	
Average (ACFM)	Average (DSCFM)
Maximum (ACFM)	Maximum (DSCFM)
Are sampling ports available? <input type="checkbox"/> No <input type="checkbox"/> Yes – Describe:	

### SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.

### SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
NO <sub>x</sub>	0.10	0.43	AP-42 Table 1.4-1
CO	0.08	0.36	AP-42 Table 1.4-1
PM	0.01	0.03	AP-42 Table 1.4-1
PM <sub>10</sub> (filterable and condensable)	0.01	0.03	AP-42 Table 1.4-1
PM <sub>2.5</sub> (filterable and condensable)	0.01	0.03	AP-42 Table 1.4-1
SO <sub>2</sub>	0.01	0.01	AP-42 Table 1.4-1

Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
VOC	0.01	0.02	AP-42 Table 1.4-1
GHG (as CO <sub>2</sub> e)	117.10	512.89	AP-42 Table 1.4-1
Largest Single HAP	0.01	0.01	AP-42 Table 1.4-3
Total HAPS	0.01	0.01	AP-42 Table 1.4-3

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



## PERMIT APPLICATION FOR FLARES

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

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

### SECTION A – GENERAL INFORMATION

Name of Firm or Organization ONEOK Rockies Midstream, L.L.C.	Facility Name East Fork Compressor Station
---	---

### SECTION B - FLARE INFORMATION

Use: <input type="checkbox"/> Emergency <input checked="" type="checkbox"/> Process <input type="checkbox"/> Both	Subject to NSPS (40 CFR 60.18) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Emission Point ID FL-2	Height Above Ground Level (ft.)	Diameter at Top (ft.)
Flame Monitor: <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infrared <input type="checkbox"/> Ultraviolet <input type="checkbox"/> Acoustic <input type="checkbox"/> Other:		
Ignition: <input checked="" type="checkbox"/> Automatic <input checked="" type="checkbox"/> Continuous Burning Pilot <input checked="" type="checkbox"/> Other:		
Average Btu/1000 scf 0.2748	Percent H <sub>2</sub> S	Maximum Hourly Flow Rate to Flare 18.98lb/hr
List source ID numbers controlled by this unit, if any: D-1		

### SECTION C – AIR CONTAMINANTS EMITTED

Pollutant	Amount (Tons Per Year)	Basis of Estimate*
NO <sub>x</sub>	0.15	AP-42 Table 1.4-1
CO	0.66	AP-42 Table 1.4-1
PM	0.01	AP-42 Table 1.4-2
PM <sub>10</sub> (filterable and condensable)	0.01	AP-42 Table 1.4-1 and Mass Balance
PM <sub>2.5</sub> (filterable and condensable)	0.01	AP-42 Table 1.4-2
SO <sub>2</sub>	0.01	AP-42 Table 1.4-2
VOC	0.01	AP-42 Table 1.4-1 and Mass Balance
GHG (as CO <sub>2</sub> e)	280.96	40 CFR 98
Largest Single HAP	0.01	AP-42 Table 1.4-1 and Mass Balance
Total HAPS	0.01	AP-42 Table 1.4-1 and Mass Balance

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

Will flaring of gas comply with applicable Ambient Air Quality Standards?

Yes

No

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

YES

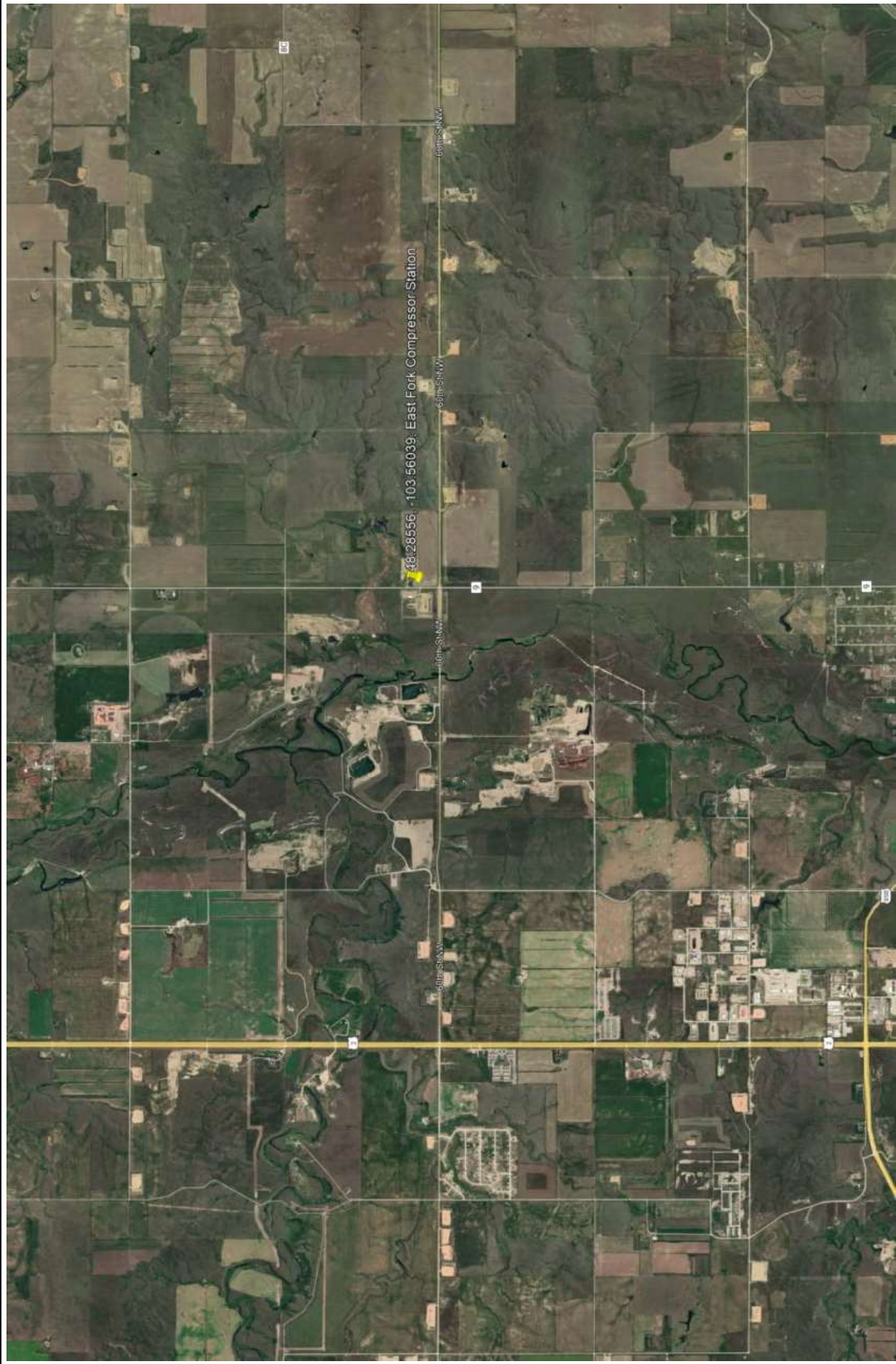
NO

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

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

**SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:**

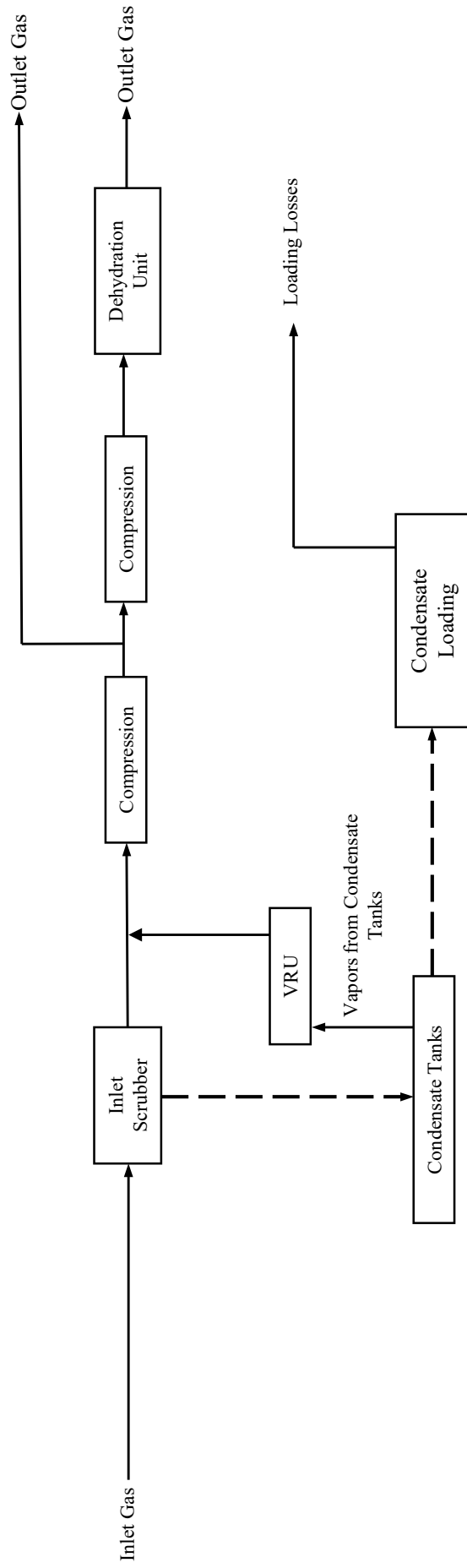
North Dakota Department of Environmental Quality  
Division of Air Quality  
4201 Normandy Street, 2<sup>nd</sup> Floor  
Bismarck, ND 58503-1324  
(701)328-5188



**Figure 1.**  
ONEOK Rockies Midstream, L.L.C.  
East Fork Compressor Station  
Williams County, ND



Figure Title: Area Map



—————> Gas/Vapor

- - - - -> Condensate/Water

**ORM East Fork Compressor Station**

Figure 2: Process Flow Diagram

Williams County, North Dakota

**ONEOK Rockies Midstream, L.L.C.**  
**East Fork Compressor Station**  
**Facility Emissions Summary - Annual**

Unit ID	Description	NOx		CO		VOC		SO <sub>2</sub>		PM		HCHO		HAP		CO <sub>2</sub> e	
		TPY		TPY		TPY		TPY		TPY		TPY		TPY		TPY	
C-1	1,680-hp Waukesha L7044 GSI	16.22		32.44		11.36		0.04		1.22		0.64		1.02		7,346.46	
C-2	1,680-hp Waukesha L7044 GSI	16.22		32.44		11.36		0.04		1.22		0.64		1.02		7,346.46	
D-1	60-mmscf/d Glycol Dehydration Unit	--		--		4.62		--		--		--		0.19		48.02	
H-1	1-MMBtu/hr Glycol Reboiler	0.43		0.36		0.02		<0.01		0.03		<0.01		0.01		512.89	
FL-2	BTEX Flare	0.15		0.66		<0.01		<0.01		<0.01		<0.01		<0.01		280.96	
FL-1	Emergency Flare	0.57		0.66		0.22		<0.01		0.04		<0.01		0.01		721.47	
TK-1	400-bbl Condensate Tank	--		--		5.93		--		--		--		0.26		4.67	
TK-2	400-bbl Condensate Tank	--		--		5.93		--		--		--		0.26		4.67	
TK-3	400-bbl Condensate Tank	--		--		5.93		--		--		--		0.26		4.67	
TK-4	400-bbl Condensate Tank	--		--		5.93		--		--		--		0.26		4.67	
TK-5	400-bbl Condensate Tank	--		--		5.93		--		--		--		0.26		4.67	
TK-6	400-bbl Condensate Tank	--		--		5.93		--		--		--		0.26		4.67	
WTK-1	400-bbl Produced Water Tank	--		--		0.06		--		--		--		<0.01		0.05	
WTK-2	400-bbl Produced Water Tank	--		--		0.06		--		--		--		<0.01		0.05	
LTK-1	400-bbl LACT Divert Tank	--		--		0.74		--		--		--		0.03		7.24	
TL-1	Condensate Truck Loading	--		--		13.50		--		--		--		2.92		0.02	
MTK-1	400-bbl Methanol Tank	--		--		0.34		--		--		--		0.34		--	
FUG	Fugitive Emissions	--		--		4.43		--		--		--		0.17		146.59	
BD	Miscellaneous Venting and Blowdowns to Atmosphere	--		--		8.48		--		--		--		0.04		331.99	
<b>Total =</b>		<b>33.60</b>		<b>66.57</b>		<b>90.78</b>		<b>0.08</b>		<b>2.51</b>		<b>1.29</b>		<b>7.27</b>		<b>16,770.20</b>	

## Notes:

1) Miscellaneous venting and blowdowns to atmosphere include, but are not limited to, miscellaneous planned and unplanned venting to atmosphere from pressure relief valves, startup, shut-down, maintenance, compressor blowdowns, pinging actions, and/or pneumatic controllers.





