TWIN STATE ENVIRONMENTAL
RICHARDTON, NORTH DAKOTA SITE
EMPTY RAILCAR VENTING AND CLEANING FACILITIES

NEW SYNTHETIC MINOR
NEW SOURCE REVIEW
CONSTRUCTION AIR PERMIT APPLICATION

NOVEMBER 2025

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Crowther & Associates, Inc.
P.O. Box 92675
Austin, Texas 78709-2675

November 28, 2025

Mr. James L. Semerad, Director
North Dakota Department of Environmental Quality
Division of Air Quality
4201 Normandy Street, 2nd Floor
Bismarck, North Dakota 58503-1324

Re: Twin State Environmental (TSE)
TSE Richardton, North Dakota Site
New Synthetic Minor New Source Review Construction Air Permit Application

Dear Mr. Semerad:

Twin State Environmental (TSE) is submitting this synthetic minor new source review (NSR) construction air permit application to the North Dakota Department of Environmental Quality (DEQ) Division of Air Quality (DoAQ), under North Dakota Administrative Code Title 33.1, Article 15, Chapter 14, Section 2 (NDAC 33.1-15-14-02), for the installation of Empty Railcar Venting and Cleaning Facilities at the TSE Richardton, North Dakota Site (TSERS). As required by NDAC 33.1-15-23-02, TSE has paid the associated $325 application filing fee. The TSERS is located at rural address 3645 89th Avenue SW, Richardton, North Dakota, 58652, which is approximately 1 mile southwest from the center of the town of Richardton in Stark County, North Dakota. We look forward to working with you and/or the air permit reviewer in your review and subsequent issuance of the construction air permit.

Please call Mr. W. Scott Tinsman III of TSE at (563) 359-3624, or me at (512) 663-0807, or e-mail us at Scott3@tsenv.com or DavidCrowther88@outlook.com, if you have any questions or need additional information.

Sincerely,

David Crowther

David Crowther, P.E.

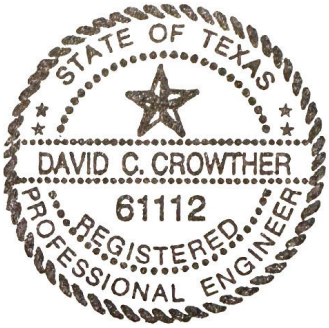
cc: Mr. W. Scott Tinsman III – Twin State Environmental (via e-mail)
Mr. Ward E. (Skee-bo) Wickham, III – High Integrity Services, Inc. (via e-mail)

PROFESSIONAL ENGINEER CERTIFICATION

I, David C. Crowther, a registered professional engineer (PE) in the State of Texas (Individual PE Registration No. 61112) and employee of Crowther & Associates, Inc. (Company PE Registration No. F-2216), certify that the attached North Dakota Department of Environmental Quality Synthetic Minor New Source Review Construction Air Permit Application associated with the Twin State Environmental (TSE) Richardton, North Dakota Site, dated on or about November 28, 2025, was prepared by me, as based on the information provided and approval of the application, by TSE personnel and/or TSE-assigned representatives.

David Crowther

David C. Crowther, P.E.



November 28, 2025

Date Sealed

INTRODUCTION

Twin State Environmental (TSE) is submitting this synthetic minor new source review (NSR) construction air permit application to the North Dakota Department of Environmental Quality (DEQ) Division of Air Quality (DoAQ), under North Dakota Administrative Code Title 33.1, Article 15, Chapter 14, Section 2 (NDAC 33.1-15-14-02), for the installation of Empty Railcar Venting and Cleaning Facilities at the TSE Richardton, North Dakota Site (TSERS). As required by NDAC 33.1-15-23-02, TSE has paid the associated $325 application filing fee.

The TSERS is located at rural address 3645 89th Avenue SW, Richardton, North Dakota, 58652, which is approximately 1 mile southwest from the center of the town of Richardton in Stark County, North Dakota. TSE is leasing part of a geographically-large site owned by Transportation Logistics, LLC and the TSERS is not affiliated with any activities that Transportation Logistics, LLC may perform at their overall site. Accordingly, the TSERS is a separate "Site", in regard to air permitting, from the overall Transportation Logistics, LLC site.

After North Dakota DoAQ issues the requested construction air permit, TSE plans to construct the facilities that will receive emptied pressurized chemical and anhydrous ammonia (called ammonia from this point on) railcars at the TSERS and vent the vapors, along with the nitrogen purge gas, from these railcars to the flare before the railcars are cleaned. The TSERS will also receive emptied atmospheric railcars, that may contain small volumes of chemical liquid heel or small amounts of solid material, where the atmospheric railcars containing chemical vapors will vent, along with the nitrogen purge gas, to the flare before they are cleaned. It is important to remember that the chemicals, ammonia, and solids have been previously unloaded from the railcars at another site before they are received at the TSERS.

This synthetic minor NSR construction air permit application is for the planned emission sources and emissions associated with the venting of the vapors associated with emptied pressurized chemical and ammonia railcars to the flare, the venting of the vapors associated with emptied atmospheric chemical railcars to the flare, the venting of the vapors associated with emptied atmospheric solids railcars to the atmosphere, the storage and loading of the wash water/detergents /solvents/chemical liquid heels, and associated steam boiler(s). The proposed permitted emissions summary and emissions estimation calculations included in this application represent the potential emission sources and maximum expected hourly and annual emissions from those emission sources to be included in the requested construction air permit.

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 Twin State Environmental		
Applicant's Name W. Scott Tinsman III		
Title Founder & CTO	Telephone Number (563) 359-3624	E-mail Address Scott3@tsenv.com
Contact Person for Air Pollution Matters W. Scott Tinsman III		
Title Founder & CTO	Telephone Number (563) 359-3624	E-mail Address Scott3@tsenv.com
Mailing Address (Street & No.) 3539 E. Kimberly Road		
City Davenport	State Iowa	ZIP Code 52807
Facility Name Twin State Environmental Richardton Facility		
Facility Address (Street & No.) 3645 89th Ave SW		
City Richardton	State North Dakota	ZIP Code 58652

County Stark	Coordinates NAD 83 in Decimal Degrees (to forth decimal degree)	
	Latitude 46.87780000	Longitude -102.33410000

Legal Description of Facility Site SE4 6-139-92 150.47acres & S2NE4, SE4NW4 L5 S of RR 6-139-92 73.75acres, NE4 S of RR 1-139-93 75.52acres & SW4 6-139-92 33.5

Quarter See Above Full Legal	Quarter Description from the	Section Stark County	Township Tax Director	Range

Land Area at Facility Site 333.24 Acres (or) _____ Sq. Ft.	MSL Elevation at Facility 2,460

SECTION B – GENERAL NATURE OF BUSINESS

Describe Nature of Business	North American Industry Classification System Number	Standard Industrial Classification Number (SIC)
Empty Railcar Venting & Cleaning	488210	4789

SECTION C – GENERAL PERMIT INFORMATION

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

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

Planned Start Construction Date 03/2026	Planned End Construction Date 06/2026

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

		Permit to Construct				Minor Source Permit to Operate						
Your Source ID Number	Source or Unit (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.)	New Source	Existing Source Modification	Existing Source Expansion	Existing Source Change of Location	New Source	Existing Source Initial Application	Existing Source After Modification	Existing Source After Expansion	Existing Source After Change of Location	Existing Source After Change of Ownership	Other
1	Flare	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2	Wash Tanks & Loading	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3	Atm PM Railcars	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4	Boiler	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Add additional pages if necessary

SECTION D2 – APPLICABLE REGULATIONS

Source ID No.	Applicable Regulations (NSPS/MACT/NESHAP/etc.)
Facility-wide	No Applicable NSPS, NESHAP, or MACT to Permitted Sources

SECTION E – TOTAL POTENTIAL EMISSIONS

Pollutant	Amount (Tons Per Year)
NO_x	8.76
CO	27.15
PM	0.28

Pollutant	Amount (Tons Per Year)
PM_{10} (filterable and condensable)	0.28
$PM_{2.5}$ (filterable and condensable)	0.28
SO_2	0.64
VOC	53.37
GHG (as CO_2e)	12,606.54
Largest Single HAP	9.96
Total HAPS	17.72

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

SECTION F1 – ADDITIONAL FORMS

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

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

SECTION F2 – OTHER ATTACHMENTS INCLUDED AS PART OF THIS APPLICATION

1.	Cover Letter & Introduction	4.	Process Description
2.	Site Diagrams	5.	Emissions Calculations
3.	Regulatory Summary	6.	

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

Signature	Date
Scott Tinsman III	11/26/2025

INSTRUCTIONS

SITE PLANS TO BE ATTACHED TO APPLICATION:

Prepare and attach a plot plan drawn to scale or properly dimensioned, showing at least the following:

a. The property involved and the outlines and heights of all buildings on the property. Identify property lines plainly. Also, indicate if there is a fence around the property that prevents public access.

b. Location and identification of all existing or proposed equipment, manufacturing processes, etc., and points of emission or discharge of air contaminants to the atmosphere.

c. Location of the facility or property with respect to the surrounding area, including residences, businesses and other permanent structures, streets and roadways. Identify all such structures and roadways. Indicate direction (**NORTH**) on the drawing and the prevailing wind direction.

EQUIPMENT PLANS AND SPECIFICATIONS FOR PERMIT TO CONSTRUCT:

Supply plans and specifications, including as a minimum an assembly drawing, dimensioned and to scale, in plan, elevation and as many sections as are needed to show clearly the design and operation of the equipment and the means by which air contaminants are controlled.

The following must be shown:

a. Size and shape of the equipment. Show exterior and interior dimensions and features.

b. Locations, sizes, and shape details of all features which may affect the production, collection, conveying, or control of air contaminants of any kind, location, size, and shape details concerning all material handling equipment.

c. All data and calculations used in selecting or designing the equipment.

d. Horsepower rating of all internal combustion engines driving the equipment.

NOTE: **STRUCTURAL DESIGN CALCULATIONS AND DETAILS ARE NOT REQUIRED.** WHEN STANDARD COMMERCIAL EQUIPMENT IS TO BE INSTALLED, THE MANUFACTURER'S CATALOG DESCRIBING THE EQUIPMENT MAY BE SUBMITTED IN LIEU OF ITEMS a, b, c, and d OF ABOVE, WHICH THE CATALOG COVERS. ALL INFORMATION REQUIRED ABOVE THAT THE CATALOG DOES NOT CONTAIN MUST BE SUBMITTED BY THE APPLICANT.

ADDITIONAL INFORMATION MAY BE REQUIRED:

If the application is signed by an authorized representative of the owner, a LETTER OF AUTHORIZATION must be attached to the application.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

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

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

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

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization Twin State Environmental		
Applicant's Name W. Scott Tinsman III		
Title Founder & CTO	Telephone Number (563) 359-3624	E-mail Address Scott3@tsenv.com
Mailing Address (Street & No.) 3539 E. Kimberly Road		
City Davenport	State Iowa	ZIP Code 52807

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters W. Scott Tinsman III		
Title Founder & CTO	Telephone Number (563) 359-3624	E-mail Address Scott3@tsenv.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 3645 89th Ave SW		
City Richardton	State North Dakota	ZIP Code 58652
County Stark	Number of Employees at Location 15	
Land Area at Plant Site 333.24 Acres (or) Sq. Ft.	MSL Elevation at Plant 2,460	

Describe Nature of Business/Process

Empty Railcar Venting & Cleaning

SECTION B – STACK DATA

Inside Diameter (ft) approx. 0.39 HP & 0.49 LP flare pipes	Height Above Grade (ft) approx. 40.00 (flare)	
Gas Temperature at Exit (°F) more than 1,000 (from flare)	Gas Velocity at Exit (ft/sec) less than 300 (from flare)	Gas Volume (scfm) up to 1,600 (to flare)

Basis of any Estimates (attach separate sheet if necessary)

Please see emissions estimation calculations

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

Nearest Residences or Building Building	Distance (ft) more than 1,900	Direction East
Nearest Property Line South Property Line	Distance (ft) more than 380	Direction Southeast

SECTION C – EMISSION STREAM DATA

Source ID Number SFN 8516 1	Mean Particle Diameter (um) NA
Flow Rate (scfm) up to 1,600 (to flare)	Drift Velocity (ft/sec) NA
Stream Temperature (°F) more than 1,000 (from flare)	Particulate Concentration (gr/dscf) NA
Moisture Content (%) 0	Halogens or Metals Present? No
Pressure (in. Hg) less than 234 (to flare)	Organic Content (ppmv) up to 1,000,000 (to flare)
Heat Content (Btu/scfm) at least 300 (to flare)	O_2 Content (%) 0

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

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

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

(Add additional pages if necessary)

Signature of Applicant Scott Tinsman III	Date 11/26/2025

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

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

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8520 (9-2021)

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

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application	
Name of Firm or Organization Twin State Environmental	Facility Name Twin State Environmental Richardton Facility

SECTION B – EQUIPMENT INFORMATION

Source ID Number (From SFN 8516) 1, 2, and 3		
Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) Empty Railcar Venting and Cleaning		
Make Zeeco or Equivalent Air-Assisted Flare	Model Not Available at this time	Date Installed 03/01/2026
Capacity (manufacturer's or designer's guaranteed maximum)	Operating Capacity (specific units) up to 1,600 scfm (to flare)	
Brief description of operation of unit or process: Emptied pressurized and atmospheric railcars, that may contain a small amount of residual chemical liquid heel, are vented to the flare and then cleaned. Emptied atmospheric railcars, that may contain a small amount of residual PM solids, are vented to atmosphere and then cleaned.		

SECTION C – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
up to 24	up to 7	up to 52	NA	NA

SECTION D – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
See	Emissions	Calculations			

SECTION E – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
See	Emissions	Calculations			

SECTION F – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
Natural Gas (Thousand CF/Yr) up to 140,500		LP Gas (Gal/Yr)		Other (Specify)	

SECTION G – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
1 (Flare)	approx. 40.00	0.39 HP, 0.49 LP	up to 1,600 (to flare)	more than 1,000	less than 300
2 (Wash Tanks/Load)	at least 13.00	0.25 breather vent	up to 12 (exhaust)	up to 200	less than 10
3 (PM Railcars)	at least 10.00	3.00 Manway	up to 1 (exhaust)	up to 150	less than 10
4 (Boiler(s))	at least 12.00	1 to 3	up to 3,790 (exhaust)	up to 800	less than 50

SECTION H – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
See	Emissions	Calculations		

SECTION I – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☐ No ■ Yes – List Below
See 40 CFR 51.100(s) for classes of compounds covered

Material Stored	Size Tank (Gallons)	Vapor Control Device
Wash Water & Detergent,	4	None
BioDiesel Solvent,	4,000 gallon	
and Liquid Heels.	Tanks	

SECTION J – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☐ No (None or less than 50 gal/yr) ■ Yes – List Below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced
BioDiesel	Solvent	up to 400,000	None

SECTION K – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☐ No ■ Yes
If 'Yes' attach form SFN 8532

SECTION L – MATERIAL STORAGE

Does the input material or product from this process contain finely divided material which could become airborne? ☐ No ■ Yes

Describe storage methods used:

Emptied pressurized and atmospheric railcars, that may contain a small amount of residual VOC/HAP liquid heel, are vented to the flare and then cleaned. Emptied atmospheric railcars, that may contain a small amount of residual PM solids, are vented to the atmosphere and then cleaned.

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen Size)	Pile Size Average Tons	Pile Wetted	Pile Covered
NA					

Describe any fugitive dust problems:

Should be none or negligible since cleaning is performed inside railcars and/or in a building

Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

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

PERMIT APPLICATION FOR VOLATILE ORGANIC COMPOUNDS STORAGE TANK

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

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

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Twin State Environmental	Twin State Environmental Richardton Facility

SECTION B – TANK DATA

Source ID Number (From SFN 8516)
2 (4 Wash Tanks Inside Building)

Capacity 4 Tanks - Each	Barrels		Gallons 4,000	
Dimensions 4 Tanks - Each	Diameter approx. 9 feet	Height approx. equiv. 8.4 feet	Length	Width

Shape: ☒ Cylindrical ☐ Spherical ☐ Other – Specify:

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

Construction: ☐ Riveted ☒ Welded ☐ Other – Specify:

Color
White or Light Gray - Will be Inside of a Building

Condition: ☒ Good ☐ Fair ☐ Poor

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

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

Type of Roof: ☐ Pan ☐ Double Deck ☐ Pontoon ☒ Other – Specify: Fixed Roof

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

SECTION C – TANK CONTENTS

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

Mixtures of water, detergents, biodiesel solvent, and liquid heels from railcars. Tank emissions estimation calculations are based on estimated realistic mixture with maximum potential VOC emissions, which is 50 wt% of water & detergent, 25 wt% biodiesel, and 25 wt% chemical liquid heel.

SECTION D – VAPOR DISPOSAL

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

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure approx. 7.8	Maximum Reid Vapor Pressure less than 7.8

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) up to 4,000 gal/hr (from any of the 4 tanks)	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) at least 0.25 foot
Average Throughput (barrels per day or gallons per day) up to 3,562 gal/day (combined for all 4 tanks)	Tank Turnovers per Year up to 325 (combined for all 4 tanks)

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent Wash Water, Detergent, and Biodiesel	Name of Material Dissolved Various Chemicals
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) approximate worst-case VOC composition of 50 wt% water/detergent, 25 wt% biodiesel, and 25 wt% chemical liquid heel	

SECTION H – AIR CONTAMINANATS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
Total VOC	32.6	4.8	Maximum Expected
(from all 4 tanks			throughput rates, liquid temperature,
AND Loading)			and vapor pressure from all 4 tanks
			(See emission calculations)

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

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

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

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

☐ Yes ■ No – Explain:

Each tank has a storage capacity of only 4,000 gallons and stores railcar wash water, which is primarily composed on water & detergent, along with biodiesel solvent and chemical liquid heels

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

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

PERMIT APPLICATION FOR 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	Facility Name
Twin State Environmental	Twin State Environmental Richardton Facility

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516)	Name of Manufacturer
4	Currently Unknown
Rated Capacity/Maximum Input	**Model Number**
up to 8 MMBtu/hr (total for 1 unit or combined smaller units)	Currently Unknown

Purpose
Space Heat _____ %
Process Heat _____ %
Power Generation _____ %
Other (Specify % if Multi-Purpose) 100 (Steam) %

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)

- ☐ Pulverized
- ☐ General
- ☐ Dry Bottom
- ☐ Wet Bottom with Fly Ash Reinjection
- ☐ Wet Bottom without Fly Ash Reinjection
- ☐ Other – Specify:
- ☐ Spreader Stoker with Fly Ash Reinjection
- ☐ Spreader Stoker without Fly Ash Reinjection
- ☐ Fluidized Bed
- ☐ Cyclone
- ☐ Hand-Fired

Fuel Oil

- ☐ Horizontally Fired
- ☐ Tangentially Fired
- ☐ Other – Specify:

Gas

- ☐ Horizontally Fired
- ☐ Tangentially Fired
- ☐ Other – Specify:

Fuel Gas - Currently Unknown Configuration

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
up to 24	up to 7	up to 52	up to 8,760	None

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year 2026

Primary Fuels		Standby Fuels	
Type: Natural Gas		Type	
Quantity Per Year: up to 78	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
0	0.0004	0.0002			

Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum	Maximum	Average	Minimum	Maximum	Average
1,000 BTU/Scf	1,400 BTU/Scf	1,200 BTU/Scf			

Describe Fuel Transport and Storage Methods:

Natural Gas Pipeline

SECTION F – COMBUSTION AIR

☐ Natural Draft ☐ Induced ■ Forced ☐ Other – Specify:

SECTION G – STACK DATA

Inside Diameter (ft) 1 to 3	Height Above Grade (ft) at least 12 feet
Gas Temperature at Exit (Avg. °F) up to 800	Gas Velocity at Exit (Avg. ft/sec) less than 50
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☐ Yes ■ No	
Stack Exit Gas Flow Rate	
Average (ACFM) 2,000 to 3,000	Average (DSCFM) 900 to 1,400
Maximum (ACFM) up to 3,790	Maximum (DSCFM) up to 1,760
Are sampling ports available? ☐ No ☐ Yes – Describe: Currently unknown	

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_x	0.79	3.44	AP-42 Table 1.4-1
CO	0.66	2.89	AP-42 Table 1.4-1
PM	0.06	0.27	AP-42 Table 1.4-2
PM_{10} (filterable and condensable)	0.06	0.27	AP-42 Table 1.4-2
$PM_{2.5}$ (filterable and condensable)	0.06	0.27	AP-42 Table 1.4-2
SO_2	0.01	0.03	AP-42 Table 1.4-2

Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
VOC	0.05	0.19	AP-42 Table 1.4-2
GHG (as CO_2e)	937	4,104	GHG Subpart C, Tier 1, Equations C-1b & C-8b
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.

INSTRUCTIONS

All applicable portions of this form should be completed by printing or typing. When any item is not applicable the letters "NA" should be placed beside the item.

For the purpose of this application, fuel burning equipment is defined as:

"Fuel-burning equipment" shall mean any furnace, boiler apparatus, stack, or appurtenances thereto used in the process of burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer.

Fuel-burning equipment, other than smokehouse generators, which meet all of the following criteria are not required to obtain a Permit to Construct or Permit to Operate:

1. The aggregate heat input per unit does not exceed ten million British thermal units per hour.

2. The total aggregate heat input from all equipment does not exceed ten million British thermal units per hour.

3. The emissions from all equipment do not exceed twenty-five tons (22.67 metric tons) per year of any air contaminant.

A separate permit application should be submitted for each separate piece of fuel-burning equipment that requires a permit.

EQUIPMENT – *Rated Capacity/ Maximum Input* shall be the equipment manufacturer's or designer's guaranteed maximum input, whichever is greater.

A description of the delivery to, storage on, and method of transporting fuels within the plant should be specified for all solid and liquid fuels used by this indirect heat exchanger. (Example: coal delivered by open truck, stored in open piles, and carried to boiler by conveyor belt system.)

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

AIR CONTAMINANTS EMITTED - The maximum emission quantity per hour at the rated capacity using the primary fuel and the quantity per year emitted from actual use of the primary and secondary fuels combined should be entered here. The estimating basis for these quantities should be described. If emission factors are used, the source of these factors and the factors themselves should be identified.

NOTE: All information included in the application, including maximum estimated emission rates, will be used to make the above determinations. The information that is supplied in the application may be used to establish permit conditions. The emission rates provided should be based on the most credible data available. Although AP-42 provides general information, it should not be solely relied on to develop emission rates. Other sources of information that accurately represent the actual conditions that the emission unit will be operated under, such as actual test data or manufacturer's data, may be preferable.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

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

PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

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

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

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Twin State Environmental	Twin State Environmental Richardton Facility
Source ID No. of Equipment being Controlled 1	

SECTION B – EQUIPMENT

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

Name of Manufacturer	Model Number	Date to Be Installed
Zeeco or Equivalent Air-Assisted Flare	Not Available at this time	March 2026 or after

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

Pollutants Removed	VOC	HAPs	Sulfur Compou	Ammonia
Design Efficiency (%)	98	98	98	98
Operating Efficiency (%)	98	98	98	98

Describe method used to determine operating efficiency:

A new elevated flare that is designed to satisfy 40 CFR 60.18 requirements should achieve at least a 98% oxidation efficiency when controlling VOC, HAP, sulfur compound, and anhydrous ammonia vapors

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			up to 1,600	
Gas Temperature (°F)			less than 200	
Gas Pressure (in. H_2O)			less than 3,200	
Gas Velocity (ft/sec)			less than 300	
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	VOC	wt%	up to 100	
	HAP	wt%	up to 100	
	Sulfur Compounds	wt%	up to 5	
	Ammonia	wt%	up to 100	

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

INSTRUCTIONS FOR PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

1. Complete this form for each piece of equipment or process, which has air pollution control equipment installed, described in the following Permit Applications: Hazardous Air Pollutant (HAP) Sources (SFN 8329), Fuel Burning Equipment for Indirect Heating (SFN 8518); Manufacturing or Processing Equipment (SFN 8520); Incinerators/Crematories (SFN 8522); Internal Combustion Engines and Turbines (SFN 8891); and Glycol Dehydration Units (SFN 58923). Print or type all information. If an item does not apply, place NA in the appropriate space.

2. Type of Equipment - If the type is not one of those listed; provide enough information so the operating principal of the equipment can be determined.

3. List each pollutant which the device is intended to control, the efficiency of removal intended by the designer, and the actual efficiency under operating conditions.

4. Please attach the following:

   - A brief description and sketch of the air pollution control device if it is of unusual design or used in conjunction with other control devices. Show any bypass of the device and specify the conditions under which the bypass is used.

   - A description of what is done with collected air contaminants from the time they are collected until they reach the final disposal point. Include a description of the transportation methods used.

   - If a stack test has been conducted, attach a copy of the results, date of the test, a description of the techniques used, and the name and address of the organization which performed the test.

5. If the control device is a combustor (e.g.: thermal oxidizer, vapor combustion unit, etc.), include an estimate of potential greenhouse gas emissions (CO_2e).

SUBMIT YOUR APPLICATION WITH ALL SUPPORTING DOCUMENTS, ALONG WITH THE FORMS SPECIFIED IN THE FIRST PARAGRAPH ABOVE, TO:

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

PERMIT APPLICATION FOR FLARES

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

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

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
Twin State Environmental	Twin State Environmental Richardton Facility

SECTION B - FLARE INFORMATION

Use: ☐ Emergency ☒ Process ☐ Both	Subject to NSPS (40 CFR 60.18) ○ Yes ◉ No	
Emission Point ID 1	Height Above Ground Level (ft.) approx. 40.00	Diameter at Top (ft.) approx. 0.39 HP pipe, 0.49 LP pipe
Flame Monitor: ☒ Thermocouple ☐ Infrared ☐ Ultraviolet ☐ Acoustic ☐ Other:		
Ignition: ☐ Automatic ☒ Continuous Burning Pilot ☐ Other:		
Average Btu/1000 scf at least 300,000	Percent H_2S 0 - 5	Maximum Hourly Flow Rate to Flare up to 95,000 scfh
List source ID numbers controlled by this unit, if any: 1		

SECTION C – AIR CONTAMINANTS EMITTED

Pollutant	Amount (Tons Per Year)	Basis of Estimate*
NO_x	5.33	AP-42 Table 13.5-1
CO	24.27	AP-42 Table 13.5-2
PM	0	Not Applicable
PM_{10} (filterable and condensable)	0	Not Applicable
$PM_{2.5}$ (filterable and condensable)	0	Not Applicable
SO_2	0.62	Material Balance
VOC	48.47	Material Balance
GHG (as CO_2e)	8,503.45	GHG Subpart C, Tier 1, Equations C-1b & C-8b
Largest Single HAP	9.96	Material Balance
Total HAPS	14.98	Material Balance

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

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

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

■ YES ☐ NO

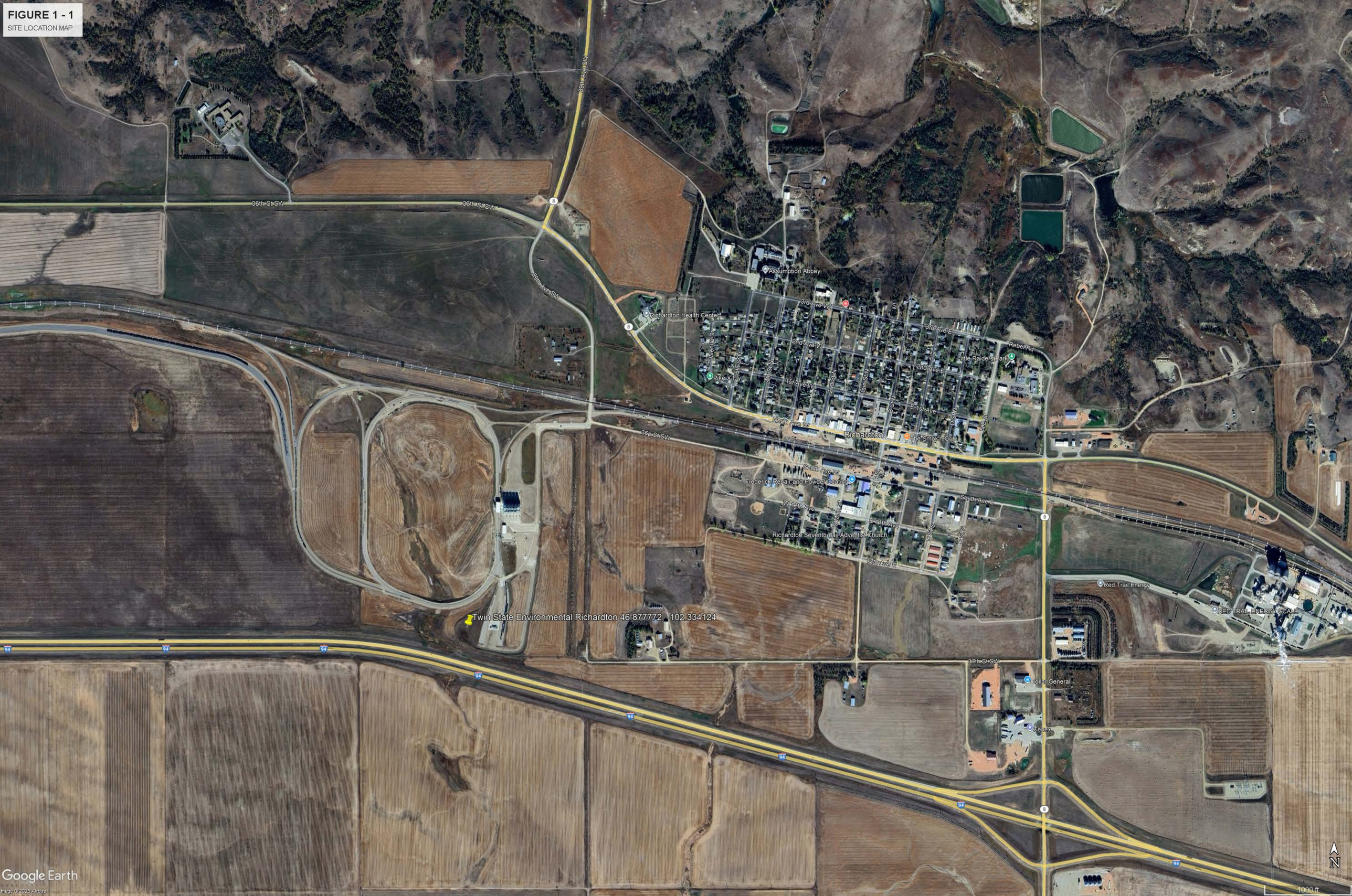
If "NO" a Compliance Schedule (SFN 61008) must be completed and attached.

