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

Emissions Report for: July

T-405 Rev1 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Waste Sulfuric Acid	0.33	0.02	0.34

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

T-405 Rev1 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):										
Vapor Space Volume (cu ft):							0.0153			
Vapor Density (lb/cu ft):							10.6592			
Vapor Space Expansion Factor:							0.0011			
Vented Vapor Saturation Factor:							0.0426			
							0.9606			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							10.6592			
Tank Diameter (ft):							2.5000			
Vapor Space Outage (ft):							2.1715			
Tank Shell Height (ft):							4.0000			
Average Liquid Height (ft):							2.0000			
Roof Outage (ft):							0.1715			
Roof Outage (Dome Roof)										
Roof Outage (ft):							0.1715			
Dome Radius (ft):							2.5000			
Shell Radius (ft):							1.2500			
Vapor Density										
Vapor Density (lb/cu ft):							0.0011			
Vapor Molecular Weight (lb/lb-mole):							18.0200			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.3567			
Daily Avg. Liquid Surface Temp. (deg. R):							530.9285			
Daily Average Ambient Temp. (deg. F):							73.0500			
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731			
Liquid Bulk Temperature (deg. R):							523.9983			
Tank Paint Solar Absorptance (Shell):							0.1700			
Tank Paint Solar Absorptance (Roof):							0.1700			
Daily Total Solar Insulation Factor (Btu/sqft day):							2,302.7457			
Vapor Space Expansion Factor										
Vapor Space Expansion Factor:							0.0426			
Daily Vapor Temperature Range (deg. R):							24.8571			
Daily Vapor Pressure Range (psia):							0.0000			
Breather Vent Press. Setting Range(psia):							0.0600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.3567			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.3567			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.3567			
Daily Avg. Liquid Surface Temp. (deg R):							530.9285			
Daily Min. Liquid Surface Temp. (deg R):							524.7142			
Daily Max. Liquid Surface Temp. (deg R):							537.1427			
Daily Ambient Temp. Range (deg. R):							19.3000			
Vented Vapor Saturation Factor										
Vented Vapor Saturation Factor:							0.9606			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.3567			
Vapor Space Outage (ft):							2.1715			
Working Losses (lb):										
Vapor Molecular Weight (lb/lb-mole):							0.3260			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							18.0200			
Net Throughput (gal/mo.):							0.3567			
Annual Turnovers:							10,575.0000			
Turnover Factor:							863.2653			
Maximum Liquid Volume (gal):							0.2014			
Maximum Liquid Height (ft):							147.0000			
Tank Diameter (ft):							4.0000			
Working Loss Product Factor:							2.5000			
							1.0000			
Total Losses (lb):							0.3412			

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

T-405 Rev1 - Vertical Fixed Roof Tank

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 Press Calculations
Waste Sulfuric Acid	Jul	71.26	65.04	77.47	64.33	0.3567	0.3567	0.3567	18.0200			0.00	

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

Identification

User Identification:	T-405 Rev1
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):	4.00
Diameter (ft):	2.50
Liquid Height (ft) :	4.00
Avg. Liquid Height (ft):	2.00
Volume (gallons):	147.00
Turnovers:	863.27
Net Throughput(gal/yr):	126,900.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
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

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

Previous: F62903 414242 A/N: 460735

Mixture Vapor Pressure
WASTE SULFURIC ACID
T-405

Operating temperature 70 F

Compounds	Amount, lb	Solution wt%*	Molecular Weight	VP mmHg	# moles (L)	mole fraction (L)	Partial VP mmHg	Mole Fraction (V)	Wt Contribution	wt% w/ water	wt% w/o water
Columns	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
H_2SO_4	10	10.00%	98.07	0.00055	0.0010196	2.00E-02	1.09E-05	5.94E-07	0.0001	0.0003%	100.00%
Water	90	90%	18.02	18.8	0.049958	0.9800	18.4420	1.00000	18.0152	99.9997%	-
	100	100%			0.050977	1.0000	18.4420	1.0000	18.02	100.00%	100.00%
						psia	0.35671		W/o water	0.0003%	

Desired throughput 126,900 gals/month
1,522,800 gals/yr

L = Liquid

(2)=(1)/100
(5)=(2)/(3)
(6)=(5)/0.050977
(7)=(4)*(6)
(8)=(7)/18.442
(9)=(3)*(8)

(10)=(9)/18.02
(11)=(10)/0.0003%

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
H_2SO_4	7.19E-10	6.28E-06	0.12	86.70	5.99E-09	7.24E-08	Yes
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					5.99E-09	7.24E-08	

Monthly throughput limit: 147 gals*10359 times/yr/12 months/yr*1 = 126,900 gals/month

ATTACMENT
WASTE SULFURIC ACID
T-405
Vertical
Control: Scrubbers

Subsequent:	460735			A/N:	414242
Given:					
Tank dimentior	ft	in	gals		
DIA.	2	6	147		
H	4	0			
Working volume				147	gals
Desired thoughput:				1,522,800	gals/yr
Turnovers per year				10,359	
Month selected for emission calculations:				July	
Number of days in July:				31	
Total pressure:				0.3567	psia
Maximum emissions**					
Working				3.29	lb/month
Breathing				0.02	lb/month
Note: **From TANK 4.0.9d Emissions Report					
Weight% of acid in vapor:				0.0003%	
Control efficiency:				95%	
Operating Schedule:					
hrs/day				24	hrs/day
days/wk				7	days/wk
weeks/yr				52	wks/yr
PM10 in PM				100%	
Cushion factor:				1.0	

(Cushion factor is used to give a cushion on the limit to insure compliance)

Calculations:

Emissions:

Total emission (working + breathing), lb/month	(3.29 + 0.02) lb/month =	3.31	lb/month
PM/PM10/HCl			
lb/day			
Uncontrolled	3.31 lb/month/31 days/month*0.000003*1 =	0.000000345	lb/day
Controlled	0.000000345 lb/day*(1-0.95) =	0.000000017	lb/day
lb/hr			
Uncontrolled	0.000000345 lb/day/24 hrs/day =	0.0000000144	lb/hr
Controlled	0.000000017 lb/day/24 hrs/day =	0.0000000007	lb/hr
lb/yr	0.000000017 lb/day*7 days/wk*52 wks/yr =	0.000006	lb/yr