**ONEOK Rockies Midstream, L.L.C.  
East Fork Compressor Station  
Facility Analyses**

Component	Molecular Weight	Stream 1 Inlet Gas			Stream 2 Condensate			Stream 3 Flash Gas					
		Mole %	Equiv. Wt. Basis	Weight %	HC Weight %	Mole %	Equiv. Wt. Basis	Weight %	HC Weight %	Mole %	Equiv. Wt. Basis	Weight %	HC Weight %
Hydrogen Sulfide	34.081	0.0000%	0.00	0.00%	-	0.0000%	0.00	0.00%	-	0.0000%	0.00	0.00%	-
Carbon Dioxide	44.010	1.0885%	0.48	2.01%	-	0.0031%	0.00	0.00%	-	0.1984%	0.09	0.19%	-
Nitrogen	28.013	2.9623%	0.83	3.48%	-	0.0005%	0.00	0.00%	-	0.3154%	0.09	0.19%	-
Helium	4.003	0.0000%	0.00	0.00%	-	0.0000%	0.00	0.00%	-	0.0000%	0.00	0.00%	-
Oxygen	31.999	0.0000%	0.00	0.00%	-	0.0000%	0.00	0.00%	-	0.0000%	0.00	0.00%	-
Methane	16.043	62.6923%	10.06	42.14%	44.59%	0.0447%	0.01	0.01%	0.01%	8.2646%	1.33	2.85%	2.86%
Ethane	30.069	20.1565%	6.06	25.40%	28.87%	0.8602%	0.26	0.31%	0.31%	22.0660%	6.64	14.24%	14.30%
Propane	44.096	9.2520%	4.08	17.10%	18.09%	4.5673%	2.01	2.38%	2.38%	31.3600%	13.83	29.69%	29.80%
i-Butane	58.122	0.7800%	0.45	1.90%	2.01%	2.0066%	1.17	1.38%	1.38%	4.9428%	2.87	6.17%	6.19%
n-Butane	58.122	2.3130%	1.34	5.63%	5.96%	11.3560%	6.60	7.78%	7.78%	18.0430%	10.49	22.51%	22.60%
i-Pentane	72.149	0.2746%	0.20	0.83%	0.88%	7.7682%	5.60	6.61%	6.61%	4.7436%	3.42	7.35%	7.38%
n-Pentane	72.149	0.3508%	0.25	1.06%	1.12%	15.7670%	11.38	13.42%	13.42%	6.9175%	4.99	10.72%	10.76%
n-Hexane	86.175	0.0307%	0.03	0.11%	0.12%	19.3150%	16.84	19.63%	19.63%	2.2214%	1.91	4.11%	4.13%
Other Hexanes	86.175	0.0634%	0.05	0.23%	0.24%	0.0000%	0.00	0.00%	0.00%	0.0000%	0.00	0.00%	0.00%
Heptanes	100.202	0.0215%	0.02	0.09%	0.10%	21.9880%	22.03	25.99%	25.99%	0.7264%	0.73	1.56%	1.57%
Benzene	78.114	0.0032%	0.00	0.01%	0.01%	0.6150%	0.48	0.57%	0.57%	0.0749%	0.06	0.13%	0.13%
Toluene	92.141	0.0006%	0.00	0.00%	0.00%	0.6511%	0.60	0.71%	0.71%	0.0199%	0.02	0.04%	0.04%
Ethylbenzene	106.167	0.0000%	0.00	0.00%	0.00%	0.0688%	0.07	0.09%	0.09%	0.0006%	0.00	0.00%	0.00%
Xylenes	106.167	0.0001%	0.00	0.00%	0.00%	0.4869%	0.52	0.61%	0.61%	0.0033%	0.00	0.01%	0.01%
Octanes	114.229	0.0010%	0.00	0.00%	0.01%	10.3370%	11.81	13.93%	13.93%	0.0960%	0.11	0.24%	0.24%
2,2,4-Trimethylpentane	114.231	0.0015%	0.00	0.01%	0.01%	0.0000%	0.00	0.00%	0.00%	0.0000%	0.00	0.00%	0.00%
Nonanes	128.255	0.0000%	0.00	0.00%	0.00%	2.3006%	2.95	3.48%	3.48%	0.0059%	0.01	0.02%	0.02%
Decanes	142.282	0.0000%	0.00	0.00%	0.00%	1.8647%	2.65	3.13%	3.13%	0.0000%	0.00	0.00%	0.00%
<b>Totals =</b>		99.9920%	23.86	100.00%	100.00%	100.0008%	84.79	100.00%	100.00%	99.9997%	46.58	100.00%	100.00%
		<b>Total HC =</b>	<b>22.56</b>	<b>Total VOC =</b>	<b>28.54%</b>	<b>Total HC =</b>	<b>84.79</b>	<b>Total VOC =</b>	<b>99.69%</b>	<b>Total HC =</b>	<b>46.40</b>	<b>Total VOC =</b>	<b>82.84%</b>
				<b>Total HAP =</b>	<b>0.14%</b>			<b>Total HAP =</b>	<b>21.60%</b>			<b>Total HAP =</b>	<b>4.30%</b>

Notes:

**ONEOK Rockies Midstream, L.L.C.**  
**East Fork Compressor Station**

**Engine Information and Manufacturer Emission Factors**

Equipment Information		
	C-1	C-2
<b>Make</b>	Waukesha	Waukesha
<b>Model</b>	L7044 GSI	L7044 GSI
<b>Design Rating (hp)</b>	1,680	1,680
<b>Fuel Consumption (Btu/hp-hr)</b>	8,526	8,526
<b>Fuel Consumption (scfh)</b>	13,961	13,961
<b>Fuel Consumption (mmBtu/hr)</b>	14.32	14.32
<b>Fuel Consumption (scf/yr)</b>	122,295,747	122,295,747
<b>Fuel Heating Value (Btu/scf)</b>	1,026	1,026
<b>Design Class</b>	4S-RB	4S-RB
<b>Controls</b>	NSCR	NSCR
<b>Operating Hours</b>	8,760	8,760
<b>Stack Height (ft)</b>	30.0	30.0
<b>Stack Diameter (ft)</b>	1.0	1.0
<b>Exhaust Temperature (°F)</b>	1201	1201
<b>Exhaust Flow (acfm)</b>	7,429	7,429
<b>Exhaust Flow (scfh)</b>	141,692	141,692
<b>Exit Velocity (ft/s)</b>	157.65	157.65

Emission Factors		
	C-1	C-2
<b>NOx (g/hp-hr)</b>	1.00	1.00
<b>CO (g/hp-hr)</b>	2.00	2.00
<b>VOC (g/hp-hr)</b>	0.70	0.70

Control Efficiency		
	C-1	C-2
<b>NOx</b>	0.00%	0.00%
<b>CO</b>	0.00%	0.00%
<b>VOC</b>	0.00%	0.00%
<b>Formaldehyde</b>	0.00%	0.00%

Post-Control Emission Factors		
	C-1	C-2
<b>NOx (g/hp-hr)</b>	1.00	1.00
<b>CO (g/hp-hr)</b>	2.00	2.00
<b>VOC (g/hp-hr)</b>	0.70	0.70

Notes:

2) Emission Factor Source: NSPS JJJJ emissions limitations for modified engines.

**ONEOK Rockies Midstream, L.L.C.  
East Fork Compressor Station  
Engine AP-42/EPA Emission Factors**

Emission Factors	
	4S-RB
NOx (lb/mmBtu)	2.21E+00
CO (lb/mmBtu)	3.72E+00
VOC (lb/mmBtu)	2.96E-02
SO <sub>2</sub> (lb/mmBtu)	5.88E-04
PM <sub>10/2.5</sub> (lb/mmBtu)	9.50E-03
PM <sub>COND</sub> (lb/mmBtu)	9.91E-03
PM <sub>TOT</sub> (lb/mmBtu)	1.94E-02
Acetaldehyde (lb/mmBtu)	2.79E-03
Acrolein (lb/mmBtu)	2.63E-03
Benzene (lb/mmBtu)	1.58E-03
Ethylbenzene (lb/mmBtu)	2.48E-05
Formaldehyde (lb/mmBtu)	2.05E-02
Methanol (lb/mmBtu)	3.06E-03
n-Hexane (lb/mmBtu)	NA
Toluene (lb/mmBtu)	5.58E-04
Xylenes (lb/mmBtu)	1.95E-04
Other HAP (lb/mmBtu)	1.08E-03
Carbon Dioxide (CO <sub>2</sub> ) (kg/mmBtu)	5.31E+01
Methane (CH <sub>4</sub> ) (kg/mmBtu)	1.00E-03
Nitrous Oxide (N <sub>2</sub> O) (kg/mmBtu)	1.00E-04

Control Efficiency	
	4S-RB
NOx	0.00%
CO	90.00%
VOC	50.00%
Formaldehyde	50.00%
HAP	50.00%

Post-Control Emission Factors	
	4S-RB
NOx (lb/mmBtu)	2.21E+00
CO (lb/mmBtu)	3.72E-01
VOC (lb/mmBtu)	1.48E-02
SO <sub>2</sub> (lb/mmBtu)	5.88E-04
PM <sub>10/2.5</sub> (lb/mmBtu)	9.50E-03
PM <sub>COND</sub> (lb/mmBtu)	9.91E-03
PM <sub>TOT</sub> (lb/mmBtu)	1.94E-02
Acetaldehyde (lb/mmBtu)	1.40E-03
Acrolein (lb/mmBtu)	1.32E-03
Benzene (lb/mmBtu)	7.90E-04
Ethylbenzene (lb/mmBtu)	1.24E-05
Formaldehyde (lb/mmBtu)	1.03E-02
Methanol (lb/mmBtu)	1.53E-03
n-Hexane (lb/mmBtu)	NA
Toluene (lb/mmBtu)	2.79E-04
Xylenes (lb/mmBtu)	9.75E-05
Other HAP (lb/mmBtu)	5.40E-04
Carbon Dioxide (CO <sub>2</sub> ) (kg/mmBtu)	5.31E+01
Methane (CH <sub>4</sub> ) (kg/mmBtu)	1.00E-03
Nitrous Oxide (N <sub>2</sub> O) (kg/mmBtu)	1.00E-04

