

APPENDIX B

INSIGNIFICANT EMISSIONS

Insignificant Emissions – Supporting Information

Emergency Generator

Emergency generator emissions calculations are provided to demonstrate that the generator is an insignificant source. The calculations were prepared using the AP-42 emission factors for a four-cycle, rich-burn engine found in Table 3.2-1 of Section 3.2 (Heavy-duty natural Gas-fired Pipeline Compressor Engines and Turbines) and assuming 500 hours of operation per year.

TEG Dehydrator Reboilers (associated with Units 4-7)

The NO_x, CO, and VOC emissions from dehydrator reboilers (associated with Units 4-7) are based on emission factors provided by the manufacturers In Fab and Enertek. For each pollutant, the worst case emission factor was selected. A copy of the calculations and the manufacturers' data sheets are provided as supporting documentation.

Storage Tanks

The tank list was updated and working and breathing losses for the storage tanks were re-calculated using TANKS 4.0.9b, the most recent version of this program. All tanks, with the exception of the two 100-bbl condensate tanks (T-11 and T-12) are insignificant sources and there are no flash emissions associated with these tanks. The TANKS 4.0.9b output files are provided in this appendix.

Potential To Emit

Source: Natural Gas Generator Exhaust
 Company: Williams Field Services Company
 Site: Ojito Compressor Station
 Date: August 2001

Source	Pollutant	Emission Factor (lb/hp-hr) EF	Rating (hp) R	Operating Time (hr/yr) OP	(ton/yr)	Emission Rate (lb/hr) ER	(g/sec)
Natural gas generator	NOx	2.20E-02	180	500	0.99	3.96	0.4989
	CO	1.90E-02	180	500	0.86	3.42	0.4309
	VOC	3.09E-04	180	500	0.01	0.06	0.0070

Source of Data:

Emission Factor: AP-42, Fifth Edition, Section 3.2, 10/96
 Heavy-duty Natural Gas-fired Pipeline Compressor Engines and Turbines
 Table 3.2-1
 Williams Field Services Company
 Williams Field Services Company
 Calculated

Rating:

Operating Time:

Emission Rate:

Notes:

The generator is equipped with a four-cycle, rich-burn engine. The design rating of the engine is 180 hp.
 PM10 and SO2 emissions are assumed to be negligible.

Equations:

Emission Rates:

$$\left(\frac{\text{EF}}{\text{hp-hr}} \right) (\text{R hp}) \left(\frac{\text{OP hr}}{\text{yr}} \right) \left(\frac{1 \text{ ton}}{2,000 \text{ lb}} \right) = \text{ER} \left(\frac{\text{ton}}{\text{yr}} \right)$$

$$\left(\frac{\text{EF}}{\text{hp-hr}} \right) (\text{R hp}) = \text{ER} \left(\frac{\text{lb}}{\text{hr}} \right)$$

$$\left(\frac{\text{ER}}{\text{hr}} \right) \left(\frac{45359 \text{ g}}{\text{lb}} \right) \left(\frac{1 \text{ hr}}{3,600 \text{ sec}} \right) = \text{ER} \left(\frac{\text{g}}{\text{sec}} \right)$$

Emissions Calculations

Source: **Dehydrator Reboilers (4b - 7b)**
 Company: **Williams Four Corners, LLC**
 Facility: **Ojito Compressor Station**

Source	Pollutant	Emission Factor	Operating Time	Emission Rate	
		(lb/day) EF	(day/yr) OP	(ton/yr)	(lb/hr)
Reboiler	NOX	1.03	365	0.19	0.04
	CO	1.07	365	0.20	0.04
	VOC	0.31	365	0.06	0.01

Equations:

$$\left(EF \frac{\text{lb}}{\text{day}} \right) \left(OP \frac{\text{day}}{\text{yr}} \right) \left(\frac{1 \text{ ton}}{2,000 \text{ lb}} \right) = ER \left(\frac{\text{ton}}{\text{yr}} \right)$$

$$\left(EF \frac{\text{lb}}{\text{day}} \right) \left(\frac{1 \text{ day}}{24 \text{ hr}} \right) = ER \left(\frac{\text{lb}}{\text{hr}} \right)$$

Source of Data:

Emission Factor: **Manufacturer (InFab and Enertek)**
 Operating Time: **Williams Four Corners, LLC**
 Emission Rate: **Calculated**

Notes:

Emission factors were taken from letters provided by InFab and Enertek. For each pollutant, the worst case emission factor was selected.