	$PM/PM10/H_2SO_4$
lb/hr	
Uncontr.	1.44E-08
Contr.	7.19E-10
lb/day	
Uncontr.	3.45E-07
Contr.	1.73E-08
lb/yr (Contr.)	6.28E-06

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
H_2SO_4	1.44E-08	1.26E-04	0.12	86.70	1.20E-07	1.45E-06	Yes
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					1.20E-07	1.45E-06	

Monthly throughput limit: 147 gals*10359 times/yr/12 months/yr*1 = 126,900 gals/month

ATTACMENT
WASTE SULFURIC ACID
T-405
Vertical
Control: None

Previous:	F62903	414242		A/N:	460735
Given:					
Tank dimentior	ft	in	gals		
DIA.	2	6	147		
H	4	0			
Working volume				147	gals
Desired thoughput:				1,522,800	gals/yr
Turnovers per year				10,359	
Month selected for emission calculations:				July	
Number of days in July:				31	
Total pressure:				0.3567	psia
Maximum emissions**					
Working				3.29	lb/month
Breathing				0.02	lb/month
Note: **From TANK 4.0.9d Emissions Report					
Weight% of acid in vapor:				0.0003%	
Control efficiency:				0%	
Operating Schedule:					
hrs/day				24	hrs/day
days/wk				7	days/wk
weeks/yr				52	wks/yr
PM10 in PM				100%	
Cushion factor:				1.0	

(Cushion factor is used to give a cushion on the limit to insure compliance)

Calculations:

Emissions:

Total emission (working + breathing), lb/month	(3.29 + 0.02) lb/month =	3.31	lb/month
PM/PM10/HCl			
lb/day			
Uncontrolled	3.31 lb/month/31 days/month*0.000003*1 =	0.000000345	lb/day
Controlled	0.000000345 lb/day*(1-0) =	0.000000345	lb/day
lb/hr			
Uncontrolled	0.000000345 lb/day/24 hrs/day =	0.0000000144	lb/hr
Controlled	0.000000345 lb/day/24 hrs/day =	0.0000000144	lb/hr
lb/yr	0.000000345 lb/day*7 days/wk*52 wks/yr =	0.000126	lb/yr

	$PM/PM10/H_2SO_4$
lb/hr	
Uncontr.	1.44E-08
Contr.	1.44E-08
lb/day	
Uncontr.	3.45E-07
Contr.	3.45E-07
lb/yr (Contr.)	1.26E-04

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

Emissions Report for: July

T-14 - Horizontal Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Acid Mixture	144.92	1.90	146.82

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

T-14 - Horizontal Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							1.8983			
Vapor Space Volume (cu ft):							550.2790			
Vapor Density (lb/cu ft):							0.0030			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.8612			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							550.2790			
Tank Diameter (ft):							10.0000			
Effective Diameter (ft):							11.8375			
Vapor Space Outage (ft):							5.0000			
Tank Shell Length (ft):							11.0000			
Vapor Density										
Vapor Density (lb/cu ft):							0.0030			
Vapor Molecular Weight (lb/lb-mole):							28.4300			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.6084			
Daily Avg. Liquid Surface Temp. (deg. R):							530.9285			
Daily Average Ambient Temp. (deg. F):							73.0500			
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731			
Liquid Bulk Temperature (deg. R):							523.9983			
Tank Paint Solar Absorptance (Shell):							0.1700			
Daily Total Solar Insulation Factor (Btu/sqft day):							2,302.7457			
Vapor Space Expansion Factor										
Vapor Space Expansion Factor:							0.0426			
Daily Vapor Temperature Range (deg. R):							24.8571			
Daily Vapor Pressure Range (psia):							0.0000			
Breather Vent Press. Setting Range(psia):							0.0600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.6084			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.6084			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.6084			
Daily Avg. Liquid Surface Temp. (deg R):							530.9285			
Daily Min. Liquid Surface Temp. (deg R):							524.7142			
Daily Max. Liquid Surface Temp. (deg R):							537.1427			
Daily Ambient Temp. Range (deg. R):							19.3000			
Vented Vapor Saturation Factor										
Vented Vapor Saturation Factor:							0.8612			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.6084			
Vapor Space Outage (ft):							5.0000			
Working Losses (lb):							144.9218			
Vapor Molecular Weight (lb/lb-mole):							28.4300			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.6084			
Net Throughput (gal/mo.):							2,010,000.0000			
Annual Turnovers:							3,573.3333			
Turnover Factor:							0.1751			
Tank Diameter (ft):							10.0000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							146.8201			

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

T-14 - Horizontal Tank

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 Press Calculations
Acid Mixture	Jul	71.26	65.04	77.47	64.33	0.6084	0.6084	0.6084	28.4300			0.00	

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

Identification

User Identification:	T-14
City:	
State:	
Company:	
Type of Tank:	Horizontal Tank
Description:	

Tank Dimensions

Shell Length (ft):	11.00
Diameter (ft):	10.00
Volume (gallons):	6,750.00
Turnovers:	3,573.33
Net Throughput(gal/yr):	24,120,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

2. 85% H3PO4	18,303
3. 70% HNO3	22,190
4. M. A. E.	5
5. H2O2 30%	100,137
6. HF 49%	16,847
7. FS Etch	11,183
8. NH4OH	7,480
9. NH4F	275
10. Acetic acid	3,798
	184,016
Water:	
In aqueous solutions:	38,419
Additional	14,600,000
Total	14,638,419

7. FS Etch

Usage		11,183 gals/yr	
Sp. Gr.		1.75	
Ingredients	mm Hg		lbs/yr
H_2SO_4	0.00055	50%	81,510
HNO_3	55	30%	48,906
HF	14.00	20%	32,604
H_2O		0%	0

8. NH_4OH

Usage		7,480 gals/yr	
Sp. Gr.		0.9	
Ingredients	mm Hg		lbs/yr
NH_4OH	561	30%	16,823
H_2O		70%	39,254

9. NH_4F

Usage		275 gals/yr	
Sp. Gr.		1.11	
Ingredients	mm Hg		lbs/yr
NH_4F	0.5	40%	1,017
H_2O		60%	33,647