## Notes:

1) Criteria pollutant and hazardous air pollutant emission factors are from AP-42 Table 3.2-2 (7/00). Greenhouse

**ONEOK Rockies Midstream, L.L.C.  
East Fork Compressor Station  
Engine Emissions Calculations**

Unit ID: C-1

Pollutant	Emission Factor	Capacity	Conversion	Hourly Emissions	Operating Hours	Conversion	Annual Emissions
NOx	1.00E+00 g/hp-hr	1,680 hp	0.00220462 lb/gr	= 3.70 lb/hr	X 8,760	0.0005 ton/lb	= 16.22 TPY
CO	2.00E+00 g/hp-hr	1,680 hp	0.00220462 lb/gr	= 7.41 lb/hr	X 8,760	0.0005 ton/lb	= 32.44 TPY
VOC	7.00E-01 g/hp-hr	1,680 hp	0.00220462 lb/gr	= 2.59 lb/hr	X 8,760	0.0005 ton/lb	= 11.36 TPY
SO <sub>2</sub>	5.88E-04 lb/mmBtu	14.32 mmBtu/hr	-	= 0.01 lb/hr	X 8,760	0.0005 ton/lb	= 0.04 TPY
PM <sub>102.5</sub>	9.50E-03 lb/mmBtu	14.32 mmBtu/hr	-	= 0.14 lb/hr	X 8,760	0.0005 ton/lb	= 0.60 TPY
PM <sub>cond</sub>	9.91E-03 lb/mmBtu	14.32 mmBtu/hr	-	= 0.14 lb/hr	X 8,760	0.0005 ton/lb	= 0.62 TPY
PM <sub>tot</sub>	1.94E-02 lb/mmBtu	14.32 mmBtu/hr	-	= 0.28 lb/hr	X 8,760	0.0005 ton/lb	= 1.22 TPY
Acetaldehyde	1.40E-03 lb/mmBtu	14.32 mmBtu/hr	-	= 0.02 lb/hr	X 8,760	0.0005 ton/lb	= 0.09 TPY
Acrolein	1.32E-03 lb/mmBtu	14.32 mmBtu/hr	-	= 0.02 lb/hr	X 8,760	0.0005 ton/lb	= 0.08 TPY
Benzene	7.90E-04 lb/mmBtu	14.32 mmBtu/hr	-	= 0.01 lb/hr	X 8,760	0.0005 ton/lb	= 0.05 TPY
Ethylbenzene	1.24E-05 lb/mmBtu	14.32 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	0.0005 ton/lb	= <0.01 TPY
Formaldehyde	1.03E-02 lb/mmBtu	14 mmBtu/hr	-	= 0.15 lb/hr	X 8,760	0.0005 ton/lb	= 0.64 TPY
Methanol	1.53E-03 lb/mmBtu	14.32 mmBtu/hr	-	= 0.02 lb/hr	X 8,760	0.0005 ton/lb	= 0.10 TPY
n-Hexane	NA	14.32 mmBtu/hr	-	= 0.00 lb/hr	X 8,760	0.0005 ton/lb	= 0.00 TPY
Toluene	2.79E-04 lb/mmBtu	14.32 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	0.0005 ton/lb	= 0.02 TPY
Xylenes	9.75E-05 lb/mmBtu	14.32 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	0.0005 ton/lb	= 0.01 TPY
Other HAP	5.40E-04 lb/mmBtu	14.32 mmBtu/hr	-	= 0.01 lb/hr	X 8,760	0.0005 ton/lb	= 0.03 TPY
CO <sub>2</sub>	5.31E+01 kg/mmBtu	14 mmBtu/hr	2.20462 lb/kg	= 1,675.54 lb/hr	X 8,760	0.0005 ton/lb	= 7,338.88 TPY
CH <sub>4</sub>	1.00E-03 kg/mmBtu	14.32 mmBtu/hr	2.20462 lb/kg	= 0.03 lb/hr	X 8,760	0.0005 ton/lb	= 0.14 TPY
N <sub>2</sub> O	1.00E-04 kg/mmBtu	14.32 mmBtu/hr	2.20462 lb/kg	= <0.01 lb/hr	X 8,760	0.0005 ton/lb	= 0.01 TPY

**ONEOK Rockies Midstream, L.L.C.  
East Fork Compressor Station  
Engine Emissions Calculations**

Unit ID: **C-2**

Pollutant	Emission Factor	Capacity	Conversion	Hourly Emissions	Operating Hours	Conversion	Annual Emissions
NOx	1.00E+00 g/hp-hr	1,680 hp	X 0.00220462 lb/gr	= 3.70 lb/hr	X 8,760	X 0.0005 ton/lb	= 16.22 TPY
CO	2.00E+00 g/hp-hr	1,680 hp	X 0.00220462 lb/gr	= 7.41 lb/hr	X 8,760	X 0.0005 ton/lb	= 32.44 TPY
VOC	7.00E-01 g/hp-hr	1,680 hp	X 0.00220462 lb/gr	= 2.59 lb/hr	X 8,760	X 0.0005 ton/lb	= 11.36 TPY
SO <sub>2</sub>	5.88E-04 lb/mmBtu	14.32 mmBtu/hr	X -	= 0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.04 TPY
PM <sub>102.5</sub>	9.50E-03 lb/mmBtu	14.32 mmBtu/hr	X -	= 0.14 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.60 TPY
PM <sub>cond</sub>	9.91E-03 lb/mmBtu	14.32 mmBtu/hr	X -	= 0.14 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.62 TPY
PM <sub>tot</sub>	1.94E-02 lb/mmBtu	14.32 mmBtu/hr	X -	= 0.28 lb/hr	X 8,760	X 0.0005 ton/lb	= 1.22 TPY
Acetaldehyde	1.40E-03 lb/mmBtu	14.32 mmBtu/hr	X -	= 0.02 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.09 TPY
Acrolein	1.32E-03 lb/mmBtu	14.32 mmBtu/hr	X -	= 0.02 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.08 TPY
Benzene	7.90E-04 lb/mmBtu	14.32 mmBtu/hr	X -	= 0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.05 TPY
Ethylbenzene	1.24E-05 lb/mmBtu	14.32 mmBtu/hr	X -	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
Formaldehyde	1.03E-02 lb/mmBtu	14 mmBtu/hr	X -	= 0.15 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.64 TPY
Methanol	1.53E-03 lb/mmBtu	14.32 mmBtu/hr	X -	= 0.02 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.10 TPY
n-Hexane	NA	14.32 mmBtu/hr	X -	= 0.00 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.00 TPY
Toluene	2.79E-04 lb/mmBtu	14.32 mmBtu/hr	X -	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.02 TPY
Xylenes	9.75E-05 lb/mmBtu	14.32 mmBtu/hr	X -	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.01 TPY
Other HAP	5.40E-04 lb/mmBtu	14.32 mmBtu/hr	X -	= 0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.03 TPY
CO <sub>2</sub>	5.31E+01 kg/mmBtu	14 mmBtu/hr	X 2.20462 lb/kg	= 1,675.54 lb/hr	X 8,760	X 0.0005 ton/lb	= 7,338.88 TPY
CH <sub>4</sub>	1.00E-03 kg/mmBtu	14.32 mmBtu/hr	X 2.20462 lb/kg	= 0.03 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.14 TPY
N <sub>2</sub> O	1.00E-04 kg/mmBtu	14.32 mmBtu/hr	X 2.20462 lb/kg	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.01 TPY

**ONEOK Rockies Midstream, L.L.C.**  
**East Fork Compressor Station**  
**Dehydration Unit Information and Operating Parameters**

<b>Equipment Information</b>	
	<b>D-1</b>
<b>Maximum Throughput (MMSCFD)</b>	60
<b>Wet Gas Temperature (°F)</b>	110
<b>Wet Gas Pressure (psig)</b>	1,125
<b>Pump Type (Electric/Gas)</b>	Electric
<b>Gas Pump Make/Model</b>	NA
<b>Gas Pump Glycol Flow Rate (gpm)</b>	14.00
<b>Electric Pump Make and Model</b>	TechnipFMC
<b>Flash Tank Temperature (°F)</b>	125
<b>Flash Tank Pressure (psia)</b>	60
<b>Flash Tank Controls</b>	Recycled/Used as Fuel
<b>Regenerator Still Vent Controls</b>	Condenser/Combustor
<b>Condenser Temperature (°F)</b>	120
<b>Condenser Pressure (psig)</b>	14.7
<b>Combustion Device Efficiency (%)</b>	98%
<b>Operating Hours</b>	8,760
<b>Safety Factor Added to GLYCalc Results</b>	10%

Notes:

- 1) The dehydration unit still vent will be controlled by an air-cooled condenser. Still vent non-condensables are sent to the combustor 98% control efficiency. The reboiler will be equipped with a burner management system to ensure constant combustion. The flash tank off-gas will be recycled and used for fuel for 100%
- 2) 10% safety factor has been added to GLYCalc™ results for a conservative estimate of emissions, and to account for possible fluctuations in inlet gas

**ONEOK Rockies Midstream, L.L.C.  
East Fork Compressor Station  
Dehydration Unit Emissions**

Unit ID: D-1

Proposed Emissions - For Reference Only<sup>1</sup>

Pollutant	GLYCalc Results Still Vent		GLYCalc Results Still Vent		GLYCalc Results Flash Tank		GLYCalc Results Flash Tank		Safety Factor	Proposed Hourly Emissions		Proposed Annual Emissions		
	Hourly Emissions	lb/hr	Annual Emissions	TPY	Hourly Emissions	lb/hr	Annual Emissions	TPY		=	lb/hr	=	Annual Emissions	TPY
Total VOC	8.4050	lb/hr	1.5338	TPY	+	14.5920	lb/hr	2.6630	TPY	+	25.30	lb/hr	4.62	TPY
H <sub>2</sub> S	0.0000	lb/hr	0.0000	TPY	+	0.0000	lb/hr	0.0000	TPY	+	0.00	lb/hr	0.00	TPY
2,2,4-Trimethylpentane	0.0040	lb/hr	0.0008	TPY	+	0.0020	lb/hr	0.0004	TPY	+	0.01	lb/hr	<0.01	TPY
n-Hexane	0.1020	lb/hr	0.0187	TPY	+	0.0560	lb/hr	0.0102	TPY	+	0.17	lb/hr	0.03	TPY
Benzene	0.5840	lb/hr	0.1065	TPY	+	0.0110	lb/hr	0.0020	TPY	+	0.65	lb/hr	0.12	TPY
Toluene	0.1490	lb/hr	0.0273	TPY	+	0.0020	lb/hr	0.0003	TPY	+	0.17	lb/hr	0.03	TPY
Ethylbenzene	0.0000	lb/hr	0.0000	TPY	+	0.0000	lb/hr	0.0000	TPY	+	0.00	lb/hr	0.00	TPY
Xylene	0.0430	lb/hr	0.0078	TPY	+	0.0010	lb/hr	0.0001	TPY	+	0.05	lb/hr	0.01	TPY
Total HAP	0.8820	lb/hr	0.1611	TPY	+	0.0720	lb/hr	0.0130	TPY	+	1.05	lb/hr	0.19	TPY
CO <sub>2</sub>	0.0008	lb/hr	0.0037	TPY	+	0.0182	lb/hr	0.0795	TPY	+	0.02	lb/hr	0.09	TPY
CH <sub>4</sub>	0.4240	lb/hr	0.0774	TPY	+	9.1250	lb/hr	1.6653	TPY	+	10.50	lb/hr	1.92	TPY