31 87
 JUN 29 '95 04:13PM WILLIAMS FIELD SVCS.

P.1/1

Oil and Gas
 Production Equipment
 J. Enervek, Inc.
 4901 East Main Street
 Farmington, NM 87401
 505/326-1151
 FAX: 505/326-0317



VIA FACSIMILE
 Fax No. (801) 334-7768
 Pages: 1

August 19, 1994

Mr. Lee Sauris
 Williams Field Services
 Salt Lake City, UT

The following table shows the stack emissions at maximum firing conditions for the dehydrators noted:

Dehydrator	NO _x #/DAY	CO #/DAY	Fuel SCFH	Total Stack Class. ACEH	Stack Ht. Ft	Stack Dia Inches	Stack Temp. F	Stack Velocity, FPM
J2P10M11109	0.86	0.17	357	10010	12'-8"	8	600	5.1
J2P10M749	1.03	0.21	429	12012	19'-1"	10	600	6.1
J2P12M11109	0.86	0.17	357	10010	12'-8"	8	600	5.1
J2P12M749	1.03	0.21	429	12012	19'-1"	10	600	6.1
J3P20M11109	1.03	0.21	429	12012	19'-1"	10	600	6.1

Please call me if you need additional information.

Sincerely,

F. Heath
 Frosty Heath

FH/nh



5928 U.S. Highway 64
Farmington, NM 87401

Office: (505)632-2200
Fax: (505)632-8070

July 22, 1998

Mr. Bobby Myers
Williams Field Services
Environmental Affairs
295 Chipeta Way
P O Box 58900
Salt Lake City, UT 84158-0900

The table shown below gives the stack emissions for our larger dehydrators:

Unit Description	SO lb/day	NO _x lb/ Day	CO lb/ Day	Fuel SCFH	Total Organic Comp. Lb/d	Stack HL Ft.	Stack Dia inches	Stack Temp °F	Stack Velocity
10 MM LP	.01	.27	.45	659	.13	10'	8	600	5.1
10 MM HP	.01	.27	.43	659	.13	10'	10	600	6.1
12 MM LP	.02	.49	.78	1208	.25	10'	8	600	5.1
12 MM HP	.02	.49	.78	1208	.25	10'	10	600	6.1
15 MM	.02	.54	.85	1518	.25	10'	8	600	5.1
20 MM LP	.02	.67	1.07	1648	.31	10'	8	600	5.1
20 MM HP	.02	.67	1.07	1648	.31	10'	12	600	6.1

If you need any additional information please call me.

Sincerely,

Darby West
Darby West
VP Engineering

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

Identification

User Identification: 210 bbl Gasoline
 City: Bloomfield
 State: NM
 Company: Williams
 Type of Tank: Vertical Fixed Roof Tank
 Description: Ojito

Tank Dimensions

Shell Height (ft): 13.00
 Diameter (ft): 11.00
 Liquid Height (ft): 12.00
 Avg. Liquid Height (ft): 7.00
 Volume (gallons): 8,530.80
 Turnovers: 7.00
 Net Throughput(gal/yr): 59,715.59
 Is Tank Heated (y/n): N

Paint Characteristics

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

Roof Characteristics

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

Breather Vent Settings

Vacuum Settings (psig): -0.03
 Pressure Settings (psig): 0.03

Meteorological Data used in Emissions Calculations: Albuquerque, New Mexico (Avg Atmospheric Pressure = 12.15 psia)

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

210 bbl Gasoline - Vertical Fixed Roof Tank
Bloomfield, NM

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)		Liquid Bulk Temp (deg F)	Vapor Pressure (psia)		Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.		Max.	Min.					
Gasoline (RVP 10)	All	64.94	53.24	76.64	5.7019	4.5407	7.0892	66.0000		92.00	Option 4: RVP=10, ASTM Slope=3

