PLAINS
PIPELINE, L.P.

AUG 2014
Received
Air Quality

August 21, 2014

Mr Terry O'Clair
North Dakota Department of Health
Division of Air Quality
918 East Divide Avenue
Bismarck, ND 58501

Dear Mr. O'Clair:

Plains Pipeline, L.P. currently operates a minor facility source under permit no. 09019 for the Robinson Lake Crude Oil Station near New Town, ND in Mountrail County. Plains wishes to add one 150,000 bbl tank to the facility with throughput of 70,000 bpd (25,550,000 bpy). An existing 20,000 bbl tank will remain unchanged.

Because potential emissions for the facility would exceed 100 TPY with addition of the new tank, Plains proposes to reduce the tank throughput on the four 400 bbl truck tanks from a maximum capacity of 350 bph to a Federally enforceable limit of 300 bph (26,280,000 bpy) which would change the facility to a synthetic minor status.

Overall emissions would increase from 96.43 TPY to 97.53 TPY with the changes proposed.

A check for the $150 application fee for the additional tank will be sent in a separate mailing.

If you have any additional questions or comments, I can be reached at (701) 575-4254 ext. 34.

Respectfully,

Daniel Holli

Daniel Holli
Environmental Specialist

P. O. Box 708 ■ Belfield, ND 58622 ■ 701-575-4254

Robinson Lake Crude Oil Truck Station Process Description

The Robinson Lake Crude Oil Station is comprised of four 400 bbl truck unloading tanks and one 20,000 bbl pipeline tank. This proposed change will add one additional 150,000 bbl tank to the facility for volume to help with pipeline capacity.

Because uncontrolled emissions would exceed 100 TPY, Federally enforceable limits of 300 bph will be requested for the four truck tanks to ensure emissions stay below this limit. Throughput on these tanks has historically been below 120 bph.

Throughput

The four 400 bbl tanks will have a reduced throughput of 300 bph for all four tanks combined. The flow rate from the existing 20,000 bbl tank will remain unchanged at 56,800 bbl/day. The additional tank will have a throughput of 70,000 bbl/day.

RVP for the crude oil will be 12 psi.

Fugitive Emission Estimates

In estimating fugitive emissions, all equipment is assumed to be in service 8760 hours per year. Emission estimates were derived from a document entitled *Air Permit Technical Guidance for Chemical Sources: Equipment Leak Fugitives, Draft October 2000.*

The Oklahoma DEQ uses the factors presented in this publication for Oklahoma permitting issues. According to the attached e-mail, the OK DEQ considers the factors for weathered crude oil > 20° API gravity as heavy oil with the exception of condensate. Condensate is typically defined as liquids that condense from natural gas wellhead gas.

Plains Pipeline proposes to use heavy oil factors as shown on the *Air Permit Technical Guidance for Chemical Sources: Equipment Leak Fugitives, Draft October 2000* for fugitive emissions calculations for components and fittings in VOC service. The calculations are attached.

Robinson Lake Station Potential Emissions

PTC-09018, PTC-11017, Amendment 1 Request to PTC-11017, Amendment Request 2 to PTC-11017, and Permit 98003

TPY

Emission Point	EUI No	VOC	H2S*	Throughput (bbl/yr)
20,000 bbl tank	1	7.72	0.001	20,732,000
400 bbl tank	2	20.24	0.002	657,000
400 bbl tank	3	20.24	0.002	657,000
400 bbl tank	2	20.24	0.002	657,000
400 bbl tank	3	20.24	0.002	657,000
150,000 bbl tank		8.69	0.001	25,550,000
Fugitives	Fug	0.16	0.000	N/A
Total Emissions		97.53	0.01	

* H2S is based on an estimate of 100 ppm in the vapor phase.