Uncontrolled Emissions - For Reference Only<sup>1</sup>

Pollutant	GLYCalc Results Still Vent		GLYCalc Results Still Vent		GLYCalc Results Flash Tank		GLYCalc Results Flash Tank		Safety Factor	Uncontrolled Hourly Emissions - For Reference Only		Uncontrolled Annual Emissions - For Reference Only		
	Hourly Emissions	lb/hr	Annual Emissions	TPY	Hourly Emissions	lb/hr	Annual Emissions	TPY		=	lb/hr	=	Annual Emissions	TPY
VOC	421.1070	lb/hr	76.8520	TPY	+	729.6020	lb/hr	133.1524	TPY	+	1150.71	lb/hr	210.00	TPY
H <sub>2</sub> S	0.0000	lb/hr	0.0000	TPY	+	0.0000	lb/hr	0.0000	TPY	+	0.00	lb/hr	0.00	TPY
2,2,4-Trimethylpentane	0.2100	lb/hr	0.0383	TPY	+	0.1120	lb/hr	0.0205	TPY	+	0.32	lb/hr	0.06	TPY
n-Hexane	5.1250	lb/hr	0.9354	TPY	+	2.8000	lb/hr	0.5109	TPY	+	7.93	lb/hr	1.45	TPY
Benzene	29.7980	lb/hr	5.4382	TPY	+	0.5530	lb/hr	0.1010	TPY	+	30.35	lb/hr	5.54	TPY
Toluene	7.5970	lb/hr	1.3865	TPY	+	0.0910	lb/hr	0.0166	TPY	+	7.69	lb/hr	1.40	TPY
Ethylbenzene	0.0000	lb/hr	0.0000	TPY	+	0.0000	lb/hr	0.0000	TPY	+	0.00	lb/hr	0.00	TPY
Xylene	2.1720	lb/hr	0.3965	TPY	+	0.0100	lb/hr	0.0019	TPY	+	2.18	lb/hr	0.40	TPY
Total HAP	44.9020	lb/hr	8.1949	TPY	+	3.5660	lb/hr	0.6509	TPY	+	48.47	lb/hr	8.85	TPY
CO <sub>2</sub>	0.0422	lb/hr	0.1848	TPY	+	0.9077	lb/hr	3.9757	TPY	+	0.95	lb/hr	4.16	TPY
CH <sub>4</sub>	21.2130	lb/hr	3.8714	TPY	+	456.2450	lb/hr	83.2648	TPY	+	477.46	lb/hr	87.14	TPY

Notes:

1) GLYCalc reports attached. Emissions shown here for reference only. Unburned emissions reported at the BTEX flare.

2) CO<sub>2</sub> emissions calculated using mass balance and inlet gas analysis as follows:tons CH<sub>4</sub> \* ton mole CH<sub>4</sub>/16 ton CH<sub>4</sub> \* ton mole gas/ton mole CH<sub>4</sub> \* ton mole CO<sub>2</sub>/ton mole gas \* 44 ton CO<sub>2</sub>/ton mole CO<sub>2</sub> = ton CO<sub>2</sub>/yr

**ONEOK Rockies Midstream, L.L.C.**  
**East Fork Compressor Station**  
**Dehy Combustor Information and Emission Factors**

Equipment Information	
	<b>FL-2</b>
<b>Description</b>	BTEX Flare
<b>VOC to Flare (lb/hr)</b>	18.90
<b>Stream Heat Content (Btu/scf)</b>	1,722
<b>Stream Net Btu Value (Btu/hr)</b>	482,580
<b>Operating Hours</b>	8,760
<b>Control Efficiency</b>	98%
<b>Pilot Stream Heat Content (Btu/scf)</b>	1,026
<b>Pilot Gas Flow Rate (scfh)</b>	25.00
<b>Pilot Gas Capacity (mmBtu/hr)</b>	0.026
<b>Pilot Operating Hours</b>	8,760

AP-42/EPA Emission Factors			
	Flare Stream		Pilot Gas
<b>NOx (lb/mmBtu)</b>	0.068	<b>NOx (lb/mmscf)</b>	100.0
<b>CO (lb/mmBtu)</b>	0.31	<b>CO (lb/mmscf)</b>	84.0
<b>VOC</b>	Mass Balance	<b>VOC (lb/mmscf)</b>	5.5
<b>SO<sub>2</sub></b>	Stoichiometric	<b>SO<sub>2</sub> (lb/mmscf)</b>	0.6
<b>PM<sub>10/2.5</sub></b>	--	<b>PM<sub>10/2.5</sub> (lb/mmscf)</b>	1.9
<b>PM<sub>COND</sub></b>	--	<b>PM<sub>COND</sub> (lb/mmscf)</b>	5.7
<b>PM<sub>TOT</sub></b>	--	<b>PM<sub>TOT</sub> (lb/mmscf)</b>	7.6
<b>Formaldehyde</b>	--	<b>Formaldehyde (lb/mmscf)</b>	7.50E-02
<b>n-Hexane</b>	Mass Balance	<b>n-Hexane (lb/mmscf)</b>	1.80E+00
<b>Benzene</b>	Mass Balance	<b>Benzene (lb/mmscf)</b>	2.10E-03
<b>Toluene</b>	Mass Balance	<b>Toluene (lb/mmscf)</b>	3.40E-03
<b>Ethylbenzene</b>	Mass Balance	<b>Ethylbenzene</b>	--
<b>Xylenes</b>	Mass Balance	<b>Xylenes</b>	--
<b>Other HAP</b>	Mass Balance	<b>Other HAP (lb/mmscf)</b>	1.90E-03
<b>Carbon Dioxide (CO<sub>2</sub>) (kg/mmBtu)</b>	53.06/Mass Balance	<b>Carbon Dioxide (CO<sub>2</sub>) (kg/mmBtu)</b>	53.06
<b>Methane (CH<sub>4</sub>) (kg/mmBtu)</b>	0.001/Mass Balance	<b>Methane (CH<sub>4</sub>) (kg/mmBtu)</b>	1.00E-03
<b>Nitrous Oxide (N<sub>2</sub>O) (kg/mmBtu)</b>	1.00E-04	<b>Nitrous Oxide (N<sub>2</sub>O) (kg/mmBtu)</b>	1.00E-04

## Notes:

1) NOx and CO emission factors (lb/mmBtu), flare stream: AP-42, Table 13.5-1 (2/2018). Pilot criteria and HAP emission factors (lb/mmscf): AP-42, Table 1.4-1, -2 (7/98). GHG emission factors (kg/mmBtu): 40 CFR 98.



**ONEOK Rockies Midstream, L.L.C.**  
**East Fork Compressor Station**  
**Dehy Combustor Emissions Calculations**

Unit ID: **FL-2**

Total Stream + Pilot

Pollutant	Hourly Emissions	Annual Emissions
NOx	0.04 lb/hr	0.15 TPY
CO	0.15 lb/hr	0.66 TPY
VOC	<0.01 lb/hr	<0.01 TPY
SO <sub>2</sub>	<0.01 lb/hr	<0.01 TPY
PM <sub>102.5</sub>	<0.01 lb/hr	<0.01 TPY
PM <sub>combd</sub>	<0.01 lb/hr	<0.01 TPY
PM <sub>tot</sub>	<0.01 lb/hr	<0.01 TPY
Formaldehyde	<0.01 lb/hr	<0.01 TPY
n-Hexane	<0.01 lb/hr	<0.01 TPY
Benzene	<0.01 lb/hr	<0.01 TPY
Toluene	<0.01 lb/hr	<0.01 TPY
Other HAP	<0.01 lb/hr	<0.01 TPY
CO <sub>2</sub>	63.60 lb/hr	278.57 TPY
CH <sub>4</sub>	0.02 lb/hr	0.09 TPY
N <sub>2</sub> O	<0.01 lb/hr	<0.01 TPY

Stream Emissions

Pollutant	Emission Factor	Capacity	Conversion	Hourly Emissions	Operating Hours	Conversion	Annual Emissions
NOx	6.80E-02 lb/mmBtu	X 4.83E-01 mmBtu/hr	-	= 0.03 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.14 TPY
CO	3.10E-01 lb/mmBtu	X 4.83E-01 mmBtu/hr	-	= 0.15 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.66 TPY
CO <sub>2</sub>	5.31E+01 kg/mmBtu	X 4.83E-01 mmBtu/hr	X 2.20462 lb/kg	= 56.45 lb/hr	X 8,760	X 0.0005 ton/lb	= 247.25 TPY
CO <sub>2</sub>	-	-	-	= 4.15 lb/hr	X 8,760	X 0.0005 ton/lb	= 18.17 TPY
CH <sub>4</sub>	1.00E-03 kg/mmBtu	X 4.83E-01 mmBtu/hr	X 2.20462 lb/kg	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
CH <sub>4</sub>	-	-	-	= 0.02 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.09 TPY
N <sub>2</sub> O	1.00E-04 kg/mmBtu	X 4.83E-01 mmBtu/hr	X 2.20462 lb/kg	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY

Pilot Emissions

Pollutant	Emission Factor	Capacity	Conversion	Hourly Emissions	Operating Hours	Conversion	Annual Emissions
NOx	1.00E+02 lb/mmBtu	X 2.50E-05 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.01 TPY
CO	8.40E+01 lb/mmBtu	X 2.50E-05 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.01 TPY
VOC	5.50E+00 lb/mmBtu	X 2.50E-05 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
SO <sub>2</sub>	6.00E-01 lb/mmBtu	X 2.50E-05 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
PM <sub>102.5</sub>	1.90E+00 lb/mmBtu	X 2.50E-05 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
PM <sub>combd</sub>	5.70E+00 lb/mmBtu	X 2.50E-05 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
PM <sub>tot</sub>	7.60E+00 lb/mmBtu	X 2.50E-05 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
Formaldehyde	1.80E+00 lb/mmBtu	X 2.50E-05 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
n-Hexane	2.10E-03 lb/mmBtu	X 2.50E-05 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
Benzene	3.40E-03 lb/mmBtu	X 2.50E-05 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
Toluene	1.90E-03 lb/mmBtu	X 2.50E-05 mmBtu/hr	-	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
Other HAP	5.31E+01 kg/mmBtu	X 2.57E-02 mmBtu/hr	X 2.20462 lb/kg	= 3.00 lb/hr	X 8,760	X 0.0005 ton/lb	= 13.14 TPY
CO <sub>2</sub>	1.00E-03 kg/mmBtu	X 2.57E-02 mmBtu/hr	X 2.20462 lb/kg	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
CH <sub>4</sub>	1.00E-04 kg/mmBtu	X 2.57E-02 mmBtu/hr	X 2.20462 lb/kg	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY

Notes:

1) Dehydration unit still vent emissions are routed to the combustor. Unburned VOC and HAP reported at the dehydration unit. Pilot VOC and HAP reported at the combustor.