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

210 bbl Gasoline - Vertical Fixed Roof Tank
Bloomfield, NM

Annual Emission Calculations	
Standing Losses (lb):	2,365.2256
Vapor Space Volume (cu ft):	561.0883
Vapor Density (lb/cu ft):	0.0668
Vapor Space Expansion Factor:	0.4751
Vented Vapor Saturation Factor:	0.3511
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	581.0883
Tank Diameter (ft):	11.0000
Vapor Space Outage (ft):	6.1148
Tank Shell Height (ft):	13.0000
Average Liquid Height (ft):	7.0000
Roof Outage (ft):	0.1148
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1146
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	5.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0668
Vapor Molecular Weight (lb/lb-mole):	66.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.7019
Daily Avg. Liquid Surface Temp. (deg. R):	524.6094
Daily Average Ambient Temp. (deg. F):	56.1542
Ideal Gas Constant R (psia cu ft / (lb-mole-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	518.0542
Tank Paint Solar Absorptance (Shell):	0.8400
Tank Paint Solar Absorptance (Roof):	0.9400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,765.3167
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.4751
Daily Vapor Temperature Range (deg. R):	46.7876
Daily Vapor Pressure Range (psia):	2.5485
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.7019
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	4.5407
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	7.0892
Daily Avg. Liquid Surface Temp. (deg R):	524.6094
Daily Min. Liquid Surface Temp. (deg R):	512.9100
Daily Max. Liquid Surface Temp. (deg R):	536.3088
Daily Ambient Temp. Range (deg. R):	27.9250
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.3511
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.7019

Vapor Space Outage (ft): 6.1146

Working Losses (lb): 535.0594

Vapor Molecular Weight (lb/lb-mole): 66.0000

Vapor Pressure at Daily Average Liquid Surface Temperature (psia): 5.7018

Annual Net Throughput (gal/yr.): 59,715.5909

Turnover Factor: 7.0000

Maximum Liquid Volume (gal): 8,530.7987

Maximum Liquid Height (ft): 12.0000

Tank Diameter (ft): 11.0000

Working Loss Product Factor: 1.0000

Total Losses (lb): 2,900.2850

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

Emissions Report for: Annual

210 bbl Gasoline - Vertical Fixed Roof Tank
Bloomfield, NM

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Gasoline (RVP 10)	535.06	2,365.23	2,900.28

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

Identification
 User Identification: 500 gal Diesel Tank
 City: Bloomfield
 State: NM
 Company: Williams
 Type of Tank: Horizontal Tank
 Description: Ojito

Tank Dimensions
 Shell Length (ft): 6.00
 Diameter (ft): 4.00
 Volume (gallons): 500.00
 Turnovers: 24.00
 Net Throughput(gal/yr): 12,000.00
 Is Tank Heated (y/n): N
 Is Tank Underground (y/n): N

Paint Characteristics
 Shell Color/Shade: Gray/Light
 Shell Condition: Good

Breather Vent Settings
 Vacuum Settings (psig): -0.03
 Pressure Settings (psig): 0.03

Meteorological Data used in Emissions Calculations: Albuquerque, New Mexico (Avg Atmospheric Pressure = 12.15 psia)

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

500 gal Diesel Tank - Horizontal Tank
Bloomfield , NM

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Distillate fuel oil no. 2	All	64.94	53.24	76.64	56.39	0.0082	0.0054	0.0110	130.0000			188.00	Option 1: VP60 = .0074 VP70 = .008

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

500 gal Diesel Tank - Horizontal Tank
Bloomfield, NM

Annual Emission Calculations	
Standing Losses (lb):	0.2806
Vapor Space Volume (cu ft):	48.0243
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0847
Vented Vapor Saturation Factor:	0.8991
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	48.0243
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.5283
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	8.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0082
Daily Avg. Liquid Surface Temp. (deg. R):	524.6084
Daily Average Ambient Temp. (deg. F):	56.1542
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	518.0542
Tank Paint Solar Absorptance (Shell):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,765.3167
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0847
Daily Vapor Temperature Range (deg. R):	46.7976
Daily Vapor Pressure Range (psia):	0.0056
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0082
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0054
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0110
Daily Avg. Liquid Surface Temp. (deg R):	524.6084
Daily Min. Liquid Surface Temp. (deg R):	512.8100
Daily Max. Liquid Surface Temp. (deg R):	536.3088
Daily Ambient Temp. Range (deg. R):	27.8250
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8991
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0082
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	
Vapor Molecular Weight (lb/lb-mole):	0.3042
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	130.0000
Annual Net Throughput (gallyr.):	0.0082
	12,000.0000