10. Acetic acid

Usage		3,798 gals/yr	
Sp. Gr.		1.05	
Ingredients	mm Hg		lbs/yr
Acetic acid	11	10%	3,322
H_2O		90%	44,988

Summary:

Mass:

	mm Hg		lb/yr
H_3PO_4	0.03	75%	221,514
Acetic acid	11	5%	5,821
HNO_3	55	5%	235,180
HBF_4	7	5%	2,499
HF	14.00	10%	115,127
H_2O_2	25.00	32%	19
H_2SO_4	0.00055	50%	81,510
NH_4OH	561	30%	16,823
NH_4F	0.5	40%	1,017
H_2O			320,031
			999,543

Volume:	gals/yr
1. SPEC Etch	3,798

Thoughput
T-14

A/N: 460734

1. SPEC Etch

Usage		3798 gals/yr	
Sp. Gr.		1.58	
Ingredients	mm Hg		lbs/yr
H_3PO_4	0.03	75%	37,490
Acetic acid	11	5%	2,499
HNO_3	55	5%	2,499
HBF_4	7	5%	2,499
H_2O		10%	4,999

2. 85% H_3PO_4

Usage		18,303 gals/yr	
Sp. Gr.		1.42	
Ingredients	mm Hg		lbs/yr
H_3PO_4	0.03	85%	184,024
H_2O		15%	32,475

3. 70% HNO_3

		22,190 gals/yr	
Sp. Gr.		1.42	
Ingredients	mm Hg		lbs/yr
HNO_3	55	70%	183,734
H_2O		30%	78,743

4. M. A. E.

Usage		5 gals/yr	
Sp. Gr.		1.42	
Ingredients	mm Hg		lbs/yr
HF	14.00	10%	6
HNO_3	55	70%	41
H_2O		20%	12

5. H_2O_2 30%

Usage		100,137 gals/yr	
Sp. Gr.		1.11	
Ingredients	mm Hg*		lbs/yr
H_2O_2	25.00	32%	19
H_2O		68%	40

*Combined

6. HF 49%

Usage		16,847 gals/yr	
Sp. Gr.		1.2	
Ingredients	mm Hg		lbs/yr
HF	15.05	49%	82,517
H_2O		51%	85,885

Previous: M56107 134700 A/N: 460734

Mixture Vapor Pressure
WASTE ACIDS
T-14

Operating temperature 70 F

Compounds	Amount, lb	Solution wt%*	Molecular Weight	VP mmHg	# moles (L)	mole fraction (L)	Partial VP mmHg	Mole Fraction (V)	Wt Contribution	wt% w/ water	wt% w/o water w/acetic	wt% w/o water w/o acetic
Columns	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
H_3PO_4	221,514	22%	98.00	0.03	0.0022615	7.30E-02	2.19E-03	6.96E-05	0.0068	0.02%	0.03%	0.031%
Acetic acid	5,821	0.58%	60.05	11.40	9.698E-05	3.13E-03	3.57E-02	1.13E-03	0.0681	0.24%	0.31%	-
HNO_3	235,180	24%	63.01	55.00	0.003734	1.20E-01	6.63E+00	2.11E-01	13.2745	46.69%	59.65%	59.835%
HBF_4	2,499	0.25%	87.81	0.00055	2.848E-05	9.19E-04	5.03E-07	1.60E-08	0.0000	0.00%	0.00001%	0.00000633%
HF	115,127	12%	20.01	75.36	0.0057572	1.86E-01	14.00	4.45E-01	8.9039	31.31%	40.01%	40.134%
H_2O_2*	19	0.0019%	34.01	-	5.567E-07	1.80E-05	-	-	-	-	-	-
H_2SO_4	81,510	8%	98.07	0.0005	0.0008315	2.68E-02	1.47E-05	4.67E-07	0.00005	0.0002%	0.0002%	0.0002%
NH_4OH**	16,823	1.68%	35.05	-	0.0004803	1.55E-02	-	-	-	-	-	-
NH_4F (Solid salt)	1,017	0.10%	37.04	-	2.747E-05	8.87E-04	-	-	-	-	-	-
H_2O	320,031	32%	18.02	18.8	0.017773	0.5735	10.7921	0.34308	6.1806	21.74%	-	-
	999,543	100%			0.030991	1.0000	31.4568	1.0000	28.43	100.00%	100.00%	100.00%
						psia	0.60844		W/o water	78.26%		
									and w/o acetic acid	78.02%		

Desired throughput 2,010,000 gals/month
24,120,000 gals/yr

L = Liquid
V = Vapor

Notes:

*Small amount, vapor pressure is negligible.

**At 1 - 2 pH, it is expected that all NH_4OH is competely neutralized.

(2)=(1)/999543
(5)=(2)/(3)
(6)=(5)/0.030991
(7)=(4)*(6)
(8)=(7)/31.4568
(9)=(3)*(8)

(10)=(9)/28.43
(11)=(10)/78.26%
(12)=(10)/78.02%

ATTACHMENT
WASTE ACIDS
T-14

	PM	PM10	H_3PO_4	HNO_3	HBF_4	HF	H_2SO_4	VOC CH_3COOH
lb/hr								
Uncontr.	0.15	0.15	0.00005	0.09	9.74E-09	0.06	3.18E-07	4.73E-04
Contr.	0.01	0.01	0.000002	0.005	4.87E-10	0.003	1.59E-08	4.73E-04
lb/day								
Uncontr.	4	4	0.001	2.21	2.34E-07	1.48	7.63E-06	0.0113
Contr.	0.18	0.18	0.00006	0.11	1.17E-08	0.07	3.81E-07	0.0113
lb/yr (Contr.)		64.56	0.02	40.24	4.26E-06	26.99	1.39E-04	4.13

Rule 1401 Evaluation:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
HNO_3	0.005	40.24	0.0859	-	5.36E-02	-	Yes
H_3PO_4	0.000002	0.02	-	607.00	-	3.41E-05	
HF	0.003	26.99	0.24	-	1.29E-02	-	
H_2SO_4	1.59E-08	1.39E-04	0.12	86.70	1.32E-07	1.60E-06	
Total					6.65E-02	3.57E-05	