Lb/hr

Emission Point	EUI No	VOC	H2S
20,000 bbl tank	1	1.76	0.000
400 bbl tank	2	4.62	0.000
400 bbl tank	3	4.62	0.000
400 bbl tank	2	4.62	0.000
400 bbl tank	3	4.62	0.000
150,000 bbl tank	3	1.98	0.000
Fugitives	Fug	0.04	0.000
Total Emissions		22.27	0.00

Emission Point	EUI No	Basis of Estimate
Tanks	1-3	Tanks 4.0.9d
Fugitives	FUG	TCEQ Air Permit Technical Guidance for Chemical Sources:
		Equipment Leak fugitives, Draft october 2000

PERMIT APPLICATION FOR AIR CONTAMINANT SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8516 (06-13)

SECTION A - FACILITY INFORMATION

Name of Firm or Organization Plains Pipeline		
Contact Person for Air Pollution Matters Daniel Holli		
Title Environmental Specialist	Telephone Number 701-575-4254 x 34	E-mail Address djholli@paalp.com
Applicant's Name Daniel Holli		
Title Environmental Specialist	Telephone Number 701-575-4254 x 34	E-mail Address djholli@paalp.com
Mailing Address (Street & No.) P.O. Box 708		
City Belfield	State ND	ZIP Code 58622
Facility Address (Street & No.) 4498 Hwy 8		
City New town	State ND	ZIP Code 58763
County Mountrail	Latitude (Nearest Second) 48.066064	Longitude (Nearest Second) -102.350012
Legal Description of Facility Site NW ¼ NW ¼, 23 Section 153N Twp. 91W Range	Land Area at Facility Site 5 Acres (or) Sq. Ft.	MSL Elevation at Facility 2200

SECTION B – GENERAL NATURE OF BUSINESS

Describe Nature of Business	North American Industry Classification System Number	Standard Industrial Classification Number (SIC)
Crude Oil Pipeline	48611	4612

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 November 1, 2014	Planned End Construction Date August 30, 2015

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	20,000 bbl tank	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑
2-5	four 400 bbl tanks	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
Fug	Fugitives	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
	150,000 bbl tank	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Add additional pages if necessary

SECTION E – IDENTIFICATION OF AIR CONTAMINANTS

Check all which are emitted in measurable quantities into the atmosphere from any operation at facility

☐ Arsenic	☐ Chlorine Compounds	☐ Sulfur Compounds	☐ Radioisotopes
☐ Asbestos	☐ Chromium Compounds	☑ Hydrogen Sulfide	☐ Visible Emissions
☐ Beryllium	☐ Fluoride Compounds	☐ Odors	☑ Particulates (specify)
☐ Cadmium	☑ Volatile Organic Compounds	☐ Carbon Monoxide	☐ Dust
☐ Lead	☐ Other Organic Compounds	☐ Nitrogen Compounds	☐ Silica
☐ Mercury	☐ Greenhouse Gases (CO_2e)	☐ Pesticides	☐ Other (specify)

List Specific Compounds
Crude oil VOC, Road dust particulates, Hydrogen Sulfide

Has Source Testing Been Done at the Facility?	Last Date when a Testing Program was Completed	If Program is Continuous, Give Approximate Testing Frequency
☐ Yes ☑ No		