Annual Turnovers:
Turnover Factor:
Tank Diameter (ft):
Working Loss Product Factor:

24.0000
1.0000
4.0000
1.0000

Total Losses (lb):

0.5648

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

Emissions Report for: Annual

**500 gal Diesel Tank - Horizontal Tank
Bloomfield , NM**

Components	Losses (lbs)		Total Emissions
	Working Loss	Breathing Loss	
Distillate fuel oil no. 2	0.30	0.28	0.58

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

Identification

User Identification: 1000 Lube Oil
 City: Bloomfield
 State: NM
 Company: Williams
 Type of Tank: Vertical Fixed Roof Tank
 Description: Ojito

Tank Dimensions

Shell Height (ft): 7.00
 Diameter (ft): 5.50
 Liquid Height (ft): 6.00
 Avg. Liquid Height (ft): 4.00
 Volume (gallons): 1,066.35
 Turnovers: 24.00
 Net Throughput(gall/yr): 25,592.40
 Is Tank Heated (y/n): N

Paint Characteristics

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

Roof Characteristics

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

Breather Vent Settings

Vacuum Settings (psig): -0.03
 Pressure Settings (psig): 0.03

Meteorological Data used in Emissions Calculations: Albuquerque, New Mexico (Avg Atmospheric Pressure = 12.15 psia)

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

1000 Lube Oil - Vertical Fixed Roof Tank
Bloomfield, NM

Mixture/Component	Month		Daily Liquid Surf. Temperature (deg F)		Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
	Avg.	Min.	Max.	Avg.		Min.	Max.	Avg.					
Residual oil no. 6	64.94	53.24	76.64	58.39	58.39	0.0000	0.0000	0.0001	190.0000			387.00	Option 1: VP60 = .00004 VP70 = .00006

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

1000 Lube Oil - Vertical Fixed Roof Tank
Bloomfield, NM

Annual Emission Calculations	
Standing Losses (lb):	0.0037
Vapor Space Volume (cu ft):	71.2749
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0843
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	71.2749
Tank Diameter (ft):	5.5000
Vapor Space Outage (ft):	3.0000
Tank Shell Height (ft):	7.0000
Average Liquid Height (ft):	4.0000
Roof Outage (ft):	0.0000
Roof Outage (Cone Roof)	0.0000
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0000
Shell Radius (ft):	2.7500
Vapor Density	0.0000
Vapor Molecular Weight (lb/lb-mole):	180.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
Daily Avg. Liquid Surface Temp. (deg. R):	524.8094
Daily Average Ambient Temp. (deg. F):	58.1542
Ideal Gas Constant R (psia-ft ³ /(lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	518.0642
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,785.3167
Vapor Space Expansion Factor	0.0843
Daily Vapor Temperature Range (deg. R):	46.7876
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range (psia):	0.0500
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0000
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg R):	524.8094
Daily Min. Liquid Surface Temp. (deg R):	512.9100
Daily Max. Liquid Surface Temp. (deg R):	536.5088
Daily Ambient Temp. Range (deg. R):	27.8250
Vented Vapor Saturation Factor	1.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000

Vapor Space Outage (ft):	3.0000
Working Losses (lb):	0.0058
Vapor Molecular Weight (lb/lb-mole):	180.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
Annual Net Throughput (gal/yr.):	25,592,3981
Turnover Factor:	24.0000
Maximum Liquid Volume (gal):	1,0000
Maximum Liquid Height (ft):	1,068,3498
Tank Diameter (ft):	6.0000
Working Loss Product Factor:	5.0000
	1.0000
Total Losses (lb):	0.0085