Throughput limit: 24120000 gals/yr/12 months/yr*1 (Cushion factor) = 2,010,000 gals/month

ATTACHMENT
WASTE ACIDS
T-14

H_3PO_4	0.03% of PM		
lb/day			
Uncontrolled		3.7 lb/day*0.0003 =	0.001136 lb/day
Controlled		0.18 lb/day*0.0003 =	5.68E-05 lb/day
lb/hr			
Uncontrolled		0.15 lb/day*0.0003 =	4.733E-05 lb/hr
Controlled		0.01 lb/day*0.0003 =	2.367E-06 lb/hr
lb/yr		67.25 lb/day*0.0003 =	0.0206745 lb/yr
HNO_3	59.83% of PM		
lb/day			
Uncontrolled		3.7 lb/day*0.5983 =	2.211081 lb/day
Controlled		0.18 lb/day*0.5983 =	0.110554 lb/day
lb/hr			
Uncontrolled		0.15 lb/day*0.5983 =	0.0921284 lb/hr
Controlled		0.01 lb/day*0.5983 =	0.0046064 lb/hr
lb/yr		64.56 lb/day*0.5983 =	40.241674 lb/yr
HBF_4	0.00000633% of PM		
lb/day			
Uncontrolled		3.7 lb/day*0.0000000633 =	2.338E-07 lb/day
Controlled		0.18 lb/day*0.0000000633 =	1.169E-08 lb/day
lb/hr			
Uncontrolled		0.15 lb/day*0.0000000633 =	9.743E-09 lb/hr
Controlled		0.01 lb/day*0.0000000633 =	4.871E-10 lb/hr
lb/yr		0.02 lb/day*0.0000000633 =	4.256E-06 lb/yr
HF	40.13% of PM		
lb/day			
Uncontrolled		3.7 lb/day*0.4013 =	1.4830844 lb/day
Controlled		0.18 lb/day*0.4013 =	0.0741542 lb/day
lb/hr			
Uncontrolled		0.15 lb/day*0.4013 =	0.0617952 lb/hr
Controlled		0.01 lb/day*0.4013 =	0.0030898 lb/hr
lb/yr		40.24 lb/day*0.4013 =	26.992137 lb/yr
H_2SO_4	0.0002% of PM		
lb/day			
Uncontrolled		3.7 lb/day*0.000002 =	7.626E-06 lb/day
Controlled		0.18 lb/day*0.000002 =	3.813E-07 lb/day
lb/hr			
Uncontrolled		0.15 lb/day*0.000002 =	3.177E-07 lb/hr
Controlled		0.01 lb/day*0.000002 =	1.589E-08 lb/hr
lb/yr		0 lb/day*0.000002 =	0.0001388 lb/yr
CH_3COOH	0.31% of all acids in vapor		
lb/day			
Uncontrolled		146.82 lb/month/31 days/month*0.7826*0.0031*1 =	0.0113 lb/day
Controlled		0.0113 lb/day*(1-0) =	0.0113 lb/day
lb/hr			
Uncontrolled		0.0113 lb/day/24 hrs/day =	0.0005 lb/hr
Controlled		0.0113 lb/day/24 hrs/day =	0.0005 lb/hr
lb/yr		0.0113 lb/day*7 days/wk*52 wks/yr =	4.13 lb/yr

ATTACHMENT
WASTE ACIDS
T-14
Horizontal

Previous:	M56107	134700		A/N:	460734
Control:	492806 Scrubber				
Given:					
Tank dimentions	ft	in			
DIA.	10	0 OK	6,757 gallons		
L	11	6			
Annual throughput:				24,120,000	gallons
Month selected for emission calculations:				July	
Number of days in the selected month:				31	
Total vapor pressure:				0.60844	psia
Maximum month emission*					
Working				144.92	lb/month
Breathing				1.90	lb/month
Note: *From TANK 4.0.9d Emissions Report					
Control efficiency:					
Acid PM				95%	
VOC				0%	
Operating Schedule:					
hrs/day				24	hrs/day
days/wk				7	days/wk
weeks/yr				52	wks/yr
PM10 in Total PM:				96%	
Weight% of all acids in vapor:			(PM+VOC)	78.26%	
Weight% of all acids, except acetic acid, in vapor:			(PM)	78.02%	
Cushion factor:				1.00	
Calculations					
Tank volume:				6,750	gallons
Turnovers per year				3,573	
Emissions:					
Total emission (working + breathing), lb/month			(144.92 + 1.9) lb/month =	146.82	lb/month
PM					
lb/day					
Uncontrolled			146.82 lb/month/31 days/month*0.7802*1 =	3.70	lb/day
Controlled			3.7 lb/day*(1-0.95) =	0.18	lb/day
lb/hr					
Uncontrolled			3.7 lb/day/24 hrs/day =	0.15	lb/hr
Controlled			0.18 lb/day/24 hrs/day =	0.01	lb/hr
lb/yr			0.18 lb/day*7 days/wk*52 wks/yr =	67.25	lb/yr
PM10					
lb/day					
Uncontrolled			3.7 lb/day*0.96 =	3.55	lb/day
Controlled			0.18 lb/day*0.96 =	0.18	lb/day
lb/hr					
Uncontrolled			0.15 lb/day*0.96 =	0.15	lb/hr
Controlled			0.01 lb/day*0.96 =	0.01	lb/hr
lb/yr			0.18 lb/day*7 days/wk*52 wks/yr =	64.56	lb/yr

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

Emissions Report for: July

T-195 Previous A/N 383506 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Aluminum Etch	0.09	0.05	0.14