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

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

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

FIGURE 1 - 1
SITE LOCATION MAP



RICHARTON_RAIL_LAYOUT SHEET 2

WEST

ELEVATED FLARE RACK PLATFORM
FOR CONNECTING CARS
TO FLARE DEGASSING SYSTEM

PIPING TO FLARE RACK

ATMOSHPERIC
PM RAILCARS

ZEECO FLARE LOCATION
AFDS-8/24-40 FLARE SYSTEM

100.0

FLARE CONTROL STATION
KNOCKOUT POT
BTU ANALYZER

378.4

225.0

68.0

LOW PRESSURE STEAM GENERATOR

84.0

(4) 4,000 GALLON WASH TANKS

64 x 84 x 32 PEMB RAILCAR CLEANING FACILITY

DIMENSIONS IN FEET

FIGURE 2-1

LETTER	DETAIL	SHEET	DATE	CHANGE	REV BY	CHK BY
A			11-11-25	INITIAL RELEASE	TS	TS

REVISIONS

SCALE 0.004

TOLERANCE ON DIMENSIONS NOT OTHERWISE SPECIFIED:
DECIMALS .0000---±.0005
.000---±.005
.00----±.03
.0-----±.06
ANGLES ±0.5°
CONCENTRICITY T.I.R. .005
MACH SURFACE 125
SCREW HOLE LOCATION TOLERANCE ±.005
DOWEL HOLE LOCATION TOLERANCE ±.0005

THIRD ANGLE PROJECTION
BREAK ALL UNNECESSARY SHARP CORNERS
REMOVE ALL BURRS
DIMENSIONS IN ( ) ARE REFERENCE DIMENSIONS; NO TOLERANCES ARE IMPLIED
USE PRO/E GEOMETRY FOR NON-DIMENSIONED PROFILE SHAPES AND HOLES

DESIGN BY:	DESIGN DATE:
TS	11-11-25
DETAIL BY:	DETAIL DATE:
TS	11-11-25
CHECKED BY:	CHECKED DATE:
TS	11-11-25

UNITS INCH

SCALE 0.001 SIZE D

ANSI Y14.5M STANDARDS APPLY

CUSTOMER TSE

TWIN STATE
3541 East Kimberly Road
Davenport, Iowa 52807

TITLE RICHARDTON, ND RAIL LAYOUT

DRAWING NO. RICHARTON_RAIL_LAYOUT

SHEET 2 OF 2

TWIN STATE INC. PROJECT NO. ND

REGULATORY SUMMARY

Related to NDAC 33.1-15-14-06: Since the potential annual emission of each criteria air pollutant is less than 100 tons per year (TPY), each hazardous air pollutant (HAP) is less than 10 TPY, and combined HAPs is less than 25 TPY, the TSERS will be a non-major (minor) emissions source under Title V and a non-major (area) emissions source under Title III of the 1990 Amendments to the Federal Clean Air Act (FCAA). Accordingly, a Federal Title V air permit is not required for the TSERS. Related to NDAC 33.1-15-15: Because the potential annual emission of each criteria air pollutant is less than 250 TPY and it is not one of the listed source types in the regulation, the TSERS will be a minor emissions source under the Federal Prevention of Significant Deterioration (PSD) regulation. Accordingly, a Federal PSD air permit is not required for the TSERS. Since there are currently no Federal Nonattainment areas in North Dakota, the TSERS cannot be a major Federal Nonattainment emissions source. Accordingly, a Federal Nonattainment air permit is not required for the TSERS.

Related to NDAC 33.1-15-07-01: The four 4,000-gallon Wash Tanks will store primarily water and detergent, along with smaller amounts of biodiesel solvent and chemical liquid heels from various railcars. Since the biodiesel solvent and chemical liquid heels are Not "Petroleum Products" and water is not be separated from them, the requirements of NDAC 33.1-15-07-01(2.) do Not apply to the Wash Tanks. Because each of the Wash Tanks will have a storage capacity greater than 1,000 gallons, they will have submerged fill pipes, as required by NDAC 33.1-15-07-01(3.). Since less than 20,000 gallons per day (gal/day), on an annual average basis, of volatile organic compound (VOC) liquids will be loaded into railcars and/or transport trucks, the requirements of NDAC 33.1-15-07-01(4.) do Not apply to the railcar and/or transport truck loading facilities. As required by NDAC 33.1-15-07-01(5.), any rotating pump handling VOC liquid will be equipped and operated with properly maintained seals designed for their specific product service and operating conditions.

Related to NDAC 33.1-15-12: Since the steam boiler (or boilers) will have a combined total natural gas combustion heat rate of 8 or less million British thermal units per hour (MMBtu/hr), the boiler(s) will Not be subject to Title 40 Code of Federal Regulation (40 CFR) Part 60 New Source Performance Standard Subpart Dc (NSPS Dc). Although it is not actually subject to the requirements of 40 CFR §60.18 because it does not control the emissions from facilities subject to any 40 CFR Part 60 NSPS or Part 61 National Emissions Standards for Hazardous Air Pollutants (NESHAP) Subpart, since it is normally required by State Agencies for permitted flares, the air-assisted flare will satisfy the applicable minimum combustion heat content, velocity, and pilot flame monitoring requirements of 40 CFR §60.18. Each of the four 4,000-gallon Wash Tanks has less than a 19,800 gallon storage capacity, so they are Not subject to NSPS Subpart Kb.

Related to NDAC 33.1-15-13: There are no known 40 CFR Part 61 NESHAP Subparts that apply to the emptied railcar venting and cleaning facilities. Related to NDAC 33.1-15-22: There are no known 40 CFR Part 63 NESHAP for Source Categories, also known as Maximum Achievable Control Technology (MACT) or Generally Available Control Technology (GACT) Standards, Subparts that apply to the emptied railcar venting and cleaning facilities. Since the steam boiler(s)

is located at an area emissions source for HAPs and is a "Gas-fired boiler", as defined by GACT Subpart JJJJJJ, it is not subject to GACT Subpart JJJJJJ.

During their construction and operation of the TSERS, TSE will comply with the applicable general requirements of NDAC 33.1-15-01.

Since the TSERS is a minor emission source for all criteria and hazardous air pollutants, emission impacts from the TSERS are not expected to exceed any applicable Ambient Air Quality Standards of NDAC 33.1-15-02. The visible air contaminants from the TSERS will not exceed the opacity requirements of NDAC 33.1-15-03-02 (general site), 33.1-15-03-03 (fugitive emissions), and 33.1-15-03-03.1 (flare).

Since the maximum expected particulate matter (PM) emissions from the cleaning of atmospheric solids railcars is less than the Table 3 lowest allowable emission rate of 0.551 pounds per hour (lbs/hr), the applicable requirements of NDAC 33.1-15-05-01 will be satisfied. Because the steam boiler(s) is rated up to 8 MMBtu/hr and will use pipeline quality sweet natural gas as fuel, its PM emissions are significantly less than the NDAC 33.1-15-05-02 Table 4 allowable emission rate of 0.6 pounds per million British thermal unit (lbs/MMBtu).

Because the steam boiler(s) and flare fuel gas will use pipeline quality sweet natural gas as fuel, they are exempt from the requirements of NDAC 33.1-15-06-01. Since the sulfur dioxide (SO_2) emissions from the flare-controlled cleaning of atmospheric railcars are not expected to exceed the applicable SO_2 Ambient Air Quality Standards of NDAC 33.1-15-02, the requirements of NDAC 33.1-15-06-02 are satisfied.

After the VOC-containing railcars vent to the flare, any chemical heel volumes mix with the wash water, detergent, and/or solvent liquids that eventually flow to the 4 Wash Tanks. When railcar vapors are flowing to the flare, the flare will have a continuously burning natural gas pilot and/or automatic ignitor, which satisfies the requirements of NDAC 33.1-15-07-02. The Wash Tank liquids are periodically loaded into railcars and/or transport trucks and removed from the site.

During their operation of the TSERS, TSE will comply with the applicable prevention of air pollution emergency episode requirements of NDAC 33.1-15-11. As evidenced by the submittal of this synthetic minor NSR construction air permit application, TSE will comply with the applicable air permitting requirements of NDAC 33.1-15-14.

TSE is using a flare to oxidize at least 98 percent (%) of the VOC, ammonia, and sulfur compounds from railcar vapors, which will help ensure that the TSERS satisfies the applicable odor restriction requirements of NDAC 33.1-15-16. Since the maximum expected PM emissions from the cleaning of atmospheric solids railcars is negligible or very small, the applicable restriction of fugitive emissions requirements of NDAC 33.1-15-17 will be satisfied. The flare and boiler(s) stack heights are adequate for compliance with applicable Ambient Air Quality Standards of NDAC 33.1-15-02 and thereby the stack height requirements of NDAC 33.1-15-18.

PROCESS DESCRIPTION

Emptied Pressurized Chemical and Ammonia Railcars Venting to the Flare

Although there may be some variances amongst the chemicals, generally up to 5 per hour and up to 1,000 per year of emptied pressurized chemical railcars, as well as up to 4 per hour and up to 1,000 per year of emptied pressurized ammonia railcars, can be cleaned at the TSERS. Depending on the atmospheric temperature and other variables, the pressure of each emptied pressurized chemical or ammonia railcar will vary, from approximately 14.7 to a maximum of 114.7 pounds per square inch absolute (psia). There should be no or negligible liquid heel volumes associated with the pressurized chemicals. After various administrative, staging, and holding procedures, each received railcar ends up being vented and purged with nitrogen to the 98% efficient air-assisted flare. Depending on the chemical and received railcar pressure, it can take anywhere from 1 to 6 hours to vent and purge each emptied pressurized chemicals or ammonia railcar to flare before the railcar can be cleaned.

Emptied Atmospheric Chemical Railcars Venting to the Flare

Although there may be some variances amongst the chemicals, generally up to 5 per hour and up to 1,000 per year of emptied atmospheric chemical railcars can be vented and purged with nitrogen to the flare. Depending on the atmospheric temperature and other variables, the pressure of each emptied atmospheric chemical railcar will vary, from approximately 0 to 14.7 psia. Liquid condensation can occur on the railcar interior walls and liquid heel volumes associated with some of these chemicals can accumulate at the bottom of the railcar. The liquid heel volumes mix with the wash water, detergents, and/or biodiesel solvent as they exit the railcars and flow into the Wash Tanks. Depending on the chemical vapor pressure, it will take 1 or less hour to vent and purge each emptied atmospheric chemical railcar to flare before the railcar can be cleaned.

Emptied Atmospheric Solids Railcars Venting to the Atmosphere

Although there may be some variances amongst the chemicals, generally up to 5 per hour and up to 1,000 per year of emptied atmospheric solids railcars can vent to the atmosphere. It will take 1 or less hour to vent each emptied atmospheric solids railcar to atmosphere before the railcar can be cleaned.

Railcar Cleaning after Railcars are Vented & Purged to Flare or Atmosphere

The Raptor© Tank Cleaning System will be used to clean the railcars. This system uses robotics, automation, and technology to clean railcars without requiring humans to enter the railcars. Single or multiple wash cycles, with automated pumps, robotic wash heads, valves, and temperature & pressure sensors are used to thoroughly and safely clean each railcar. Wash water, detergent, and/or biodiesel solvent are used by the system to clean the internal walls of the railcar, where the spent liquids and any chemical liquid heel volumes are drained into the atmospheric Wash Tanks. Wash tank liquids are periodically loaded into railcars and/or transport trucks and removed from the site.

EMISSIONS ESTIMATION METHODOLOGIES SUMMARY

Flare – Fuel Gas Combustion Emissions

It is expected that the flare pilot fuel gas will not be continuously needed because the venting to the flare of the emptied pressurized chemical and ammonia railcars, as well as emptied atmospheric chemical railcars, will not be continuous. However, in order to estimate and permit the maximum potential emission rates, continuous 8,760 hours per year (hrs/yr) combustion of fuel gas is used as a basis in the associated flare pilot gas combustion emissions calculations. A representative fuel gas analysis was obtained from the associated natural gas utility company and the combustion heat content, in British thermal units per standard cubic feet (Btu/scf) units, was calculated and the analysis is used to convert the fuel gas volumetric rates to speciated hourly and annual mass rates.

Up to 42,000 standard cubic feet per hour (scfh) and up to 93 million standard cubic feet per year (MMScf/yr) of nitrogen will be used to purge the railcars before they can be cleaned. Since nitrogen has no combustion heat content, up to 22,800 scfh and up to 50.486 MMScf/yr of BTU Assist Gas will be added to the nitrogen purge gas stream flowing to the flare to ensure that the combined flare feed gas combustion heat content is always greater than 300 Btu/scf. A BTU analyzer will be installed and operated to measure and record the combined flare feed gas stream Btu/scf content and control the addition of BTU Assist Gas to ensure that the combined flare feed gas stream combustion heat content is always greater than 300 Btu/scf.

Since the flare is expected to be at least 98% efficient in the oxidation of chemicals to combustion products, the sum of 2% of the VOC component hourly and annual mass rates are represented as the total VOC hourly and annual emissions from the combustion of the fuel gas.

Using the maximum expected hourly and annual volumetric rates of fuel gas, and the Btu/scf combustion heat content of each component, the MMBtu/hr and million British thermal units per year (MMBtu/yr) combustion heat values are determined. The Environmental Protection Agency (EPA) AP-42 Chapter 13.5, Table 13.5-1 flare oxides of nitrogen (NOx) emissions factor of 0.068 lbs/MMBtu is multiplied by the total fuel gas MMBtu/hr and MMBtu/yr combustion heat values to determine the potential hourly lbs/hr and annual TPY NOx emission rates associated with the combustion of the flare fuel gas. The EPA AP-42 Chapter 13.5, Table 13.5-2 flare carbon monoxide (CO) emissions factor of 0.310 lbs/MMBtu is multiplied by the total fuel gas MMBtu/hr and MMBtu/yr combustion heat values to determine the potential hourly lbs/hr and annual TPY CO emission rates associated with the combustion of the flare fuel gas.

The pipeline quality fuel gas can normally contain up to 4 parts per million by volume (ppmv) of hydrogen sulfide (H_2S), and the mass rate of H_2S is multiplied by the ratio of the SO_2 and H_2S molecular weights to estimate the maximum SO_2 emission rate by using a 100% efficiency in the oxidation of H_2S to SO_2. To estimate the maximum potential H_2S emission rate, a 98% oxidation efficiency is used.

Flare - Pressurized Chemical and Ammonia Railcar Vent Gas Combustion Emissions

Although there may be some variances amongst the chemicals, generally up to 5 per hour and up to 1,000 per year of emptied pressurized chemical railcars, as well as up to 4 per hour and up to 1,000 per year of emptied pressurized ammonia railcars, can be vented to the flare. Depending on the atmospheric temperature and other variables, the pressure of each emptied pressurized chemical or ammonia railcar will vary, from approximately 14.7 up to 114.7 psia. An actual pressure of 114.7 psia is used for chemicals that have a Reid vapor pressure (RVP) greater than 114.7 psia because the maximum expected received pressurized railcar pressure is 100 pounds per square inch gauge (psig). Because the RVPs of the pressurized chemicals exceed atmospheric pressure, there should be no or negligible liquid heel volumes associated with these chemicals. Depending on the chemical and received railcar pressure, it can take anywhere from 1 to 6 hours to vent and purge each emptied pressurized chemical or ammonia railcar to flare before the railcar can be cleaned. Although the atmospheric temperature in Richardton, North Dakota rarely approaches 100 degrees Fahrenheit (°F), in order to estimate and permit conservatively high emission rates, chemical vapor pressures at 100 °F (e.g. RVP) are used as the actual railcar pressure in the emission calculations.

Chemical and ammonia railcar size can vary but the expected average volume of the emptied pressurized chemical and ammonia railcars is approximately 32,000 gallons. The 32,000 gallon railcar volume converts to a potential vapor space volume of approximately 4,278 actual cubic feet (acf). Based on the 4,278 acf volume, the potential actual chemical railcar pressures as described above, maximum expected temperature of 100 °F which equals 100 + 460 = 560 degrees Rankine (°R), and standard conditions of 14.7 psia and 68 °F (= 528 °R), the standard cubic feet (scf) vapor space volume of each emptied pressurized chemical and ammonia railcar is determined. The chemical railcar scf vapor space volume is divided by the number of hours each chemical railcar vents to flare and then multiplied by the potential number of chemical railcars venting to the flare during any given hour in order to determine the maximum potential chemical scfh volumetric rate to the flare. The maximum annual potential chemical standard cubic feet per year (scf/yr) volumetric rate to the flare equals the chemical railcar scf vapor space volume multiplied by the potential number of chemical railcars venting to the flare during a year.

Using chemical molecular weights and a 385.4616 standard cubic feet per pound mole (scf/lb mole) conversion factor, which is based on standard conditions of 14.7 psia and 68 °F, the maximum potential hourly and annual flare feed volumetric rates for each chemical are converted to maximum potential hourly and annual chemical mass rates to flare. Since the flare is expected to be at least 98% efficient in the oxidation of chemicals and ammonia to combustion products, 2% of the chemical and ammonia hourly and annual mass rates are represented as the maximum potential chemical and ammonia hourly and annual emission rates from the combustion of the pressurized railcar vapors. Using the maximum expected hourly and annual volumetric rates of each chemical, and the Btu/scf combustion heat content of each chemical, the MMBtu/hr and MMBtu/yr combustion heat values of each chemical are determined.

The EPA AP-42 Chapter 13.5, Table 13.5-1 flare NOx emissions factor of 0.068 lbs/MMBtu is multiplied by the chemical MMBtu/hr and MMBtu/yr combustion heat values to determine the potential hourly lbs/hr and annual TPY NOx emission rates associated with the combustion of each chemical. The EPA AP-42 Chapter 13.5, Table 13.5-2 flare CO emissions factor of 0.310 lbs/MMBtu is multiplied by the chemical MMBtu/hr and MMBtu/yr combustion heat values to determine the potential hourly lbs/hr and annual TPY CO emission rates associated with the combustion of each chemical.

Except for 1,3-butadiene, which is limited to a maximum 435 railcars per year to ensure its annual emission rate is less than the Title V major source qualifying threshold of 10 TPY for an individual HAP, the emissions estimation calculations are "standardized" to a maximum expected 5 emptied pressurized chemical (not including ammonia) railcars per hour and 1,000 emptied pressurized chemical railcars per year venting to flare for each chemical in order to determine which chemical has the highest uncombusted VOC hourly and annual emissions, as well as highest NOx and CO hourly and annual emissions. Although, in reality it will be a mix of emptied pressurized chemical railcars venting to the flare during any given hour and/or year, selecting the chemical with the highest hourly and annual VOC, NOx, and CO flare emission rates ensures that the permitted emission rates will not be exceeded when a mix of chemical vapors actually route to the flare during any given hour and/or year.

The highest chemical or ammonia NOx and CO flare hourly emission rate is represented as the maximum hourly flare NOx and CO emission rate during the venting of the emptied pressurized railcars to flare. The chemical with the highest annual NOx and CO flare emissions are added to the ammonia annual NOx and CO flare emissions for the represented maximum annual flare NOx and CO emissions during the venting of the emptied pressurized railcars to flare.

As previously mentioned, although it is not actually subject to the requirements of 40 CFR §60.18 because it does not control the emissions from facilities subject to a 40 CFR Part 60 NSPS or Part 61 NESHAP Subpart, since it is normally required by State Agencies for permitted flares, the air-assisted flare will satisfy the applicable heat content, velocity, and pilot flame monitoring requirements of 40 CFR §60.18. The 40 CFR §60.18(f.)(6.) maximum allowed air-assisted flare gas velocity was determined for each flared chemical and are shown on the associated emissions estimation calculation sheets. Based on the maximum expected chemical hourly vent rate and high pressure gas flare pipe exhaust area, the maximum expected hourly gas velocity was determined for each flared chemical. As shown on the associated emissions estimation calculation sheets, the maximum expected gas velocity of each chemical is less than the respective 40 CFR §60.18(f.)(6.) allowed velocity. As also shown on the associated emissions estimation calculation sheets, the combustion heat content value of each chemical is greater than 40 CFR §60.18-required minimum of 300 Btu/scf for air-assisted flares.

Flare – Atmospheric Chemical Railcar Vent Gas Combustion Emissions

Although there may be some variances amongst the chemicals, generally up to 5 per hour and up to 1,000 per year of emptied atmospheric chemical railcars can be vented to the flare. Depending on the atmospheric temperature and other variables, the pressure of each emptied atmospheric chemical railcar will vary, from approximately 0 to 14.7 psia. Because the RVPs of these atmospheric chemicals are less than atmospheric pressure, liquid condensation can occur on the railcar interior walls and liquid heel volumes associated with some of these chemicals can accumulate at the bottom of the railcar. The liquid heel volumes mix with the wash water, detergents, and/or biodiesel solvent as they exit the railcars and flow into the Wash Tanks. Depending on the chemical vapor pressure, it will take 1 or less hour to vent and purge each emptied atmospheric chemical railcar to flare before the railcar can be cleaned. Although the atmospheric temperature in Richardton, North Dakota rarely approaches 100 ºF, in order to estimate and permit conservatively high emission rates, chemical vapor pressures at 100 ºF (e.g. RVP) are used as the actual railcar pressure in the emission calculations.

Chemical railcar size can vary but the expected average volume of the emptied atmospheric chemical railcars is approximately 32,000 gallons. The 32,000 gallon railcar volume converts to a potential vapor space volume of approximately 4,278 acf. Based on the 4,278 acf volume, the potential actual chemical vapor pressures, maximum expected temperature of 100 ºF which equals 100 + 460 = 560 ºR, and standard conditions of 14.7 psia and 68 ºF (= 528 ºR), the scf vapor space volume of each emptied atmospheric chemical railcar is determined. The chemical railcar scf vapor space volume is divided by the number of hours each chemical railcar vents to flare and then multiplied by the potential number of chemical railcars venting to the flare during any given hour in order to determine the maximum potential chemical scfh volumetric rate to the flare. The maximum annual potential chemical scf/yr volumetric rate to the flare equals the chemical railcar scf vapor space volume multiplied by the potential number of chemical railcars venting to the flare during a year.

Using chemical molecular weights and a 385.4616 scf/lb mole conversion factor, which is based on standard conditions of 14.7 psia and 68 ºF, the maximum potential hourly and annual flare feed volumetric rates for each chemical are converted to maximum potential hourly and annual chemical mass rates to flare. Since the flare is expected to be at least 98% efficient in the oxidation of chemicals to combustion products, 2% of the chemicals hourly and annual mass rates are represented as the maximum potential chemical hourly and annual emission rates from the combustion of the atmospheric chemical railcar vapors. Using the maximum expected hourly and annual volumetric rates of each chemical, and the Btu/scf combustion heat content of each chemical, the MMBtu/hr and MMBtu/yr combustion heat values of each chemical are determined. The EPA AP-42 Chapter 13.5, Table 13.5-1 flare NOx emissions factor of 0.068 lbs/MMBtu is multiplied by the chemical MMBtu/hr and MMBtu/yr combustion heat values to determine the potential hourly lbs/hr and annual TPY NOx emission rates associated with the combustion of each chemical. The EPA AP-42 Chapter 13.5, Table 13.5-2 flare CO emissions factor of 0.310 lbs/MMBtu is multiplied by the chemical MMBtu/hr and MMBtu/yr combustion heat values to determine the potential hourly lbs/hr and annual TPY CO emission rates associated with the combustion of each chemical.

The emissions estimation calculations are "standardized" to a maximum expected 5 emptied atmospheric chemical railcars per hour and 1,000 emptied atmospheric chemical railcars per year venting to flare for each chemical in order to determine which chemical has the highest NOx and CO hourly and annual emissions. Although, in reality it will be a mix of emptied atmospheric chemical railcars venting to the flare during any given hour and/or year, selecting the chemical with the highest hourly and annual NOx and CO flare emission rates ensures that the permitted emission rates will not be exceeded when a mix of chemical vapors actually route to the flare during any given hour and/or year. As previously mentioned, although it is not actually subject to the requirements of 40 CFR §60.18 because it does not control the emissions from facilities subject to a 40 CFR Part 60 NSPS or Part 61 NESHAP Subpart, since it is normally required by State Agencies for permitted flares, the air-assisted flare will satisfy the applicable heat content, velocity, and pilot flame monitoring requirements of 40 CFR §60.18. The 40 CFR §60.18(f.)(6.) maximum allowed air-assisted flare gas velocity was determined for each flared chemical and are shown on the associated emissions estimation calculation sheets. Based on the maximum expected chemical hourly vent rate and low pressure gas flare pipe exhaust area, the maximum expected hourly gas velocity was determined for each flared chemical. As shown on the associated emissions estimation calculation sheets, the maximum expected hourly gas velocity of each chemical is less than the respective 40 CFR §60.18(f.)(6.) allowed velocity. As also shown on the associated emissions estimation calculation sheets, the combustion heat content value of each chemical is greater than 40 CFR §60.18-required minimum of 300 Btu/scf for air-assisted flares.