**ONEOK Rockies Midstream, L.L.C.  
East Fork Compressor Station  
Dehy Combustor Emissions Calculations - Flare Stream Analysis**

Unit ID: **FL-2**

Component	Molecular Weight	Stream 1		Total Streams Burned in Flare				Net Heating Value Btu/scf	Net Btu Rate Btu/hr	
		D-1 Still Vent Emissions		scfd	Controlled		Btu/scf			
		2.82E+02	scfh		Uncontrolled	Controlled				
Mole %	lb/hr	lb/hr	TPY	lb/hr	TPY	TPY	TPY			
Water	18.0153	11.600%	1.55	1.55	6.79	784	1.55	6.79	0.00	0
Hydrogen Sulfide	34.081	0.000%	0.00	0.00	0.00	0	0.00	0.00	586.80	0
Carbon Dioxide	44.010	12.700%	4.15	4.15	18.17	858	4.15	18.17	0.00	0
Nitrogen	28.013	0.463%	0.10	0.10	0.42	31	0.10	0.42	0.00	0
Helium	4.003	0.000%	0.00	0.00	0.00	0	0.00	0.00	0.00	0
Oxygen	31.999	0.000%	0.00	0.00	0.00	0	0.00	0.00	0.00	0
Methane	16.043	8.150%	0.97	0.97	4.25	551	0.02	0.09	909.40	20,871
Ethane	30.069	20.400%	4.55	4.55	19.94	1,379	0.09	0.40	1,618.70	92,988
Propane	44.096	22.200%	7.27	7.27	31.82	1,500	0.15	0.64	2,314.90	144,716
i-Butane	58.122	2.890%	1.25	1.25	5.46	195	0.02	0.11	3,000.40	24,418
n-Butane	58.122	12.800%	5.52	5.52	24.19	865	0.11	0.48	3,010.80	108,524
i-Pentane	72.149	1.410%	0.76	0.76	3.31	95	0.02	0.07	3,699.00	14,687
n-Pentane	72.149	2.520%	1.35	1.35	5.91	170	0.03	0.12	3,706.90	26,305
n-Hexane	86.175	0.367%	0.23	0.23	1.03	25	0.00	0.02	4,403.80	4,551
Other Hexanes	86.175	0.546%	0.35	0.35	1.53	37	0.01	0.03	4,403.80	6,771
Heptanes	100.202	0.474%	0.35	0.35	1.54	32	0.01	0.03	5,100.00	6,807
Benzene	78.114	2.300%	1.33	1.33	5.84	155	0.03	0.12	3,590.90	23,258
Toluene	92.141	0.500%	0.34	0.34	1.50	34	0.01	0.03	4,273.60	6,017
Ethylbenzene	106.167	0.000%	0.00	0.00	0.00	0	0.00	0.00	4,970.50	0
Xylenes	106.167	0.124%	0.10	0.10	0.43	8	0.00	0.01	4,957.10	1,731
Octanes	114.229	0.046%	0.04	0.04	0.17	3	0.00	0.00	5,796.00	751
2,2,4-Trimethylpentane	114.231	0.011%	0.01	0.01	0.04	1	0.00	0.00	5,778.80	184
Nonanes	128.255	0.000%	0.00	0.00	0.00	0	0.00	0.00	6,493.20	0
Decanes	142.282	0.000%	0.00	0.00	0.00	0	0.00	0.00	7,189.60	0
<b>Totals =</b>		<b>99.5%</b>	<b>30.22</b>	<b>30.22</b>	<b>132.35</b>	<b>6,725</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>482,580</b>
<b>Total VOC =</b>		<b>46.188%</b>	<b>18.90</b>	<b>18.90</b>	<b>82.77</b>	<b>--</b>	<b>0.38</b>	<b>1.66</b>	<b>Heat Value</b>	<b>1,722</b>
			<b>Total HAP =</b>		<b>8.84</b>	<b>--</b>	<b>0.04</b>	<b>0.18</b>	<b>(Btu/scf)</b>	
			<b>Total H<sub>2</sub>S =</b>		<b>0.00</b>	<b>--</b>	<b>0.00</b>	<b>0.00</b>		
			<b>MW of Stream =</b>						<b>40.91</b>	

Notes:  
1) Stream compositions and flow rates calculated by GLYCalc. 10% safety factor added to flow rates for a conservative estimate of emissions.

**ONEOK Rockies Midstream, L.L.C.**  
**East Fork Compressor Station**  
**Heater Information and Emission Factors**

<b>Equipment Information</b>	
	<b>H-1</b>
<b>Description</b>	Glycol Reboiler
<b>Combustor Type</b>	Uncontrolled
<b>Burner Design (mmBtu/hr)</b>	1.00
<b>Fuel Consumption (mmscf/hr)</b>	9.75E-04
<b>Fuel Consumption (mmscf/yr)</b>	8.54
<b>Fuel HHV (Btu/scf)</b>	1,026
<b>Operating Hours</b>	8,760

<b>AP-42/EPA Emission Factors</b>	
	<b>Uncontrolled</b>
<b>NO<sub>x</sub> (lb/mmscf)</b>	100.0
<b>CO (lb/mmscf)</b>	84.0
<b>VOC (lb/mmscf)</b>	5.5
<b>SO<sub>2</sub> (lb/mmscf)</b>	0.6
<b>PM<sub>10/2.5</sub> (lb/mmscf)</b>	1.9
<b>PM<sub>COND</sub> (lb/mmscf)</b>	5.7
<b>PM<sub>TOT</sub> (lb/mmscf)</b>	7.6
<b>Benzene (lb/mmscf)</b>	2.10E-03
<b>Formaldehyde (lb/mmscf)</b>	7.50E-02
<b>n-Hexane (lb/mmscf)</b>	1.80E+00
<b>Toluene (lb/mmscf)</b>	3.40E-03
<b>Other HAP (lb/mmscf)</b>	1.90E-03
<b>Carbon Dioxide (CO<sub>2</sub>) (kg/mmBtu)</b>	53.06
<b>Methane (CH<sub>4</sub>) (kg/mmBtu)</b>	1.00E-03
<b>Nitrous Oxide (N<sub>2</sub>O) (kg/mmBtu)</b>	1.00E-04

Notes:

- 1) Criteria pollutant emission factor source: AP-42 Tables 1.4-1, -2 (7/98); HAP emission factor source: AP-42 Table 1.4-3 (7/98);

**ONEOK Rockies Midstream, L.L.C.  
East Fork Compressor Station  
Heater Emissions Calculations**

Unit ID: **H-1**

Pollutant	Emission Factor	Capacity	Conversion	Hourly Emissions	Operating Hours	Conversion	Annual Emissions
NOx	1.00E+02 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= 0.10 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.43 TPY
CO	8.40E+01 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= 0.08 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.36 TPY
VOC	5.50E+00 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= 0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.02 TPY
SO <sub>2</sub>	6.00E-01 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
PM <sub>102.5</sub>	1.90E+00 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.01 TPY
PM <sub>COND</sub>	5.70E+00 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= 0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.02 TPY
PM <sub>TOT</sub>	7.60E+00 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= 0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.03 TPY
Benzene	2.10E-03 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
Formaldehyde	7.50E-02 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
n-Hexane	1.80E+00 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.01 TPY
Toluene	3.40E-03 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
Other HAP	1.90E-03 lb/mmscf	X 9.75E-04 mmscf/hr	X -	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY
CO <sub>2</sub>	5.31E+01 kg/mmBtu	X 1.00E+00 mmBtu/hr	X 2.20462 lb/kg	= 116.98 lb/hr	X 8,760	X 0.0005 ton/lb	= 512.36 TPY
CH <sub>4</sub>	1.00E-03 kg/mmBtu	X 1.00E+00 mmBtu/hr	X 2.20462 lb/kg	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= 0.01 TPY
N <sub>2</sub> O	1.00E-04 kg/mmBtu	X 1.00E+00 mmBtu/hr	X 2.20462 lb/kg	= <0.01 lb/hr	X 8,760	X 0.0005 ton/lb	= <0.01 TPY

Notes:

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



**East Fork Offload - Williston, ND**

**VHP - L7044GSI**

ONEOK Josh Kreisler

Gas Compression

ENGINE SPEED (rpm):	1200	NOx SELECTION (g/bhp-hr):	0.15 NOx 0.30 CO
DISPLACEMENT (in3):	7040	COOLING SYSTEM:	JW, IC + OC
COMPRESSION RATIO:	8:1	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):	18
ENGINE SOUND LEVEL (dBA)	104	MAX. AIR INLET RESTRICTION (in. H2O):	15
IGNITION TIMING:	ESM2 Controlled	EXHAUST SOUND LEVEL (dBA)	111

**SITE CONDITIONS:**

FUEL:	Natural Gas	ALTITUDE (ft):	1910
FUEL PRESSURE RANGE (psig):	30 - 60	MAXIMUM INLET AIR TEMPERATURE (°F):	100
FUEL HHV (BTU/ft3):	1,414.4	FUEL WKI:	51.8
FUEL LHV (BTU/ft3):	1,278.6		

**SITE SPECIFIC TECHNICAL DATA**

POWER RATING	UNITS	110% OVERLOAD SITE DATA (See note 18)	MAX RATING AT 100 °F AIR TEMP	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE OF 100 °F		
				86%		86%
CONTINUOUS ENGINE POWER	BHP	1386	1474	1260		1260
OVERLOAD	% 2/24 hr	Note 18	0	10		-
MECHANICAL EFFICIENCY (LHV)	%	29.9	30.3	29.2		29.2
CONTINUOUS POWER AT FLYWHEEL	BHP	1386	1474	1260		1260

*based on no auxiliary engine driven equipment*

AVAILABLE TURNDOWN SPEED RANGE	RPM	700 - 1200
--------------------------------	-----	------------

**FUEL CONSUMPTION**

FUEL CONSUMPTION (LHV)	BTU/BHP-hr	8526	8411	8715		8715
FUEL CONSUMPTION (HHV)	BTU/BHP-hr	9432	9304	9640		9640
FUEL FLOW	SCFM	154	162	143		143

*based on fuel analysis LHV*

**HEAT REJECTION**

JACKET WATER (JW)	BTU/hr x 1000	3614	3749	3423		3422
LUBE OIL (OC)	BTU/hr x 1000	535	545	520		520
INTERCOOLER (IC)	BTU/hr x 1000	213	230	189		189
EXHAUST	BTU/hr x 1000	3479	3679	3192		3191
RADIATION	BTU/hr x 1000	679	688	664		664

**EMISSIONS (CATALYST OUT):**

NOx (NO + NO2)	g/bhp-hr	0.15	0.15	0.15		0.15
CO	g/bhp-hr	0.30	0.30	0.30		0.30
THC	g/bhp-hr	1.52	1.52	1.52		1.52
NMHC	g/bhp-hr	0.444	0.445	0.444		0.444
NM,NEHC (VOC)	g/bhp-hr	0.175	0.176	0.175		0.175
CO2	g/bhp-hr	582	574	594		594
CO2e (Methane GWP: 25)	g/bhp-hr	597	590	610		610
CH2O	g/bhp-hr	0.001	0.001	0.001		0.001
CH4	g/bhp-hr	0.63	0.63	0.63		0.63

**AIR INTAKE / EXHAUST GAS**

INDUCTION AIR FLOW	SCFM	2164	2271	2011		2010
EXHAUST GAS MASS FLOW	lb/hr	10063	10561	9351		9349
EXHAUST GAS FLOW	ACFM	7429	7834	6853		6852
EXHAUST TEMPERATURE	°F	1201	1209	1189		1189