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

Emissions Report for: Annual

1000 Lube Oil - Vertical Fixed Roof Tank
Bloomfield, NM

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Residual oil no. 6	0.01	0.00	0.01

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

Identification

User Identification: 100 bbl Ambitrol/ Glycol
 City: Bloomfield
 State: NM
 Company: Williams
 Type of Tank: Vertical Fixed Roof Tank
 Description: Ojito

Tank Dimensions

Shell Height (ft): 14.00
 Diameter (ft): 7.00
 Liquid Height (ft): 14.00
 Avg. Liquid Height (ft): 7.00
 Volume (gallons): 4,030.39
 Turnovers: 24.00
 Net Throughput(gal/yr): 86,729.39
 Is Tank Heated (y/n): N

Paint Characteristics

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

Roof Characteristics

Type: Dome
 Height (ft): 0.00
 Radius (ft) (Dome Roof): 0.00

Breather Vent Settings

Vacuum Settings (psig): -0.03
 Pressure Settings (psig): 0.03

Meteorological Data used in Emissions Calculations: Albuquerque, New Mexico (Avg Atmospheric Pressure = 12.15 psia)

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

100 bbl Ambitrol/ Glycol - Vertical Fixed Roof Tank
Bloomfield, NM

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Propylene glycol	All	64.94	53.24	76.64	56.39	0.0012	0.0006	0.0023	76.1100		76.11	Option 2: A=8.2082, B=2.085.9, C=203.54	

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

100 bbl Ambitrol/ Glycol - Vertical Fixed Roof Tank
Bloomfield, NM

Annual Emission Calculations	
Standing Losses (lb):	0.1481
Vapor Space Volume (cu ft):	287.8693
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0844
Vented Vapor Saturation Factor:	0.9895
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	287.8693
Tank Diameter (ft):	7.0000
Vapor Space Outlets (ft):	7.4801
Tank Shell Height (ft):	14.0000
Average Liquid Height (ft):	7.0000
Roof Outlets (ft):	0.4801
Roof Outlets (Dome Roof)	
Roof Outlets (ft):	0.4801
Dome Radius (ft):	7.0000
Shell Radius (ft):	3.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	76.1100
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0012
Daily Avg. Liquid Surface Temp. (deg. R):	524.6094
Daily Average Ambient Temp. (deg. F):	58.1542
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	518.0642
Tank Paint Solar Absorbance (Shell):	0.5400
Tank Paint Solar Absorbance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,765.3167
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0844
Daily Vapor Temperature Range (deg. R):	46.7976
Daily Vapor Pressure Range (psia):	0.0016
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0012
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0006
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0023
Daily Avg. Liquid Surface Temp. (deg R):	524.6094
Daily Min. Liquid Surface Temp. (deg R):	512.9100
Daily Max. Liquid Surface Temp. (deg R):	536.3088
Daily Ambient Temp. Range (deg. R):	27.9250
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9895
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0012
Vapor Space Outlets (ft):	7.4801

Working Losses (lb): 0.2166
Vapor Molecular Weight (lb/lb-mole): 76.1100
Vapor Pressure at Daily Average Liquid Surface Temperature (psia): 0.0012
Annual Net Throughput (gal/yr.): 96,729,3869
Annual Turnovers: 24,0000
Turnover Factor: 1,0000
Maximum Liquid Volume (gal): 4,030,3911
Maximum Liquid Height (ft): 14,0000
Tank Diameter (ft): 7,0000
Working Loss Product Factor: 1,0000

Total Losses (lb): 0.3646

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

Emissions Report for: Annual

100 bbl Ambitrol/ Glycol - Vertical Fixed Roof Tank
Bloomfield, NM

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Propylene glycol	0.22	0.15	0.36

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

Identification

User Identification: 100 bbl Methanol
 City: Bloomfield
 State: NM
 Company: Williams
 Type of Tank: Vertical Fixed Roof Tank
 Description: Ojito

Tank Dimensions

Shell Height (ft): 14.00
 Diameter (ft): 7.00
 Liquid Height (ft) : 14.00
 Avg. Liquid Height (ft): 7.00
 Volume (gallons): 4,030.39
 Turnovers: 24.00
 Net Throughput(gal/yr): 96,729.39
 Is Tank Heated (y/n): N