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

T-195 Previous A/N 383506 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.0473			
Vapor Space Volume (cu ft):							48.6458			
Vapor Density (lb/cu ft):							0.0008			
Vapor Space Expansion Factor:							0.0427			
Vented Vapor Saturation Factor:							0.9700			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							48.6458			
Tank Diameter (ft):							4.5000			
Vapor Space Outage (ft):							3.0587			
Tank Shell Height (ft):							5.5000			
Average Liquid Height (ft):							2.7500			
Roof Outage (ft):							0.3087			
Roof Outage (Dome Roof)										
Roof Outage (ft):							0.3087			
Dome Radius (ft):							4.5000			
Shell Radius (ft):							2.2500			
Vapor Density										
Vapor Density (lb/cu ft):							0.0008			
Vapor Molecular Weight (lb/lb-mole):							22.5700			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1911			
Daily Avg. Liquid Surface Temp. (deg. R):							530.9285			
Daily Average Ambient Temp. (deg. F):							73.0500			
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731			
Liquid Bulk Temperature (deg. R):							523.9983			
Tank Paint Solar Absorptance (Shell):							0.1700			
Tank Paint Solar Absorptance (Roof):							0.1700			
Daily Total Solar Insulation Factor (Btu/sqft day):							2,302.7457			
Vapor Space Expansion Factor										
Vapor Space Expansion Factor:							0.0427			
Daily Vapor Temperature Range (deg. R):							24.8571			
Daily Vapor Pressure Range (psia):							0.0000			
Breather Vent Press. Setting Range(psia):							0.0600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1911			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.1991			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.1991			
Daily Avg. Liquid Surface Temp. (deg R):							530.9285			
Daily Min. Liquid Surface Temp. (deg R):							524.7142			
Daily Max. Liquid Surface Temp. (deg R):							537.1427			
Daily Ambient Temp. Range (deg. R):							19.3000			
Vented Vapor Saturation Factor										
Vented Vapor Saturation Factor:							0.9700			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.1911			
Vapor Space Outage (ft):							3.0587			
Working Losses (lb):							0.0942			
Vapor Molecular Weight (lb/lb-mole):							22.5700			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1911			
Net Throughput (gal/mo.):							917.0000			
Annual Turnovers:							16.8257			
Turnover Factor:							1.0000			
Maximum Liquid Volume (gal):							654.0000			
Maximum Liquid Height (ft):							5.5000			
Tank Diameter (ft):							4.5000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							0.1414			

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

T-195 Previous A/N 383506 - Vertical Fixed Roof Tank

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 Press Calculations
Aluminum Etch	Jul	71.26	65.04	77.47	64.33	0.1911	0.1991	0.1991	22.5700			0.00	

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

Identification

User Identification:	T-195 Previous A/N 383506
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):		5.50
Diameter (ft):		4.50
Liquid Height (ft) :		5.50
Avg. Liquid Height (ft):		2.75
Volume (gallons):		654.00
Turnovers:		16.83
Net Throughput(gal/yr):		11,004.00
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
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

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

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

Emissions Report for: July

T-195 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Aluminum Etch	0.29	0.05	0.34

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

T-195 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.0492			
Vapor Space Volume (cu ft):							48.6458			
Vapor Density (lb/cu ft):							0.0008			
Vapor Space Expansion Factor:							0.0427			
Vented Vapor Saturation Factor:							0.9687			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							48.6458			
Tank Diameter (ft):							4.5000			
Vapor Space Outage (ft):							3.0587			
Tank Shell Height (ft):							5.5000			
Average Liquid Height (ft):							2.7500			
Roof Outage (ft):							0.3087			
Roof Outage (Dome Roof)										
Roof Outage (ft):							0.3087			
Dome Radius (ft):							4.5000			
Shell Radius (ft):							2.2500			
Vapor Density										
Vapor Density (lb/cu ft):							0.0008			
Vapor Molecular Weight (lb/lb-mole):							22.5700			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1991			
Daily Avg. Liquid Surface Temp. (deg. R):							530.9285			
Daily Average Ambient Temp. (deg. F):							73.0500			
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731			
Liquid Bulk Temperature (deg. R):							523.9983			
Tank Paint Solar Absorptance (Shell):							0.1700			
Tank Paint Solar Absorptance (Roof):							0.1700			
Daily Total Solar Insulation Factor (Btu/sqft day):							2,302.7457			
Vapor Space Expansion Factor										
Vapor Space Expansion Factor:							0.0427			
Daily Vapor Temperature Range (deg. R):							24.8571			
Daily Vapor Pressure Range (psia):							0.0000			
Breather Vent Press. Setting Range(psia):							0.0600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1991			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.1991			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.1991			
Daily Avg. Liquid Surface Temp. (deg R):							530.9285			
Daily Min. Liquid Surface Temp. (deg R):							524.7142			
Daily Max. Liquid Surface Temp. (deg R):							537.1427			
Daily Ambient Temp. Range (deg. R):							19.3000			
Vented Vapor Saturation Factor										
Vented Vapor Saturation Factor:							0.9687			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.1991			
Vapor Space Outage (ft):							3.0587			
Working Losses (lb):							0.2863			
Vapor Molecular Weight (lb/lb-mole):							22.5700			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1991			
Net Throughput (gal/mo.):							6,244.0000			
Annual Turnovers:							114.5688			
Turnover Factor:							0.4285			
Maximum Liquid Volume (gal):							654.0000			
Maximum Liquid Height (ft):							5.5000			
Tank Diameter (ft):							4.5000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							0.3355			

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

T-195 - Vertical Fixed Roof Tank

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 Press Calculations
Aluminum Etch	Jul	71.26	65.04	77.47	64.33	0.1991	0.1991	0.1991	22.5700			0.00	

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

Identification

User Identification:	T-195
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):	5.50
Diameter (ft):	4.50
Liquid Height (ft) :	5.50
Avg. Liquid Height (ft):	2.75
Volume (gallons):	654.00
Turnovers:	114.57
Net Throughput(gal/yr):	74,928.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
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

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

Previous: F54709 383506 A/N: 460733

Mixture Vapor Pressure
ALUMINUM ETCH
T-195

Operating temperature 70 F

Compounds	Amount, lb	Solution wt%*	Molecular Weight	VP mmHg	# moles (L)	mole fraction (L)	Partial VP mmHg	Mole Fraction (V)	Wt Contribution	wt% w/ water	wt% w/o water w/acetic	wt% w/o water w/o acetic
Columns	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
HNO_3	1	1%	63.01	55.00	0.0001587	8.62E-03	4.74E-01	4.61E-02	2.9038	12.86%	37.86%	96%
H_3PO_4	76	76%	98.00	0.03	0.0077555	4.21E-01	1.26E-02	1.23E-03	0.1204	0.53%	1.57%	4%
CH_3COOH	8	8%	37.04	11.00	0.00216	1.17E-01	1.29E+00	1.25E-01	4.6460	20.58%	60.57%	-
Water	15	15%	18.02	18.8	0.008326	0.4525	8.5154	0.82725	14.9030	66.02%	-	-
	100	100%			0.018401	1.0000	10.2937	1.0000	22.57	100.00%	100.00%	100.00%
				Previous		psia	0.19910		W/o water	33.98%		
Desired throughput	6244 gals/month			917					and w/o acetic	13.40%		
	74,928 gals/yr			11,004								