*at exhaust temp, 14.5 psia*

**HEAT EXCHANGER SIZING<sup>12</sup>**

TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000	4098	4251
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000	848	878

**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


**East Fork Offload - Williston, ND**

ONEOK Josh Kreisler

**VHP - L7044GSI**

Gas Compression

**FUEL COMPOSITION**
**HYDROCARBONS:**

		<u>Mole or Volume %</u>
Methane	CH4	60.31
Ethane	C2H6	20.36
Propane	C3H8	9.76
Iso-Butane	I-C4H10	0.92
Normal Butane	N-C4H10	2.86
Iso-Pentane	I-C5H12	0.44
Normal Pentane	N-C5H12	0.6
Hexane	C6H14	0.32
Heptane	C7H16	0.04
Ethene	C2H4	0
Propene	C3H6	0

SUM HYDROCARBONS 95.61

**NON-HYDROCARBONS:**

Nitrogen	N2	3.1
Oxygen	O2	0
Helium	He	0
Carbon Dioxide	CO2	1.26
Carbon Monoxide	CO	0
Hydrogen	H2	0
Water Vapor	H2O	0.03

TOTAL FUEL 100

FUEL:	Natural Gas
FUEL PRESSURE RANGE (psig):	30 - 60
FUEL WKI:	51.8

FUEL SLHV (BTU/ft3):	1256.76
FUEL SLHV (MJ/Nm3):	49.42

FUEL LHV (BTU/ft3):	1278.62
FUEL LHV (MJ/Nm3):	50.28

FUEL HHV (BTU/ft3):	1414.40
FUEL HHV (MJ/Nm3):	55.62

FUEL DENSITY (SG):	0.86
--------------------	------

Standard Conditions per ASTM D3588-91 [60°F and 14.696psia] and ISO 6976:1996-02-01[25, V(0;101.325)].

Based on the fuel composition, supply pressure and temperature, liquid hydrocarbons may be present in the fuel. No liquid hydrocarbons are allowed in the fuel. The fuel must not contain any liquid water.

Waukesha recommends both of the following:

1) Dew point of the fuel gas to be at least 20°F (11°C) below the measured temperature of the gas at the inlet of the engine fuel regulator.

2) A fuel filter separator to be used on all fuels except commercial quality natural gas.

Refer to the 'Fuel and Lubrication' section of 'Technical Data' or contact the Waukesha Application Engineering Department for additional information on fuels, or LHV and WKI\* calculations.

\* Trademark of INNIO Waukesha Gas Engines Inc.

**FUEL CONTAMINANTS**

Total Sulfur Compounds	0	% volume
Total Halogen as Chloride	0	% volume
Total Ammonia	0	% volume

Total Sulfur Compounds	0	µg/BTU
Total Halogen as Chloric	0	µg/BTU
Total Ammonia	0	µg/BTU

**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 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.

**East Fork Offload - Williston, ND**

ONEOK Josh Kreisler

**VHP - L7044GSI**

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  $\pm 3\%$ .
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  $\pm 30\%$  for radiation, and  $\pm 8\%$  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 H<sub>2</sub>O/lb (10.71 g H<sub>2</sub>O/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. NO<sub>x</sub>, CO, THC, and NMHC emission levels are listed as a not to exceed limit, all other emission levels are estimated. CO<sub>2</sub> 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  $\pm 7\%$ .
7. Exhaust temperature given at engine exhaust outlet flange with a tolerance of  $\pm 50^{\circ}\text{F}$  ( $28^{\circ}\text{C}$ ).
8. Exhaust gas mass flow value is based on a "wet basis" with a tolerance of  $\pm 7\%$ .
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 O<sub>2</sub> 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**

Requires option code 1008B/1008SB for 0.15 g/bhp-hr NO<sub>x</sub> 0.30 g/bhp-hr CO catalyst.

## GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: East Fork CS Regen 1

File Name: \\Client\H\$\ENV COMPLIANCE\NGGP\ORM\East Fork - ND\2.0 Air Files\2.1 Permit Actions\2023-12\_PTC\Eas

Fork 60MMCF\_Regen 1\_2024-01-09.ddf

Date: January 18, 2024

## DESCRIPTION:

-----

Description: REGEN-1 Condenser/Burner  
 60 MMCFD  
 Gas Analysis 1/4/2024  
 Wet Gas @ 1125 psig  
 Temp 110 Degrees F & Pump Rate @ 14 gpm

Annual Hours of Operation: 8760.0 hours/yr

## WET GAS:

-----

Temperature: 110.00 deg. F  
 Pressure: 1125.00 psig  
 Wet Gas Water Content: Saturated

Component	Conc. (vol %)
-----------	------------------

-----

Carbon Dioxide	1.0885
Nitrogen	2.9623
Methane	62.6923
Ethane	20.1565
Propane	9.2520
Isobutane	0.7800
n-Butane	2.3130
Isopentane	0.2764
n-Pentane	0.3508
n-Hexane	0.0307
Cyclohexane	0.0048
Other Hexanes	0.0634
Heptanes	0.0215
Methylcyclohexane	0.0014
2,2,4-Trimethylpentane	0.0015
Benzene	0.0032
Toluene	0.0006
Xylenes	0.0001
C8+ Heavies	0.0010

## DRY GAS:

-----

Flow Rate: 60.0 MMSCF/day



Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

---

Glycol Type: TEG  
Water Content: 1.5 wt% H2O  
Flow Rate: 14.0 gpm

PUMP:

---

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

---

Flash Control: Combustion device  
Flash Control Efficiency: 98.00 %  
Temperature: 125.0 deg. F  
Pressure: 60.0 psig

REGENERATOR OVERHEADS CONTROL DEVICE:

---

Control Device: Condenser  
Temperature: 120.0 deg. F  
Pressure: 14.7 psia

Control Device: Combustion Device  
Destruction Efficiency: 98.0 %  
Excess Oxygen: 0.0 %  
Ambient Air Temperature: 80.0 deg. F

## GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: East Fork CS Regen 1

File Name: \\Client\H\$\ENV COMPLIANCE\NGGP\ORM\East Fork - ND\2.0 Air Files\2.1 Permit Actions\2023-12\_PTC\Eas  
Fork 60MMCF\_Regen 1\_2024-01-09.ddf

Date: January 18, 2024

## DESCRIPTION:

Description: REGEN-1 Condenser/Burner  
 60 MMCFD  
 Gas Analysis 1/4/2024  
 Wet Gas @ 1125 psig  
 Temp 110 Degrees F & Pump Rate @ 14 gpm

Annual Hours of Operation: 8760.0 hours/yr

## EMISSIONS REPORTS:

## CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0177	0.424	0.0774
Ethane	0.0828	1.986	0.3625
Propane	0.1323	3.174	0.5793
Isobutane	0.0227	0.544	0.0994
n-Butane	0.1008	2.419	0.4415
Isopentane	0.0138	0.331	0.0604
n-Pentane	0.0245	0.589	0.1075
n-Hexane	0.0043	0.102	0.0187
Cyclohexane	0.0042	0.100	0.0182
Other Hexanes	0.0064	0.153	0.0279
Heptanes	0.0064	0.154	0.0281
Methylcyclohexane	0.0013	0.032	0.0059
2,2,4-Trimethylpentane	0.0002	0.004	0.0008
Benzene	0.0243	0.584	0.1065
Toluene	0.0062	0.149	0.0273
Xylenes	0.0018	0.043	0.0078
C8+ Heavies	0.0011	0.025	0.0046
<b>Total Emissions</b>	<b>0.4506</b>	<b>10.815</b>	<b>1.9738</b>
<b>Total Hydrocarbon Emissions</b>	<b>0.4506</b>	<b>10.815</b>	<b>1.9738</b>
<b>Total VOC Emissions</b>	<b>0.3502</b>	<b>8.405</b>	<b>1.5338</b>
<b>Total HAP Emissions</b>	<b>0.0368</b>	<b>0.882</b>	<b>0.1610</b>
<b>Total BTEX Emissions</b>	<b>0.0323</b>	<b>0.776</b>	<b>0.1415</b>

## UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.8839	21.213	3.8714
Ethane	4.1395	99.348	18.1310
Propane	6.6152	158.765	28.9746
Isobutane	1.1343	27.224	4.9684
n-Butane	5.0407	120.977	22.0784
Isopentane	0.6897	16.554	3.0210
n-Pentane	1.2275	29.459	5.3763
n-Hexane	0.2136	5.125	0.9354
Cyclohexane	0.2083	5.000	0.9124
Other Hexanes	0.3183	7.638	1.3940
Heptanes	0.3211	7.705	1.4062
Methylcyclohexane	0.0671	1.611	0.2939
2,2,4-Trimethylpentane	0.0088	0.210	0.0383
Benzene	1.2416	29.798	5.4382
Toluene	0.3165	7.597	1.3865
Xylenes	0.0905	2.172	0.3965
C8+ Heavies	0.0529	1.271	0.2319
<b>Total Emissions</b>	<b>22.5695</b>	<b>541.668</b>	<b>98.8545</b>
<b>Total Hydrocarbon Emissions</b>	<b>22.5695</b>	<b>541.668</b>	<b>98.8545</b>
<b>Total VOC Emissions</b>	<b>17.5461</b>	<b>421.107</b>	<b>76.8520</b>
<b>Total HAP Emissions</b>	<b>1.8710</b>	<b>44.903</b>	<b>8.1948</b>
<b>Total BTEX Emissions</b>	<b>1.6487</b>	<b>39.568</b>	<b>7.2211</b>

## FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.3802	9.125	1.6653
Ethane	0.5077	12.185	2.2238
Propane	0.3720	8.928	1.6294
Isobutane	0.0422	1.012	0.1847
n-Butane	0.1426	3.422	0.6245
Isopentane	0.0171	0.410	0.0748
n-Pentane	0.0242	0.580	0.1059
n-Hexane	0.0023	0.056	0.0102
Cyclohexane	0.0006	0.014	0.0025
Other Hexanes	0.0046	0.110	0.0202
Heptanes	0.0017	0.041	0.0075
Methylcyclohexane	0.0001	0.003	0.0006
2,2,4-Trimethylpentane	0.0001	0.002	0.0004
Benzene	0.0005	0.011	0.0020
Toluene	0.0001	0.002	0.0003

Page: 3

Xylenes	<0.0001	<0.001	<0.0001
C8+ Heavies	<0.0001	0.001	0.0001

---

Total Emissions	1.4959	35.902	6.5522
-----------------	--------	--------	--------

Total Hydrocarbon Emissions	1.4959	35.902	6.5522
Total VOC Emissions	0.6080	14.592	2.6630
Total HAP Emissions	0.0030	0.071	0.0130
Total BTEX Emissions	0.0005	0.013	0.0024

## FLASH TANK OFF GAS

---

Component	lbs/hr	lbs/day	tons/yr
Methane	19.0102	456.245	83.2648
Ethane	25.3864	609.274	111.1925
Propane	18.6004	446.410	81.4698
Isobutane	2.1082	50.596	9.2337
n-Butane	7.1285	171.084	31.2228
Isopentane	0.8534	20.481	3.7378
n-Pentane	1.2086	29.007	5.2938
n-Hexane	0.1167	2.800	0.5109
Cyclohexane	0.0286	0.686	0.1252
Other Hexanes	0.2300	5.521	1.0076
Heptanes	0.0854	2.048	0.3738
Methylcyclohexane	0.0072	0.172	0.0313
2,2,4-Trimethylpentane	0.0047	0.112	0.0205
Benzene	0.0231	0.553	0.1010
Toluene	0.0038	0.091	0.0166
Xylenes	0.0004	0.010	0.0019
C8+ Heavies	0.0013	0.032	0.0058