Wash Tank and Railcar/Transport Truck Loading Emissions

There will be up four 4,000-gallon capacity atmospheric Wash Tanks that receive and store the mixed wash water, detergents, biodiesel solvent, and chemical liquid heel volumes from the cleaned railcars. The stored wash liquids will be periodically loaded into railcars and/or transport trucks and removed from the site. The atmospheric wash tanks can be heated by steam coils and will be located and vent inside of a ventilated building. The loading of wash liquids into railcars and/or transport trucks will occur inside of a ventilated building. Although the liquids being stored in the Wash Tanks will normally consist primarily of water and used detergents, the emissions calculation use a mixture consisting of 50 weight percent (wt%) water & detergents, 25 wt% biodiesel solvent, and 25 wt% chemical liquid heel, where n-pentane is used because it is a liquid at atmospheric pressure that has a high RVP that slightly exceeds atmospheric pressure. The latest EPA AP-42 Chapter 7.1 storage tank emissions calculation methodologies are used to estimate the working and standing loss emissions from the tanks. Since the tanks can be heated by steam, a maximum expected liquid temperature of 200 ^{o}F is used to estimate worst-case emissions. The hourly tank emissions rate is based on one of the 4,000-gallon tanks being filled-up within 1 hour. The annual tank emissions rate is based on up to 325,000 gal/yr of liquid flowing through each of the 4 tanks. Since the emissions from the loading of railcars (i.e tank cars) and transport trucks (i.e tank trucks) is a similar process to filling-up storage tanks, and since up to 4,000 gal/hr will fill-up a tank or railcar/truck during any given hour, the estimated hourly tank emissions apply to the tanks and loading. Assuming the same amount of liquid flowing through the tanks is the same volume of liquid loaded into railcars and/or transport trucks, the estimated annual tank emissions are doubled for the estimated annual tank and loading emissions.

Atmospheric Solids Railcar Vent Gas Particulate Matter (PM) Emissions

Although there may be some variances amongst the chemicals, generally up to 5 per hour and up to 1,000 per year of emptied atmospheric solids railcars can vent to the atmosphere. Since these chemicals are solids that have no vapor pressure, a negligible vapor pressure of 0.0001 psia is used to estimate the potential small amount of Total PM/PM of 10 or less microns in size (PM_{10})/PM of 2.5 or less microns in size ($PM_{2.5}$) that may vent to atmosphere during the cleaning of the emptied atmospheric solids railcars. It will take 1 or less hour to vent each emptied atmospheric solids railcar to atmosphere before the railcar can be cleaned. Solids railcar size can vary but the expected average volume of the emptied atmospheric solids railcars is approximately 32,000 gallons. The 32,000 gallon railcar volume converts to a potential vapor space volume of approximately 4,278 acf. Based on the 4,278 acf volume, the 0.0001 psia chemical vapor pressure as described above, maximum expected temperature of 100 ^{o}F which equals 100 + 460 = 560 ^{o}R, and standard conditions of 14.7 psia and 68 ^{o}F (= 528 ^{o}R), the scf vapor space volume of each emptied atmospheric solids railcar is determined. The chemical railcar scf vapor space volume is divided by the number of hours each chemical railcar vents to the atmosphere, and then multiplied by the potential number of chemical railcars venting to the atmosphere during any given hour in order to determine the maximum potential chemical scfh volumetric rate to the atmosphere. The maximum annual potential chemical scf/yr volumetric rate to the atmosphere equals the chemical railcar scf vapor space volume multiplied by the potential number of chemical railcars venting to the atmosphere during a year. Using chemical molecular weights and a 385.4616 scf/lb mole conversion factor, which is based on standard conditions of 14.7 psia and 68 ^{o}F, the maximum potential hourly and annual chemical mass rates to the atmosphere are determined. The emissions estimation calculations are "standardized" to a maximum expected 5 emptied atmospheric solids railcars per hour and 1,000 emptied atmospheric solids railcars per year venting to the atmosphere for each solids chemical in order to determine which solids chemical has the highest Total PM/PM_{10}/$PM_{2.5}$ hourly and annual emissions. Although, in reality it will be a mix of emptied atmospheric solids chemical railcars venting to the atmosphere during any given hour and/or year, selecting the solids chemical with the highest hourly and annual PM emission rates ensures that the permitted emission rates will not be exceeded when a mix of solids chemical vapors actually vent to the atmosphere during any given hour and/or year.

Steam Boiler(s) – Fuel Gas Combustion Emissions

Although the steam boiler(s) will Not be continuously needed, the emissions estimation calculations for the steam boiler(s) are based on a continuous 8,760 hrs/yr of operation in order to estimate and permit the maximum potential emission rates for the steam boiler(s). Since the boiler(s) will be fired with pipeline quality fuel gas, the EPA AP-42 Chapter 1.4 Tables 1.4-1, 1.4-2, and 1.4-3 NOx, CO, SO_2, Total PM/PM_{10}/$PM_{2.5}$, Total VOC, and formaldehyde pounds of emissions per million standard cubic feet of fuel gas burned (lbs/MMScf) emission factors are used to estimate the emission of the same. The steam boiler(s) maximum MMBtu/hr fuel gas firing rating is multiplied by 1,000,000 Btu/MMBtu and then divided by the fuel gas Btu/scf combustion heat content in order to determine the fuel gas scfh usage rate. Per the notes at the bottom of the EPA AP-42 Chapter 1.4 Tables 1.4-1, 1.4-2, and 1.4-3, since the EPA AP-42 emission factors are based on a fuel gas with 1,020 Btu/scf combustion heat content, the calculated emissions are adjusted by the ratio of the fuel gas Btu/scf combustion heat content divided by 1,020 Btu/scf.

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Proposed Permitted Emissions Summary

	NOx		CO	
Emissions Source Number - Name	**lbs/hr**	**TPY**	**lbs/hr**	**TPY**
1 - Flare Fuel Gas Combustion	1.6915	1.9209	7.7114	8.7571
1 - Flare Pressurized Railcar Vent Combustion	7.0602	2.8608	32.1861	13.0418
1 - Flare Atmospheric Railcar Vent Combustion	5.4018	0.5402	24.6260	2.4626
2 - Wash Tank & Loading Emissions from Building				
3 - Atmospheric Railcars Uncontrolled Particulate Matter				
4 - Steam Boiler(s)	0.7843	3.4353	0.6588	2.8856
TOTAL Emissions	**14.9378**	**8.7572**	**65.1823**	**27.1471**

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Proposed Permitted Emissions Summary				
	Total PM / PM10 / PM2.5		**SO2**	
Emissions Source Number - Name	**lbs/hr**	**TPY**	**lbs/hr**	**TPY**
1 - Flare Fuel Gas Combustion			0.0153	0.0174
1 - Flare Pressurized Railcar Vent Combustion				
1 - Flare Atmospheric Railcar Vent Combustion			5.9733	0.5973
2 - Wash Tank & Loading Emissions from Building				
3 - Atmospheric Railcars Uncontrolled Particulate Matter	0.1037	0.0104		
4 - Steam Boiler(s)	0.0596	0.2611	0.0047	0.0206
TOTAL Emissions	**0.1633**	**0.2715**	**5.9933**	**0.6353**

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Proposed Permitted Emissions Summary

	Total VOC		Hazardous Air Pollutants (HAP)	
Emissions Source Number - Name	**lbs/hr**	**TPY**	**lbs/hr**	**TPY**
1 - Flare Fuel Gas Combustion	3.4124	3.8752	0.0088	0.0100
1 - Flare Pressurized Railcar Vent Combustion	105.0755	36.0021	76.3108	9.9586
1 - Flare Atmospheric Railcar Vent Combustion	85.8796	8.5880	50.0264	5.0026
2 - Wash Tank & Loading Emissions from Building	32.5364	4.7104	18.9530	2.7439
3 - Atmospheric Railcars Uncontrolled Particulate Matter				
4 - Steam Boiler(s)	0.0431	0.1889	0.0006	0.0026
TOTAL Emissions	**226.9471**	**53.3646**	**145.2996**	**17.7177**

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Proposed Permitted Emissions Summary

	Anhydrous Ammonia		CO2e	
Emissions Source Number - Name	**lbs/hr**	**TPY**	**lbs/hr**	**TPY**
1 - Flare Fuel Gas Combustion				3,307.8389
1 - Flare Pressurized Railcar Vent Combustion	18.5395	13.9046		4,265.4000
1 - Flare Atmospheric Railcar Vent Combustion				930.2061
2 - Wash Tank & Loading Emissions from Building				
3 - Atmospheric Railcars Uncontrolled Particulate Matter				
4 - Steam Boiler(s)				4,103.0939
TOTAL Emissions	**18.5395**	**13.9046**	**0.0000**	**12,606.5388**

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Flare - Fuel Gas Combustion Emissions

Key Conversion Factor: 385.4616 SCF/lb mole (based on standard conditions of 68 F, 14.7 psia)

Pilot Gas Rate Information			BTU Assist Gas Rate Information			
Hourly gas rate:	200	scf/hr	Hourly gas rate:	22,800	scf/hr	
	0.5189	lb moles/hr		59.1499	lb moles/hr	
Operating hours per year (up to):	8,760	hrs/yr	Operating hours per year (up to):	8,760	hrs/yr	
Annual gas rate:	1.752	MMScf/yr	Annual gas rate:	50.486	MMScf/yr	
	4,545.1998	lb moles/yr		130,974.6919	lb moles/yr	

	Molecular	Net	Pilot Gas Compositional Rates							BTU Assist Gas Stream Compositional Rates						
COMPONENT	Weight	Heat Value	mole %	equiv wt	weight %	scf/hr	MMScf/yr	lbs/hr	lbs/yr	mole %	equiv wt	weight %	scf/hr	MMScf/yr	lbs/hr	lbs/yr
	lb/lb mole	BTU/SCF														
methane	16.0420	909.40	67.3985%	10.8121	50.0260%	134.797	1.181	5.6099	49,143	67.3985%	10.8121	50.0260%	15,366.858	34.027	639.5323	1,416,107
ethane	30.0690	1,618.70	19.6977%	5.9229	27.4045%	39.395	0.345	3.0731	26,921	19.6977%	5.9229	27.4045%	4,491.076	9.945	350.3388	775,750
propane	44.0960	2,314.90	5.5358%	2.4411	11.2945%	11.072	0.097	1.2666	11,095	5.5358%	2.4411	11.2945%	1,262.162	2.795	144.3887	319,718
isobutane	58.1220	3,000.40	0.1817%	0.1056	0.4886%	0.363	0.003	0.0548	480	0.1817%	0.1056	0.4886%	41.428	0.092	6.2467	13,832
n-butane	58.1220	3,010.80	0.4511%	0.2622	1.2131%	0.902	0.008	0.1360	1,192	0.4511%	0.2622	1.2131%	102.851	0.228	15.5084	34,340
isopentane	72.1490	3,699.00	0.0287%	0.0207	0.0958%	0.057	0.001	0.0107	94	0.0287%	0.0207	0.0958%	6.544	0.014	1.2248	2,712
n-pentane	72.1490	3,706.90	0.0312%	0.0225	0.1042%	0.062	0.001	0.0117	102	0.0312%	0.0225	0.1042%	7.114	0.016	1.3315	2,948
n-hexane	86.1750	4,299.57	0.0086%	0.0074	0.0343%	0.017	0.000	0.0038	34	0.0086%	0.0074	0.0343%	1.961	0.004	0.4384	971
benzene	78.1120	3,496.85	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0
toluene	92.1380	4,164.43	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0
ethylbenzene	106.1650	4,944.94	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0
xylenes	106.1650	4,832.30	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0
heptanes	100.2020	4,979.66	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0
octanes	114.2290	5,659.27	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0
nonanes	128.2550	6,493.20	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0
decanes +	142.2820	7,189.50	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0
hydrogen sulfide	34.0820	586.80	0.0004%	0.0001	0.0006%	0.001	0.000	0.0001	1	0.0004%	0.0001	0.0006%	0.091	0.000	0.0081	18
carbon dioxide	44.0100	0.00	0.9430%	0.4150	1.9202%	1.886	0.017	0.2153	1,886	0.9430%	0.4150	1.9202%	215.004	0.476	24.5480	54,356
nitrogen	28.0135	0.00	5.7233%	1.6033	7.4182%	11.447	0.100	0.8319	7,287	5.7233%	1.6033	7.4182%	1,304.912	2.889	94.8348	209,991
water	18.0153	0.00	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0	0.0000%	0.0000	0.0000%	0.000	0.000	0.0000	0
			100.0000%	21.6129	100.0000%	200.000	1.752	11.2140	98,235	100.0000%	21.6129	100.0000%	22,800.000	50.486	1,278.4004	2,830,744

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Flare - Fuel Gas Combustion Emissions

Key Conversion Factor: 385.4616 SCF/lb mole (based on standard conditions of 68 F, 14.7 psia)

	Combined Flare Feed Stream Compositional Rates											Emission Estimates				
COMPONENT	mole % (hourly basis)	mole % (annual basis)	weight %	scf/hr	MMScf/yr	lbs/hr	lbs/yr	MMBtu/hr	BTU/SCF (hourly basis)	MMBtu/yr	BTU/SCF (annual basis)	Flare DRE %	Hourly lbs/hr	Annual TPY		
methane	67.3985%	67.3985%	50.0260%	15,501.655	35.207	645.1422	1,465,250	14.097	612.9	32,017.642	612.9	98.00%	12.9028	14.6525	EPA AP-42	
ethane	19.6977%	19.6977%	27.4045%	4,530.471	10.290	353.4119	802,671	7.333	318.8	16,655.821	318.8	98.00%	7.0682	8.0267	Tables 13.5-1 & 13.5-2	
propane	5.5358%	5.5358%	11.2945%	1,273.234	2.892	145.6553	330,813	2.947	128.1	6,694.171	128.1	98.00%	2.9131	3.3081	Flare Factors	
isobutane	0.1817%	0.1817%	0.4886%	41.791	0.095	6.3015	14,312	0.125	5.5	284.786	5.5	98.00%	0.1260	0.1431	**0.0680**	lb NOx/MMBtu
n-butane	0.4511%	0.4511%	1.2131%	103.753	0.236	15.6444	35,532	0.312	13.6	709.478	13.6	98.00%	0.3129	0.3553	**0.3100**	lb CO/MMBtu
isopentane	0.0287%	0.0287%	0.0958%	6.601	0.015	1.2355	2,806	0.024	1.1	55.456	1.1	98.00%	0.0247	0.0281	**NOx Emissions**	
n-pentane	0.0312%	0.0312%	0.1042%	7.176	0.016	1.3432	3,051	0.027	1.2	60.416	1.2	98.00%	0.0269	0.0305	**1.6915**	lbs/hr
n-hexane	0.0086%	0.0086%	0.0343%	1.978	0.004	0.4422	1,004	0.009	0.4	19.316	0.4	98.00%	0.0088	0.0100	**1.9209**	TPY
benzene	0.0000%	0.0000%	0.0000%	0.000	0.000	0.0000	0	0.000	0.0	0.000	0.0	98.00%	0.0000	0.0000	**CO Emissions**	
toluene	0.0000%	0.0000%	0.0000%	0.000	0.000	0.0000	0	0.000	0.0	0.000	0.0	98.00%	0.0000	0.0000	**7.7114**	lbs/hr
ethylbenzene	0.0000%	0.0000%	0.0000%	0.000	0.000	0.0000	0	0.000	0.0	0.000	0.0	98.00%	0.0000	0.0000	**8.7571**	TPY
xylenes	0.0000%	0.0000%	0.0000%	0.000	0.000	0.0000	0	0.000	0.0	0.000	0.0	98.00%	0.0000	0.0000		
heptanes	0.0000%	0.0000%	0.0000%	0.000	0.000	0.0000	0	0.000	0.0	0.000	0.0	98.00%	0.0000	0.0000		
octanes	0.0000%	0.0000%	0.0000%	0.000	0.000	0.0000	0	0.000	0.0	0.000	0.0	98.00%	0.0000	0.0000		
nonanes	0.0000%	0.0000%	0.0000%	0.000	0.000	0.0000	0	0.000	0.0	0.000	0.0	98.00%	0.0000	0.0000	SO2 and H2S Mol. Weights	
decanes +	0.0000%	0.0000%	0.0000%	0.000	0.000	0.0000	0	0.000	0.0	0.000	0.0	98.00%	0.0000	0.0000	64.0650	lb SO2/lb mole
hydrogen sulfide	0.0004%	0.0004%	0.0006%	0.092	0.000	0.0081	18	0.000	0.0	0.123	0.0	98.00%	**0.0002**	**0.0002**	34.0820	lb H2S/lb mole
carbon dioxide	0.9430%	0.9430%	1.9202%	216.890	0.493	24.7634	56,243	0.000	0.0	0.000	0.0	0.00%	24.7634	28.1213	**SO2 Emissions**	
nitrogen	5.7233%	5.7233%	7.4182%	1,316.359	2.990	95.6667	217,279	0.000	0.0	0.000	0.0	0.00%	95.6667	108.6393	**0.0153**	lbs/hr
water	0.0000%	0.0000%	0.0000%	0.000	0.000	0.0000	0	0.000	0.0	0.000	0.0	0.00%	0.0000	0.0000	**0.0174**	TPY
													VOC Emissions			
	100.0000%	100.0000%	100.0000%	23,000.000	52.238	1,289.6145	2,928,979	24.875	1,081.5	56,497.208	1,081.5		**3.4124**	**3.8752**		
													lbs/hr	TPY		

Twin State Environmental

Richardton Facility

Synthetic Minor Air Permit Application

Emptied Railcar Venting & Cleaning Flare and Atmospheric Emissions

Chemical	CAS Numbers	Reid Vapor Pressure psia	Estimated Actual Pressure psia **(Note 4)**	Vapor Molecular Weight lbs / lb mole	Average Railcar Volume gallons	Conversion Factor gallons / cubic feet	Average Railcar Volume Actual Cubic Feet	Standard Pressure psia
Pressurized Railcars								
1,2-Butadiene; Methylallene. **See Note 2 concerning no liquid heel**.	590-19-2	37.2300	37.2300	54.0900	32,000	7.48052	4,277.777	14.7
1,3-Butadiene; trans-Butadiene; Biethylene; Erythrene. **See Note 2 concerning no liquid heel**.	106-99-0	59.4600	59.4600	54.0900	32,000	7.48052	4,277.777	14.7
1-Butene; Butylene; Ethylethylene. **See Note 2 concerning no liquid heel**.	106-98-9	62.0700	62.0700	56.1060	32,000	7.48052	4,277.777	14.7
Butylene Mix; mix of 1-Butene, cis-2-Butene, trans-2-Butene, Isobutene. **See Note 2 concerning no liquid heel**.	25167-67-3	55.9550	55.9550	56.1060	32,000	7.48052	4,277.777	14.7
Isobutane; 2-methypropane. **See Note 2 concerning no liquid heel**.	75-28-5	72.4800	72.4800	58.1220	32,000	7.48052	4,277.777	14.7
Isobutylene; Isobutene; 2-methylpropene; 2-methyl-1-propene. **See Note 2 concerning no liquid heel**.	115-11-7	63.1700	63.1700	56.1060	32,000	7.48052	4,277.777	14.7
Isopentane; 2-methylbutane; ethyldimethylethane. **See Note 2 concerning no liquid heel**.	78-78-4	20.4600	20.4600	72.1490	32,000	7.48052	4,277.777	14.7
Methylcyclopropane; 1-methylcyclopropane. **See Note 2 concerning no liquid heel**.	594-11-6	43.5173	43.5173	56.1060	32,000	7.48052	4,277.777	14.7
n-Butane; Butane. **See Note 2 concerning no liquid heel**.	106-97-8	51.6800	51.6800	58.1220	32,000	7.48052	4,277.777	14.7
Neopentane; 2,2-dimethylpropane; tert-pentane. **See Note 2 concerning no liquid heel**.	463-82-1	36.7000	36.7000	72.1490	32,000	7.48052	4,277.777	14.7
n-Pentane; Pentane. **See Note 2 concerning no liquid heel**.	109-66-0	15.7600	15.7600	72.1490	32,000	7.48052	4,277.777	14.7
Propane; LPG; Dimethylmethane; Propyl Hydride; Freon 290. **See Note 2 concerning no liquid heel**.	74-98-6	188.7000	114.7000	44.0960	32,000	7.48052	4,277.777	14.7
Propylene; 1-Propene; Methylethylene. **See Note 2 concerning no liquid heel**.	115-07-1	227.9000	114.7000	42.0800	32,000	7.48052	4,277.777	14.7
trans-2-Butene; t-2-butene; trans-butene. **See Note 2 concerning no liquid heel**.	624-64-6	49.8400	49.8400	56.1060	32,000	7.48052	4,277.777	14.7
Anhydrous Ammonia; Ammonia; Azane. **See Note 2 concerning no liquid heel**.	7664-41-7	212.0000	114.7000	17.0306	32,000	7.48052	4,277.777	14.7
Pressurized Railcars								
Flare Emissions								

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Reid Vapor Pressure Temperature Deg R	Standard Temperature Deg R	Railcar Chemical Volume Standard Cubic Feet	Each Railcar Chemical Total Vent Time Hours	Each Railcar Chemical Average Volume Scf / Hour	Potential Number of Railcars Venting at Same Time	Potential Hourly Chemical Volume Scf / Hour	Conversion Factor Scf / lb mole	Potential Hourly Chemical Moles lb moles / hr
Pressurized Railcars									
1,2-Butadiene; Methylallene. **See Note 2 concerning no liquid heel**.	560	528	10,215.03	2.00	5,107.52	5	25,537.58	385.4616	66.25
1,3-Butadiene; trans-Butadiene; Biethylene; Erythrene. **See Note 2 concerning no liquid heel**.	560	528	16,314.42	3.00	5,438.14	5	27,190.70	385.4616	70.54
1-Butene; Butylene; Ethylethylene. **See Note 2 concerning no liquid heel**.	560	528	17,030.54	3.00	5,676.85	5	28,384.24	385.4616	73.64
Butylene Mix; mix of 1-Butene, cis-2-Butene, trans-2-Butene, Isobutene. **See Note 2 concerning no liquid heel**.	560	528	15,352.73	3.00	5,117.58	5	25,587.89	385.4616	66.38
Isobutane; 2-methypropane. **See Note 2 concerning no liquid heel**.	560	528	19,886.80	4.00	4,971.70	5	24,858.50	385.4616	64.49
Isobutylene; Isobutene; 2-methylpropene; 2-methyl-1-propene. **See Note 2 concerning no liquid heel**.	560	528	17,332.36	3.00	5,777.45	5	28,887.26	385.4616	74.94
Isopentane; 2-methylbutane; ethyldimethylethane. **See Note 2 concerning no liquid heel**.	560	528	5,613.74	1.00	5,613.74	5	28,068.71	385.4616	72.82
Methylcyclopropane; 1-methylcyclopropane. **See Note 2 concerning no liquid heel**.	560	528	11,940.12	2.00	5,970.06	5	29,850.30	385.4616	77.44
n-Butane; Butane. **See Note 2 concerning no liquid heel**.	560	528	14,179.77	3.00	4,726.59	5	23,632.95	385.4616	61.31
Neopentane; 2,2-dimethylpropane; tert-pentane. **See Note 2 concerning no liquid heel**.	560	528	10,069.61	2.00	5,034.81	5	25,174.03	385.4616	65.31
n-Pentane; Pentane. **See Note 2 concerning no liquid heel**.	560	528	4,324.17	1.00	4,324.17	5	21,620.86	385.4616	56.09
Propane; LPG; Dimethylmethane; Propyl Hydride; Freon 290. **See Note 2 concerning no liquid heel**.	560	528	31,470.97	6.00	5,245.16	5	26,225.81	385.4616	68.04
Propylene; 1-Propene; Methylethylene. **See Note 2 concerning no liquid heel**.	560	528	31,470.97	6.00	5,245.16	5	26,225.81	385.4616	68.04
trans-2-Butene; t-2-butene; trans-butene. **See Note 2 concerning no liquid heel**.	560	528	13,674.92	3.00	4,558.31	5	22,791.53	385.4616	59.13
Anhydrous Ammonia; Ammonia; Azane. **See Note 2 concerning no liquid heel**.	560	528	31,470.97	6.00	5,245.16	4	20,980.65	385.4616	54.43

Pressurized Railcars

Flare Emissions

Twin State Environm									
Richardton Facility									
Synthetic Minor Air Permit A									
Emptied Railcar Venting & Clear									
	(See Note 1)				***(See Note 1)***				
	Potential Hourly	Potential Annual	Potential Annual	Conversion	Potential Annual	Utilized Flare	Chemical Heat of	Chemical Combustion	Hourly Flare Chemical
Chemical	Chemical Mass	Chemical Railcars	Chemical Mass	Factor	Chemical Mass	Oxidation	Combustion	Heating Value	Combustion Heat Value
	lbs / hr	railcars / year	lbs / year	lbs / ton	TPY	Efficiency %	Btu / lb	Btu / Scf	MMBtu / hr
Pressurized Railcars									
1,2-Butadiene; Methylallene. **See Note 2 concerning no liquid heel**.	3,583.5681	1,000	1,433,427	2,000	716.7136	98.00%	19,379.00	2,789.00	71.224
1,3-Butadiene; trans-Butadiene; Biethylene; Erythrene. **See Note 2 concerning no liquid heel**.	3,815.5422	435	995,857	2,000	497.9283	98.00%	18,980.00	2,730.00	74.231
1-Butene; Butylene; Ethylethylene. **See Note 2 concerning no liquid heel**.	4,131.4779	1,000	2,478,887	2,000	1,239.4434	98.00%	19,308.00	2,878.60	81.707
Butylene Mix; mix of 1-Butene, cis-2-Butene, trans-2-Butene, Isobutene. **See Note 2 concerning no liquid heel**.	3,724.4538	1,000	2,234,672	2,000	1,117.3361	98.00%	19,238.00	2,870.00	73.437
Isobutane; 2-methypropane. **See Note 2 concerning no liquid heel**.	3,748.3003	1,000	2,998,640	2,000	1,499.3201	98.00%	19,437.00	3,000.40	74.585
Isobutylene; Isobutene; 2-methylpropene; 2-methyl-1-propene. **See Note 2 concerning no liquid heel**.	4,204.6956	1,000	2,522,817	2,000	1,261.4087	98.00%	19,179.00	2,859.90	82.615
Isopentane; 2-methylbutane; ethyldimethylethane. **See Note 2 concerning no liquid heel**.	5,253.7763	1,000	1,050,755	2,000	525.3776	98.00%	19,303.00	3,699.00	103.826
Methylcyclopropane; 1-methylcyclopropane. **See Note 2 concerning no liquid heel**.	4,344.8710	1,000	1,737,948	2,000	868.9742	98.00%	19,657.00	2,861.40	85.414
n-Butane; Butane. **See Note 2 concerning no liquid heel**.	3,563.5055	1,000	2,138,103	2,000	1,069.0517	98.00%	19,494.00	3,010.80	71.154
Neopentane; 2,2-dimethylpropane; tert-pentane. **See Note 2 concerning no liquid heel**.	4,711.9646	1,000	1,884,786	2,000	942.3929	98.00%	19,235.00	3,682.90	92.713
n-Pentane; Pentane. **See Note 2 concerning no liquid heel**.	4,046.8971	1,000	809,379	2,000	404.6897	98.00%	19,335.00	3,706.90	80.146
Propane; LPG; Dimethylmethane; Propyl Hydride; Freon 290. **See Note 2 concerning no liquid heel**.	3,000.1778	1,000	3,600,213	2,000	1,800.1067	98.00%	19,758.00	2,314.90	60.710
Propylene; 1-Propene; Methylethylene. **See Note 2 concerning no liquid heel**.	2,863.0144	1,000	3,435,617	2,000	1,717.8086	98.00%	19,512.00	2,182.10	57.227
trans-2-Butene; t-2-butene; trans-butene. **See Note 2 concerning no liquid heel**.	3,317.4296	1,000	1,990,458	2,000	995.2289	98.00%	19,219.00	2,866.80	65.339
Anhydrous Ammonia; Ammonia; Azane. **See Note 2 concerning no liquid heel**.	926.9744	1,000	1,390,462	2,000	695.2308	98.00%	7,996.56	358.70	7.526
Pressurized Railcars									
Flare Emissions									