L = Liquid

(2)=(1)/100
(5)=(2)/(3)
(6)=(5)/0.018401
(7)=(4)*(6)
(8)=(7)/10.2937
(9)=(3)*(8)

(10)=(9)/22.57
(11)=(10)/33.98%
(12)=(10)/13.4%

H_3PO_4 3.98% of PM

lb/day

Uncontrolled 0.001 lb/day*0.0398 = 0.0000 lb/day

Controlled 0 lb/day*(1-0.95) = 0.00000 lb/day

lb/hr

Uncontrolled 0 lb/day/24 hrs/day = 0.00000 lb/hr

Controlled 0 lb/day/24 hrs/day = 5.52E-08 lb/hr

lb/yr 0 lb/day*7 days/wk*52 wks/yr = 0.000 lb/yr

$C_2H_4O_2$

lb/day

Uncontrolled 0.14 lb/month/31 days/month*0.3398*1.1 = 0.002 lb/day

Controlled 0.002 lb/day*(1-0) = 0.0017 lb/day

lb/hr

Uncontrolled 0.002 lb/day/24 hrs/day = 0.0001 lb/hr

Controlled 0.0017 lb/day/24 hrs/day = 0.00007 lb/hr

lb/yr 0.0017 lb/day*7 days/wk*52 wks/yr = 0.61 lb/yr

	PM/PM10	HNO_3	H_3PO_4	$C_2H_4O_2$
lb/hr				
Uncontr.	2.77E-05	2.66E-05	1.10E-06	7.03E-05
Contr.	1.39E-06	1.33E-06	5.52E-08	7.03E-05
lb/day				
Uncontr.	6.66E-04	6.39E-04	2.65E-05	1.69E-03
Contr.	3.33E-05	3.20E-05	1.32E-06	1.69E-03
lb/yr (Contr.)	0.01	0.01	0.000	0.61

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
HNO_3	1.33E-06	0.01	0.0859	-	0.00002	-	Yes
H_3PO_4	5.52E-08	0.000	-	607.00	-	0.000001	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					0.00002	0.000001	

Monthly throughput 654 gals*17 times/yr/12 months/yr*1.1 = 1,009 gals/month

ATTACMENT
ALUMINUM ETCH
T-195
Vertical
Control: Scrubbers

Subsequent:	460733			A/N:	383506
Given:					
Tank dimentior	ft	in	gals		
DIA.	4	6	654		
H	5	6			
Working volume				654	gals
Desired thoughput:				11,004	gals/yr
Turnovers per year				17	
*Diameter of a circle whose area is equal to the surface cross section area.					
Month selected for emission calculations:				July	
Number of days in July:				31	
Total pressure:				0.199102	psia
Maximum emissions**					
Working				0.09	lb/month
Breathing				0.05	lb/month
Note: **From TANK 4.0.9d Emissions Report				0.14	
Weight fraction of all acids in vapor:				33.98%	
Weight fraction of acids (excluding acetic acid) in vapor:				13.40%	
Control efficiency:					
PM acids				95%	
Acetic acid				0%	
Operating Schedule:					
hrs/day				24	hrs/day
days/wk				7	days/wk
weeks/yr				52	wks/yr
PM10 in PM				100%	
Cushion factor:				1.1	

Calculations:

Emissions:

Total emission (working + breathing), lb/month		(0.09 + 0.05) lb/month =	0.14 lb/month
PM			
lb/day			
Uncontrolled		0.14 lb/month/31 days/month*0.134*1.1 =	0.001 lb/day
Controlled		0.001 lb/day*(1-0.95) =	0.0000 lb/day
lb/hr			
Uncontrolled		0.001 lb/day/24 hrs/day =	0.00003 lb/hr
Controlled		0 lb/day/24 hrs/day =	0.00000 lb/hr
lb/yr		0 lb/day*7 days/wk*52 wks/yr =	0.01 lb/yr
HNO_3	96.02% of PM		
lb/day			
Uncontrolled		0.001 lb/day*0.9602 =	0.001 lb/day
Controlled		0.001 lb/day*(1-0.95) =	0.0000 lb/day
lb/hr			
Uncontrolled		0.001 lb/day/24 hrs/day =	0.0000 lb/hr
Controlled		0 lb/day/24 hrs/day =	0.00000 lb/hr
lb/yr		0 lb/day*7 days/wk*52 wks/yr =	0.01 lb/yr

H_3PO_4 3.98% of PM

lb/day

Uncontrolled 0.002 lb/day*0.0398 = 0.0001 lb/day

Controlled 0.0001 lb/day*(1-0.95) = 0.00000 lb/day

lb/hr

Uncontrolled 0.0001 lb/day/24 hrs/day = 0.00000 lb/hr

Controlled 0 lb/day/24 hrs/day = 1.34E-07 lb/hr

lb/yr 0 lb/day*7 days/wk*52 wks/yr = 0.001 lb/yr

$C_2H_4O_2$

lb/day

Uncontrolled 0.34 lb/month/31 days/month*0.3398*1.1 = 0.004 lb/day

Controlled 0.004 lb/day*(1-0) = 0.0041 lb/day

lb/hr

Uncontrolled 0.004 lb/day/24 hrs/day = 0.0002 lb/hr

Controlled 0.0041 lb/day/24 hrs/day = 0.00017 lb/hr

lb/yr 0.0041 lb/day*7 days/wk*52 wks/yr = 1.49 lb/yr

	PM/PM10	HNO_3	H_3PO_4	$C_2H_4O_2$
lb/hr				
Uncontr.	6.73E-05	6.47E-05	2.68E-06	1.71E-04
Contr.	3.37E-06	3.23E-06	1.34E-07	1.71E-04
lb/day				
Uncontr.	1.62E-03	1.55E-03	6.43E-05	4.10E-03
Contr.	8.08E-05	7.76E-05	3.22E-06	4.10E-03
lb/yr (Contr.)	0.03	0.03	0.001	1.49