SECTION F1 – ADDITIONAL FORMS

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

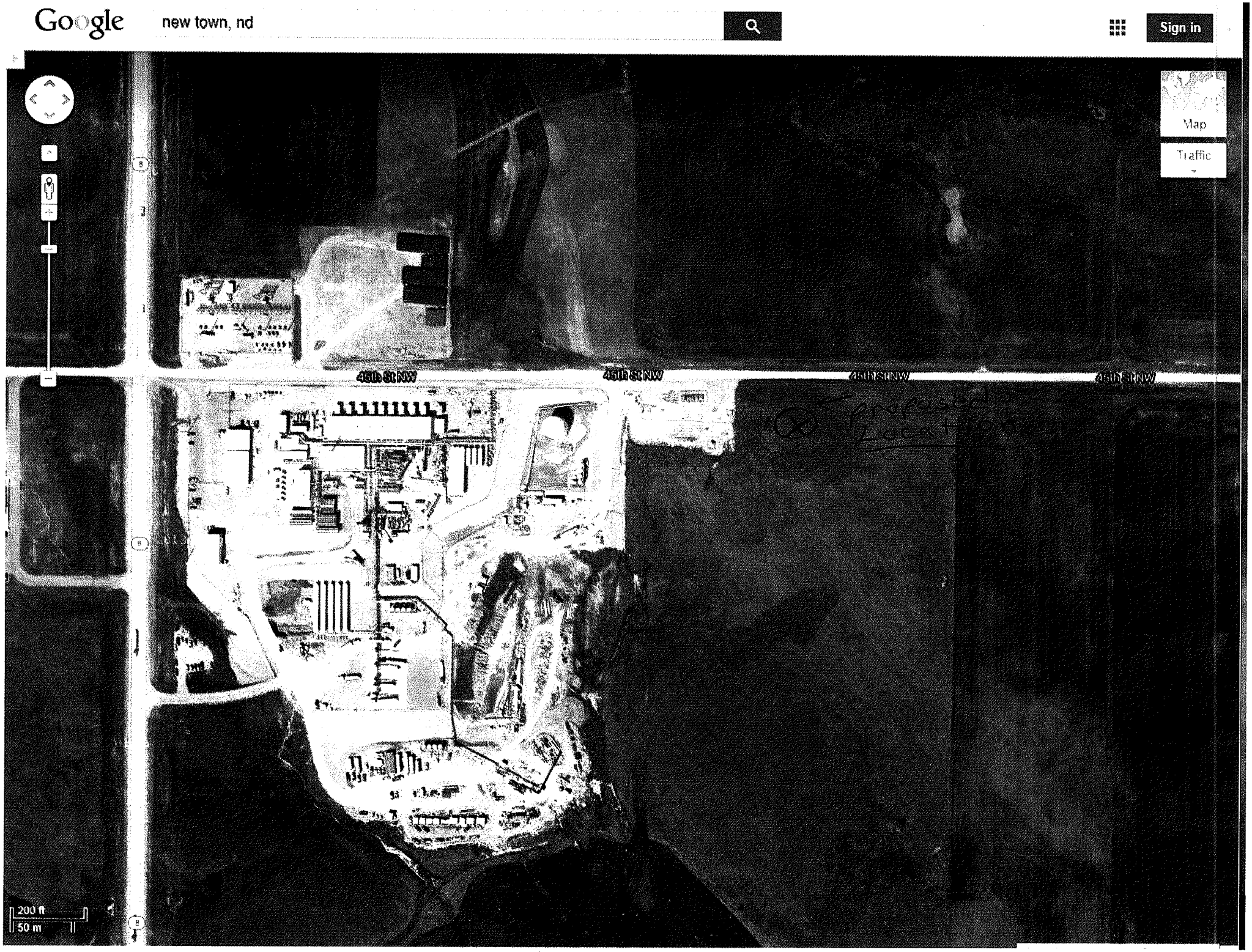
☐ Air Pollution Control Equipment (SFN 8532)	☐ Fuel Burning Equipment Used for Indirect Heating (SFN 8518)
☐ Construct/Operate Incinerators (SFN 8522)	☐ Hazardous Air Pollutant (HAP) Sources (SFN 8329)
☐ Natural Gas Processing Plants (SFN 11408)	☐ Manufacturing or Processing Equipment (SFN 8520)
☐ Glycol Dehydration Units (SFN 58923)	☑ Volatile Organic Compounds Storage Tank (SFN 8535)
☐ Flares (SFN 59652)	☐ Internal Combustion Engines and Turbines (SFN 8891)
☐ Rock, Sand, and Gravel Plants (SFN 8530)	☐ Oil/Gas Production Facility Registration (SFN 14334)
☐ Asphalt Concrete Plants (SFN 8526)	☐ Grain, Feed, and Fertilizer Operations (SFN 8524)