---

Total Emissions	74.7967	1795.122	327.6097
-----------------	---------	----------	----------

Total Hydrocarbon Emissions	74.7967	1795.122	327.6097
Total VOC Emissions	30.4001	729.602	133.1524
Total HAP Emissions	0.1486	3.566	0.6509
Total BTEX Emissions	0.0273	0.654	0.1194

## COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

---

Component	lbs/hr	lbs/day	tons/yr
Methane	0.3979	9.549	1.7427
Ethane	0.5905	14.172	2.5864
Propane	0.5043	12.103	2.2087
Isobutane	0.0648	1.556	0.2840
n-Butane	0.2434	5.841	1.0659
Isopentane	0.0309	0.741	0.1352

Page: 4

n-Pentane	0.0487	1.169	0.2134
n-Hexane	0.0066	0.158	0.0289
Cyclohexane	0.0047	0.114	0.0207
Other Hexanes	0.0110	0.263	0.0480

Heptanes	0.0081	0.195	0.0356
Methylcyclohexane	0.0015	0.036	0.0065
2,2,4-Trimethylpentane	0.0003	0.006	0.0012
Benzene	0.0248	0.595	0.1085
Toluene	0.0063	0.151	0.0276

Xylenes	0.0018	0.043	0.0078
C8+ Heavies	0.0011	0.026	0.0048

---

Total Emissions	1.9466	46.718	8.5260
-----------------	--------	--------	--------

Total Hydrocarbon Emissions	1.9466	46.718	8.5260
Total VOC Emissions	0.9582	22.997	4.1969
Total HAP Emissions	0.0397	0.954	0.1740
Total BTEX Emissions	0.0329	0.789	0.1439

---

**COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:**


---

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction
-----------	-------------------------	-----------------------	-------------

---

Methane	87.1362	1.7427	98.00
Ethane	129.3235	2.5864	98.00
Propane	110.4444	2.2087	98.00
Isobutane	14.2021	0.2840	98.00
n-Butane	53.3012	1.0659	98.00
Isopentane	6.7588	0.1352	98.00
n-Pentane	10.6701	0.2134	98.00
n-Hexane	1.4463	0.0289	98.00
Cyclohexane	1.0376	0.0207	98.00
Other Hexanes	2.4016	0.0480	98.00
Heptanes	1.7801	0.0356	98.00
Methylcyclohexane	0.3253	0.0065	98.00
2,2,4-Trimethylpentane	0.0588	0.0012	98.00
Benzene	5.5392	0.1085	98.04
Toluene	1.4030	0.0276	98.03
Xylenes	0.3983	0.0078	98.04
C8+ Heavies	0.2377	0.0048	98.00

---

Total Emissions	426.4641	8.5260	98.00
-----------------	----------	--------	-------

Total Hydrocarbon Emissions	426.4641	8.5260	98.00
Total VOC Emissions	210.0045	4.1969	98.00
Total HAP Emissions	8.8457	0.1740	98.03
Total BTEX Emissions	7.3406	0.1439	98.04

## EQUIPMENT REPORTS:

## CONDENSER AND COMBUSTION DEVICE

Condenser Outlet Temperature: 120.00 deg. F  
 Condenser Pressure: 14.70 psia  
 Condenser Duty: 9.30e-002 MM BTU/hr  
 Produced Water: 11.63 bbls/day  
 Ambient Temperature: 80.00 deg. F  
 Excess Oxygen: 0.00 %  
 Combustion Efficiency: 98.00 %  
 Supplemental Fuel Requirement: 9.30e-002 MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	2.00%	98.00%
Isobutane	2.00%	98.00%
n-Butane	2.00%	98.00%
Isopentane	2.00%	98.00%
n-Pentane	2.00%	98.00%
n-Hexane	2.00%	98.00%
Cyclohexane	2.00%	98.00%
Other Hexanes	2.00%	98.00%
Heptanes	2.00%	98.00%
Methylcyclohexane	2.00%	98.00%
2,2,4-Trimethylpentane	2.00%	98.00%
Benzene	1.96%	98.04%
Toluene	1.97%	98.03%
Xylenes	1.96%	98.04%
C8+ Heavies	2.00%	98.00%

## ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25  
 Calculated Dry Gas Dew Point: 4.08 lbs. H<sub>2</sub>O/MMSCF

Page: 6

Temperature: 110.0 deg. F

Pressure: 1125.0 psig

Dry Gas Flow Rate: 60.0000 MMSCF/day

Glycol Losses with Dry Gas: 5.0135 lb/hr

Wet Gas Water Content: Saturated

Calculated Wet Gas Water Content: 72.40 lbs. H2O/MMSCF

Calculated Lean Glycol Recirc. Ratio: 4.92 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.62%	94.38%
Carbon Dioxide	99.67%	0.33%
Nitrogen	99.96%	0.04%
Methane	99.97%	0.03%
Ethane	99.93%	0.07%
Propane	99.91%	0.09%
Isobutane	99.89%	0.11%
n-Butane	99.86%	0.14%
Isopentane	99.88%	0.12%
n-Pentane	99.85%	0.15%
n-Hexane	99.81%	0.19%
Cyclohexane	99.11%	0.89%
Other Hexanes	99.85%	0.15%
Heptanes	99.71%	0.29%
Methylcyclohexane	99.18%	0.82%
2,2,4-Trimethylpentane	99.88%	0.12%
Benzene	92.32%	7.68%
Toluene	91.21%	8.79%
Xylenes	87.00%	13.00%
C8+ Heavies	99.52%	0.48%

## FLASH TANK

Flash Control: Combustion device

Flash Control Efficiency: 98.00 %

Flash Temperature: 125.0 deg. F

Flash Pressure: 60.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.96%	0.04%
Carbon Dioxide	36.04%	63.96%
Nitrogen	4.30%	95.70%
Methane	4.44%	95.56%
Ethane	14.02%	85.98%
Propane	26.23%	73.77%
Isobutane	34.98%	65.02%
n-Butane	41.42%	58.58%

Page: 7

Isopentane	44.97%	55.03%
n-Pentane	50.63%	49.37%
n-Hexane	64.85%	35.15%
Cyclohexane	88.32%	11.68%
Other Hexanes	58.46%	41.54%
Heptanes	79.10%	20.90%
Methylcyclohexane	90.75%	9.25%
2,2,4-Trimethylpentane	65.65%	34.35%
Benzene	98.27%	1.73%
Toluene	98.91%	1.09%
Xylenes	99.59%	0.41%
C8+ Heavies	97.87%	2.13%

## REGENERATOR

---

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	40.87%	59.13%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	1.11%	98.89%
n-Pentane	0.99%	99.01%
n-Hexane	0.77%	99.23%
Cyclohexane	3.62%	96.38%
Other Hexanes	1.71%	98.29%
Heptanes	0.63%	99.37%
Methylcyclohexane	4.41%	95.59%
2,2,4-Trimethylpentane	2.28%	97.72%
Benzene	5.09%	94.91%
Toluene	7.99%	92.01%
Xylenes	13.00%	87.00%
C8+ Heavies	12.30%	87.70%

## STREAM REPORTS:

---



## WET GAS STREAM

Temperature: 110.00 deg. F  
 Pressure: 1139.70 psia  
 Flow Rate: 2.51e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.53e-001	1.81e+002
Carbon Dioxide	1.09e+000	3.16e+003
Nitrogen	2.96e+000	5.47e+003
Methane	6.26e+001	6.63e+004
Ethane	2.01e+001	4.00e+004
Propane	9.24e+000	2.69e+004
Isobutane	7.79e-001	2.99e+003
n-Butane	2.31e+000	8.86e+003
Isopentane	2.76e-001	1.31e+003
n-Pentane	3.50e-001	1.67e+003
n-Hexane	3.07e-002	1.74e+002
Cyclohexane	4.79e-003	2.66e+001
Other Hexanes	6.33e-002	3.60e+002
Heptanes	2.15e-002	1.42e+002
Methylcyclohexane	1.40e-003	9.06e+000
2,2,4-Trimethylpentane	1.50e-003	1.13e+001
Benzene	3.20e-003	1.65e+001
Toluene	5.99e-004	3.64e+000
Xylenes	9.98e-005	7.00e-001
C8+ Heavies	9.98e-004	1.12e+001
<b>Total Components</b>	<b>100.00</b>	<b>1.58e+005</b>

## DRY GAS STREAM

Temperature: 110.00 deg. F  
 Pressure: 1139.70 psia  
 Flow Rate: 2.50e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	8.59e-003	1.02e+001
Carbon Dioxide	1.09e+000	3.15e+003
Nitrogen	2.96e+000	5.47e+003
Methane	6.27e+001	6.63e+004
Ethane	2.02e+001	3.99e+004
Propane	9.25e+000	2.69e+004
Isobutane	7.79e-001	2.99e+003
n-Butane	2.31e+000	8.85e+003
Isopentane	2.76e-001	1.31e+003
n-Pentane	3.50e-001	1.67e+003

Page: 9

n-Hexane	3.07e-002	1.74e+002
Cyclohexane	4.76e-003	2.64e+001
Other Hexanes	6.33e-002	3.60e+002
Heptanes	2.14e-002	1.42e+002
Methylcyclohexane	1.39e-003	8.99e+000
2,2,4-Trimethylpentane	1.50e-003	1.13e+001
Benzene	2.96e-003	1.52e+001
Toluene	5.48e-004	3.32e+000
Xylenes	8.70e-005	6.09e-001
C8+ Heavies	9.96e-004	1.12e+001
-----		
Total Components	100.00	1.57e+005

## LEAN GLYCOL STREAM

Temperature: 110.00 deg. F  
Flow Rate: 1.40e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
-----		
TEG	9.85e+001	7.76e+003
Water	1.50e+000	1.18e+002
Carbon Dioxide	1.34e-011	1.06e-009
Nitrogen	2.59e-012	2.04e-010
Methane	8.48e-018	6.68e-016
Ethane	1.77e-007	1.39e-005
Propane	1.30e-008	1.03e-006
Isobutane	1.23e-009	9.73e-008
n-Butane	3.83e-009	3.02e-007
Isopentane	9.84e-005	7.75e-003
n-Pentane	1.55e-004	1.22e-002
n-Hexane	2.11e-005	1.66e-003
Cyclohexane	9.94e-005	7.83e-003
Other Hexanes	7.03e-005	5.54e-003
Heptanes	2.59e-005	2.04e-003
Methylcyclohexane	3.93e-005	3.09e-003
2,2,4-Trimethylpentane	2.60e-006	2.05e-004
Benzene	8.45e-004	6.66e-002
Toluene	3.49e-004	2.75e-002
Xylenes	1.72e-004	1.35e-002
C8+ Heavies	9.42e-005	7.43e-003
-----		
Total Components	100.00	7.88e+003