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Annual Flare Chemical Combustion Heat Value MMBtu / year	EPA AP-42 Table 13.5-1 Flare NOx factor lbs / MMBtu	EPA AP-42 Table 13.5-2 Flare CO factor lbs / MMBtu	**Flare Hourly Chemical Emissions lbs / hr**	**Flare Annual Chemical Emissions TPY**	**Flare Hourly NOx Emissions lbs / hr**	**Flare Annual NOx Emissions TPY**	**Flare Hourly CO Emissions lbs / hr**	**Flare Annual CO Emissions TPY**
Pressurized Railcars									
1,2-Butadiene; Methylallene. **See Note 2 concerning no liquid heel**.	28,489.728	0.0680	0.3100	71.6714	14.3343	**4.8433**	**0.9687**	**22.0795**	**4.4159**
1,3-Butadiene; trans-Butadiene; Biethylene; Erythrene. **See Note 2 concerning no liquid heel**.	19,374.190	0.0680	0.3100	76.3108	9.9586	**5.0477**	**0.6587**	**23.0115**	**3.0030**
1-Butene; Butylene; Ethylethylene. **See Note 2 concerning no liquid heel**.	49,024.121	0.0680	0.3100	82.6296	24.7889	**5.5561**	**1.6668**	**25.3291**	**7.5987**
Butylene Mix; mix of 1-Butene, cis-2-Butene, trans-2-Butene, Isobutene. **See Note 2 concerning no liquid heel**.	44,062.339	0.0680	0.3100	74.4891	22.3467	**4.9937**	**1.4981**	**22.7655**	**6.8297**
Isobutane; 2-methypropane. **See Note 2 concerning no liquid heel**.	59,668.359	0.0680	0.3100	74.9660	29.9864	**5.0718**	**2.0287**	**23.1215**	**9.2486**
Isobutylene; Isobutene; 2-methylpropene; 2-methyl-1-propene. **See Note 2 concerning no liquid heel**.	49,568.808	0.0680	0.3100	84.0939	25.2282	**5.6178**	**1.6853**	**25.6106**	**7.6832**
Isopentane; 2-methylbutane; ethyldimethylethane. **See Note 2 concerning no liquid heel**.	20,765.228	0.0680	0.3100	**105.0755**	10.5076	**7.0602**	**0.7060**	**32.1861**	**3.2186**
Methylcyclopropane; 1-methylcyclopropane. **See Note 2 concerning no liquid heel**.	34,165.459	0.0680	0.3100	86.8974	17.3795	**5.8081**	**1.1616**	**26.4782**	**5.2956**
n-Butane; Butane. **See Note 2 concerning no liquid heel**.	42,692.458	0.0680	0.3100	71.2701	21.3810	**4.8385**	**1.4515**	**22.0578**	**6.6173**
Neopentane; 2,2-dimethylpropane; tert-pentane. **See Note 2 concerning no liquid heel**.	37,085.381	0.0680	0.3100	94.2393	18.8479	**6.3045**	**1.2609**	**28.7412**	**5.7482**
n-Pentane; Pentane. **See Note 2 concerning no liquid heel**.	16,029.273	0.0680	0.3100	80.9379	8.0938	**5.4500**	**0.5450**	**24.8454**	**2.4845**
Propane; LPG; Dimethylmethane; Propyl Hydride; Freon 290. **See Note 2 concerning no liquid heel**.	72,852.155	0.0680	0.3100	60.0036	**36.0021**	**4.1283**	**2.4770**	**18.8201**	**11.2921**
Propylene; 1-Propene; Methylethylene. **See Note 2 concerning no liquid heel**.	68,672.810	0.0680	0.3100	57.2603	34.3562	**3.8915**	**2.3349**	**17.7405**	**10.6443**
trans-2-Butene; t-2-butene; trans-butene. **See Note 2 concerning no liquid heel**.	39,203.260	0.0680	0.3100	66.3486	19.9046	**4.4430**	**1.3329**	**20.2550**	**6.0765**
Anhydrous Ammonia; Ammonia; Azane. **See Note 2 concerning no liquid heel**.	11,288.638	0.0680	0.3100	**18.5395**	**13.9046**	**0.5118**	**0.3838**	**2.3330**	**1.7497**
Pressurized Railcars			**Total VOC**	**105.0755**	**36.0021**	**7.0602**	**2.8608**	**32.1861**	**13.0418**
Flare Emissions			**Ammonia**	**18.5395**	**13.9046**				

Twin State Environme						
Richardton Facility						
Synthetic Minor Air Permit A						
Emptied Railcar Venting & Clear						
	Maximum Expected	**Total Hourly**	**Total Annual**	**Maximum Expected**	**Total Hourly**	**Total Annual**
Chemical	**Vapor HAP Content**	**HAP Emissions**	**HAP Emissions**	**Vapor Sulfur Content**	**SO2 Emissions**	**SO2 Emissions**
	Wt%	**lbs / hr**	**TPY**	**Wt%**	**lbs / hr**	**TPY**
Pressurized Railcars						
1,2-Butadiene; Methylallene. **See Note 2 concerning no liquid heel**.						
1,3-Butadiene; trans-Butadiene; Biethylene; Erythrene. **See Note 2 concerning no liquid heel**.	**100.0000%**	**76.3108**	**9.9586**			
1-Butene; Butylene; Ethylethylene. **See Note 2 concerning no liquid heel**.						
Butylene Mix; mix of 1-Butene, cis-2-Butene, trans-2-Butene, Isobutene. **See Note 2 concerning no liquid heel**.						
Isobutane; 2-methypropane. **See Note 2 concerning no liquid heel**.						
Isobutylene; Isobutene; 2-methylpropene; 2-methyl-1-propene. **See Note 2 concerning no liquid heel**.						
Isopentane; 2-methylbutane; ethyldimethylethane. **See Note 2 concerning no liquid heel**.						
Methylcyclopropane; 1-methylcyclopropane. **See Note 2 concerning no liquid heel**.						
n-Butane; Butane. **See Note 2 concerning no liquid heel**.						
Neopentane; 2,2-dimethylpropane; tert-pentane. **See Note 2 concerning no liquid heel**.						
n-Pentane; Pentane. **See Note 2 concerning no liquid heel**.						
Propane; LPG; Dimethylmethane; Propyl Hydride; Freon 290. **See Note 2 concerning no liquid heel**.						
Propylene; 1-Propene; Methylethylene. **See Note 2 concerning no liquid heel**.						
trans-2-Butene; t-2-butene; trans-butene. **See Note 2 concerning no liquid heel**.						
Anhydrous Ammonia; Ammonia; Azane. **See Note 2 concerning no liquid heel**.						
Pressurized Railcars		**76.3108**	**9.9586**			
Flare Emissions						

Twin State Environme			40 CFR 60.18(f.)(6.) Maximum Velocity Calculations for Air-Assisted Flare				
Richardton Facility	0.001055056	Mjoules per Btu			HP Flare Exhaust Area	17.5000	square inches
Synthetic Minor Air Permit A	0.028316850	Scm per Scf		Vmax=8.706 + (0.7084)(Ht)	HP Flare Exhaust Area	0.1215	square feet
Emptied Railcar Venting & Clear	3.280840000	Feet per Meter			LP Flare Exhaust Area	27.0000	square inches
		(Ht)	(Vmax)	(Vmax)	LP Flare Exhaust Area	0.1875	square feet
	Lower / Net	Lower / Net	Maximum	Maximum	Maximum Hourly	Maximum Hourly	Maximum Hourly
Chemical	Heating Value	Heating Value	Allowed Velocity	Allowed Velocity	Gas Volume to Flare	Gas Volume to Flare	Gas Velocity from Flare
	Btu/Scf	Mjoules/Scm	Meters/second	Feet/second	Scf/Hour	Scf/Second	Feet/second
Pressurized Railcars							
1,2-Butadiene; Methylallene. **See Note 2 concerning no liquid heel**.	2,789.0	103.92	82.32	270.08	25,538	7.09	58.37
1,3-Butadiene; trans-Butadiene; Biethylene; Erythrene. **See Note 2 concerning no liquid heel**.	2,730.0	101.72	80.76	264.97	27,191	7.55	62.15
1-Butene; Butylene; Ethylethylene. **See Note 2 concerning no liquid heel**.	2,878.6	107.25	84.68	277.84	28,384	7.88	64.88
Butylene Mix; mix of 1-Butene, cis-2-Butene, trans-2-Butene, Isobutene. **See Note 2 concerning no liquid heel**.	2,870.0	106.93	84.46	277.09	25,588	7.11	58.49
Isobutane; 2-methypropane. **See Note 2 concerning no liquid heel**.	3,000.4	111.79	87.90	288.38	24,859	6.91	56.82
Isobutylene; Isobutene; 2-methylpropene; 2-methyl-1-propene. **See Note 2 concerning no liquid heel**.	2,859.9	106.56	84.19	276.22	28,887	8.02	66.03
Isopentane; 2-methylbutane; ethyldimethylethane. **See Note 2 concerning no liquid heel**.	3,699.0	137.82	106.34	348.88	28,069	7.80	64.16
Methylcyclopropane; 1-methylcyclopropane. **See Note 2 concerning no liquid heel**.	2,861.4	106.61	84.23	276.35	29,850	8.29	68.23
n-Butane; Butane. **See Note 2 concerning no liquid heel**.	3,010.8	112.18	88.17	289.28	23,633	6.56	54.02
Neopentane; 2,2-dimethylpropane; tert-pentane. **See Note 2 concerning no liquid heel**.	3,682.9	137.22	105.91	347.48	25,174	6.99	57.54
n-Pentane; Pentane. **See Note 2 concerning no liquid heel**.	3,706.9	138.12	106.55	349.56	21,621	6.01	49.42
Propane; LPG; Dimethylmethane; Propyl Hydride; Freon 290. **See Note 2 concerning no liquid heel**.	2,314.9	86.25	69.81	229.02	26,226	7.28	59.94
Propylene; 1-Propene; Methylethylene. **See Note 2 concerning no liquid heel**.	2,182.1	81.30	66.30	217.52	26,226	7.28	59.94
trans-2-Butene; t-2-butene; trans-butene. **See Note 2 concerning no liquid heel**.	2,866.8	106.81	84.37	276.81	22,792	6.33	52.09
Anhydrous Ammonia; Ammonia; Azane. **See Note 2 concerning no liquid heel**.	358.7	13.36	18.17	59.62	20,981	5.83	47.96
Pressurized Railcars							
Flare Emissions							

Twin State Environmental

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Synthetic Minor Air Permit Application

Emptied Railcar Venting & Cleaning Flare and Atmospheric Emissions

Chemical	CAS Numbers	Reid Vapor Pressure psia	Estimated Actual Pressure psia **(Note 4)**	Vapor Molecular Weight lbs / lb mole	Average Railcar Volume gallons	Conversion Factor gallons / cubic feet	Average Railcar Volume Actual Cubic Feet	Standard Pressure psia
Atmospheric VOC Railcars								
2-Ethyl Hexanol; 2-Ethylhexyl Alcohol	104-76-7	0.0138	0.0138	130.2000	32,000	7.48052	4,277.777	14.7
Acetic Acid	64-19-7	0.6000	0.6000	60.0520	32,000	7.48052	4,277.777	14.7
Acetone	67-64-1	7.5011	7.5011	58.0800	32,000	7.48052	4,277.777	14.7
Acrylonitrile	107-13-1	3.5580	3.5580	53.0600	32,000	7.48052	4,277.777	14.7
a-Methyl Styrene; Alpha-Methylstyrene; Methyl Styrene	98-83-9	0.2300	0.2300	118.1700	32,000	7.48052	4,277.777	14.7
Benzene	71-43-2	3.2220	3.2220	78.1120	32,000	7.48052	4,277.777	14.7
Biodiesel; Soybean Oil Methyl Esters; Fatty Acids C6-C10 Tetraesters with Sorbitan	67784-80-9; 228573-47-5	0.0003	0.0003	285.0000	32,000	7.48052	4,277.777	14.7
Butyl Alcohol; Butanol; 1-Butanol; n-Butyl Alcohol	71-36-3	0.3201	0.3201	74.1200	32,000	7.48052	4,277.777	14.7
Coal Tar Pitch Volatiles; Coal Tar Naphtha; Crude Coal Tar; Petroleum Coke	8007-45-2; 64741-79-3; 65996-93-2	0.0022	0.0022	240.3870	32,000	7.48052	4,277.777	14.7
Cumene; Isopropylbenzene	98-82-8	0.1865	0.1865	120.1900	32,000	7.48052	4,277.777	14.7
Cyclohexane	110-82-7	3.2670	3.2670	84.1590	32,000	7.48052	4,277.777	14.7
Cyclohexanone	108-94-1	0.8000	0.8000	98.1500	32,000	7.48052	4,277.777	14.7
Cyclohexene	110-83-8	2.9899	2.9899	82.1500	32,000	7.48052	4,277.777	14.7
Diethanolamine; 2,2'-Iminodiethanol; GE Betz Petroflo 21Y21	111-42-2	0.9700	0.9700	105.1400	32,000	7.48052	4,277.777	14.7
Diethylene Glycol	111-46-6	0.0005	0.0005	106.1200	32,000	7.48052	4,277.777	14.7
Ethanol; Ethyl Alcohol; Denatured Ethanol	64-17-5	2.3130	2.3130	46.0680	32,000	7.48052	4,277.777	14.7
Ethyl Acetate; Acetic Acid Ethyl Ester	141-78-6	3.2706	3.2706	88.1100	32,000	7.48052	4,277.777	14.7
Ethyl Benzene; Ethylbenzene	100-41-4	0.3705	0.3705	106.1650	32,000	7.48052	4,277.777	14.7
Ethylene Glycol; 1,2-dihydroxyethane; 1,2-ethandiol	107-21-1	0.0080	0.0080	62.0700	32,000	7.48052	4,277.777	14.7
Fatty Acids; Fatty Acids - Numerous Types	61788-89-4; 61789-01-3; 61789-31-9; 61790-44-1; 61790-66-7; 61790-69-0; 61790-86-1; 61790-90-7; 61791-00-2; 61791-19-3; 64754-93-4; 64754-94-5; 64754-98-9; 64754-99-0; 65997-03-7; 66070-80-2; 67701-05-7; 67701-06-8; 67701-08-0; 67701-10-4; 67701-19-3; 67762-36-1; 67762-38-3; 67762-39-4; 67784-78-5; 67989-30-4; 67989-52-0; 68002-77-7; 68071-65-8; 68082-29-1; 68132-39-8; 68139-89-9; 68132-60-5; 68153-60-6; 68153-61-7; 68154-36-9; 68154-46-1; 68154-48-3; 68154-49-4; 68188-40-9; 68308-89-4; 68309-24-0; 68334-03-2; 68390-61-4; 68410-19-5; 68440-15-3; 68440-27-7; 68475-81-0; 68475-96-7; 68526-44-3; 68551-92-8; 68551-95-1; 68552-48-7; 68604-43-3; 68605-92-5; 68647-57-4; 68648-19-1; 68650-50-0; 68855-69-6; 68891-75-8; 68910-84-9; 68911-13-7; 68911-14-8; 68919-76-6; 68920-32-1; 68920-41-2; 68937-81-5; 68937-84-8; 68937-90-6; 68938-27-2; 68953-01-5; 68953-36-6; 68956-04-7; 68956-12-7; 68956-25-2; 68956-41-2; 68956-43-4; 68990-47-6; 68995-98-6; 70248-31-6; 71820-35-4; 72480-45-6; 73138-54-2; 84998-77-2; 91051-73-9; 96591-17-2; 100816-02-2; 150739-79-0; 162627-17-0; 163961-32-8	0.0003	0.0003	285.0000	32,000	7.48052	4,277.777	14.7
Fatty Alcohols; Alcohols C12-15, Ethoxylated; Fatty Alcohols C16-C18; Cetostearyl Alcohol; Alpha-Decyl-Omega-Hydroxy-Poly(Oxy-1,2-Ethanediyl); N-Decyl Alpha-D-Glucopyranoside; Neodol 25-7; Ethoxylated Fatty Alcohols; Decyl Alcohol Ethoxylates; Oxyalkylated Fatty Alcohol	26183-52-8; 29781-81-5; 67762-30-5; 68131-39-5	0.00015	0.00015	262.0000	32,000	7.48052	4,277.777	14.7
Fatty Amines; Fatty Amine Carboxylate Complex; Tallow Alkyl Amines; OctaDecylAmine; Amines, Coco Alkyl; Amines, Hydrogenated Tallow Alkyl; (Z)-OctaDec-9-Enylamine	112-90-3; 124-30-1; 61788-45-2; 61788-46-3; 61790-33-8; 68132-78-5; 68308-48-5; 68603-65-6; 68955-73-7; 72968-31-1	0.00015	0.00015	267.0000	32,000	7.48052	4,277.777	14.7
Fish Oil; Eicosapentaenoic Acid (EPA); Docosahexaenoic Acid (DHA)	10417-94-4 (EPA); 6217-54-5 (DHA)	0.00015	0.00015	909.3900	32,000	7.48052	4,277.777	14.7
Formaldehyde (solution): Formalin; Oxymethylene	50-00-0	0.0900	0.0900	30.0300	32,000	7.48052	4,277.777	14.7
Furfuryl Alcohol	98-00-0	0.0700	0.0700	98.1000	32,000	7.48052	4,277.777	14.7
Glycerin Mist; Glycerin; Crude Glycerin	56-81-5	0.00001	0.00001	92.1000	32,000	7.48052	4,277.777	14.7
Heptane; n-Heptane	142-82-5	1.6203	1.6203	100.2020	32,000	7.48052	4,277.777	14.7

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Reid Vapor Pressure Temperature Deg R	Standard Temperature Deg R	Railcar Chemical Volume Standard Cubic Feet	Each Railcar Chemical Total Vent Time Hours	Each Railcar Chemical Average Volume Scf / Hour	Potential Number of Railcars Venting at Same Time	Potential Hourly Chemical Volume Scf / Hour	Conversion Factor Scf / lb mole	Potential Hourly Chemical Moles lb moles / hr
Atmospheric VOC Railcars									
2-Ethyl Hexanol; 2-Ethylhexyl Alcohol	560	528	3.79	1.00	3.79	5	18.93	385.4616	0.05
Acetic Acid	560	528	164.63	1.00	164.63	5	823.13	385.4616	2.14
Acetone	560	528	2,058.12	1.00	2,058.12	5	10,290.62	385.4616	26.70
Acrylonitrile	560	528	976.23	1.00	976.23	5	4,881.16	385.4616	12.66
a-Methyl Styrene; Alpha-Methylstyrene; Methyl Styrene	560	528	63.11	1.00	63.11	5	315.53	385.4616	0.82
Benzene	560	528	884.04	1.00	884.04	5	4,420.20	385.4616	11.47
Biodiesel; Soybean Oil Methyl Esters; Fatty Acids C6-C10 Tetraesters with Sorbitan	560	528	0.08	1.00	0.08	5	0.41	385.4616	0.00
Butyl Alcohol; Butanol; 1-Butanol; n-Butyl Alcohol	560	528	87.83	1.00	87.83	5	439.14	385.4616	1.14
Coal Tar Pitch Volatiles; Coal Tar Naphtha; Crude Coal Tar; Petroleum Coke	560	528	0.60	1.00	0.60	5	3.02	385.4616	0.01
Cumene; Isopropylbenzene	560	528	51.17	1.00	51.17	5	255.86	385.4616	0.66
Cyclohexane	560	528	896.39	1.00	896.39	5	4,481.94	385.4616	11.63
Cyclohexanone	560	528	219.50	1.00	219.50	5	1,097.51	385.4616	2.85
Cyclohexene	560	528	820.36	1.00	820.36	5	4,101.79	385.4616	10.64
Diethanolamine; 2,2'-Iminodiethanol; GE Betz Petroflo 21Y21	560	528	266.15	1.00	266.15	5	1,330.73	385.4616	3.45
Diethylene Glycol	560	528	0.14	1.00	0.14	5	0.69	385.4616	0.00
Ethanol; Ethyl Alcohol; Denatured Ethanol	560	528	634.63	1.00	634.63	5	3,173.16	385.4616	8.23
Ethyl Acetate; Acetic Acid Ethyl Ester	560	528	897.38	1.00	897.38	5	4,486.88	385.4616	11.64
Ethyl Benzene; Ethylbenzene	560	528	101.66	1.00	101.66	5	508.28	385.4616	1.32
Ethylene Glycol; 1,2-dihydroxyethane; 1,2-ethandiol	560	528	2.20	1.00	2.20	5	10.98	385.4616	0.03
Fatty Acids; Fatty Acids - Numerous Types	560	528	0.08	1.00	0.08	5	0.41	385.4616	0.00
Fatty Alcohols; Alcohols C12-15, Ethoxylated; Fatty Alcohols C16-C18; Cetostearyl Alcohol; Alpha-Decyl-Omega-Hydroxy-Poly(Oxy-1,2-Ethanediyl); N-Decyl Alpha-D-Glucopyranoside; Neodol 25-7; Ethoxylated Fatty Alcohols; Decyl Alcohol Ethoxylates; Oxyalkylated Fatty Alcohol	560	528	0.04	1.00	0.04	5	0.21	385.4616	0.00
Fatty Amines; Fatty Amine Carboxylate Complex; Tallow Alkyl Amines; OctaDecylAmine; Amines, Coco Alkyl; Amines, Hydrogenated Tallow Alkyl; (Z)-OctaDec-9-Enylamine	560	528	0.04	1.00	0.04	5	0.21	385.4616	0.00
Fish Oil; Eicosapentaenoic Acid (EPA); Docosahexaenoic Acid (DHA)	560	528	0.04	1.00	0.04	5	0.21	385.4616	0.00
Formaldehyde (solution): Formalin; Oxymethylene	560	528	24.69	1.00	24.69	5	123.47	385.4616	0.32
Furfuryl Alcohol	560	528	19.21	1.00	19.21	5	96.03	385.4616	0.25
Glycerin Mist; Glycerin; Crude Glycerin	560	528	0.00	1.00	0.00	5	0.01	385.4616	0.00
Heptane; n-Heptane	560	528	444.57	1.00	444.57	5	2,222.86	385.4616	5.77

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	*(See Note 1)* Potential Hourly Chemical Mass lbs / hr	Potential Annual Chemical Railcars railcars / year	Potential Annual Chemical Mass lbs / year	Conversion Factor lbs / ton	*(See Note 1)* Potential Annual Chemical Mass TPY	Utilized Flare Oxidation Efficiency %	Chemical Heat of Combustion Btu / lb	Chemical Combustion Heating Value Btu / Scf	Hourly Flare Chemical Combustion Heat Value MMBtu / hr
Atmospheric VOC Railcars									
2-Ethyl Hexanol; 2-Ethylhexyl Alcohol	6.3948	1,000	1,279	2,000	0.6395	98.00%	17,480.00	5,904.34	0.112
Acetic Acid	128.2373	1,000	25,647	2,000	12.8237	98.00%	5,645.00	879.45	0.724
Acetone	1,550.5551	1,000	310,111	2,000	155.0555	98.00%	12,282.00	1,850.61	19.044
Acrylonitrile	671.9065	1,000	134,381	2,000	67.1906	98.00%	14,300.00	1,968.44	9.608
a-Methyl Styrene; Alpha-Methylstyrene; Methyl Styrene	96.7321	1,000	19,346	2,000	9.6732	98.00%	17,690.00	5,423.18	1.711
Benzene	895.7337	1,000	179,147	2,000	89.5734	98.00%	17,256.00	3,496.85	15.457
Biodiesel; Soybean Oil Methyl Esters; Fatty Acids C6-C10 Tetraesters with Sorbitan	0.3043	1,000	61	2,000	0.0304	98.00%	15,856.00	11,723.50	0.005
Butyl Alcohol; Butanol; 1-Butanol; n-Butyl Alcohol	84.4417	1,000	16,888	2,000	8.4442	98.00%	14,246.00	2,739.35	1.203
Coal Tar Pitch Volatiles; Coal Tar Naphtha; Crude Coal Tar; Petroleum Coke	1.8822	1,000	376	2,000	0.1882	98.00%	17,500.00	10,913.60	0.033
Cumene; Isopropylbenzene	79.7779	1,000	15,956	2,000	7.9778	98.00%	17,711.00	5,522.43	1.413
Cyclohexane	978.5552	1,000	195,711	2,000	97.8555	98.00%	18,675.00	4,077.37	18.275
Cyclohexanone	279.4576	1,000	55,892	2,000	27.9458	98.00%	15,430.00	3,928.94	4.312
Cyclohexene	874.1780	1,000	174,836	2,000	87.4178	98.00%	18,485.00	3,939.54	16.159
Diethanolamine; 2,2'-Iminodiethanol; GE Betz Petroflo 21Y21	362.9739	1,000	72,595	2,000	36.2974	98.00%	9,857.00	2,688.63	3.578
Diethylene Glycol	0.1888	1,000	38	2,000	0.0189	98.00%	8,730.00	2,403.42	0.002
Ethanol; Ethyl Alcohol; Denatured Ethanol	379.2369	1,000	75,847	2,000	37.9237	98.00%	11,523.00	1,377.16	4.370
Ethyl Acetate; Acetic Acid Ethyl Ester	1,025.6242	1,000	205,125	2,000	102.5624	98.00%	10,066.00	2,300.92	10.324
Ethyl Benzene; Ethylbenzene	139.9926	1,000	27,999	2,000	13.9993	98.00%	17,954.00	4,944.94	2.513
Ethylene Glycol; 1,2-dihydroxyethane; 1,2-ethandiol	1.7673	1,000	353	2,000	0.1767	98.00%	7,259.00	1,168.90	0.013
Fatty Acids; Fatty Acids - Numerous Types	0.3043	1,000	61	2,000	0.0304	98.00%	15,856.00	11,723.50	0.005
Fatty Alcohols; Alcohols C12-15, Ethoxylated; Fatty Alcohols C16-C18; Cetostearyl Alcohol; Alpha-Decyl-Omega-Hydroxy-Poly(Oxy-1,2-Ethanediyl); N-Decyl Alpha-D-Glucopyranoside; Neodol 25-7; Ethoxylated Fatty Alcohols; Decyl Alcohol Ethoxylates; Oxyalkylated Fatty Alcohol	0.1399	1,000	28	2,000	0.0140	98.00%	18,500.00	12,574.53	0.003
Fatty Amines; Fatty Amine Carboxylate Complex; Tallow Alkyl Amines; OctaDecylAmine; Amines, Coco Alkyl; Amines, Hydrogenated Tallow Alkyl; (Z)-OctaDec-9-Enylamine	0.1425	1,000	29	2,000	0.0143	98.00%	18,000.00	12,468.17	0.003
Fish Oil; Eicosapentaenoic Acid (EPA); Docosahexaenoic Acid (DHA)	0.4855	1,000	97	2,000	0.0485	98.00%	16,398.00	38,686.54	0.008
Formaldehyde (solution): Formalin; Oxymethylene	9.6191	1,000	1,924	2,000	0.9619	98.00%	7,745.19	603.40	0.075
Furfuryl Alcohol	24.4401	1,000	4,888	2,000	2.4440	98.00%	11,200.00	2,850.40	0.274
Glycerin Mist; Glycerin; Crude Glycerin	0.0033	1,000	1	2,000	0.0003	98.00%	7,758.00	1,853.65	0.000
Heptane; n-Heptane	577.8398	1,000	115,568	2,000	57.7840	98.00%	19,156.00	4,979.66	11.069