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
HNO_3	3.23E-06	0.03	0.0859	-	0.00004	-	Yes
H_3PO_4	1.34E-07	0.001	-	607.00	-	0.000002	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					0.00004	0.000002	

Monthly throughput 654 gals*115 times/yr/12 months/yr*1.1 = 6,868 gals/month

ATTACMENT
ALUMINUM ETCH
T-195
Vertical
Control: 492806

Previous:	F54709	383506		A/N:	460733
Given:					
Tank dimentior	ft	in	gals		
DIA.	4	6	654		
H	5	6			
Working volume				654	gals
Desired thoughput:				74,928	gals/yr
Turnovers per year				115	
*Diameter of a circle whose area is equal to the surface cross section area.					
Month selected for emission calculations:				July	
Number of days in July:				31	
Total pressure:				0.199102	psia
Maximum emissions**					
Working				0.29	lb/month
Breathing				0.05	lb/month
Note: **From TANK 4.0.9d Emissions Report				0.34	
Weight fraction of all acids in vapor:				33.98%	
Weight fraction of acids (excluding acetic acid) in vapor:				13.40%	
Control efficiency:					
PM acids				95%	
Acetic acid				0%	
Operating Schedule:					
hrs/day				24	hrs/day
days/wk				7	days/wk
weeks/yr				52	wks/yr
PM10 in PM				100%	
Cushion factor:				1.1	

Calculations:

Emissions:

Total emission (working + breathing), lb/month		(0.29 + 0.05) lb/month =	0.34 lb/month
PM			
lb/day			
Uncontrolled		0.34 lb/month/31 days/month*0.134*1.1 =	0.002 lb/day
Controlled		0.002 lb/day*(1-0.95) =	0.0001 lb/day
lb/hr			
Uncontrolled		0.002 lb/day/24 hrs/day =	0.00007 lb/hr
Controlled		0.0001 lb/day/24 hrs/day =	0.00000 lb/hr
lb/yr		0.0001 lb/day*7 days/wk*52 wks/yr =	0.03 lb/yr
HNO_3	96.02% of PM		
lb/day			
Uncontrolled		0.002 lb/day*0.9602 =	0.002 lb/day
Controlled		0.002 lb/day*(1-0.95) =	0.0001 lb/day
lb/hr			
Uncontrolled		0.002 lb/day/24 hrs/day =	0.0001 lb/hr
Controlled		0.0001 lb/day/24 hrs/day =	0.00000 lb/hr
lb/yr		0.0001 lb/day*7 days/wk*52 wks/yr =	0.03 lb/yr

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

Emissions Report for: July

T-191 Previous A/N 381815 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Aluminum Etch	0.10	0.05	0.15

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

T-191 Previous A/N 381815 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.0492			
Vapor Space Volume (cu ft):							48.6458			
Vapor Density (lb/cu ft):							0.0008			
Vapor Space Expansion Factor:							0.0427			
Vented Vapor Saturation Factor:							0.9687			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							48.6458			
Tank Diameter (ft):							4.5000			
Vapor Space Outage (ft):							3.0587			
Tank Shell Height (ft):							5.5000			
Average Liquid Height (ft):							2.7500			
Roof Outage (ft):							0.3087			
Roof Outage (Dome Roof)										
Roof Outage (ft):							0.3087			
Dome Radius (ft):							4.5000			
Shell Radius (ft):							2.2500			
Vapor Density										
Vapor Density (lb/cu ft):							0.0008			
Vapor Molecular Weight (lb/lb-mole):							22.5700			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1991			
Daily Avg. Liquid Surface Temp. (deg. R):							530.9285			
Daily Average Ambient Temp. (deg. F):							73.0500			
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731			
Liquid Bulk Temperature (deg. R):							523.9983			
Tank Paint Solar Absorptance (Shell):							0.1700			
Tank Paint Solar Absorptance (Roof):							0.1700			
Daily Total Solar Insulation Factor (Btu/sqft day):							2,302.7457			
Vapor Space Expansion Factor										
Vapor Space Expansion Factor:							0.0427			
Daily Vapor Temperature Range (deg. R):							24.8571			
Daily Vapor Pressure Range (psia):							0.0000			
Breather Vent Press. Setting Range(psia):							0.0600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1991			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.1991			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.1991			
Daily Avg. Liquid Surface Temp. (deg R):							530.9285			
Daily Min. Liquid Surface Temp. (deg R):							524.7142			
Daily Max. Liquid Surface Temp. (deg R):							537.1427			
Daily Ambient Temp. Range (deg. R):							19.3000			
Vented Vapor Saturation Factor										
Vented Vapor Saturation Factor:							0.9687			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.1991			
Vapor Space Outage (ft):							3.0587			
Working Losses (lb):							0.0981			
Vapor Molecular Weight (lb/lb-mole):							22.5700			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1991			
Net Throughput (gal/mo.):							917.0000			
Annual Turnovers:							16.8257			
Turnover Factor:							1.0000			
Maximum Liquid Volume (gal):							654.0000			
Maximum Liquid Height (ft):							5.5000			
Tank Diameter (ft):							4.5000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							0.1473			

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

T-191 Previous A/N 381815 - Vertical Fixed Roof Tank

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 Press Calculations
Aluminum Etch	Jul	71.26	65.04	77.47	64.33	0.1991	0.1991	0.1991	22.5700			0.00	

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

Identification

User Identification:	T-191 Previous A/N 381815
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):		5.50
Diameter (ft):		4.50
Liquid Height (ft) :		5.50
Avg. Liquid Height (ft):		2.75
Volume (gallons):		654.00
Turnovers:		16.83
Net Throughput(gal/yr):		11,004.00
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
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

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

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

Emissions Report for: July

T-191 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Aluminum Etch	0.29	0.05	0.34