SECTION F2 – OTHER ATTACHMENTS INCLUDED AS PART OF THIS APPLICATION

1.	Tanks 4.09d calculations for 150,000 bbl tank	4.	
2.	Tanks 4.09d calculation for four 400 bbl tanks	5.	
3.	Fugitive VOC calculations for valves and components	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 Health 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 23-25 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 of Applicant	Date
Daniel Holly	8/21/14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proposed
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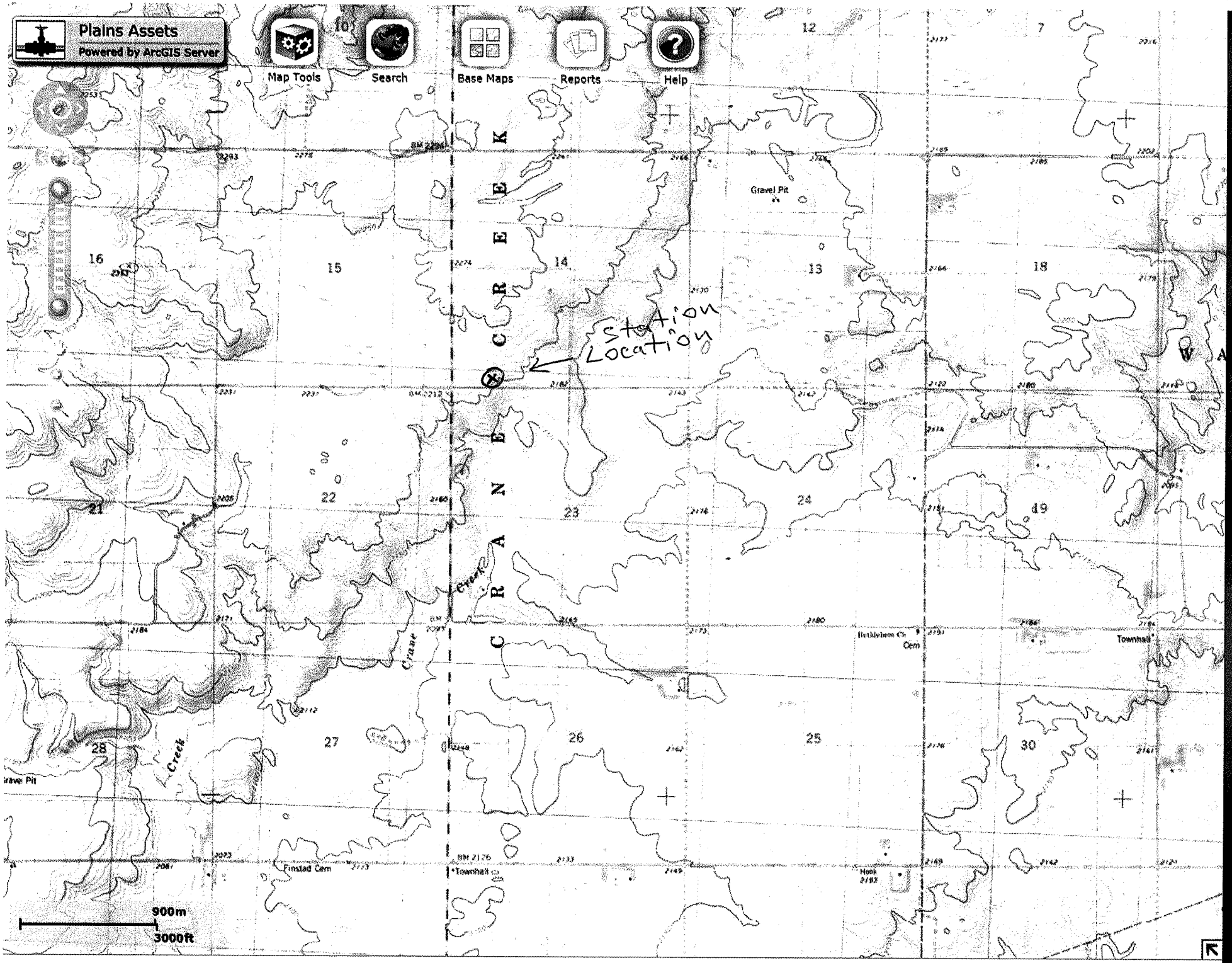
Plains Assets
Powered by ArcGIS Server
Map Tools
Search
Base Maps
Reports
Help
Station Location
CRANE CREEK
Gravel Pit
Crane Creek
Creek
Finstad Cem
Townhall
Hook
Cem
900m
3000ft
100%