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Annual Flare Chemical Combustion Heat Value MMBtu / year	EPA AP-42 Table 13.5-1 Flare NOx factor lbs / MMBtu	EPA AP-42 Table 13.5-2 Flare CO factor lbs / MMBtu	**Flare Hourly Chemical Emissions lbs / hr**	**Flare Annual Chemical Emissions TPY**	**Flare Hourly NOx Emissions lbs / hr**	**Flare Annual NOx Emissions TPY**	**Flare Hourly CO Emissions lbs / hr**	**Flare Annual CO Emissions TPY**
Atmospheric VOC Railcars									
2-Ethyl Hexanol; 2-Ethylhexyl Alcohol	22.356	0.0680	0.3100	**0.1279**	**0.0128**	**0.0076**	**0.0008**	**0.0347**	**0.0035**
Acetic Acid	144.780	0.0680	0.3100	**2.5647**	**0.2565**	**0.0492**	**0.0049**	**0.2244**	**0.0224**
Acetone	3,808.783	0.0680	0.3100	**31.0111**	**3.1011**	**1.2950**	**0.1295**	**5.9036**	**0.5904**
Acrylonitrile	1,921.653	0.0680	0.3100	**13.4381**	**1.3438**	**0.6534**	**0.0653**	**2.9786**	**0.2979**
a-Methyl Styrene; Alpha-Methylstyrene; Methyl Styrene	342.238	0.0680	0.3100	**1.9346**	**0.1935**	**0.1164**	**0.0116**	**0.5305**	**0.0530**
Benzene	3,091.356	0.0680	0.3100	**17.9147**	**1.7915**	**1.0511**	**0.1051**	**4.7916**	**0.4792**
Biodiesel; Soybean Oil Methyl Esters; Fatty Acids C6-C10 Tetraesters with Sorbitan	0.965	0.0680	0.3100	**0.0061**	**0.0006**	**0.0003**	**0.0000**	**0.0015**	**0.0001**
Butyl Alcohol; Butanol; 1-Butanol; n-Butyl Alcohol	240.591	0.0680	0.3100	**1.6888**	**0.1689**	**0.0818**	**0.0082**	**0.3729**	**0.0373**
Coal Tar Pitch Volatiles; Coal Tar Naphtha; Crude Coal Tar; Petroleum Coke	6.588	0.0680	0.3100	**0.0376**	**0.0038**	**0.0022**	**0.0002**	**0.0102**	**0.0010**
Cumene; Isopropylbenzene	282.589	0.0680	0.3100	**1.5956**	**0.1596**	**0.0961**	**0.0096**	**0.4380**	**0.0438**
Cyclohexane	3,654.904	0.0680	0.3100	**19.5711**	**1.9571**	**1.2427**	**0.1243**	**5.6651**	**0.5665**
Cyclohexanone	862.406	0.0680	0.3100	**5.5892**	**0.5589**	**0.2932**	**0.0293**	**1.3367**	**0.1337**
Cyclohexene	3,231.836	0.0680	0.3100	**17.4836**	**1.7484**	**1.0988**	**0.1099**	**5.0093**	**0.5009**
Diethanolamine; 2,2'-Iminodiethanol; GE Betz Petroflo 21Y21	715.567	0.0680	0.3100	**7.2595**	**0.7259**	**0.2433**	**0.0243**	**1.1091**	**0.1109**
Diethylene Glycol	0.330	0.0680	0.3100	**0.0038**	**0.0004**	**0.0001**	**0.0000**	**0.0005**	**0.0001**
Ethanol; Ethyl Alcohol; Denatured Ethanol	873.989	0.0680	0.3100	**7.5847**	**0.7585**	**0.2972**	**0.0297**	**1.3547**	**0.1355**
Ethyl Acetate; Acetic Acid Ethyl Ester	2,064.787	0.0680	0.3100	**20.5125**	**2.0512**	**0.7020**	**0.0702**	**3.2004**	**0.3200**
Ethyl Benzene; Ethylbenzene	502.686	0.0680	0.3100	**2.7999**	**0.2800**	**0.1709**	**0.0171**	**0.7792**	**0.0779**
Ethylene Glycol; 1,2-dihydroxyethane; 1,2-ethandiol	2.566	0.0680	0.3100	**0.0353**	**0.0035**	**0.0009**	**0.0001**	**0.0040**	**0.0004**
Fatty Acids; Fatty Acids - Numerous Types	0.965	0.0680	0.3100	**0.0061**	**0.0006**	**0.0003**	**0.0000**	**0.0015**	**0.0001**
Fatty Alcohols; Alcohols C12-15, Ethoxylated; Fatty Alcohols C16-C18; Cetostearyl Alcohol; Alpha-Decyl-Omega-Hydroxy-Poly(Oxy-1,2-Ethanediyl); N-Decyl Alpha-D-Glucopyranoside; Neodol 25-7; Ethoxylated Fatty Alcohols; Decyl Alcohol Ethoxylates; Oxyalkylated Fatty Alcohol	0.518	0.0680	0.3100	**0.0028**	**0.0003**	**0.0002**	**0.0000**	**0.0008**	**0.0001**
Fatty Amines; Fatty Amine Carboxylate Complex; Tallow Alkyl Amines; OctaDecylAmine; Amines, Coco Alkyl; Amines, Hydrogenated Tallow Alkyl; (Z)-OctaDec-9-Enylamine	0.513	0.0680	0.3100	**0.0029**	**0.0003**	**0.0002**	**0.0000**	**0.0008**	**0.0001**
Fish Oil; Eicosapentaenoic Acid (EPA); Docosahexaenoic Acid (DHA)	1.592	0.0680	0.3100	**0.0097**	**0.0010**	**0.0005**	**0.0001**	**0.0025**	**0.0002**
Formaldehyde (solution): Formalin; Oxymethylene	14.900	0.0680	0.3100	**0.1924**	**0.0192**	**0.0051**	**0.0005**	**0.0231**	**0.0023**
Furfuryl Alcohol	54.746	0.0680	0.3100	**0.4888**	**0.0489**	**0.0186**	**0.0019**	**0.0849**	**0.0085**
Glycerin Mist; Glycerin; Crude Glycerin	0.005	0.0680	0.3100	**0.0001**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Heptane; n-Heptane	2,213.820	0.0680	0.3100	**11.5568**	**1.1557**	**0.7527**	**0.0753**	**3.4314**	**0.3431**

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Maximum Expected Vapor HAP Content Wt%	Total Hourly HAP Emissions lbs / hr	Total Annual HAP Emissions TPY	Maximum Expected Vapor Sulfur Content Wt%	Total Hourly SO2 Emissions lbs / hr	Total Annual SO2 Emissions TPY
Atmospheric VOC Railcars						
2-Ethyl Hexanol; 2-Ethylhexyl Alcohol						
Acetic Acid						
Acetone						
Acrylonitrile	**100.0000%**	**13.4381**	**1.3438**			
a-Methyl Styrene; Alpha-Methylstyrene; Methyl Styrene						
Benzene	**100.0000%**	**17.9147**	**1.7915**			
Biodiesel; Soybean Oil Methyl Esters; Fatty Acids C6-C10 Tetraesters with Sorbitan	**1.0000%**	**0.0001**	**0.0000**			
Butyl Alcohol; Butanol; 1-Butanol; n-Butyl Alcohol						
Coal Tar Pitch Volatiles; Coal Tar Naphtha; Crude Coal Tar; Petroleum Coke	**100.0000%**	**0.0376**	**0.0038**	**0.5000%**	**0.0004**	**0.0000**
Cumene; Isopropylbenzene	**100.0000%**	**1.5956**	**0.1596**			
Cyclohexane						
Cyclohexanone						
Cyclohexene						
Diethanolamine; 2,2'-Iminodiethanol; GE Betz Petroflo 21Y21	**100.0000%**	**7.2595**	**0.7259**			
Diethylene Glycol	**100.0000%**	**0.0038**	**0.0004**			
Ethanol; Ethyl Alcohol; Denatured Ethanol						
Ethyl Acetate; Acetic Acid Ethyl Ester						
Ethyl Benzene; Ethylbenzene	**100.0000%**	**2.7999**	**0.2800**			
Ethylene Glycol; 1,2-dihydroxyethane; 1,2-ethandiol	**100.0000%**	**0.0353**	**0.0035**			
Fatty Acids; Fatty Acids - Numerous Types						
Fatty Alcohols; Alcohols C12-15, Ethoxylated; Fatty Alcohols C16-C18; Cetostearyl Alcohol; Alpha-Decyl-Omega-Hydroxy-Poly(Oxy-1,2-Ethanediyl); N-Decyl Alpha-D-Glucopyranoside; Neodol 25-7; Ethoxylated Fatty Alcohols; Decyl Alcohol Ethoxylates; Oxyalkylated Fatty Alcohol						
Fatty Amines; Fatty Amine Carboxylate Complex; Tallow Alkyl Amines; OctaDecylAmine; Amines, Coco Alkyl; Amines, Hydrogenated Tallow Alkyl; (Z)-OctaDec-9-Enylamine						
Fish Oil; Eicosapentaenoic Acid (EPA); Docosahexaenoic Acid (DHA)						
Formaldehyde (solution): Formalin; Oxymethylene	**100.0000%**	**0.1924**	**0.0192**			
Furfuryl Alcohol						
Glycerin Mist; Glycerin; Crude Glycerin						
Heptane; n-Heptane						

Twin State Environm	40 CFR 60.18(f.)(6.) Maximum Velocity Calculations for Air-Assisted Flare						
Richardton Facility	0.001055056	Mjoules per Btu			HP Flare Exhaust Area	17.5000	square inches
Synthetic Minor Air Permit A	0.028316850	Scm per Scf		Vmax=8.706 + (0.7084)(Ht)	HP Flare Exhaust Area	0.1215	square feet
Emptied Railcar Venting & Clear	3.280840000	Feet per Meter			LP Flare Exhaust Area	27.0000	square inches
		(Ht)	(Vmax)	(Vmax)	LP Flare Exhaust Area	0.1875	square feet
	Lower / Net	Lower / Net	Maximum	Maximum	Maximum Hourly	Maximum Hourly	Maximum Hourly
Chemical	Heating Value	Heating Value	Allowed Velocity	Allowed Velocity	Gas Volume to Flare	Gas Volume to Flare	Gas Velocity from Flare
	Btu/Scf	Mjoules/Scm	Meters/second	Feet/second	Scf/Hour	Scf/Second	Feet/second
Atmospheric VOC Railcars							
2-Ethyl Hexanol; 2-Ethylhexyl Alcohol	5,904.3	219.99	164.55	539.85	19	0.01	0.03
Acetic Acid	879.4	32.77	31.92	104.72	823	0.23	1.22
Acetone	1,850.6	68.95	57.55	188.82	10,291	2.86	15.25
Acrylonitrile	1,968.4	73.34	60.66	199.02	4,881	1.36	7.23
a-Methyl Styrene; Alpha-Methylstyrene; Methyl Styrene	5,423.2	202.06	151.85	498.18	316	0.09	0.47
Benzene	3,496.8	130.29	101.00	331.37	4,420	1.23	6.55
Biodiesel; Soybean Oil Methyl Esters; Fatty Acids C6-C10 Tetraesters with Sorbitan	11,723.5	436.81	318.14	1,043.76	0	0.00	0.00
Butyl Alcohol; Butanol; 1-Butanol; n-Butyl Alcohol	2,739.3	102.07	81.01	265.78	439	0.12	0.65
Coal Tar Pitch Volatiles; Coal Tar Naphtha; Crude Coal Tar; Petroleum Coke	10,913.6	406.63	296.76	973.63	3	0.00	0.00
Cumene; Isopropylbenzene	5,522.4	205.76	154.47	506.78	256	0.07	0.38
Cyclohexane	4,077.4	151.92	116.33	381.64	4,482	1.24	6.64
Cyclohexanone	3,928.9	146.39	112.41	368.79	1,098	0.30	1.63
Cyclohexene	3,939.5	146.78	112.69	369.71	4,102	1.14	6.08
Diethanolamine; 2,2'-Iminodiethanol; GE Betz Petroflo 21Y21	2,688.6	100.18	79.67	261.39	1,331	0.37	1.97
Diethylene Glycol	2,403.4	89.55	72.14	236.69	1	0.00	0.00
Ethanol; Ethyl Alcohol; Denatured Ethanol	1,377.2	51.31	45.06	147.82	3,173	0.88	4.70
Ethyl Acetate; Acetic Acid Ethyl Ester	2,300.9	85.73	69.44	227.81	4,487	1.25	6.65
Ethyl Benzene; Ethylbenzene	4,944.9	184.24	139.22	456.77	508	0.14	0.75
Ethylene Glycol; 1,2-dihydroxyethane; 1,2-ethandiol	1,168.9	43.55	39.56	129.78	11	0.00	0.02
Fatty Acids; Fatty Acids - Numerous Types	11,723.5	436.81	318.14	1,043.76	0	0.00	0.00
Fatty Alcohols; Alcohols C12-15, Ethoxylated; Fatty Alcohols C16-C18; Cetostearyl Alcohol; Alpha-Decyl-Omega-Hydroxy-Poly(Oxy-1,2-Ethanediyl); N-Decyl Alpha-D-Glucopyranoside; Neodol 25-7; Ethoxylated Fatty Alcohols; Decyl Alcohol Ethoxylates; Oxyalkylated Fatty Alcohol	12,574.5	468.51	340.60	1,117.46	0	0.00	0.00
Fatty Amines; Fatty Amine Carboxylate Complex; Tallow Alkyl Amines; OctaDecylAmine; Amines, Coco Alkyl; Amines, Hydrogenated Tallow Alkyl; (Z)-OctaDec-9-Enylamine	12,468.2	464.55	337.79	1,108.25	0	0.00	0.00
Fish Oil; Eicosapentaenoic Acid (EPA); Docosahexaenoic Acid (DHA)	38,686.5	1,441.42	1,029.81	3,378.63	0	0.00	0.00
Formaldehyde (solution): Formalin; Oxymethylene	603.4	22.48	24.63	80.81	123	0.03	0.18
Furfuryl Alcohol	2,850.4	106.20	83.94	275.39	96	0.03	0.14
Glycerin Mist; Glycerin; Crude Glycerin	1,853.7	69.07	57.63	189.08	0	0.00	0.00
Heptane; n-Heptane	4,979.7	185.54	140.14	459.78	2,223	0.62	3.29

Twin State Environmental

Richardton Facility

Synthetic Minor Air Permit Application

Emptied Railcar Venting & Cleaning Flare and Atmospheric Emissions

Chemical	CAS Numbers	Reid Vapor Pressure psia	Estimated Actual Pressure psia **(Note 4)**	Vapor Molecular Weight lbs / lb mole	Average Railcar Volume gallons	Conversion Factor gallons / cubic feet	Average Railcar Volume Actual Cubic Feet	Standard Pressure psia
Hexane - Other Isomers; Isohexane; Hexane, Mixed Isomers; 2-Methylpentane	107-83-5; 73513-42-5; 92112-69-1	6.7537	6.7537	86.1750	32,000	7.48052	4,277.777	14.7
Hexane (n-Hexane)	110-54-3	4.9610	4.9610	86.1750	32,000	7.48052	4,277.777	14.7
Hydrogen Peroxide	7722-84-1	0.1160	0.1160	34.0100	32,000	7.48052	4,277.777	14.7
Isobutyl Alcohol; Isobutanol; 2-Methyl-1-Propanol	78-83-1	0.4852	0.4852	74.1200	32,000	7.48052	4,277.777	14.7
Isopropyl Alcohol; Isopropanol; 2-Proponol	67-63-0	1.8414	1.8414	60.1000	32,000	7.48052	4,277.777	14.7
Isopropyl Ether; Diisopropyl Ether	108-20-3	3.8674	3.8674	102.2000	32,000	7.48052	4,277.777	14.7
Kerosene; Fuel Oil No. 4; Jet Fuel; Aviation Fuel; Cutter Stock; Cutting Oil	8008-20-6; 64742-81-0; 68476-31-3	0.1000	0.1000	170.0000	32,000	7.48052	4,277.777	14.7
Methyl Alcohol; Methanol	67-56-1	4.6310	4.6310	32.0420	32,000	7.48052	4,277.777	14.7
Methyl Ethyl Ketone (MEK); 2-Butanone	78-93-3	3.2516	3.2516	72.1100	32,000	7.48052	4,277.777	14.7
Methyl Isobutyl Ketone; 2-Methyl-4-Pentanone; 4-Methyl-2-Pentanone; Hexone	108-10-1	0.7581	0.7581	100.1600	32,000	7.48052	4,277.777	14.7
Methyl-t-Butyl Ether; MTBE; Methyl Tert-Butyl Ether; Tert-Butyl Methyl Ether	1634-04-4	7.9728	7.9728	88.1500	32,000	7.48052	4,277.777	14.7
Mineral Spirits; Aliphatic Petroleum Distillates	64475-85-0; 64741-41-9	0.1300	0.1300	140.0000	32,000	7.48052	4,277.777	14.7
Molasses; Beet Molasses; Sodium Cyclamate	68476-78-8	0.0001	0.0001	203.2300	32,000	7.48052	4,277.777	14.7
Naphtha; Aliphatic Petroleum Naphthas; Full-Range Straight-Run Naphthas; Light Alkylate Naphtha; Catalytic Reformed Naphthas; Hydrodesulfurized Naphthas; Hydrotreated Naphthas; Solvent Refined Naphthas; Coal Tar Desulfurized Naphthas; Isopar K; Aromatic Naphtha	8030-30-6; 64741-42-0; 64741-63-5; 64741-65-7; 64741-66-8; 64741-68-0; 64741-84-0; 64742-30-9; 64742-48-9; 64742-49-0; 64742-64-9; 64742-82-1; 64742-88-7; 64742-89-8; 64742-91-2; 65996-79-4; 65996-92-1; 68131-80-6; 68410-16-2; 68478-07-9; 68478-08-0; 68527-25-3; 68603-08-7; 92045-53-9; 92045-64-2	5.0000	5.0000	85.0000	32,000	7.48052	4,277.777	14.7
Naphthalene	91-20-3	0.0065	0.0065	128.1700	32,000	7.48052	4,277.777	14.7
Octane; n-Octane	111-65-9	0.5366	0.5366	114.2290	32,000	7.48052	4,277.777	14.7
Oil Mist, Mineral; Mineral Oil; Paraffinic Mineral Oil; Paraffin Oil; Catalytic Dewaxed Light Paraffin Oil; Solvent Dewaxed Light Paraffinic Distillates; Hydrotreated Light Naphthenic Petroleum Distillate; Naphthenic Mineral Oil; White Mineral Oil	8012-95-1; 8042-47-5; 64742-03-6; 64742-53-6; 64742-56-9; 64742-62-7; 64742-71-8	0.0050	0.0050	170.3400	32,000	7.48052	4,277.777	14.7
Pentane; n-Pentane	109-66-0	15.7600	15.7600	72.1490	32,000	7.48052	4,277.777	14.7
Petroleum Ether; Ligroine	8032-32-4	14.0000	14.0000	86.1780	32,000	7.48052	4,277.777	14.7
Propyl Alcohol; Propanol; n-Propyl Alcohol; 1-Propanol	71-23-8	0.8764	0.8764	60.1000	32,000	7.48052	4,277.777	14.7
Propylene Glycol Monopropyl Ether; 1-Propoxy-2-Propanol; Propyl Propasol; Propylene Glycol n-Propyl Ether (PNP)	1569-01-3	0.0677	0.0677	118.1700	32,000	7.48052	4,277.777	14.7
Propylene Glycol; 1,2-Propylene Glycol; 1,2-Propanediol	57-55-6	0.0022	0.0022	76.1000	32,000	7.48052	4,277.777	14.7
Refinery Petroleum Fractions containing < 10% benzene - Asphalt; Vacuum Residues; Vaccum Tower Bottoms.	8052-42-4; 61789-60-4; 64741-56-6; 128683-24-9	0.0005	0.0005	200.0000	32,000	7.48052	4,277.777	14.7
Refinery Petroleum Fractions containing < 10% benzene - Catalytic Reformed Distillates; Oxidized Light Distillates.	64741-45-3; 64742-98-9; 67891-80-9; 68477-29-2; 68477-31-6; 68514-79-4; 68955-35-1	5.0000	5.0000	85.0000	32,000	7.48052	4,277.777	14.7
Refinery Petroleum Fractions containing < 10% benzene - Crude Oil; Distillates (Petroleum) Crude Oil; Hydrocarbon Condensate.	8002-05-9; 68410-00-4; 68919-39-1	12.0000	12.0000	70.0000	32,000	7.48052	4,277.777	14.7
Refinery Petroleum Fractions containing < 10% benzene - Diesel Fuels, Fuel Oil No. 2.	64741-85-1; 64742-13-8; 68334-30-5; 68476-30-2; 68476-33-5; 68476-34-6; 68513-69-9	0.1100	0.1100	130.0000	32,000	7.48052	4,277.777	14.7

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Reid Vapor Pressure Temperature Deg R	Standard Temperature Deg R	Railcar Chemical Volume Standard Cubic Feet	Each Railcar Chemical Total Vent Time Hours	Each Railcar Chemical Average Volume Scf / Hour	Potential Number of Railcars Venting at Same Time	Potential Hourly Chemical Volume Scf / Hour	Conversion Factor Scf / lb mole	Potential Hourly Chemical Moles lb moles / hr
Hexane - Other Isomers; Isohexane; Hexane, Mixed Isomers; 2-Methylpentane	560	528	1,853.06	1.00	1,853.06	5	9,265.28	385.4616	24.04
Hexane (n-Hexane)	560	528	1,361.18	1.00	1,361.18	5	6,805.91	385.4616	17.66
Hydrogen Peroxide	560	528	31.83	1.00	31.83	5	159.14	385.4616	0.41
Isobutyl Alcohol; Isobutanol; 2-Methyl-1-Propanol	560	528	133.13	1.00	133.13	5	665.64	385.4616	1.73
Isopropyl Alcohol; Isopropanol; 2-Proponol	560	528	505.24	1.00	505.24	5	2,526.18	385.4616	6.55
Isopropyl Ether; Diisopropyl Ether	560	528	1,061.12	1.00	1,061.12	5	5,305.62	385.4616	13.76
Kerosene; Fuel Oil No. 4; Jet Fuel; Aviation Fuel; Cutter Stock; Cutting Oil	560	528	27.44	1.00	27.44	5	137.19	385.4616	0.36
Methyl Alcohol; Methanol	560	528	1,270.64	1.00	1,270.64	5	6,353.19	385.4616	16.48
Methyl Ethyl Ketone (MEK); 2-Butanone	560	528	892.16	1.00	892.16	5	4,460.81	385.4616	11.57
Methyl Isobutyl Ketone; 2-Methyl-4-Pentanone; 4-Methyl-2-Pentanone; Hexone	560	528	208.00	1.00	208.00	5	1,040.02	385.4616	2.70
Methyl-t-Butyl Ether; MTBE; Methyl Tert-Butyl Ether; Tert-Butyl Methyl Ether	560	528	2,187.55	1.00	2,187.55	5	10,937.74	385.4616	28.38
Mineral Spirits; Aliphatic Petroleum Distillates	560	528	35.67	1.00	35.67	5	178.34	385.4616	0.46
Molasses; Beet Molasses; Sodium Cyclamate	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Naphtha; Aliphatic Petroleum Naphthas; Full-Range Straight-Run Naphthas; Light Alkylate Naphtha; Catalytic Reformed Naphthas; Hydrodesulfurized Naphthas; Hydrotreated Naphthas; Solvent Refined Naphthas; Coal Tar Desulfurized Naphthas; Isopar K; Aromatic Naphtha	560	528	1,371.88	1.00	1,371.88	5	6,859.41	385.4616	17.80
Naphthalene	560	528	1.78	1.00	1.78	5	8.92	385.4616	0.02
Octane; n-Octane	560	528	147.23	1.00	147.23	5	736.15	385.4616	1.91
Oil Mist, Mineral; Mineral Oil; Paraffinic Mineral Oil; Paraffin Oil; Catalytic Dewaxed Light Paraffin Oil; Solvent Dewaxed Light Paraffinic Distillates; Hydrotreated Light Naphthenic Petroleum Distillate; Naphthenic Mineral Oil; White Mineral Oil	560	528	1.37	1.00	1.37	5	6.86	385.4616	0.02
Pentane; n-Pentane	560	528	4,324.17	1.00	4,324.17	5	21,620.86	385.4616	56.09
Petroleum Ether; Ligroine	560	528	3,841.27	1.00	3,841.27	5	19,206.35	385.4616	49.83
Propyl Alcohol; Propanol; n-Propyl Alcohol; 1-Propanol	560	528	240.46	1.00	240.46	5	1,202.32	385.4616	3.12
Propylene Glycol Monopropyl Ether; 1-Propoxy-2-Propanol; Propyl Propasol; Propylene Glycol n-Propyl Ether (PNP)	560	528	18.58	1.00	18.58	5	92.88	385.4616	0.24
Propylene Glycol; 1,2-Propylene Glycol; 1,2-Propanediol	560	528	0.60	1.00	0.60	5	3.02	385.4616	0.01
Refinery Petroleum Fractions containing < 10% benzene - Asphalt; Vacuum Residues; Vaccum Tower Bottoms.	560	528	0.14	1.00	0.14	5	0.69	385.4616	0.00
Refinery Petroleum Fractions containing < 10% benzene - Catalytic Reformed Distillates; Oxidized Light Distillates.	560	528	1,371.88	1.00	1,371.88	5	6,859.41	385.4616	17.80
Refinery Petroleum Fractions containing < 10% benzene - Crude Oil; Distillates (Petroleum) Crude Oil; Hydrocarbon Condensate.	560	528	3,292.52	1.00	3,292.52	5	16,462.58	385.4616	42.71
Refinery Petroleum Fractions containing < 10% benzene - Diesel Fuels, Fuel Oil No. 2.	560	528	30.18	1.00	30.18	5	150.91	385.4616	0.39

Twin State Environm									
Richardton Facility									
Synthetic Minor Air Permit A									
Emptied Railcar Venting & Clear									
	(See Note 1)				***(See Note 1)***				
	Potential Hourly	Potential Annual	Potential Annual	Conversion	Potential Annual	Utilized Flare	Chemical Heat of	Chemical Combustion	Hourly Flare Chemical
Chemical	Chemical Mass	Chemical Railcars	Chemical Mass	Factor	Chemical Mass	Oxidation	Combustion	Heating Value	Combustion Heat Value
	lbs / hr	railcars / year	lbs / year	lbs / ton	TPY	Efficiency %	Btu / lb	Btu / Scf	MMBtu / hr
Hexane - Other Isomers; Isohexane; Hexane, Mixed Isomers; 2-Methylpentane	2,071.3748	1,000	414,275	2,000	207.1375	98.00%	19,202.00	4,292.86	39.775
Hexane (n-Hexane)	1,521.5497	1,000	304,310	2,000	152.1550	98.00%	19,232.00	4,299.57	29.262
Hydrogen Peroxide	14.0411	1,000	2,808	2,000	1.4041	98.00%	13,146.71	1,159.96	0.185
Isobutyl Alcohol; Isobutanol; 2-Methyl-1-Propanol	127.9947	1,000	25,599	2,000	12.7995	98.00%	14,205.00	2,731.46	1.818
Isopropyl Alcohol; Isopropanol; 2-Proponol	393.8748	1,000	78,775	2,000	39.3875	98.00%	13,092.00	2,041.26	5.157
Isopropyl Ether; Diisopropyl Ether	1,406.7134	1,000	281,343	2,000	140.6713	98.00%	16,900.00	4,480.81	23.773
Kerosene; Fuel Oil No. 4; Jet Fuel; Aviation Fuel; Cutter Stock; Cutting Oil	60.5041	1,000	12,101	2,000	6.0504	98.00%	18,500.00	8,159.05	1.119
Methyl Alcohol; Methanol	528.1169	1,000	105,623	2,000	52.8117	98.00%	8,561.00	711.64	4.521
Methyl Ethyl Ketone (MEK); 2-Butanone	834.5037	1,000	166,901	2,000	83.4504	98.00%	13,485.00	2,522.70	11.253
Methyl Isobutyl Ketone; 2-Methyl-4-Pentanone; 4-Methyl-2-Pentanone; Hexone	270.2442	1,000	54,049	2,000	27.0244	98.00%	10,400.00	2,702.38	2.811
Methyl-t-Butyl Ether; MTBE; Methyl Tert-Butyl Ether; Tert-Butyl Methyl Ether	2,501.3175	1,000	500,264	2,000	250.1318	98.00%	15,119.00	3,457.52	37.817
Mineral Spirits; Aliphatic Petroleum Distillates	64.7749	1,000	12,955	2,000	6.4775	98.00%	18,400.00	6,682.90	1.192
Molasses; Beet Molasses; Sodium Cyclamate	0.0723	1,000	14	2,000	0.0072	98.00%	20,000.00	10,544.76	0.001
Naphtha; Aliphatic Petroleum Naphthas; Full-Range Straight-Run Naphthas; Light Alkylate Naphtha; Catalytic Reformed Naphthas; Hydrodesulfurized Naphthas; Hydrotreated Naphthas; Solvent Refined Naphthas; Coal Tar Desulfurized Naphthas; Isopar K; Aromatic Naphtha	1,512.6016	1,000	302,520	2,000	151.2602	98.00%	18,600.00	4,101.58	28.134
Naphthalene	2.9651	1,000	593	2,000	0.2965	98.00%	16,707.00	5,555.25	0.050
Octane; n-Octane	218.1537	1,000	43,631	2,000	21.8154	98.00%	19,097.00	5,659.27	4.166
Oil Mist, Mineral; Mineral Oil; Paraffinic Mineral Oil; Paraffin Oil; Catalytic Dewaxed Light Paraffin Oil; Solvent Dewaxed Light Paraffinic Distillates; Hydrotreated Light Naphthenic Petroleum Distillate; Naphthenic Mineral Oil; White Mineral Oil	3.0313	1,000	606	2,000	0.3031	98.00%	18,300.00	8,086.98	0.055
Pentane; n-Pentane	4,046.8971	1,000	809,379	2,000	404.6897	98.00%	19,335.00	3,619.04	78.247
Petroleum Ether; Ligroine	4,293.9806	1,000	858,796	2,000	429.3981	98.00%	18,500.00	4,136.06	79.439
Propyl Alcohol; Propanol; n-Propyl Alcohol; 1-Propanol	187.4617	1,000	37,492	2,000	18.7462	98.00%	13,191.00	2,056.70	2.473
Propylene Glycol Monopropyl Ether; 1-Propoxy-2-Propanol; Propyl Propasol; Propylene Glycol n-Propyl Ether (PNP)	28.4729	1,000	5,695	2,000	2.8473	98.00%	12,898.00	3,954.11	0.367
Propylene Glycol; 1,2-Propylene Glycol; 1,2-Propanediol	0.5959	1,000	119	2,000	0.0596	98.00%	10,310.00	2,035.46	0.006
Refinery Petroleum Fractions containing < 10% benzene - Asphalt; Vacuum Residues; Vaccum Tower Bottoms.	0.3559	1,000	71	2,000	0.0356	98.00%	17,000.00	8,820.59	0.006
Refinery Petroleum Fractions containing < 10% benzene - Catalytic Reformed Distillates; Oxidized Light Distillates.	1,512.6016	1,000	302,520	2,000	151.2602	98.00%	18,600.00	4,101.58	28.134
Refinery Petroleum Fractions containing < 10% benzene - Crude Oil; Distillates (Petroleum) Crude Oil; Hydrocarbon Condensate.	2,989.6126	1,000	597,923	2,000	298.9613	98.00%	18,800.00	3,414.09	56.205
Refinery Petroleum Fractions containing < 10% benzene - Diesel Fuels, Fuel Oil No. 2.	50.8946	1,000	10,179	2,000	5.0895	98.00%	18,400.00	6,205.55	0.936