Paint Characteristics

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

Roof Characteristics

Type: Dome
 Height (ft): 0.00
 Radius (ft) (Dome Roof): 0.00

Breather Vent Settings

Vacuum Settings (psig): -0.03
 Pressure Settings (psig): 0.03

Meteorological Data used in Emissions Calculations: Albuquerque, New Mexico (Avg Atmospheric Pressure = 12.15 psia)

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

100 bbl Methanol - Vertical Fixed Roof Tank
Bloomfield, NM

Mixture/Component	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
	Month	Avg.	Min.		Max.	Avg.	Min.					
Methyl alcohol	All	64.94	53.24	76.64	58.39	1.6820	1.1617	2.3895	32.0400		32.04	Option 2: A=7.897, B=1474.08, C=228.13

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

100 bbl Methanol - Vertical Fixed Roof Tank
Bloomfield, NM

Annual Emission Calculations

Standing Losses (lb): 121.1416
 Vapor Space Volume (cu ft): 287.6693
 Vapor Density (lb/cu ft): 0.0096
 Vapor Space Expansion Factor: 0.2008
 Vented Vapor Saturation Factor: 0.6000

Tank Vapor Space Volume: 287.6693
 Vapor Space Volume (cu ft): 7.0000
 Tank Diameter (ft): 7.4801
 Vapor Space Outage (ft): 14.0000
 Tank Shell Height (ft): 7.0000
 Average Liquid Height (ft): 0.4801
 Roof Outage (ft): 0.4801

Roof Outage (Dome Roof)
 Roof Outage (ft): 0.4801
 Dome Radius (ft): 7.0000
 Shell Radius (ft): 3.5000

Vapor Density 0.0096
 Vapor Density (lb/cu ft): 32.0400
 Vapor Molecular Weight (lb/lb-mole): 1.6820
 Vapor Pressure at Daily Average Liquid Surface Temperature (psia): 524.6094
 Daily Avg. Liquid Surface Temp. (deg. R): 56.1542
 Daily Average Ambient Temp. (deg. F): 10.731
 Ideal Gas Constant R (psia cuft / (lb-mole deg R)): 518.0642
 Liquid Bulk Temperature (deg. R): 0.5400
 Tank Paint Solar Absorptance (Shell): 0.5400
 Tank Paint Solar Absorptance (Roof): 1.765.3167
 Daily Total Solar Insulation Factor (Btu/sqft day):

Vapor Space Expansion Factor 0.2008
 Vapor Space Expansion Factor: 46.7976
 Daily Vapor Temperature Range (deg. R): 1.2278
 Daily Vapor Pressure Range (psia): 0.0600
 Breather Vent Press. Setting Range (psia): 1.6820
 Vapor Pressure at Daily Average Liquid Surface Temperature (psia): 1.1617
 Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia): 2.3895
 Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia): 524.6094
 Daily Avg. Liquid Surface Temp. (deg R): 572.8100
 Daily Min. Liquid Surface Temp. (deg R): 556.3098
 Daily Max. Liquid Surface Temp. (deg R): 27.9250
 Daily Ambient Temp. Range (deg. R):

Vented Vapor Saturation Factor 0.6000
 Vented Vapor Saturation Factor: 1.6820
 Vapor Pressure at Daily Average Liquid Surface Temperature (psia): 7.4801
 Vapor Space Outage (ft):

Working Losses (lb): 124,1125
Vapor Molecular Weight (lb-mole): 32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia): 1.6820
Annual Net Throughput (gal/yr.): 86,729,3869
Turnover Factor: 24,0000
Maximum Liquid Volume (gal): 1,0000
Maximum Liquid Height (ft): 4,030,3811
Tank Diameter (ft): 14,0000
Working Loss Product Factor: 7,0000
1,0000

Total Losses (lb): 245,2541

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

Emissions Report for: Annual

100 bbl Methanol - Vertical Fixed Roof Tank
Bloomfield, NM

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Methyl alcohol	124.11	121.14	245.25