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – GENERAL INFORMATION

Name of Firm or Organization Plains Pipeline, LP		
Applicant's Name Daniel Holli		
Title Environmental specialist	Telephone Number 701-575-4254 x 34	E-mail Address djholli@paalp.com
Mailing Address (Street & No.) P.O. Box 708		
City Belfield	State ND	ZIP Code 58622
Contact Person for Air Pollution Matters Daniel Holli		
Title Environmental specialist	Telephone Number 701-575-4254 x 34	E-mail Address djholli@paalp.com

SECTION B – TANK DATA

Legal Description of Facility Site NW ¼ NW ¼ 23 Section 153 N Twp. 91 W Range				
County Mountrail		Source ID Number 4612 -- 48611		
Capacity	Barrels 150,000		Gallons 6,300,000	
Dimensions	Diameter 150'	Height 48'	Length	Width
Shape	■ Cylindrical	☐ Spherical	☐ Other – Specify:	
Materials of Construction	(i.e., steel) Steel			
Construction	☐ Riveted	■ Welded	☐ Other – Specify:	
Color				
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:
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.

Crude Oil -- API 45

SECTION D – VAPOR DISPOSAL

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

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure 9.56	Maximum Reid Vapor Pressure 12

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) N/A	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) N/A
Average Throughput (barrels per day or gallons per day) 70,000 bpd	Tank Turnovers per Year 170.33

SECTION G – SOLUTION STORAGE

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

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
VOC	1.98	8.69	Tanks 4.0.9d

* 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

Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ◉ Yes ○ No – Explain:

Signature of Applicant	Date
Daniel Holli	8/21/14

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Robinson lake 150,000
City:	Robinson Lake
State:	North Dakota
Company:	Plains Pipeline, L.P.
Type of Tank:	Internal Floating Roof Tank
Description:	150,000 bbl tank

Tank Dimensions

Diameter (ft):		150.00
Volume (gallons):		6,300,000.00
Turnovers:		170.33
Self Supp. Roof? (y/n):	N	
No. of Columns:		9.00
Eff. Col. Diam. (ft):		1.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Mechanical Shoe
Secondary Seal	None

Deck Characteristics

Deck Fitting Category:	Typical	
Deck Type:	Bolted	
Construction:	Sheet	
Deck Seam:	Sheet: 5 Ft Wide	
Deck Seam Len. (ft):		3,534.29

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	9
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1
Roof Leg or Hanger Well/Adjustable	58
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Stub Drain (1-in. Diameter)/Slit Fabric Seal 10% Open	180
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Williston, North Dakota (Avg Atmospheric Pressure = 13.82 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Robinson lake 150,000 - Internal Floating Roof Tank
Robinson Lake, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Crude Oil (RVP 12)	All	43.08	37.17	48.98	41.45	7.2732	N/A	N/A	50.0000			207.00	Option 4: RVP=12

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Robinson lake 150,000 - Internal Floating Roof Tank
Robinson Lake, North Dakota

Annual Emission Calcaulations

Rim Seal Losses (lb):	3,213.2757
Seal Factor A (lb-mole/ft-yr):	5.8000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.3000
Value of Vapor Pressure Function:	0.1847
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.2732
Tank Diameter (ft):	150.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000
Product Factor:	0.4000
Withdrawal Losses (lb):	7,253.0105
Number of Columns:	9.0000
Effective Column Diameter (ft):	1.0000
Annual Net Throughput (gal/yr.):	1,073,079,000.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0060
Average Organic Liquid Density (lb/gal):	7.1000
Tank Diameter (ft):	150.0000
Deck Fitting Losses (lb):	4,585.0120
Value of Vapor Pressure Function:	0.1847
Vapor Molecular Weight (lb/lb-mole):	50.0000
Product Factor:	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	1,241.4000
Deck Seam Losses (lb):	2,326.8556
Deck Seam Length (ft):	3,534.2900
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.1400
Deck Seam Length Factor(ft/sqft):	0.2000
Tank Diameter (ft):	150.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000
Product Factor:	0.4000
Total Losses (lb):	17,378.1537