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Annual Flare Chemical Combustion Heat Value MMBtu / year	EPA AP-42 Table 13.5-1 Flare NOx factor lbs / MMBtu	EPA AP-42 Table 13.5-2 Flare CO factor lbs / MMBtu	**Flare Hourly Chemical Emissions lbs / hr**	**Flare Annual Chemical Emissions TPY**	**Flare Hourly NOx Emissions lbs / hr**	**Flare Annual NOx Emissions TPY**	**Flare Hourly CO Emissions lbs / hr**	**Flare Annual CO Emissions TPY**
Hexane - Other Isomers; Isohexane; Hexane, Mixed Isomers; 2-Methylpentane	7,954.908	0.0680	0.3100	**41.4275**	**4.1427**	**2.7047**	**0.2705**	**12.3301**	**1.2330**
Hexane (n-Hexane)	5,852.489	0.0680	0.3100	**30.4310**	**3.0431**	**1.9898**	**0.1990**	**9.0714**	**0.9071**
Hydrogen Peroxide	36.919	0.0680	0.3100	**0.2808**	**0.0281**	**0.0126**	**0.0013**	**0.0572**	**0.0057**
Isobutyl Alcohol; Isobutanol; 2-Methyl-1-Propanol	363.633	0.0680	0.3100	**2.5599**	**0.2560**	**0.1236**	**0.0124**	**0.5636**	**0.0564**
Isopropyl Alcohol; Isopropanol; 2-Proponol	1,031.322	0.0680	0.3100	**7.8775**	**0.7877**	**0.3506**	**0.0351**	**1.5985**	**0.1599**
Isopropyl Ether; Diisopropyl Ether	4,754.691	0.0680	0.3100	**28.1343**	**2.8134**	**1.6166**	**0.1617**	**7.3698**	**0.7370**
Kerosene; Fuel Oil No. 4; Jet Fuel; Aviation Fuel; Cutter Stock; Cutting Oil	223.865	0.0680	0.3100	**1.2101**	**0.1210**	**0.0761**	**0.0076**	**0.3470**	**0.0347**
Methyl Alcohol; Methanol	904.242	0.0680	0.3100	**10.5623**	**1.0562**	**0.3074**	**0.0307**	**1.4016**	**0.1402**
Methyl Ethyl Ketone (MEK); 2-Butanone	2,250.656	0.0680	0.3100	**16.6901**	**1.6690**	**0.7652**	**0.0765**	**3.4885**	**0.3489**
Methyl Isobutyl Ketone; 2-Methyl-4-Pentanone; 4-Methyl-2-Pentanone; Hexone	562.108	0.0680	0.3100	**5.4049**	**0.5405**	**0.1911**	**0.0191**	**0.8713**	**0.0871**
Methyl-t-Butyl Ether; MTBE; Methyl Tert-Butyl Ether; Tert-Butyl Methyl Ether	7,563.484	0.0680	0.3100	**50.0264**	**5.0026**	**2.5716**	**0.2572**	**11.7234**	**1.1723**
Mineral Spirits; Aliphatic Petroleum Distillates	238.372	0.0680	0.3100	**1.2955**	**0.1295**	**0.0810**	**0.0081**	**0.3695**	**0.0369**
Molasses; Beet Molasses; Sodium Cyclamate	0.289	0.0680	0.3100	**0.0014**	**0.0001**	**0.0001**	**0.0000**	**0.0004**	**0.0000**
Naphtha; Aliphatic Petroleum Naphthas; Full-Range Straight-Run Naphthas; Light Alkylate Naphtha; Catalytic Reformed Naphthas; Hydrodesulfurized Naphthas; Hydrotreated Naphthas; Solvent Refined Naphthas; Coal Tar Desulfurized Naphthas; Isopar K; Aromatic Naphtha	5,626.878	0.0680	0.3100	**30.2520**	**3.0252**	**1.9131**	**0.1913**	**8.7217**	**0.8722**
Naphthalene	9.907	0.0680	0.3100	**0.0593**	**0.0059**	**0.0034**	**0.0003**	**0.0154**	**0.0015**
Octane; n-Octane	833.216	0.0680	0.3100	**4.3631**	**0.4363**	**0.2833**	**0.0283**	**1.2915**	**0.1291**
Oil Mist, Mineral; Mineral Oil; Paraffinic Mineral Oil; Paraffin Oil; Catalytic Dewaxed Light Paraffin Oil; Solvent Dewaxed Light Paraffinic Distillates; Hydrotreated Light Naphthenic Petroleum Distillate; Naphthenic Mineral Oil; White Mineral Oil	11.094	0.0680	0.3100	**0.0606**	**0.0061**	**0.0038**	**0.0004**	**0.0172**	**0.0017**
Pentane; n-Pentane	15,649.351	0.0680	0.3100	**80.9379**	**8.0938**	**5.3208**	**0.5321**	**24.2565**	**2.4256**
Petroleum Ether; Ligroine	15,887.728	0.0680	0.3100	**85.8796**	**8.5880**	**5.4018**	**0.5402**	**24.6260**	**2.4626**
Propyl Alcohol; Propanol; n-Propyl Alcohol; 1-Propanol	494.561	0.0680	0.3100	**3.7492**	**0.3749**	**0.1682**	**0.0168**	**0.7666**	**0.0767**
Propylene Glycol Monopropyl Ether; 1-Propoxy-2-Propanol; Propyl Propasol; Propylene Glycol n-Propyl Ether (PNP)	73.449	0.0680	0.3100	**0.5695**	**0.0569**	**0.0250**	**0.0025**	**0.1138**	**0.0114**
Propylene Glycol; 1,2-Propylene Glycol; 1,2-Propanediol	1.229	0.0680	0.3100	**0.0119**	**0.0012**	**0.0004**	**0.0000**	**0.0019**	**0.0002**
Refinery Petroleum Fractions containing < 10% benzene - Asphalt; Vacuum Residues; Vaccum Tower Bottoms.	1.210	0.0680	0.3100	**0.0071**	**0.0007**	**0.0004**	**0.0000**	**0.0019**	**0.0002**
Refinery Petroleum Fractions containing < 10% benzene - Catalytic Reformed Distillates; Oxidized Light Distillates.	5,626.878	0.0680	0.3100	**30.2520**	**3.0252**	**1.9131**	**0.1913**	**8.7217**	**0.8722**
Refinery Petroleum Fractions containing < 10% benzene - Crude Oil; Distillates (Petroleum) Crude Oil; Hydrocarbon Condensate.	11,240.944	0.0680	0.3100	**59.7923**	**5.9792**	**3.8219**	**0.3822**	**17.4235**	**1.7423**
Refinery Petroleum Fractions containing < 10% benzene - Diesel Fuels, Fuel Oil No. 2.	187.292	0.0680	0.3100	**1.0179**	**0.1018**	**0.0637**	**0.0064**	**0.2903**	**0.0290**

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Maximum Expected Vapor HAP Content Wt%	Total Hourly HAP Emissions lbs / hr	Total Annual HAP Emissions TPY	Maximum Expected Vapor Sulfur Content Wt%	Total Hourly SO2 Emissions lbs / hr	Total Annual SO2 Emissions TPY
Hexane - Other Isomers; Isohexane; Hexane, Mixed Isomers; 2-Methylpentane						
Hexane (n-Hexane)	100.0000%	30.4310	3.0431			
Hydrogen Peroxide						
Isobutyl Alcohol; Isobutanol; 2-Methyl-1-Propanol						
Isopropyl Alcohol; Isopropanol; 2-Proponol						
Isopropyl Ether; Diisopropyl Ether						
Kerosene; Fuel Oil No. 4; Jet Fuel; Aviation Fuel; Cutter Stock; Cutting Oil	10.0000%	0.1210	0.0121	0.0500%	0.0012	0.0001
Methyl Alcohol; Methanol	100.0000%	10.5623	1.0562			
Methyl Ethyl Ketone (MEK); 2-Butanone						
Methyl Isobutyl Ketone; 2-Methyl-4-Pentanone; 4-Methyl-2-Pentanone; Hexone	100.0000%	5.4049	0.5405			
Methyl-t-Butyl Ether; MTBE; Methyl Tert-Butyl Ether; Tert-Butyl Methyl Ether	100.0000%	50.0264	5.0026			
Mineral Spirits; Aliphatic Petroleum Distillates	2.0000%	0.0259	0.0026			
Molasses; Beet Molasses; Sodium Cyclamate						
Naphtha; Aliphatic Petroleum Naphthas; Full-Range Straight-Run Naphthas; Light Alkylate Naphtha; Catalytic Reformed Naphthas; Hydrodesulfurized Naphthas; Hydrotreated Naphthas; Solvent Refined Naphthas; Coal Tar Desulfurized Naphthas; Isopar K; Aromatic Naphtha	10.0000%	3.0252	0.3025	0.0500%	0.0302	0.0030
Naphthalene	100.0000%	0.0593	0.0059			
Octane; n-Octane						
Oil Mist, Mineral; Mineral Oil; Paraffinic Mineral Oil; Paraffin Oil; Catalytic Dewaxed Light Paraffin Oil; Solvent Dewaxed Light Paraffinic Distillates; Hydrotreated Light Naphthenic Petroleum Distillate; Naphthenic Mineral Oil; White Mineral Oil	1.0000%	0.0006	0.0001			
Pentane; n-Pentane						
Petroleum Ether; Ligroine						
Propyl Alcohol; Propanol; n-Propyl Alcohol; 1-Propanol						
Propylene Glycol Monopropyl Ether; 1-Propoxy-2-Propanol; Propyl Propasol; Propylene Glycol n-Propyl Ether (PNP)						
Propylene Glycol; 1,2-Propylene Glycol; 1,2-Propanediol						
Refinery Petroleum Fractions containing < 10% benzene - Asphalt; Vacuum Residues; Vaccum Tower Bottoms.	1.0000%	0.0001	0.0000	5.0000%	0.0007	0.0001
Refinery Petroleum Fractions containing < 10% benzene - Catalytic Reformed Distillates; Oxidized Light Distillates.	10.0000%	3.0252	0.3025	0.0500%	0.0302	0.0030
Refinery Petroleum Fractions containing < 10% benzene - Crude Oil; Distillates (Petroleum) Crude Oil; Hydrocarbon Condensate.	10.0000%	5.9792	0.5979	5.0000%	5.9733	0.5973
Refinery Petroleum Fractions containing < 10% benzene - Diesel Fuels, Fuel Oil No. 2.	10.0000%	0.1018	0.0102	0.0500%	0.0010	0.0001

Twin State Environm	40 CFR 60.18(f.)(6.) Maximum Velocity Calculations for Air-Assisted Flare						
Richardton Facility	0.001055056	Mjoules per Btu			HP Flare Exhaust Area	17.5000	square inches
Synthetic Minor Air Permit A	0.028316850	Scm per Scf		Vmax=8.706 + (0.7084)(Ht)	HP Flare Exhaust Area	0.1215	square feet
Emptied Railcar Venting & Clear	3.280840000	Feet per Meter			LP Flare Exhaust Area	27.0000	square inches
		(Ht)	(Vmax)	(Vmax)	LP Flare Exhaust Area	0.1875	square feet
	Lower / Net	Lower / Net	Maximum	Maximum	Maximum Hourly	Maximum Hourly	Maximum Hourly
Chemical	Heating Value	Heating Value	Allowed Velocity	Allowed Velocity	Gas Volume to Flare	Gas Volume to Flare	Gas Velocity from Flare
	Btu/Scf	Mjoules/Scm	Meters/second	Feet/second	Scf/Hour	Scf/Second	Feet/second
Hexane - Other Isomers; Isohexane; Hexane, Mixed Isomers; 2-Methylpentane	4,292.9	159.95	122.01	400.30	9,265	2.57	13.73
Hexane (n-Hexane)	4,299.6	160.20	122.19	400.89	6,806	1.89	10.08
Hydrogen Peroxide	1,160.0	43.22	39.32	129.01	159	0.04	0.24
Isobutyl Alcohol; Isobutanol; 2-Methyl-1-Propanol	2,731.5	101.77	80.80	265.09	666	0.18	0.99
Isopropyl Alcohol; Isopropanol; 2-Proponol	2,041.3	76.06	62.58	205.33	2,526	0.70	3.74
Isopropyl Ether; Diisopropyl Ether	4,480.8	166.95	126.97	416.58	5,306	1.47	7.86
Kerosene; Fuel Oil No. 4; Jet Fuel; Aviation Fuel; Cutter Stock; Cutting Oil	8,159.0	304.00	224.06	735.10	137	0.04	0.20
Methyl Alcohol; Methanol	711.6	26.52	27.49	90.19	6,353	1.76	9.41
Methyl Ethyl Ketone (MEK); 2-Butanone	2,522.7	93.99	75.29	247.02	4,461	1.24	6.61
Methyl Isobutyl Ketone; 2-Methyl-4-Pentanone; 4-Methyl-2-Pentanone; Hexone	2,702.4	100.69	80.03	262.58	1,040	0.29	1.54
Methyl-t-Butyl Ether; MTBE; Methyl Tert-Butyl Ether; Tert-Butyl Methyl Ether	3,457.5	128.82	99.96	327.97	10,938	3.04	16.20
Mineral Spirits; Aliphatic Petroleum Distillates	6,682.9	249.00	185.10	607.27	178	0.05	0.26
Molasses; Beet Molasses; Sodium Cyclamate	10,544.8	392.89	287.03	941.69	0	0.00	0.00
Naphtha; Aliphatic Petroleum Naphthas; Full-Range Straight-Run Naphthas; Light Alkylate Naphtha; Catalytic Reformed Naphthas; Hydrodesulfurized Naphthas; Hydrotreated Naphthas; Solvent Refined Naphthas; Coal Tar Desulfurized Naphthas; Isopar K; Aromatic Naphtha	4,101.6	152.82	116.96	383.74	6,859	1.91	10.16
Naphthalene	5,555.3	206.98	155.33	509.62	9	0.00	0.01
Octane; n-Octane	5,659.3	210.86	158.08	518.63	736	0.20	1.09
Oil Mist, Mineral; Mineral Oil; Paraffinic Mineral Oil; Paraffin Oil; Catalytic Dewaxed Light Paraffin Oil; Solvent Dewaxed Light Paraffinic Distillates; Hydrotreated Light Naphthenic Petroleum Distillate; Naphthenic Mineral Oil; White Mineral Oil	8,087.0	301.31	222.16	728.86	7	0.00	0.01
Pentane; n-Pentane	3,619.0	134.84	104.23	341.95	21,621	6.01	32.03
Petroleum Ether; Ligroine	4,136.1	154.11	117.87	386.73	19,206	5.34	28.45
Propyl Alcohol; Propanol; n-Propyl Alcohol; 1-Propanol	2,056.7	76.63	62.99	206.66	1,202	0.33	1.78
Propylene Glycol Monopropyl Ether; 1-Propoxy-2-Propanol; Propyl Propasol; Propylene Glycol n-Propyl Ether (PNP)	3,954.1	147.33	113.07	370.97	93	0.03	0.14
Propylene Glycol; 1,2-Propylene Glycol; 1,2-Propanediol	2,035.5	75.84	62.43	204.82	3	0.00	0.00
Refinery Petroleum Fractions containing < 10% benzene - Asphalt; Vacuum Residues; Vaccum Tower Bottoms.	8,820.6	328.65	241.52	792.38	1	0.00	0.00
Refinery Petroleum Fractions containing < 10% benzene - Catalytic Reformed Distillates; Oxidized Light Distillates.	4,101.6	152.82	116.96	383.74	6,859	1.91	10.16
Refinery Petroleum Fractions containing < 10% benzene - Crude Oil; Distillates (Petroleum) Crude Oil; Hydrocarbon Condensate.	3,414.1	127.21	98.82	324.21	16,463	4.57	24.39
Refinery Petroleum Fractions containing < 10% benzene - Diesel Fuels, Fuel Oil No. 2.	6,205.5	231.21	172.50	565.93	151	0.04	0.22

Twin State Environmental

Richardton Facility

Synthetic Minor Air Permit Application

Emptied Railcar Venting & Cleaning Flare and Atmospheric Emissions

Chemical	CAS Numbers	Reid Vapor Pressure psia	Estimated Actual Pressure psia **(Note 4)**	Vapor Molecular Weight lbs / lb mole	Average Railcar Volume gallons	Conversion Factor gallons / cubic feet	Average Railcar Volume Actual Cubic Feet	Standard Pressure psia
Refinery Petroleum Fractions containing < 10% benzene - Engine Oils; Motor Oils; Lube Oil Additives; Fuel Oil No. 6; Residual Fuel Oil; Bunker Fuel; Heavy Fuel Oil; Carbon Black Oil; Solvent Deasphalted Residual Oil; Light Paraffinic Distillates; Straight-Run Middle Distillates; Light Gas Oil; Refinery Slurry Oil; Coker Gas Oil; Hydrotreated Heavy Paraffins; Paraffin Wax (fume vapor); Acid Treated Petroleum Distillates and Gas Oils; Solvent Dewaxed Paraffinic Distillates.	8002-74-2; 8009-03-8; 64741-44-2; 64741-61-3; 64741-62-4; 64741-81-7; 64741-88-4; 64741-95-3; 64742-04-7; 64742-05-8; 64742-14-9; 64742-17-2; 64742-31-0; 64742-54-7; 64742-55-8; 64742-65-0; 64742-70-7; 64742-90-1; 68333-26-6; 68476-33-5; 68512-62-9; 68553-00-4; 68602-96-0; 68915-96-8; 68955-27-1	0.0500	0.0500	150.0000	32,000	7.48052	4,277.777	14.7
Refinery Petroleum Fractions containing < 10% benzene - Gasoline Fuels, E15, RFA.	64741-55-5; 68425-31-0; 68527-27-5; 8006-61-9; 86290-81-5	9.0000	9.0000	75.0000	32,000	7.48052	4,277.777	14.7
Refinery Petroleum Fractions containing < 10% benzene - Intermediate Petroleum Distillates; Hydrodesulfurized Middle Distillates; Steam-Cracked Petroleum Distillates.	64741-60-2; 64741-98-6; 64742-80-9; 64742-95-6; 64742-96-7; 68132-00-3; 68477-54-3	0.7000	0.7000	100.0000	32,000	7.48052	4,277.777	14.7
Refinery Petroleum Fractions containing < 10% benzene - Straight-Run Gas Oils; Light Cycle Oil; Middle Petroleum Distillates; Coal Solvent.	64741-43-1; 64741-59-9; 64741-86-2; 64741-91-9; 64742-38-7; 64742-46-7; 64742-47-8; 642928-30-1	0.1000	0.1000	130.0000	32,000	7.48052	4,277.777	14.7
Refinery Petroleum Fractions containing < 10% benzene - Vacuum Gas Oils, Vacuum Residual Oils, Petroleum Asphaltenes.	64741-57-7; 64741-58-8; 64743-06-2; 70592-77-7; 70592-78-8; 91995-23-2; 101316-73-8	0.0010	0.0010	190.0000	32,000	7.48052	4,277.777	14.7
Stoddard Solvent	8052-41-3	0.1000	0.1000	223.1100	32,000	7.48052	4,277.777	14.7
Tall Oil; Tall Oil Fatty Acids; Tall Oil Rosin	8002-26-4; 8052-10-6; 61788-81-6; 61790-12-3; 65071-95-6; 66070-62-0; 68648-06-6; 68648-08-8; 68815-17-8; 68910-93-0; 68919-79-9; 1203451-13-1	0.000002	0.000002	250.4800	32,000	7.48052	4,277.777	14.7
Tallow; Tallow, Fatty Acids; Tallow, Methyl Esters	61788-61-2; 61789-97-7; 61790-37-2	0.00015	0.00015	285.0000	32,000	7.48052	4,277.777	14.7
tert-Amyl Methyl Ether; 2-methoxy-2-methylbutane	994-05-8	2.1373	2.1373	102.1800	32,000	7.48052	4,277.777	14.7
Toluene; Methylbenzene	108-88-3	1.0322	1.0322	92.1380	32,000	7.48052	4,277.777	14.7
Triethylene Glycol; TEG; 2,2'-[1,2-ethanediylbis(oxy)]diethanol	112-27-6	0.0003	0.0003	150.1700	32,000	7.48052	4,277.777	14.7
Trimethyl Benzene; Trimethylbenzene; 1,2,3-Trimethylbenzene; Hemimellitene; 1,2,4-Trimethylbenzene; Pseudocumene; 1,3,5-Trimethylbenzene; Mesitylene	25551-13-7; 526-73-8; 95-63-6; 108-67-8	0.1076	0.1076	120.1900	32,000	7.48052	4,277.777	14.7
Turpentine; Turpentine Oil, Alpha, Beta, Limonene Fractions	8006-64-2; 65996-96-5; 65996-97-6; 65996-99-8	0.2600	0.2600	136.2380	32,000	7.48052	4,277.777	14.7
Urea Ammonium Nitrate Fertilizer Solution	15978-77-5	0.2000	0.2000	138.0389	32,000	7.48052	4,277.777	14.7
Urea Liquid Solution	57-13-6	0.4750	0.4750	60.0600	32,000	7.48052	4,277.777	14.7
Vegetable Oil Mists; Avocado Oil; Canola Oil; Corn Oil; Corn Syrup; Cottonseed Oil; Lemongrass Oil; Linseed Oil; Palm Oil; Peanut Oil; Rapeseed Oil; Soy Bean Oil	8001-22-7; 8001-26-1; 8001-29-4; 8001-30-7; 8002-03-7; 8002-75-3; 8007-02-1; 8024-32-6; 8029-43-4; 68334-28-1; 68956-68-3; 68990-52-3; 91051-32-0; 120962-03-0; 129828-16-6	0.2901	0.2901	875.0000	32,000	7.48052	4,277.777	14.7
Xylene (o-, m-, p- isomers); Mixed Xylenes; Dimethylbenzene; m-Xylene; 1,3-dimethylbenzene; o-Xylene; 1,2-dimethylbenzene; p-Xylene; 1,4-dimethylbenzene	1330-20-7; 108-38-3; 95-47-6; 106-42-3	0.3422	0.3422	106.1650	32,000	7.48052	4,277.777	14.7

Atmospheric VOC Railcars

Flare Emissions

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Reid Vapor Pressure Temperature Deg R	Standard Temperature Deg R	Railcar Chemical Volume Standard Cubic Feet	Each Railcar Chemical Total Vent Time Hours	Each Railcar Chemical Average Volume Scf / Hour	Potential Number of Railcars Venting at Same Time	Potential Hourly Chemical Volume Scf / Hour	Conversion Factor Scf / lb mole	Potential Hourly Chemical Moles lb moles / hr
Refinery Petroleum Fractions containing < 10% benzene - Engine Oils; Motor Oils; Lube Oil Additives; Fuel Oil No. 6; Residual Fuel Oil; Bunker Fuel; Heavy Fuel Oil; Carbon Black Oil; Solvent Deasphalted Residual Oil; Light Paraffinic Distillates; Straight-Run Middle Distillates; Light Gas Oil; Refinery Slurry Oil; Coker Gas Oil; Hydrotreated Heavy Paraffins; Paraffin Wax (fume vapor); Acid Treated Petroleum Distillates and Gas Oils; Solvent Dewaxed Paraffinic Distillates.	560	528	13.72	1.00	13.72	5	68.59	385.4616	0.18
Refinery Petroleum Fractions containing < 10% benzene - Gasoline Fuels, E15, RFA.	560	528	2,469.39	1.00	2,469.39	5	12,346.94	385.4616	32.03
Refinery Petroleum Fractions containing < 10% benzene - Intermediate Petroleum Distillates; Hydrodesulfurized Middle Distillates; Steam-Cracked Petroleum Distillates.	560	528	192.06	1.00	192.06	5	960.32	385.4616	2.49
Refinery Petroleum Fractions containing < 10% benzene - Straight-Run Gas Oils; Light Cycle Oil; Middle Petroleum Distillates; Coal Solvent.	560	528	27.44	1.00	27.44	5	137.19	385.4616	0.36
Refinery Petroleum Fractions containing < 10% benzene - Vacuum Gas Oils, Vacuum Residual Oils, Petroleum Asphaltenes.	560	528	0.27	1.00	0.27	5	1.37	385.4616	0.00
Stoddard Solvent	560	528	27.44	1.00	27.44	5	137.19	385.4616	0.36
Tall Oil; Tall Oil Fatty Acids; Tall Oil Rosin	560	528	0.00	1.00	0.00	5	0.00	385.4616	0.00
Tallow; Tallow, Fatty Acids; Tallow, Methyl Esters	560	528	0.04	1.00	0.04	5	0.21	385.4616	0.00
tert-Amyl Methyl Ether; 2-methoxy-2-methylbutane	560	528	586.42	1.00	586.42	5	2,932.12	385.4616	7.61
Toluene; Methylbenzene	560	528	283.21	1.00	283.21	5	1,416.06	385.4616	3.67
Triethylene Glycol; TEG; 2,2'-[1,2-ethanediylbis(oxy)]diethanol	560	528	0.08	1.00	0.08	5	0.41	385.4616	0.00
Trimethyl Benzene; Trimethylbenzene; 1,2,3-Trimethylbenzene; Hemimellitene; 1,2,4-Trimethylbenzene; Pseudocumene; 1,3,5-Trimethylbenzene; Mesitylene	560	528	29.52	1.00	29.52	5	147.61	385.4616	0.38
Turpentine; Turpentine Oil, Alpha, Beta, Limonene Fractions	560	528	71.34	1.00	71.34	5	356.69	385.4616	0.93
Urea Ammonium Nitrate Fertilizer Solution	560	528	54.88	1.00	54.88	5	274.38	385.4616	0.71
Urea Liquid Solution	560	528	130.33	1.00	130.33	5	651.64	385.4616	1.69
Vegetable Oil Mists; Avocado Oil; Canola Oil; Corn Oil; Corn Syrup; Cottonseed Oil; Lemongrass Oil; Linseed Oil; Palm Oil; Peanut Oil; Rapeseed Oil; Soy Bean Oil	560	528	79.60	1.00	79.60	5	397.98	385.4616	1.03
Xylene (o-, m-, p- isomers); Mixed Xylenes; Dimethylbenzene; m-Xylene; 1,3-dimethylbenzene; o-Xylene; 1,2-dimethylbenzene; p-Xylene; 1,4-dimethylbenzene	560	528	93.89	1.00	93.89	5	469.46	385.4616	1.22