## RICH GLYCOL STREAM

Page: 10

Temperature: 110.00 deg. F

Pressure: 1139.70 psia

Flow Rate: 1.46e+001 gpm

NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.51e+001	7.76e+003
Water	3.55e+000	2.89e+002
Carbon Dioxide	1.29e-001	1.06e+001
Nitrogen	2.50e-002	2.04e+000
Methane	2.44e-001	1.99e+001
Ethane	3.62e-001	2.95e+001
Propane	3.09e-001	2.52e+001
Isobutane	3.97e-002	3.24e+000
n-Butane	1.49e-001	1.22e+001
Isopentane	1.90e-002	1.55e+000
n-Pentane	3.00e-002	2.45e+000
n-Hexane	4.07e-003	3.32e-001
Cyclohexane	3.00e-003	2.45e-001
Other Hexanes	6.79e-003	5.54e-001
Heptanes	5.00e-003	4.08e-001
Methylcyclohexane	9.48e-004	7.74e-002
2,2,4-Trimethylpentane	1.67e-004	1.36e-002
Benzene	1.63e-002	1.33e+000
Toluene	4.26e-003	3.48e-001
Xylenes	1.28e-003	1.04e-001
C8+ Heavies	7.56e-004	6.17e-002
Total Components	100.00	8.16e+003

## FLASH TANK OFF GAS STREAM

Temperature: 125.00 deg. F

Pressure: 74.70 psia

Flow Rate: 1.09e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.24e-001	1.16e-001
Carbon Dioxide	5.34e+000	6.76e+000
Nitrogen	2.43e+000	1.95e+000
Methane	4.12e+001	1.90e+001
Ethane	2.94e+001	2.54e+001
Propane	1.47e+001	1.86e+001
Isobutane	1.26e+000	2.11e+000
n-Butane	4.27e+000	7.13e+000
Isopentane	4.12e-001	8.53e-001

Page: 11

n-Pentane 5.83e-001 1.21e+000

n-Hexane 4.71e-002 1.17e-001

Cyclohexane 1.18e-002 2.86e-002

Other Hexanes 9.29e-002 2.30e-001

Heptanes 2.96e-002 8.54e-002

Methylcyclohexane 2.53e-003 7.15e-003

2,2,4-Trimethylpentane 1.43e-003 4.68e-003

Benzene 1.03e-002 2.31e-002

Toluene 1.43e-003 3.78e-003

Xylenes 1.40e-004 4.28e-004

C8+ Heavies 2.69e-004 1.32e-003

-----  
Total Components 100.00 8.36e+001

## FLASH TANK GLYCOL STREAM

-----  
Temperature: 125.00 deg. F

Flow Rate: 1.44e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
-----------	----------------	--------------------

-----  
TEG 9.61e+001 7.76e+003

Water 3.58e+000 2.89e+002

Carbon Dioxide 4.71e-002 3.81e+000

Nitrogen 1.09e-003 8.77e-002

Methane 1.09e-002 8.84e-001

Ethane 5.12e-002 4.14e+000

Propane 8.19e-002 6.62e+000

Isobutane 1.40e-002 1.13e+000

n-Butane 6.24e-002 5.04e+000

Isopentane 8.63e-003 6.97e-001

n-Pentane 1.53e-002 1.24e+000

n-Hexane 2.66e-003 2.15e-001

Cyclohexane 2.68e-003 2.16e-001

Other Hexanes 4.01e-003 3.24e-001

Heptanes 4.00e-003 3.23e-001

Methylcyclohexane 8.69e-004 7.02e-002

2,2,4-Trimethylpentane 1.11e-004 8.96e-003

Benzene 1.62e-002 1.31e+000

Toluene 4.26e-003 3.44e-001

Xylenes 1.29e-003 1.04e-001

C8+ Heavies 7.47e-004 6.04e-002

-----  
Total Components 100.00 8.08e+003

## FLASH GAS EMISSIONS

Flow Rate: 4.77e+003 scfh  
 Control Method: Combustion Device  
 Control Efficiency: 98.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	5.92e+001	1.34e+002
Carbon Dioxide	3.98e+001	2.20e+002
Nitrogen	5.55e-001	1.95e+000
Methane	1.88e-001	3.80e-001
Ethane	1.34e-001	5.08e-001
Propane	6.71e-002	3.72e-001
Isobutane	5.77e-003	4.22e-002
n-Butane	1.95e-002	1.43e-001
Isopentane	1.88e-003	1.71e-002
n-Pentane	2.66e-003	2.42e-002
n-Hexane	2.15e-004	2.33e-003
Cyclohexane	5.40e-005	5.72e-004
Other Hexanes	4.24e-004	4.60e-003
Heptanes	1.35e-004	1.71e-003
Methylcyclohexane	1.16e-005	1.43e-004
2,2,4-Trimethylpentane	6.52e-006	9.37e-005
Benzene	4.69e-005	4.61e-004
Toluene	6.53e-006	7.56e-005
Xylenes	6.41e-007	8.57e-006
C8+ Heavies	1.23e-006	2.63e-005
Total Components	100.00	3.58e+002

#### REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F  
 Pressure: 14.70 psia  
 Flow Rate: 3.83e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.41e+001	1.71e+002
Carbon Dioxide	8.57e-001	3.81e+000
Nitrogen	3.10e-002	8.77e-002
Methane	5.46e-001	8.84e-001
Ethane	1.36e+000	4.14e+000
Propane	1.49e+000	6.62e+000
Isobutane	1.93e-001	1.13e+000
n-Butane	8.59e-001	5.04e+000
Isopentane	9.47e-002	6.90e-001
n-Pentane	1.68e-001	1.23e+000

Page: 13

n-Hexane	2.45e-002	2.14e-001
Cyclohexane	2.45e-002	2.08e-001
Other Hexanes	3.66e-002	3.18e-001
Heptanes	3.17e-002	3.21e-001
Methylcyclohexane	6.77e-003	6.71e-002
2,2,4-Trimethylpentane	7.59e-004	8.75e-003
Benzene	1.57e-001	1.24e+000
Toluene	3.40e-002	3.17e-001
Xylenes	8.44e-003	9.05e-002
C8+ Heavies	3.08e-003	5.29e-002
-----		
Total Components	100.00	1.98e+002

## CONDENSER PRODUCED WATER STREAM

Temperature: 120.00 deg. F  
Flow Rate: 3.39e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
-----			
Water	1.00e+002	1.70e+002	999665.
Carbon Dioxide	1.12e-002	1.89e-002	112.
Nitrogen	6.73e-006	1.14e-005	0.
Methane	1.31e-004	2.22e-004	1.
Ethane	6.96e-004	1.18e-003	7.
Propane	1.14e-003	1.94e-003	11.
Isobutane	1.07e-004	1.81e-004	1.
n-Butane	6.29e-004	1.07e-003	6.
Isopentane	6.06e-005	1.03e-004	1.
n-Pentane	1.16e-004	1.97e-004	1.
n-Hexane	1.67e-005	2.83e-005	0.
Cyclohexane	9.20e-005	1.56e-004	1.
Other Hexanes	2.01e-005	3.40e-005	0.
Heptanes	1.39e-005	2.36e-005	0.
Methylcyclohexane	1.41e-005	2.40e-005	0.
2,2,4-Trimethylpentane	2.53e-007	4.30e-007	0.
Benzene	1.52e-002	2.58e-002	152.
Toluene	3.19e-003	5.42e-003	32.
Xylenes	9.53e-004	1.62e-003	10.
C8+ Heavies	1.44e-006	2.45e-006	0.
-----			
Total Components	100.00	1.70e+002	1000000.

## CONDENSER RECOVERED OIL STREAM

Temperature: 120.00 deg. F

The calculated flow rate is less than 0.000001 #mol/hr.

The stream flow rate and composition are not reported.

### CONDENSER VENT STREAM

Temperature: 120.00 deg. F  
 Pressure: 14.70 psia  
 Flow Rate: 2.56e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----------	-----------------	--------------------

Water	1.16e+001	1.41e+000
Carbon Dioxide	1.27e+001	3.79e+000
Nitrogen	4.63e-001	8.77e-002
Methane	8.15e+000	8.84e-001
Ethane	2.04e+001	4.14e+000
Propane	2.22e+001	6.61e+000
Isobutane	2.89e+000	1.13e+000
n-Butane	1.28e+001	5.04e+000
Isopentane	1.41e+000	6.90e-001
n-Pentane	2.52e+000	1.23e+000
n-Hexane	3.67e-001	2.14e-001
Cyclohexane	3.66e-001	2.08e-001
Other Hexanes	5.46e-001	3.18e-001
Heptanes	4.74e-001	3.21e-001
Methylcyclohexane	1.01e-001	6.71e-002
2,2,4-Trimethylpentane	1.13e-002	8.75e-003
Benzene	2.30e+000	1.22e+000
Toluene	5.00e-001	3.11e-001
Xylenes	1.24e-001	8.89e-002
C8+ Heavies	4.60e-002	5.29e-002
<b>Total Components</b>	<b>100.00</b>	<b>2.78e+001</b>

### COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F  
 Pressure: 14.70 psia  
 Flow Rate: 3.86e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----------	-----------------	--------------------

Methane	1.08e+001	1.77e-002
Ethane	2.71e+001	8.28e-002
Propane	2.95e+001	1.32e-001
Isobutane	3.84e+000	2.27e-002
n-Butane	1.71e+001	1.01e-001
Isopentane	1.88e+000	1.38e-002

Page: 15

n-Pentane 3.35e+000 2.45e-002  
 n-Hexane 4.88e-001 4.27e-003  
 Cyclohexane 4.87e-001 4.16e-003  
 Other Hexanes 7.27e-001 6.36e-003

Heptanes 6.30e-001 6.42e-003  
 Methylcyclohexane 1.34e-001 1.34e-003  
 2,2,4-Trimethylpentane 1.51e-002 1.75e-004  
 Benzene 3.06e+000 2.43e-002  
 Toluene 6.64e-001 6.22e-003

Xylenes 1.65e-001 1.78e-003  
 C8+ Heavies 6.12e-002 1.06e-003

-----  
 Total Components 100.00 4.51e-001

CONDENSER CONTROL CURVE DATA REPORT:  
 -----

CONDENSER CONTROL EFFICIENCY CURVES  
 -----

Note: Condenser curves computed for the range 40.0 F <= T <= 170.0 F. DO NOT EXTRAPOLATE BEYOND THIS RANGE

Temp(F)	BTEX	Total HAP	VOC
40.0	55.03	52.71	11.52
45.0	46.93	44.58	9.38
50.0	38.40	36.15	7.32
55.0	29.79	27.76	5.38
60.0	21.69	19.99	3.70
65.0	14.99	13.68	2.43
70.0	10.41	9.41	1.65
75.0	7.74	6.96	1.22
80.0	6.13	5.48	0.97
85.0	5.09	4.54	0.82
90.0	4.34	3.86	0.70
95.0	3.75	3.33	0.60
100.0	3.30	2.93	0.53
105.0	2.90	2.57	0.45
110.0	2.56	2.27	0.38
115.0	2.26	2.00	0.30
120.0	1.99	1.76	0.21
125.0	1.80	1.59	0.19
130.0	1.63	1.44	0.17
135.0	1.47	1.30	0.16
140.0	1.33	1.17	0.14
145.0	1.19	1.05	0.13
150.0	1.07	0.94	0.12
155.0	0.95	0.84	0.11
160.0	0.84	0.74	0.09
165.0	0.73	0.65	0.08
170.0	0.64	0.56	0.08

Maximum temperature for 80% control (deg.F):



N/A      N/A      Page: 16  
N/A

---