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1	36.00	5.90	1.20	132.9631
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	51.7079
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	9	47.00	0.00	0.00	1,562.3168
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1	76.00	0.00	0.00	280.6999
Roof Leg or Hanger Well/Adjustable	58	7.90	0.00	0.00	1,692.3252
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1	12.00	0.00	0.00	44.3210
Stub Drain (1-in. Diameter)/	180	1.20	0.00	0.00	797.7788
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	22.8992

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Robinson lake 150,000 - Internal Floating Roof Tank
Robinson Lake, North Dakota

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Crude Oil (RVP 12)	3,213.28	7,253.01	4,585.01	2,326.86	17,378.15

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – GENERAL INFORMATION

Name of Firm or Organization Plains Pipeline, LP		
Applicant's Name Daniel Holli		
Title Environmental Specialist	Telephone Number 701-575-4254 x 34	E-mail Address djholli@paalp.com
Mailing Address (Street & No.) P.O. Box 708		
City Belfield	State ND	ZIP Code 58622
Contact Person for Air Pollution Matters Daniel Holli		
Title Environmental Specialist	Telephone Number 701-575-4254 x 34	E-mail Address djholli@paalp.com

SECTION B – TANK DATA

Legal Description of Facility Site NW ¼ NW ¼ 23 Section 153 N Twp. 91 W Range				
County Mountrail		Source ID Number 4612 -- 48611		
Capacity	Barrels 400		Gallons 16,800	
Dimensions	Diameter 12'	Height 20'	Length	Width
Shape	■ Cylindrical	☐ Spherical	☐ Other – Specify:	
Materials of Construction	(i.e., steel) Steel			
Construction	☐ Riveted	■ Welded	☐ Other – Specify:	
Color				
Condition	■ Good	☐ Fair	☐ Poor	
Status	☐ New Construction	☐ Alteration	■ Existing (Give Date Constructed): 2011 / 2012	
Type of Tank	■ Fixed Roof ☐ Variable Vapor Space ☐ Pressure (low or high)		☐ External Floating ☐ Internal Floating ☐ Other – Specify:	
Type of Roof	☐ Pan	☐ Double Deck	☐ Pontoon	☐ Other – Specify:
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.

Crude Oil -- API 45

SECTION D – VAPOR DISPOSAL

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

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure 9.56	Maximum Reid Vapor Pressure 12

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) N/A	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) N/A
Average Throughput (barrels per day or gallons per day) 1,800 bpd per tank	Tank Turnovers per Year 1642.5 per tank

SECTION G – SOLUTION STORAGE

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

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
VOC	4.62	20.24	Tanks 4.0.9d

* 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

Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ◉ Yes ○ No – Explain:

Tanks are exempted from Kb

Signature of Applicant	Date
Daniel Holly	8/21/14

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Nexen Robinson Lake 400 bbl tank
City:	Robinson Lake
State:	North Dakota
Company:	Plains Marketing, L.P.
Type of Tank:	Vertical Fixed Roof Tank
Description:	400 bbl tank

Tank Dimensions

Shell Height (ft):		20.00
Diameter (ft):		12.00
Liquid Height (ft) :		20.00
Avg. Liquid Height (ft):		10.00
Volume (gallons):		16,920.59
Turnovers:		1,642.50
Net Throughput(gal/yr):		27,792,073.12
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good
Roof Color/Shade:	Gray/Medium
Roof Condition:	Good