Atmospheric VOC Railcars

Flare Emissions

Twin State Environm									
Richardton Facility									
Synthetic Minor Air Permit A									
Emptied Railcar Venting & Clear									
	(See Note 1)				***(See Note 1)***				
	Potential Hourly	Potential Annual	Potential Annual	Conversion	Potential Annual	Utilized Flare	Chemical Heat of	Chemical Combustion	Hourly Flare Chemical
Chemical	Chemical Mass	Chemical Railcars	Chemical Mass	Factor	Chemical Mass	Oxidation	Combustion	Heating Value	Combustion Heat Value
	lbs / hr	railcars / year	lbs / year	lbs / ton	TPY	Efficiency %	Btu / lb	Btu / Scf	MMBtu / hr
Refinery Petroleum Fractions containing < 10% benzene - Engine Oils; Motor Oils; Lube Oil Additives; Fuel Oil No. 6; Residual Fuel Oil; Bunker Fuel; Heavy Fuel Oil; Carbon Black Oil; Solvent Deasphalted Residual Oil; Light Paraffinic Distillates; Straight-Run Middle Distillates; Light Gas Oil; Refinery Slurry Oil; Coker Gas Oil; Hydrotreated Heavy Paraffins; Paraffin Wax (fume vapor); Acid Treated Petroleum Distillates and Gas Oils; Solvent Dewaxed Paraffinic Distillates.	26.6930	1,000	5,339	2,000	2.6693	98.00%	18,300.00	7,121.33	0.488
Refinery Petroleum Fractions containing < 10% benzene - Gasoline Fuels, E15, RFA.	2,402.3673	1,000	480,473	2,000	240.2367	98.00%	18,700.00	3,638.49	44.924
Refinery Petroleum Fractions containing < 10% benzene - Intermediate Petroleum Distillates; Hydrodesulfurized Middle Distillates; Steam-Cracked Petroleum Distillates.	249.1344	1,000	49,827	2,000	24.9134	98.00%	18,500.00	4,799.44	4.609
Refinery Petroleum Fractions containing < 10% benzene - Straight-Run Gas Oils; Light Cycle Oil; Middle Petroleum Distillates; Coal Solvent.	46.2678	1,000	9,254	2,000	4.6268	98.00%	18,400.00	6,205.55	0.851
Refinery Petroleum Fractions containing < 10% benzene - Vacuum Gas Oils, Vacuum Residual Oils, Petroleum Asphaltenes.	0.6762	1,000	135	2,000	0.0676	98.00%	17,500.00	8,626.02	0.012
Stoddard Solvent	79.4062	1,000	15,881	2,000	7.9406	98.00%	18,200.00	10,534.39	1.445
Tall Oil; Tall Oil Fatty Acids; Tall Oil Rosin	0.0018	1,000	0	2,000	0.0002	98.00%	20,000.00	12,996.37	0.000
Tallow; Tallow, Fatty Acids; Tallow, Methyl Esters	0.1521	1,000	30	2,000	0.0152	98.00%	18,000.00	13,308.72	0.003
tert-Amyl Methyl Ether; 2-methoxy-2-methylbutane	777.2613	1,000	155,452	2,000	77.7261	98.00%	15,000.00	3,976.27	11.659
Toluene; Methylbenzene	338.4841	1,000	67,697	2,000	33.8484	98.00%	17,422.00	4,164.43	5.897
Triethylene Glycol; TEG; 2,2'-[1,2-ethanediylbis(oxy)]diethanol	0.1603	1,000	32	2,000	0.0160	98.00%	10,190.00	3,969.87	0.002
Trimethyl Benzene; Trimethylbenzene; 1,2,3-Trimethylbenzene; Hemimellitene; 1,2,4-Trimethylbenzene; Pseudocumene; 1,3,5-Trimethylbenzene; Mesitylene	46.0274	1,000	9,205	2,000	4.6027	98.00%	17,649.00	5,503.10	0.812
Turpentine; Turpentine Oil, Alpha, Beta, Limonene Fractions	126.0687	1,000	25,214	2,000	12.6069	98.00%	18,917.00	6,686.05	2.385
Urea Ammonium Nitrate Fertilizer Solution	98.2578	1,000	19,652	2,000	9.8258	98.00%	4,546.00	1,627.98	0.447
Urea Liquid Solution	101.5347	1,000	20,307	2,000	10.1535	98.00%	4,546.00	708.33	0.462
Vegetable Oil Mists; Avocado Oil; Canola Oil; Corn Oil; Corn Syrup; Cottonseed Oil; Lemongrass Oil; Linseed Oil; Palm Oil; Peanut Oil; Rapeseed Oil; Soy Bean Oil	903.4236	1,000	180,685	2,000	90.3424	98.00%	16,982.00	38,549.24	15.342
Xylene (o-, m-, p- isomers); Mixed Xylenes; Dimethylbenzene; m-Xylene; 1,3-dimethylbenzene; o-Xylene; 1,2-dimethylbenzene; p-Xylene; 1,4-dimethylbenzene	129.2995	1,000	25,860	2,000	12.9300	98.00%	17,545.00	4,832.30	2.269
Atmospheric VOC Railcars									
Flare Emissions									

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Annual Flare Chemical Combustion Heat Value MMBtu / year	EPA AP-42 Table 13.5-1 Flare NOx factor lbs / MMBtu	EPA AP-42 Table 13.5-2 Flare CO factor lbs / MMBtu	**Flare Hourly Chemical Emissions lbs / hr**	**Flare Annual Chemical Emissions TPY**	**Flare Hourly NOx Emissions lbs / hr**	**Flare Annual NOx Emissions TPY**	**Flare Hourly CO Emissions lbs / hr**	**Flare Annual CO Emissions TPY**
Refinery Petroleum Fractions containing < 10% benzene - Engine Oils; Motor Oils; Lube Oil Additives; Fuel Oil No. 6; Residual Fuel Oil; Bunker Fuel; Heavy Fuel Oil; Carbon Black Oil; Solvent Deasphalted Residual Oil; Light Paraffinic Distillates; Straight-Run Middle Distillates; Light Gas Oil; Refinery Slurry Oil; Coker Gas Oil; Hydrotreated Heavy Paraffins; Paraffin Wax (fume vapor); Acid Treated Petroleum Distillates and Gas Oils; Solvent Dewaxed Paraffinic Distillates.	97.696	0.0680	0.3100	**0.5339**	**0.0534**	**0.0332**	**0.0033**	**0.1514**	**0.0151**
Refinery Petroleum Fractions containing < 10% benzene - Gasoline Fuels, E15, RFA.	8,984.854	0.0680	0.3100	**48.0473**	**4.8047**	**3.0549**	**0.3055**	**13.9265**	**1.3927**
Refinery Petroleum Fractions containing < 10% benzene - Intermediate Petroleum Distillates; Hydrodesulfurized Middle Distillates; Steam-Cracked Petroleum Distillates.	921.797	0.0680	0.3100	**4.9827**	**0.4983**	**0.3134**	**0.0313**	**1.4288**	**0.1429**
Refinery Petroleum Fractions containing < 10% benzene - Straight-Run Gas Oils; Light Cycle Oil; Middle Petroleum Distillates; Coal Solvent.	170.266	0.0680	0.3100	**0.9254**	**0.0925**	**0.0579**	**0.0058**	**0.2639**	**0.0264**
Refinery Petroleum Fractions containing < 10% benzene - Vacuum Gas Oils, Vacuum Residual Oils, Petroleum Asphaltenes.	2.367	0.0680	0.3100	**0.0135**	**0.0014**	**0.0008**	**0.0001**	**0.0037**	**0.0004**
Stoddard Solvent	289.039	0.0680	0.3100	**1.5881**	**0.1588**	**0.0983**	**0.0098**	**0.4480**	**0.0448**
Tall Oil; Tall Oil Fatty Acids; Tall Oil Rosin	0.007	0.0680	0.3100	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Tallow; Tallow, Fatty Acids; Tallow, Methyl Esters	0.548	0.0680	0.3100	**0.0030**	**0.0003**	**0.0002**	**0.0000**	**0.0008**	**0.0001**
tert-Amyl Methyl Ether; 2-methoxy-2-methylbutane	2,331.784	0.0680	0.3100	**15.5452**	**1.5545**	**0.7928**	**0.0793**	**3.6143**	**0.3614**
Toluene; Methylbenzene	1,179.414	0.0680	0.3100	**6.7697**	**0.6770**	**0.4010**	**0.0401**	**1.8281**	**0.1828**
Triethylene Glycol; TEG; 2,2'-[1,2-ethanediylbis(oxy)]diethanol	0.327	0.0680	0.3100	**0.0032**	**0.0003**	**0.0001**	**0.0000**	**0.0005**	**0.0001**
Trimethyl Benzene; Trimethylbenzene; 1,2,3-Trimethylbenzene; Hemimellitene; 1,2,4-Trimethylbenzene; Pseudocumene; 1,3,5-Trimethylbenzene; Mesitylene	162.467	0.0680	0.3100	**0.9205**	**0.0921**	**0.0552**	**0.0055**	**0.2518**	**0.0252**
Turpentine; Turpentine Oil, Alpha, Beta, Limonene Fractions	476.968	0.0680	0.3100	**2.5214**	**0.2521**	**0.1622**	**0.0162**	**0.7393**	**0.0739**
Urea Ammonium Nitrate Fertilizer Solution	89.336	0.0680	0.3100	**1.9652**	**0.1965**	**0.0304**	**0.0030**	**0.1385**	**0.0138**
Urea Liquid Solution	92.315	0.0680	0.3100	**2.0307**	**0.2031**	**0.0314**	**0.0031**	**0.1431**	**0.0143**
Vegetable Oil Mists; Avocado Oil; Canola Oil; Corn Oil; Corn Syrup; Cottonseed Oil; Lemongrass Oil; Linseed Oil; Palm Oil; Peanut Oil; Rapeseed Oil; Soy Bean Oil	3,068.388	0.0680	0.3100	**18.0685**	**1.8068**	**1.0433**	**0.1043**	**4.7560**	**0.4756**
Xylene (o-, m-, p- isomers); Mixed Xylenes; Dimethylbenzene; m-Xylene; 1,3-dimethylbenzene; o-Xylene; 1,2-dimethylbenzene; p-Xylene; 1,4-dimethylbenzene	453.712	0.0680	0.3100	**2.5860**	**0.2586**	**0.1543**	**0.0154**	**0.7033**	**0.0703**
Atmospheric VOC Railcars				**85.8796**	**8.5880**	**5.4018**	**0.5402**	**24.6260**	**2.4626**
Flare Emissions									

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Emptied Railcar Venting & Clear

Chemical	Maximum Expected Vapor HAP Content Wt%	Total Hourly HAP Emissions lbs / hr	Total Annual HAP Emissions TPY	Maximum Expected Vapor Sulfur Content Wt%	Total Hourly SO2 Emissions lbs / hr	Total Annual SO2 Emissions TPY
Refinery Petroleum Fractions containing < 10% benzene - Engine Oils; Motor Oils; Lube Oil Additives; Fuel Oil No. 6; Residual Fuel Oil; Bunker Fuel; Heavy Fuel Oil; Carbon Black Oil; Solvent Deasphalted Residual Oil; Light Paraffinic Distillates; Straight-Run Middle Distillates; Light Gas Oil; Refinery Slurry Oil; Coker Gas Oil; Hydrotreated Heavy Paraffins; Paraffin Wax (fume vapor); Acid Treated Petroleum Distillates and Gas Oils; Solvent Dewaxed Paraffinic Distillates.	10.0000%	0.0534	0.0053	0.5000%	0.0053	0.0005
Refinery Petroleum Fractions containing < 10% benzene - Gasoline Fuels, E15, RFA.	15.0000%	7.2071	0.7207	0.0500%	0.0480	0.0048
Refinery Petroleum Fractions containing < 10% benzene - Intermediate Petroleum Distillates; Hydrodesulfurized Middle Distillates; Steam-Cracked Petroleum Distillates.	10.0000%	0.4983	0.0498	0.0500%	0.0050	0.0005
Refinery Petroleum Fractions containing < 10% benzene - Straight-Run Gas Oils; Light Cycle Oil; Middle Petroleum Distillates; Coal Solvent.	10.0000%	0.0925	0.0093	0.0500%	0.0009	0.0001
Refinery Petroleum Fractions containing < 10% benzene - Vacuum Gas Oils, Vacuum Residual Oils, Petroleum Asphaltenes.	1.0000%	0.0001	0.0000	5.0000%	0.0014	0.0001
Stoddard Solvent	2.0000%	0.0318	0.0032			
Tall Oil; Tall Oil Fatty Acids; Tall Oil Rosin						
Tallow; Tallow, Fatty Acids; Tallow, Methyl Esters						
tert-Amyl Methyl Ether; 2-methoxy-2-methylbutane						
Toluene; Methylbenzene	100.0000%	6.7697	0.6770			
Triethylene Glycol; TEG; 2,2'-[1,2-ethanediylbis(oxy)]diethanol	100.0000%	0.0032	0.0003			
Trimethyl Benzene; Trimethylbenzene; 1,2,3-Trimethylbenzene; Hemimellitene; 1,2,4-Trimethylbenzene; Pseudocumene; 1,3,5-Trimethylbenzene; Mesitylene						
Turpentine; Turpentine Oil, Alpha, Beta, Limonene Fractions	0.5000%	0.0126	0.0013			
Urea Ammonium Nitrate Fertilizer Solution						
Urea Liquid Solution						
Vegetable Oil Mists; Avocado Oil; Canola Oil; Corn Oil; Corn Syrup; Cottonseed Oil; Lemongrass Oil; Linseed Oil; Palm Oil; Peanut Oil; Rapeseed Oil; Soy Bean Oil						
Xylene (o-, m-, p- isomers); Mixed Xylenes; Dimethylbenzene; m-Xylene; 1,3-dimethylbenzene; o-Xylene; 1,2-dimethylbenzene; p-Xylene; 1,4-dimethylbenzene	100.0000%	2.5860	0.2586			
Atmospheric VOC Railcars		50.0264	5.0026		5.9733	0.5973
Flare Emissions						

Twin State Environme			40 CFR 60.18(f.)(6.) Maximum Velocity Calculations for Air-Assisted Flare				
Richardton Facility	0.001055056	Mjoules per Btu			HP Flare Exhaust Area	17.5000	square inches
Synthetic Minor Air Permit A	0.028316850	Scm per Scf		Vmax=8.706 + (0.7084)(Ht)	HP Flare Exhaust Area	0.1215	square feet
Emptied Railcar Venting & Clear	3.280840000	Feet per Meter			LP Flare Exhaust Area	27.0000	square inches
		(Ht)	(Vmax)	(Vmax)	LP Flare Exhaust Area	0.1875	square feet
	Lower / Net	Lower / Net	Maximum	Maximum	Maximum Hourly	Maximum Hourly	Maximum Hourly
Chemical	Heating Value	Heating Value	Allowed Velocity	Allowed Velocity	Gas Volume to Flare	Gas Volume to Flare	Gas Velocity from Flare
	Btu/Scf	Mjoules/Scm	Meters/second	Feet/second	Scf/Hour	Scf/Second	Feet/second
Refinery Petroleum Fractions containing < 10% benzene - Engine Oils; Motor Oils; Lube Oil Additives; Fuel Oil No. 6; Residual Fuel Oil; Bunker Fuel; Heavy Fuel Oil; Carbon Black Oil; Solvent Deasphalted Residual Oil; Light Paraffinic Distillates; Straight-Run Middle Distillates; Light Gas Oil; Refinery Slurry Oil; Coker Gas Oil; Hydrotreated Heavy Paraffins; Paraffin Wax (fume vapor); Acid Treated Petroleum Distillates and Gas Oils; Solvent Dewaxed Paraffinic Distillates.	7,121.3	265.33	196.67	645.24	69	0.02	0.10
Refinery Petroleum Fractions containing < 10% benzene - Gasoline Fuels, E15, RFA.	3,638.5	135.57	104.74	343.64	12,347	3.43	18.29
Refinery Petroleum Fractions containing < 10% benzene - Intermediate Petroleum Distillates; Hydrodesulfurized Middle Distillates; Steam-Cracked Petroleum Distillates.	4,799.4	178.82	135.38	444.17	960	0.27	1.42
Refinery Petroleum Fractions containing < 10% benzene - Straight-Run Gas Oils; Light Cycle Oil; Middle Petroleum Distillates; Coal Solvent.	6,205.5	231.21	172.50	565.93	137	0.04	0.20
Refinery Petroleum Fractions containing < 10% benzene - Vacuum Gas Oils, Vacuum Residual Oils, Petroleum Asphaltenes.	8,626.0	321.40	236.38	775.54	1	0.00	0.00
Stoddard Solvent	10,534.4	392.50	286.75	940.79	137	0.04	0.20
Tall Oil; Tall Oil Fatty Acids; Tall Oil Rosin	12,996.4	484.23	351.74	1,153.99	0	0.00	0.00
Tallow; Tallow, Fatty Acids; Tallow, Methyl Esters	13,308.7	495.87	359.98	1,181.04	0	0.00	0.00
tert-Amyl Methyl Ether; 2-methoxy-2-methylbutane	3,976.3	148.15	113.66	372.89	2,932	0.81	4.34
Toluene; Methylbenzene	4,164.4	155.16	118.62	389.18	1,416	0.39	2.10
Triethylene Glycol; TEG; 2,2'-[1,2-ethanediylbis(oxy)]diethanol	3,969.9	147.91	113.49	372.33	0	0.00	0.00
Trimethyl Benzene; Trimethylbenzene; 1,2,3-Trimethylbenzene; Hemimellitene; 1,2,4-Trimethylbenzene; Pseudocumene; 1,3,5-Trimethylbenzene; Mesitylene	5,503.1	205.04	153.96	505.11	148	0.04	0.22
Turpentine; Turpentine Oil, Alpha, Beta, Limonene Fractions	6,686.0	249.12	185.18	607.54	357	0.10	0.53
Urea Ammonium Nitrate Fertilizer Solution	1,628.0	60.66	51.68	169.54	274	0.08	0.41
Urea Liquid Solution	708.3	26.39	27.40	89.90	652	0.18	0.97
Vegetable Oil Mists; Avocado Oil; Canola Oil; Corn Oil; Corn Syrup; Cottonseed Oil; Lemongrass Oil; Linseed Oil; Palm Oil; Peanut Oil; Rapeseed Oil; Soy Bean Oil	38,549.2	1,436.30	1,026.18	3,366.74	398	0.11	0.59
Xylene (o-, m-, p- isomers); Mixed Xylenes; Dimethylbenzene; m-Xylene; 1,3-dimethylbenzene; o-Xylene; 1,2-dimethylbenzene; p-Xylene; 1,4-dimethylbenzene	4,832.3	180.05	136.25	447.02	469	0.13	0.70
Atmospheric VOC Railcars							
Flare Emissions							

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Synthetic Minor Air Permit Application

Emptied Railcar Venting & Cleaning Flare and Atmospheric Emissions

Chemical	CAS Numbers	Reid Vapor Pressure psia	Estimated Actual Pressure psia **(Note 4)**	Vapor Molecular Weight lbs / lb mole	Average Railcar Volume gallons	Conversion Factor gallons / cubic feet	Average Railcar Volume Actual Cubic Feet	Standard Pressure psia
Atmospheric PM Railcars								
Ammonium Bisulfite. **See Note 3 concerning the vapor pressure**.	10192-30-0	0.0001	0.0001	99.1100	32,000	7.48052	4,277.777	14.7
Benzothiophene; 1-benzothiophene; thionaphthene. **See Note 3 concerning the vapor pressure**.	95-15-8	0.0001	0.0001	134.2000	32,000	7.48052	4,277.777	14.7
Calcium Sulfate; Calcium Sulfate Dihydrate; Gypsum; Plaster of Paris. **See Note 3 concerning the vapor pressure**.	7778-16-9; 10101-41-4	0.0001	0.0001	136.1400	32,000	7.48052	4,277.777	14.7
Dibenzothiophene. **See Note 3 concerning the vapor pressure**.	132-65-0	0.0001	0.0001	184.2600	32,000	7.48052	4,277.777	14.7
Disodium Tetraborate Pentahydrate; Borax Pentahydrate; Boric Acid, Disodium Salt, Pentahydrate. **See Note 3 concerning the vapor pressure**.	12179-04-3	0.0001	0.0001	291.3500	32,000	7.48052	4,277.777	14.7
Fertilizer (solid). **See Note 3 concerning the vapor pressure**.	7440-09-7 (potassium); 7723-14-0 (phosphorous)	0.0001	0.0001	35.0360	32,000	7.48052	4,277.777	14.7
Iron Salts, Soluble; Ferric Chloride; Iron (III) Chloride. **See Note 3 concerning the vapor pressure**.	7705-08-0	0.0001	0.0001	162.2000	32,000	7.48052	4,277.777	14.7
Magnesium Nitrate. **See Note 3 concerning the vapor pressure**.	13446-18-9; 10377-60-3	0.0001	0.0001	148.3200	32,000	7.48052	4,277.777	14.7
Sodium Bisulfite. **See Note 3 concerning the vapor pressure**.	7631-90-5	0.0001	0.0001	104.0600	32,000	7.48052	4,277.777	14.7
Sodium Hydroxide; Caustic. **See Note 3 concerning the vapor pressure**.	1310-73-2	0.0001	0.0001	40.0000	32,000	7.48052	4,277.777	14.7
Sulfur. **See Note 3 concerning the vapor pressure**.	7704-34-9	0.0001	0.0001	32.0700	32,000	7.48052	4,277.777	14.7
Toluene Diamine; 3.4-Toluenediamine; 3,4-Diaminotoluene; 4-Methylbenzene-1,2-Diamine. **See Note 3 concerning the vapor pressure**.	496-72-0	0.0001	0.0001	122.1700	32,000	7.48052	4,277.777	14.7

Atmospheric Railcars
PM Emissions

Note 1: Liquid heels are drained into the Wash Tanks, so the associated emissions are represented with the Wash Tank emissions.

Note 2: For pressurized railcars that have components with Reid vapor pressures exceeding atmospheric pressure, no or negligible liquid heel volume should exist at atmospheric pressure.

Note 3: Since this chemical is a solid with no expected chemical vapor pressure, a vapor pressure of 0.0001 psia is used to estimate the negligible amount of chemical particulate emissions that may occur during the cleaning of railcars.

Note 4: The maximum expected received pressurized railcar pressure is 100 psig. So for the components with Reid vapor pressures greater than 100 psig + 14.7 psia atmospheric pressure = 114.7 psia, a pressure of 114.7 psia is used as the actual pressure, and for components with Reid vapor pressures less than 114.7 psia, the Reid vapor pressure is used as the actual pressure.

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Emptied Railcar Venting & Clear

Chemical	Reid Vapor Pressure Temperature Deg R	Standard Temperature Deg R	Railcar Chemical Volume Standard Cubic Feet	Each Railcar Chemical Total Vent Time Hours	Each Railcar Chemical Average Volume Scf / Hour	Potential Number of Railcars Venting at Same Time	Potential Hourly Chemical Volume Scf / Hour	Conversion Factor Scf / lb mole	Potential Hourly Chemical Moles lb moles / hr
Atmospheric PM Railcars									
Ammonium Bisulfite. **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Benzothiophene; 1-benzothiophene; thionaphthene. **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Calcium Sulfate; Calcium Sulfate Dihydrate; Gypsum; Plaster of Paris. **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Dibenzothiophene. **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Disodium Tetraborate Pentahydrate; Borax Pentahydrate; Boric Acid, Disodium Salt, Pentahydrate. **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Fertilizer (solid). **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Iron Salts, Soluble; Ferric Chloride; Iron (III) Chloride. **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Magnesium Nitrate. **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Sodium Bisulfite. **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Sodium Hydroxide; Caustic. **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Sulfur. **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Toluene Diamine; 3.4-Toluenediamine; 3,4-Diaminotoluene; 4-Methylbenzene-1,2-Diamine. **See Note 3 concerning the vapor pressure**.	560	528	0.03	1.00	0.03	5	0.14	385.4616	0.00
Atmospheric Railcars PM Emissions									**Total PM**

Note 1: Liquid heels are drained in

Note 2: For pressurized railcars th
no or negligible liquid hee

Note 3: Since this chemical is a sc
to estimate the negligible a

Note 4: The maximum expected re
greater than 100 psig + 14.
and for components with F

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Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	*(See Note 1)* Potential Hourly Chemical Mass lbs / hr	Potential Annual Chemical Railcars railcars / year	Potential Annual Chemical Mass lbs / year	Conversion Factor lbs / ton	*(See Note 1)* Potential Annual Chemical Mass TPY	Utilized Flare Oxidation Efficiency %	Chemical Heat of Combustion Btu / lb	Chemical Combustion Heating Value Btu / Scf	Hourly Flare Chemical Combustion Heat Value MMBtu / hr
Atmospheric PM Railcars									
Ammonium Bisulfite. **See Note 3 concerning the vapor pressure**.	0.0353	1,000	7	2,000	0.0035	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Benzothiophene; 1-benzothiophene; thionaphthene. **See Note 3 concerning the vapor pressure**.	0.0478	1,000	10	2,000	0.0048	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Calcium Sulfate; Calcium Sulfate Dihydrate; Gypsum; Plaster of Paris. **See Note 3 concerning the vapor pressure**.	0.0485	1,000	10	2,000	0.0048	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Dibenzothiophene. **See Note 3 concerning the vapor pressure**.	0.0656	1,000	13	2,000	0.0066	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Disodium Tetraborate Pentahydrate; Borax Pentahydrate; Boric Acid, Disodium Salt, Pentahydrate. **See Note 3 concerning the vapor pressure**.	0.1037	1,000	21	2,000	0.0104	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Fertilizer (solid). **See Note 3 concerning the vapor pressure**.	0.0125	1,000	2	2,000	0.0012	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Iron Salts, Soluble; Ferric Chloride; Iron (III) Chloride. **See Note 3 concerning the vapor pressure**.	0.0577	1,000	12	2,000	0.0058	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Magnesium Nitrate. **See Note 3 concerning the vapor pressure**.	0.0528	1,000	11	2,000	0.0053	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Sodium Bisulfite. **See Note 3 concerning the vapor pressure**.	0.0370	1,000	7	2,000	0.0037	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Sodium Hydroxide; Caustic. **See Note 3 concerning the vapor pressure**.	0.0142	1,000	3	2,000	0.0014	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Sulfur. **See Note 3 concerning the vapor pressure**.	0.0114	1,000	2	2,000	0.0011	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Toluene Diamine; 3.4-Toluenediamine; 3,4-Diaminotoluene; 4-Methylbenzene-1,2-Diamine. **See Note 3 concerning the vapor pressure**.	0.0435	1,000	9	2,000	0.0043	***Cleaning of this chemical does not require the vapor stream to be controlled by the Flare***			
Atmospheric Railcars PM Emissions	**0.1037**				**0.0104**				

Note 1: Liquid heels are drained in

Note 2: For pressurized railcars th
no or negligible liquid hee

Note 3: Since this chemical is a sc
to estimate the negligible a

Note 4: The maximum expected re
greater than 100 psig + 14.
and for components with F

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Annual Flare Chemical Combustion Heat Value MMBtu / year	EPA AP-42 Table 13.5-1 Flare NOx factor lbs / MMBtu	EPA AP-42 Table 13.5-2 Flare CO factor lbs / MMBtu	**Flare Hourly Chemical Emissions lbs / hr**	**Flare Annual Chemical Emissions TPY**	**Flare Hourly NOx Emissions lbs / hr**	**Flare Annual NOx Emissions TPY**	**Flare Hourly CO Emissions lbs / hr**	**Flare Annual CO Emissions TPY**
Atmospheric PM Railcars									
Ammonium Bisulfite. **See Note 3 concerning the vapor pressure**.									
Benzothiophene; 1-benzothiophene; thionaphthene. **See Note 3 concerning the vapor pressure**.									
Calcium Sulfate; Calcium Sulfate Dihydrate; Gypsum; Plaster of Paris. **See Note 3 concerning the vapor pressure**.									
Dibenzothiophene. **See Note 3 concerning the vapor pressure**.									
Disodium Tetraborate Pentahydrate; Borax Pentahydrate; Boric Acid, Disodium Salt, Pentahydrate. **See Note 3 concerning the vapor pressure**.									
Fertilizer (solid). **See Note 3 concerning the vapor pressure**.									
Iron Salts, Soluble; Ferric Chloride; Iron (III) Chloride. **See Note 3 concerning the vapor pressure**.									
Magnesium Nitrate. **See Note 3 concerning the vapor pressure**.									
Sodium Bisulfite. **See Note 3 concerning the vapor pressure**.									
Sodium Hydroxide; Caustic. **See Note 3 concerning the vapor pressure**.									
Sulfur. **See Note 3 concerning the vapor pressure**.									
Toluene Diamine; 3.4-Toluenediamine; 3,4-Diaminotoluene; 4-Methylbenzene-1,2-Diamine. **See Note 3 concerning the vapor pressure**.									

Atmospheric Railcars
PM Emissions

Note 1: Liquid heels are drained in

Note 2: For pressurized railcars th
no or negligible liquid hee

Note 3: Since this chemical is a so
to estimate the negligible a

Note 4: The maximum expected re
greater than 100 psig + 14.
and for components with F

Twin State Environm

Richardton Facility

Synthetic Minor Air Permit A

Emptied Railcar Venting & Clear

Chemical	Maximum Expected Vapor HAP Content Wt%	Total Hourly HAP Emissions lbs / hr	Total Annual HAP Emissions TPY	Maximum Expected Vapor Sulfur Content Wt%	Total Hourly SO2 Emissions lbs / hr	Total Annual SO2 Emissions TPY
Atmospheric PM Railcars						
Ammonium Bisulfite. **See Note 3 concerning the vapor pressure**.						
Benzothiophene; 1-benzothiophene; thionaphthene. **See Note 3 concerning the vapor pressure**.						
Calcium Sulfate; Calcium Sulfate Dihydrate; Gypsum; Plaster of Paris. **See Note 3 concerning the vapor pressure**.						
Dibenzothiophene. **See Note 3 concerning the vapor pressure**.						
Disodium Tetraborate Pentahydrate; Borax Pentahydrate; Boric Acid, Disodium Salt, Pentahydrate. **See Note 3 concerning the vapor pressure**.						
Fertilizer (solid). **See Note 3 concerning the vapor pressure**.						
Iron Salts, Soluble; Ferric Chloride; Iron (III) Chloride. **See Note 3 concerning the vapor pressure**.						
Magnesium Nitrate. **See Note 3 concerning the vapor pressure**.						
Sodium Bisulfite. **See Note 3 concerning the vapor pressure**.						
Sodium Hydroxide; Caustic. **See Note 3 concerning the vapor pressure**.						
Sulfur. **See Note 3 concerning the vapor pressure**.						
Toluene Diamine; 3.4-Toluenediamine; 3,4-Diaminotoluene; 4-Methylbenzene-1,2-Diamine. **See Note 3 concerning the vapor pressure**.						
Atmospheric Railcars PM Emissions						

Note 1: Liquid heels are drained in

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Note 4: The maximum expected re
greater than 100 psig + 14.
and for components with H

Twin State Environme			**40 CFR 60.18(f.)(6.) Maximum Velocity Calculations for Air-Assisted Flare**				
Richardton Facility	0.001055056	Mjoules per Btu			HP Flare Exhaust Area	17.5000	square inches
Synthetic Minor Air Permit A	0.028316850	Scm per Scf		Vmax=8.706 + (0.7084)(Ht)	HP Flare Exhaust Area	0.1215	square feet
Emptied Railcar Venting & Clear	3.280840000	Feet per Meter			LP Flare Exhaust Area	27.0000	square inches
		(Ht)	(Vmax)	(Vmax)	LP Flare Exhaust Area	0.1875	square feet
	Lower / Net	Lower / Net	Maximum	Maximum	Maximum Hourly	Maximum Hourly	Maximum Hourly
Chemical	Heating Value	Heating Value	Allowed Velocity	Allowed Velocity	Gas Volume to Flare	Gas Volume to Flare	Gas Velocity from Flare
	Btu/Scf	Mjoules/Scm	Meters/second	Feet/second	Scf/Hour	Scf/Second	Feet/second
Atmospheric PM Railcars							
Ammonium Bisulfite. **See Note 3 concerning the vapor pressure**.							
Benzothiophene; 1-benzothiophene; thionaphthene. **See Note 3 concerning the vapor pressure**.							
Calcium Sulfate; Calcium Sulfate Dihydrate; Gypsum; Plaster of Paris. **See Note 3 concerning the vapor pressure**.							
Dibenzothiophene. **See Note 3 concerning the vapor pressure**.							
Disodium Tetraborate Pentahydrate; Borax Pentahydrate; Boric Acid, Disodium Salt, Pentahydrate. **See Note 3 concerning the vapor pressure**.							
Fertilizer (solid). **See Note 3 concerning the vapor pressure**.							
Iron Salts, Soluble; Ferric Chloride; Iron (III) Chloride. **See Note 3 concerning the vapor pressure**.							
Magnesium Nitrate. **See Note 3 concerning the vapor pressure**.							
Sodium Bisulfite. **See Note 3 concerning the vapor pressure**.							
Sodium Hydroxide; Caustic. **See Note 3 concerning the vapor pressure**.							
Sulfur. **See Note 3 concerning the vapor pressure**.							
Toluene Diamine; 3.4-Toluenediamine; 3,4-Diaminotoluene; 4-Methylbenzene-1,2-Diamine. **See Note 3 concerning the vapor pressure**.							
Atmospheric Railcars							
PM Emissions							
Note 1: Liquid heels are drained in							
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Note 3: Since this chemical is a so							
to estimate the negligible a							
Note 4: The maximum expected re							
greater than 100 psig + 14.							
and for components with h							

Twin State Environmental

Richardton Facility

Synthetic Minor Air Permit Application

Steam Boiler(s) Emissions

Heater Attribute and Emission Calculations

Heater Attribute	Attribute Value	Attribute Units
Hourly Firing Rate:	8.00	MMBtu/Hr
Annual Average Firing Rate:	8.00	MMBtu/Hr
Fuel Net Heating Value:	1,081.54	Btu/Scf
Hourly Fuel Usage:	7,397	Scf/Hr
Annual Fuel Usage:	64.796	MMScf/Yr
Annual Runhours:	8,760	Hrs/Yr
MMBTU/Year:	**70,080.00**	

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis	Hourly Emissions lbs/hr(1)	Annual Emissions TPY(1)
NOx	100.000	lbs/MMScf	AP42, T1.4-1	0.7843	3.4353
CO	84.000	lbs/MMScf	AP42, T1.4-1	0.6588	2.8856
SO2	0.600	lbs/MMScf	AP42, T1.4-2	0.0047	0.0206
PM/PM10/PM2.5	7.600	lbs/MMScf	AP42, T1.4-2	0.0596	0.2611
Total VOC	5.500	lbs/MMScf	AP42, T1.4-2	0.0431	0.1889
Formaldehyde	0.075	lbs/MMScf	AP42, T1.4-3	0.0006	0.0026

(1) Per AP-42 instructions, emissions corrected to fuel gas with 1020 Btu/Scf heat content.

Fuel Gas and Stoichiometric Combustion Calculations

Fuel Gas Net Heating Value:	1,081.5406	Btu/Scf	
Conversion Factor:	385.4616	Scf/lbmole	(based on standard atmospheric conditions of 68F, 14.7 psia)
Fuel Gas VOC Weight%:	13.2305%		

Component	Mole %	Molecular Weight lb/lbmole	Equivalent Weight lb/lbmole	Weight %	Net Heating Value Btu/Scf	Heat Value Contribution Btu/Scf	Molar Rate lbmoles/hr	Stoichiometric O2 Consumed lbmoles/hr	Stoichiometric Associated N2 lbmoles/hr	Stoichiometric CO2 Formed lbmoles/hr	Stoichiometric H2O Formed lbmoles/hr
methane	67.3985%	16.0420	10.8121	50.0260%	909.40	612.9220	12.9335	25.8670	97.3092	12.9335	25.8670
ethane	19.6977%	30.0690	5.9229	27.4045%	1,618.70	318.8467	3.7799	13.2297	49.7688	7.5598	11.3397
propane	5.5358%	44.0960	2.4411	11.2945%	2,314.90	128.1482	1.0623	5.3115	19.9813	3.1869	4.2492
isobutane	0.1817%	58.1220	0.1056	0.4886%	3,000.40	5.4517	0.0349	0.2266	0.8526	0.1395	0.1743
n-butane	0.4511%	58.1220	0.2622	1.2131%	3,010.80	13.5817	0.0866	0.5627	2.1167	0.3463	0.4328
isopentane	0.0287%	72.1490	0.0207	0.0958%	3,699.00	1.0616	0.0055	0.0441	0.1657	0.0275	0.0330
n-pentane	0.0312%	72.1490	0.0225	0.1042%	3,706.90	1.1566	0.0060	0.0479	0.1802	0.0299	0.0359
hexane+	0.0086%	86.1750	0.0074	0.0343%	4,299.57	0.3698	0.0017	0.0157	0.0590	0.0099	0.0116
hydrogen sulfide	0.0004%	34.0820	0.0001	0.0006%	586.80	0.0023	0.0001	0.0001	0.0004	0.0000	0.0001
carbon dioxide	0.9430%	44.0100	0.4150	1.9202%	0.00	0.0000	0.1810	0.0000	0.0000	0.0000	0.0000
nitrogen	5.7233%	28.0135	1.6033	7.4182%	0.00	0.0000	1.0983	0.0000	0.0000	0.0000	0.0000
Totals	100.0000%		21.6129	100.0000%		1,081.5406	19.1896	45.3052	170.4340	24.2333	42.1437

Exhaust Stack Attributes and Related Calculations

Stack Attribute	Stack Attribute Value	Stack Attribute Units
Stack Diameter:	2.0000	feet
Stack Area:	3.1416	ft2
Stack Temperature:	500	F
Excess Air Percent:	15.00%	
Stack Flowrate:	104,248.57	Scf/Hr
Stack Velocity:	16.76	Ft/Sec
Fuel Flow Rate:	123.28	Scf/Min
Total Air Flow Rate:	1,593.88	Scf/Min
Exhaust Flow Rate:	1,737.48	Scf/Min

Exhaust Constituent	Molar Rate lbmoles/hr	Volumetric Rate SCF/hr	Mole %
Fuel Nitrogen:	1.0983		
Stoichiometric Nitrogen:	170.4340	66,119.12	63.4245%
Fuel CO2:	0.1810		
Stoichiometric CO2:	24.2333	9,410.77	9.0272%
Stoichiometric H2O:	42.1437	16,244.78	15.5827%
Stoichiometric SO2:	0.0001	0.03	0.0000%
Excess Air	32.3609	12,473.88	11.9655%
Totals	270.4513	104,248.57	100.0000%

Subpart C - General Stationary Fuel Combustion - Tier 1 Calculation Methodology Using Equations C-1b and C-8b

OPTIONAL SPREADSHEET FOR FACILITY RECORDKEEPING PURPOSES

Version e-GGRT RY2024.R.02

Today's date 11/11/2025

Use one spreadsheet for each fuel. Make additional copies as needed.

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Equation C-1b:

$$CO_2 = 1 \; x \; 10^{-3} * Gas * EF$$

Equation C-8b:

$$CH_4 \; or \; N_2O = 1 \; x \; 10^{-3} * Fuel * EF$$

Facility Name:	Richardton Facility
Reporter Name:	Twin State Environmental
Unit or Group Name/ ID:	Flare - Fuel Gas Combustion Emissions
Configuration Type:	Type #1: single unit not employing CEMS
Fuel/ Fuel Type:	Natural Gas
Reporting Period:	PTE
Comments:	
Unit Type:	General Stationary Fuel Combustion

Fuel Input Data

[Gas] or **[Fuel]** = Annual natural gas usage from billing records (mmBtu)	56,497.20805
[1 x 10^{-3}] = Conversion Factor from kg to metric tons (constant)	0.001

Annual CO_2 Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-1b

[EF] = Fuel-Specific Default CO_2 Emission Factor for natural gas, from Table C-1 (kg CO_2/mmBtu)	53.06
[CO_2] = Annual CO_2 emissions from natural gas combustion (metric tons)	**2997.7418593**

Note: 53.06 kg CO_2/mmBTU is the emission factor effective 1/1/14. Prior to this date, the correct emission factor to use is 53.02 kg CO2/mmBTU.

Enter this value in e-GGRT

Annual CH_4 Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8b

[EF] = Fuel-Specific Default Emission Factor for CH_4, from Table C-2 (kg CH_4/mmBtu)	0.001
[CH_4] = Annual CH_4 emissions from natural gas combustion (metric tons)	**0.0564972**

Note: If you are reporting CH4 emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

Annual N_2O Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8b

[EF] = Fuel-Specific Default Emission Factor for N_2O, from Table C-2 (kg N_2O/mmBtu)	0.0001
[N_2O] = Annual N_2O emissions from natural gas combustion (metric tons)	**0.0056497**

Note: If you are reporting N2O emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

INFORMATION ONLY: Annual CH_4 Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO_2e)

[GWP_{CH4}] = Global Warming Potential for CH_4	28
[CH_4] = Annual CH_4 emissions from combustion of the specified fuel (metric tons CO_2e)	1.581921825

Note: 28 is the GWP effective 1/1/25. The new GWP will affect reports for the 2024 reporting year (submitted to EPA by May 2025) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 25.

INFORMATION ONLY: Annual N_2O Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO_2e)

[GWP_{N2O}] = Global Warming Potential for N_2O	265
[N_2O] = Annual N_2O emissions from combustion of the specified fuel (metric tons CO_2e)	1.497176013

Note: 265 is the GWP effective 1/1/25. The new GWP will affect reports for the2024 reporting year (submitted to EPA by May 2025) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 298.

Subpart C - General Stationary Fuel Combustion - Tier 1 Calculation Methodology Using Equations C-1b and C-8b

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Equation C-1b:

$$CO_2 = 1 \; x \; 10^{-3} * Gas * EF$$

Equation C-8b:

$$CH_4 \; or \; N_2O = 1 \; x \; 10^{-3} * Fuel * EF$$

Facility Name:	Richardton Facility
Reporter Name:	Twin State Environmental
Unit or Group Name/ ID:	Flare Pressure Railcar Vent Combustion Emissions
Configuration Type:	Type #1: single unit not employing CEMS
Fuel/ Fuel Type:	Natural Gas
Reporting Period:	PTE
Comments:	
Unit Type:	General Stationary Fuel Combustion

Fuel Input Data

[Gas] or **[Fuel]** = Annual natural gas usage from billing records (mmBtu)	72,852.1551
[1 x 10^{-3}] = Conversion Factor from kg to metric tons (constant)	0.001

Annual CO_2 Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-1b

[EF] = Fuel-Specific Default CO_2 Emission Factor for natural gas, from Table C-1 (kg CO_2/mmBtu)	53.06
[CO_2] = Annual CO_2 emissions from natural gas combustion (metric tons)	**3865.5353496**

Note: 53.06 kg CO_2/mmBTU is the emission factor effective 1/1/14. Prior to this date, the correct emission factor to use is 53.02 kg CO2/mmBTU.

Enter this value in e-GGRT

Annual CH_4 Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8b

[EF] = Fuel-Specific Default Emission Factor for CH_4, from Table C-2 (kg CH_4/mmBtu)	0.001
[CH_4] = Annual CH_4 emissions from natural gas combustion (metric tons)	**0.0728522**

Note: If you are reporting CH4 emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

Annual N_2O Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8b

[EF] = Fuel-Specific Default Emission Factor for N_2O, from Table C-2 (kg N_2O/mmBtu)	0.0001
[N_2O] = Annual N_2O emissions from natural gas combustion (metric tons)	**0.0072852**

Note: If you are reporting N2O emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

INFORMATION ONLY: Annual CH_4 Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO_2e)

[GWP_{CH4}] = Global Warming Potential for CH_4	28
[CH_4] = Annual CH_4 emissions from combustion of the specified fuel (metric tons CO_2e)	2.039860343

Note: 28 is the GWP effective 1/1/25. The new GWP will affect reports for the 2024 reporting year (submitted to EPA by May 2025) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 25.

INFORMATION ONLY: Annual N_2O Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO_2e)

[GWP_{N2O}] = Global Warming Potential for N_2O	265
[N_2O] = Annual N_2O emissions from combustion of the specified fuel (metric tons CO_2e)	1.93058211

Note: 265 is the GWP effective 1/1/25. The new GWP will affect reports for the2024 reporting year (submitted to EPA by May 2025) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 298.

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Equation C-1b:

$$CO_2 = 1 \; x \; 10^{-3} * Gas * EF$$

Equation C-8b:

$$CH_4 \; or \; N_2O = 1 \; x \; 10^{-3} * Fuel * EF$$

Facility Name:	Richardton Facility
Reporter Name:	Twin State Environmental
Unit or Group Name/ ID:	Flare Atmospheric Railcar Vent Combustion Emissions
Configuration Type:	Type #1: single unit not employing CEMS
Fuel/ Fuel Type:	Natural Gas
Reporting Period:	PTE
Comments:	
Unit Type:	General Stationary Fuel Combustion

Fuel Input Data

[Gas] or **[Fuel]** = Annual natural gas usage from billing records (mmBtu)	15,887.72836
[1 x 10^{-3}] = Conversion Factor from kg to metric tons (constant)	0.001

Annual CO_2 Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-1b

[EF] = Fuel-Specific Default CO_2 Emission Factor for natural gas, from Table C-1 (kg CO_2/mmBtu)	53.06
[CO_2] = Annual CO_2 emissions from natural gas combustion (metric tons)	**843.0028667**

Note: 53.06 kg CO_2/mmBTU is the emission factor effective 1/1/14. Prior to this date, the correct emission factor to use is 53.02 kg CO2/mmBTU.

Enter this value in e-GGRT

Annual CH_4 Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8b

[EF] = Fuel-Specific Default Emission Factor for CH_4, from Table C-2 (kg CH_4/mmBtu)	0.001
[CH_4] = Annual CH_4 emissions from natural gas combustion (metric tons)	**0.0158877**

Note: If you are reporting CH4 emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

Annual N_2O Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8b

[EF] = Fuel-Specific Default Emission Factor for N_2O, from Table C-2 (kg N_2O/mmBtu)	0.0001
[N_2O] = Annual N_2O emissions from natural gas combustion (metric tons)	**0.0015888**

Note: If you are reporting N2O emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

INFORMATION ONLY: Annual CH_4 Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO_2e)

[GWP_{CH4}] = Global Warming Potential for CH_4	28
[CH_4] = Annual CH_4 emissions from combustion of the specified fuel (metric tons CO_2e)	0.444856394

Note: 28 is the GWP effective 1/1/25. The new GWP will affect reports for the 2024 reporting year (submitted to EPA by May 2025) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 25.

INFORMATION ONLY: Annual N_2O Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO_2e)

[GWP_{N2O}] = Global Warming Potential for N_2O	265
[N_2O] = Annual N_2O emissions from combustion of the specified fuel (metric tons CO_2e)	0.421024802

Note: 265 is the GWP effective 1/1/25. The new GWP will affect reports for the2024 reporting year (submitted to EPA by May 2025) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 298.

Subpart C - General Stationary Fuel Combustion - Tier 1 Calculation Methodology Using Equations C-1b and C-8b

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Equation C-1b:

$$CO_2 = 1 \; x \; 10^{-3} * Gas * EF$$

Equation C-8b:

$$CH_4 \; or \; N_2O = 1 \; x \; 10^{-3} * Fuel * EF$$

Facility Name:	Richardton Facility
Reporter Name:	Twin State Environmental
Unit or Group Name/ ID:	Steam Boiler(s) Emissions
Configuration Type:	Type #1: single unit not employing CEMS
Fuel/ Fuel Type:	Natural Gas
Reporting Period:	PTE
Comments:	
Unit Type:	General Stationary Fuel Combustion

Fuel Input Data

[Gas] or **[Fuel]** = Annual natural gas usage from billing records (mmBtu)	70,080.
[1 x 10^{-3}] = Conversion Factor from kg to metric tons (constant)	0.001

Annual CO_2 Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-1b

[EF] = Fuel-Specific Default CO_2 Emission Factor for natural gas, from Table C-1 (kg CO_2/mmBtu)	53.06
[CO_2] = Annual CO_2 emissions from natural gas combustion (metric tons)	**3718.4448000**

Note: 53.06 kg CO_2/mmBTU is the emission factor effective 1/1/14. Prior to this date, the correct emission factor to use is 53.02 kg CO2/mmBTU.

Enter this value in e-GGRT

Annual CH_4 Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8b

[EF] = Fuel-Specific Default Emission Factor for CH_4, from Table C-2 (kg CH_4/mmBtu)	0.001
[CH_4] = Annual CH_4 emissions from natural gas combustion (metric tons)	**0.0700800**

Note: If you are reporting CH4 emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

Annual N_2O Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8b

[EF] = Fuel-Specific Default Emission Factor for N_2O, from Table C-2 (kg N_2O/mmBtu)	0.0001
[N_2O] = Annual N_2O emissions from natural gas combustion (metric tons)	**0.0070080**

Note: If you are reporting N2O emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

INFORMATION ONLY: Annual CH_4 Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO_2e)

[GWP_{CH4}] = Global Warming Potential for CH_4	28
[CH_4] = Annual CH_4 emissions from combustion of the specified fuel (metric tons CO_2e)	1.96224

Note: 28 is the GWP effective 1/1/25. The new GWP will affect reports for the 2024 reporting year (submitted to EPA by May 2025) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 25.

INFORMATION ONLY: Annual N_2O Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO_2e)

[GWP_{N2O}] = Global Warming Potential for N_2O	265
[N_2O] = Annual N_2O emissions from combustion of the specified fuel (metric tons CO_2e)	1.85712

Note: 265 is the GWP effective 1/1/25. The new GWP will affect reports for the2024 reporting year (submitted to EPA by May 2025) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 298.

Emission Report Oil and Gas for 2025 Annual							
Site: TwinStateRichardtonND, TwinStateRichardton							
Equations for this site: After 2020 AP-42 revisions H/D ratio: calculated (for Tanks Module)							
Start Date/Time	**Tank ID**	**Fixed Roof Type**	**Height (ft)**	**Diameter (ft)**	**Roof Finish**	**Shell Finish**	**Product**
1/1/2025	TK-01	Vertical	8.4	9	Inside Building	Inside Building	TwinStateRichardtonLiquid
1/1/2025	TK-02	Vertical	8.4	9	Inside Building	Inside Building	TwinStateRichardtonLiquid
1/1/2025	TK-03	Vertical	8.4	9	Inside Building	Inside Building	TwinStateRichardtonLiquid
1/1/2025	TK-04	Vertical	8.4	9	Inside Building	Inside Building	TwinStateRichardtonLiquid

Emission Report Oil and Gas for 2025 Annual							
Site: TwinStateRichardtonND, TwinStateRichar							
Equations for this site: After 2020 AP-42 revisior							
Start Date/Time	Tank ID	Max. Pump Rate (gal/hr)	Maximum Liquid Surface Temperature (degF)	TVP at Max Surface Temp (psia)	Working Short Term Emissions (lbs/hr)	Standing Short Term Emissions (lbs/hr)	Short Term Emissions (lbs/hr)
1/1/2025	TK-01	4,000	155	7.7430	32.4274	0.1090	32.5364
1/1/2025	TK-02	4,000	155	7.7430	32.4274	0.1090	32.5364
1/1/2025	TK-03	4,000	155	7.7430	32.4274	0.1090	32.5364
1/1/2025	TK-04	4,000	155	7.7430	32.4274	0.1090	32.5364

Emission Report Oil and Gas for 2025 Annual							
Site: TwinStateRichardtonND, TwinStateRichar							
Equations for this site: After 2020 AP-42 revisior							
Start Date/Time	Tank ID	Throughput in gal/yr	Liquid Surface Temperature (degF)	Avg. TVP (psia)	Working loss (w/out control) (lbs/yr)	Standing loss (w/out control) (lbs/yr)	Routine Emissions (lbs/yr)
1/1/2025	TK-01	325,000	139	5.5608	978.1631	416.2204	1,394.3836
1/1/2025	TK-02	325,000	139	5.5608	978.1631	416.2204	1,394.3836
1/1/2025	TK-03	325,000	139	5.5608	978.1631	416.2204	1,394.3836
1/1/2025	TK-04	325,000	139	5.5608	978.1631	416.2204	1,394.3836

Emission Report Oil and Gas for 2025 Annual				
Site: TwinStateRichardtonND, TwinStateRichar				
Equations for this site: After 2020 AP-42 revisior				
		Speciated Total Emissions components in the "Oil & Gas" set (lbs/yr)		
Start Date/Time	Tank ID	Pentane (n-)	BioDiesel Solvent	Water
1/1/2025	TK-01	1,177.5591	0.0442	216.7803
1/1/2025	TK-02	1,177.5591	0.0442	216.7803
1/1/2025	TK-03	1,177.5591	0.0442	216.7803
1/1/2025	TK-04	1,177.5591	0.0442	216.7803

Air Permit to Construct - New

version 1.3

(Submission #: HQG-NEDF-TNAN8, version 1)

Details

Submission ID HQG-NEDF-TNAN8

Form Input

Form Instructions

General Process for all Pre-Construction Permitting

NOTE: At the very minimum, an application should include the following items:

1. A written description of the proposed project and the facility including site diagrams (if a physical change is proposed) and applicable process descriptions and technical specifications.

2. A summary of Hazardous Air Pollutant emissions and compliance with the Air Toxics Policy.

3. A written section addressing Title V and PSD applicability.

4. A summary of state and federal rule applicability including a listing of any New Source Performance Standards (NSPS, see 40 CFR 60) and National Emission Standards for Hazardous Air Pollutants (NESHAP, see 40 CFR 63) subparts that apply.

5. A statement addressing any dispersion modeling requirements for Criteria Pollutants or Air Toxics and the inclusion of any required modeling analysis with a complete method description in accordance with the State Air Quality Analysis Guide or Department guidance.

6. All Applicable Air Quality Permit Application forms.

7. The $325 Permit to Construct filing fee payment per NDAC 33.1-15-23-02.
Additional Pre-Construction Permitting Information

Section A - Applicant Information

Applicant

First Name	Last Name
W. Scott	Tinsman III

Title
Founder & CTO

Phone Type	Number	Extension
Business	563-359-3624	

Email
Scott3@tsenv.com

Section B - Source Information

Permit Application for Air Contaminant Sources

Follow link to complete form SFN 8516 and upload below. If this form is already included in your application package, please upload complete application in Section D instead of this Section.
Link to SFN 8516 - Permit Application for Air Contaminant Sources

Upload form SFN 8516

NONE PROVIDED

Comment

NONE PROVIDED

Section C - Source Location

Facility Name

Twin State Environmental Richardton Facility

Click the link below to use Google Maps to find the lat/long for a given address

Google Maps

Facility Location:

46.877772,-102.334124

Section D - File Upload

File Upload

Select and upload applicable SFN permit forms, from the list below, to detail information provided in Section D of SFN 8516.

DO NOT ADD CONFIDENTIAL INFORMATION to this form. If you have Confidential Information see NDAC 33.1-15-14-01-16.
NDAC 33.1-15-14-01-16

Please also remember to upload all additional documents necessary to meet Steps 1-5 of the Form Instructions Section.

Additional Forms

NONE PROVIDED

Attachments

TwinStateRichardtonConstructionPermitApplication 11-28-2025.pdf - 11/28/2025 06:43 AM

Comment

NONE PROVIDED