Roof Characteristics

Type:	Cone	
Height (ft)		0.00
Slope (ft/ft) (Cone Roof)		0.06

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.00

Meterological Data used in Emissions Calculations: Williston, North Dakota (Avg Atmospheric Pressure = 13.82 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Nexen Robinson Lake 400 bbl tank - Vertical Fixed Roof Tank
Robinson Lake, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Crude Oil (RVP 12)	All	49.69	39.44	59.95	44.51	8.1154	6.8398	9.5641	50.0000			207.00	Option 4: RVP=12
2,2,4-Trimethylpentane (isooctane)						0.4394	0.3196	0.5948	114.2300	0.0010	0.0002	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						0.8713	0.6415	1.1662	78.1100	0.0060	0.0027	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0751	0.0511	0.1083	106.1700	0.0040	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						1.4538	1.0911	1.9109	86.1700	0.0040	0.0030	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene (cumene; corrected)						0.0324	0.0214	0.0480	120.2000	0.0010	0.0000	120.20	Option 2: A=6.93666, B=1460.793, C=207.78
Toluene						0.2376	0.1684	0.3296	92.1300	0.0100	0.0012	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						8.8452	8.8303	8.8315	49.8387	0.9600	0.9923	217.56	
Xylene (-m)						0.0623	0.0422	0.0902	106.1700	0.0140	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Nexen Robinson Lake 400 bbl tank - Vertical Fixed Roof Tank
Robinson Lake, North Dakota

Annual Emission Calcaulations

Standing Losses (lb):	3,234.4691
Vapor Space Volume (cu ft):	1,145.1105
Vapor Density (lb/cu ft):	0.0742
Vapor Space Expansion Factor:	0.5582
Vented Vapor Saturation Factor:	0.1867
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,145.1105
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	10.1250
Tank Shell Height (ft):	20.0000
Average Liquid Height (ft):	10.0000
Roof Outage (ft):	0.1250
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1250
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0742
Vapor Molecular Weight (lb/lb-mole):	50.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.1154
Daily Avg. Liquid Surface Temp. (deg. R):	509.3644
Daily Average Ambient Temp. (deg. F):	41.4292
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	504.1792
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,217.5000
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.5582
Daily Vapor Temperature Range (deg. R):	41.0192
Daily Vapor Pressure Range (psia):	2.7243
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.1154
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	6.8398
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	9.5641
Daily Avg. Liquid Surface Temp. (deg R):	509.3644
Daily Min. Liquid Surface Temp. (deg R):	499.1096
Daily Max. Liquid Surface Temp. (deg R):	519.6192
Daily Ambient Temp. Range (deg. R):	24.7750
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.1867
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	8.1154
Vapor Space Outage (ft):	10.1250
Working Losses (lb):	37,241.3575
Vapor Molecular Weight (lb/lb-mole):	50.0000
Vapor Pressure at Daily Average Liquid	

Surface Temperature (psia):	8.1154
Annual Net Throughput (gal/yr.):	27,792,073.1156
Annual Turnovers:	1,642.5000
Turnover Factor:	0.1849
Maximum Liquid Volume (gal):	16,920.5925
Maximum Liquid Height (ft):	20.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	0.7500

Total Losses (lb):	40,475.8266

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Nexen Robinson Lake 400 bbl tank - Vertical Fixed Roof Tank
Robinson Lake, North Dakota

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Crude Oil (RVP 12)	37,241.36	3,234.47	40,475.83
2,2,4-Trimethylpentane (isooctane)	8.35	0.72	9.07
Benzene	99.32	8.63	107.95
Isopropyl benzene (cumene; corrected)	0.61	0.05	0.67
Ethylbenzene	5.71	0.50	6.20
Hexane (-n)	110.48	9.60	120.08
Toluene	45.14	3.92	49.06
Xylene (-m)	16.58	1.44	18.02
Unidentified Components	36,955.16	3,209.61	40,164.78

Robinson Lake Fugitive Emission Calculations (November, 1995)

SOURCE DESCRIP.	SOURCE COUNT	SERVICE	Emission Factor[c] (lb/hr/component)		Emission Factor (lb/day/component)	(VOC) %	lbs/hr	tons/yr
Connector	0	gas	4.40E-04	=	1.06E-02	100.00%	0.0000	0.00
Flange	0	gas	8.60E-04	=	2.06E-02	100.00%	0.0000	0.00
Open-ended line	0	gas	4.40E-03	=	1.06E-01	100.00%	0.0000	0.00
Other[a]	0	gas	1.90E-02	=	4.56E-01	100.00%	0.0000	0.00
Pump	0	gas	5.30E-03	=	1.27E-01	100.00%	0.0000	0.00
Valve	0	gas	9.90E-03	=	2.38E-01	100.00%	0.0000	0.00
Connector	100	heavy oil (<20 API Gravity)	1.70E-05	=	4.08E-04	100.00%	0.0017	0.01
Flange	2,100	heavy oil (<20 API Gravity)	8.60E-07	=	2.06E-05	100.00%	0.0018	0.01
Open-ended line	15	heavy oil (<20 API Gravity)	3.10E-04	=	7.44E-03	100.00%	0.0047	0.02
Other[a]	20	heavy oil (<20 API Gravity)	7.00E-05	=	1.68E-03	100.00%	0.0014	0.01
Pump[d]	16	heavy oil (<20 API Gravity)	1.10E-03	=	2.64E-02	100.00%	0.0176	0.08
Valve	550	heavy oil (<20 API Gravity)	1.90E-05	=	4.56E-04	100.00%	0.0105	0.05
Connector		light oil (>=20 API Gravity)	4.60E-04	=	1.10E-02	100.00%	0.0000	0.00
Flange		light oil (>=20 API Gravity)	2.40E-04	=	5.76E-03	100.00%	0.0000	0.00
Open-ended line		light oil (>=20 API Gravity)	3.10E-03	=	7.44E-02	100.00%	0.0000	0.00
Other[a]		light oil (>=20 API Gravity)	1.70E-02	=	4.08E-01	100.00%	0.0000	0.00
Pump		light oil (>=20 API Gravity)	2.90E-02	=	6.96E-01	100.00%	0.0000	0.00
Valve		light oil (>=20 API Gravity)	5.50E-03	=	1.32E-01	100.00%	0.0000	0.00
Connector	0	water/oil[b]	2.40E-04	=	5.76E-03	100.00%	0.0000	0.00
Flange	0	water/oil[b]	6.40E-06	=	1.54E-04	100.00%	0.0000	0.00
Open-ended line	0	water/oil[b]	5.50E-04	=	1.32E-02	100.00%	0.0000	0.00
Other[a]	0	water/oil[b]	3.10E-02	=	7.44E-01	100.00%	0.0000	0.00
Pump	0	water/oil[b]	5.30E-05	=	1.27E-03	100.00%	0.0000	0.00
Valve	0	water/oil[b]	2.20E-04	=	5.28E-03	100.00%	0.0000	0.00
						Totals:	0.0376	**0.16**

[a]The "other" equipment type includes compressors, pressure relief valves, relief valves, diaphragms, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, and vents.
This "other" equipment type should be applied for any equipment type other than connectors, flanges, open-ended lines, pumps, or valves.

[b]Water/Oil emission factors apply to water streams in oil service with a water content greater than 50%, from the point of origin to the point where the water content reaches 99%. For water streams with a water content greater than 99%, the emission rate is considered negligible.

[c]These factors are for total organic compound emission rates (including non-VOC's such as methane and ethane) and apply to light crude, heavy crude, gas plant, gas production and off shore facilities.

[d]Not enough data was available to develop the indicated emission factor.
This is a suggested factor from a January 10, 1996 TCEQ memorandum.

Basis: All Pipeline valves , flanges , compressor seals, and pumps.
Emission Factors were taken from "Air Permit Technical Guidance for Chemical Sources: Equipment Leak fugitives"
The operation time used for the facility is: 24 hrs/day x 7 days/wk x 52 wks/yr OR 8760 hrs/yr

NOTE: These calculations are taken from "Air Permit Technical Guidance for Chemical Sources: Equipment Leak fugitives" Draft released in October 2000

Example Calculation:

VOC Emissions (lbs/hr) = (source count) x (VOC content, %) / (100) x (emission factor lbs/day/source) / (24 hrs/day)