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

T-191 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.0492			
Vapor Space Volume (cu ft):							48.6458			
Vapor Density (lb/cu ft):							0.0008			
Vapor Space Expansion Factor:							0.0427			
Vented Vapor Saturation Factor:							0.9687			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							48.6458			
Tank Diameter (ft):							4.5000			
Vapor Space Outage (ft):							3.0587			
Tank Shell Height (ft):							5.5000			
Average Liquid Height (ft):							2.7500			
Roof Outage (ft):							0.3087			
Roof Outage (Dome Roof)										
Roof Outage (ft):							0.3087			
Dome Radius (ft):							4.5000			
Shell Radius (ft):							2.2500			
Vapor Density										
Vapor Density (lb/cu ft):							0.0008			
Vapor Molecular Weight (lb/lb-mole):							22.5700			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1991			
Daily Avg. Liquid Surface Temp. (deg. R):							530.9285			
Daily Average Ambient Temp. (deg. F):							73.0500			
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731			
Liquid Bulk Temperature (deg. R):							523.9983			
Tank Paint Solar Absorptance (Shell):							0.1700			
Tank Paint Solar Absorptance (Roof):							0.1700			
Daily Total Solar Insulation Factor (Btu/sqft day):							2,302.7457			
Vapor Space Expansion Factor										
Vapor Space Expansion Factor:							0.0427			
Daily Vapor Temperature Range (deg. R):							24.8571			
Daily Vapor Pressure Range (psia):							0.0000			
Breather Vent Press. Setting Range(psia):							0.0600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1991			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.1991			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.1991			
Daily Avg. Liquid Surface Temp. (deg R):							530.9285			
Daily Min. Liquid Surface Temp. (deg R):							524.7142			
Daily Max. Liquid Surface Temp. (deg R):							537.1427			
Daily Ambient Temp. Range (deg. R):							19.3000			
Vented Vapor Saturation Factor										
Vented Vapor Saturation Factor:							0.9687			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.1991			
Vapor Space Outage (ft):							3.0587			
Working Losses (lb):							0.2863			
Vapor Molecular Weight (lb/lb-mole):							22.5700			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.1991			
Net Throughput (gal/mo.):							6,244.0000			
Annual Turnovers:							114.5688			
Turnover Factor:							0.4285			
Maximum Liquid Volume (gal):							654.0000			
Maximum Liquid Height (ft):							5.5000			
Tank Diameter (ft):							4.5000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							0.3355			

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

T-191 - Vertical Fixed Roof Tank

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 Press Calculations
Aluminum Etch	Jul	71.26	65.04	77.47	64.33	0.1991	0.1991	0.1991	22.5700			92.00	

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

Identification

User Identification:	T-191
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):		5.50
Diameter (ft):		4.50
Liquid Height (ft) :		5.50
Avg. Liquid Height (ft):		2.75
Volume (gallons):		654.00
Turnovers:		114.57
Net Throughput(gal/yr):		74,928.00
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
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

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

Previous: F54715 381815 A/N: 460732

Mixture Vapor Pressure
ALUMINUM ETCH
T-191

Operating temperature 70 F

Compounds	Amount, lb	Solution wt%*	Molecular Weight	VP mmHg	# moles (L)	mole fraction (L)	Partial VP mmHg	Mole Fraction (V)	Wt Contribution	wt% w/ water	wt% w/o water w/acetic	wt% w/o water w/o acetic
Columns	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
HNO_3	1	1%	63.01	55.00	0.0001587	8.62E-03	4.74E-01	4.61E-02	2.9038	12.86%	37.86%	96%
H_3PO_4	76	76%	98.00	0.03	0.0077555	4.21E-01	1.26E-02	1.23E-03	0.1204	0.53%	1.57%	4%
CH_3COOH	8	8%	37.04	11.00	0.00216	1.17E-01	1.29E+00	1.25E-01	4.6460	20.58%	60.57%	-
Water	15	15%	18.02	18.8	0.008326	0.4525	8.5154	0.82725	14.9030	66.02%	-	-
	100	100%			0.018401	1.0000	10.2937	1.0000	22.57	100.00%	100.00%	100.00%
						psia	0.19910		W/o water	33.98%		
									and w/o acetic	13.40%		

		Previous
Desired throughput	6244 gals/month	917
	74,928 gals/yr	11,004

L = Liquid
V = Vapor

(2)=(1)/100
(5)=(2)/(3)
(6)=(5)/0.018401
(7)=(4)*(6)
(8)=(7)/10.2937
(9)=(3)*(8)

(10)=(9)/22.57
(11)=(10)/33.98%
(12)=(10)/13.4%

H_3PO_4 3.98% of PM

lb/day

Uncontrolled 0.001 lb/day*0.0398 = 0.0000 lb/day

Controlled 0 lb/day*(1-0.95) = 0.00000 lb/day

lb/hr

Uncontrolled 0 lb/day/24 hrs/day = 0.00000 lb/hr

Controlled 0 lb/day/24 hrs/day = 5.38E-08 lb/hr

lb/yr 0 lb/day*7 days/wk*52 wks/yr = 0.000 lb/yr

$C_2H_4O_2$

lb/day

Uncontrolled 0.15 lb/month/31 days/month*0.3398*1 = 0.002 lb/day

Controlled 0.002 lb/day*(1-0) = 0.0016 lb/day

lb/hr

Uncontrolled 0.002 lb/day/24 hrs/day = 0.0001 lb/hr

Controlled 0.0016 lb/day/24 hrs/day = 0.00007 lb/hr

lb/yr 0.0016 lb/day*7 days/wk*52 wks/yr = 0.60 lb/yr

	PM/PM10	HNO_3	H_3PO_4	$C_2H_4O_2$
lb/hr				
Uncontr.	2.70E-05	2.59E-05	1.08E-06	6.85E-05
Contr.	1.35E-06	1.30E-06	5.38E-08	6.85E-05
lb/day				
Uncontr.	6.48E-04	6.22E-04	2.58E-05	1.64E-03
Contr.	3.24E-05	3.11E-05	1.29E-06	1.64E-03
lb/yr (Contr.)	0.01	0.01	0.000	0.60

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
HNO_3	1.30E-06	0.01	0.0859	-	0.00002	-	Yes
H_3PO_4	5.38E-08	0.000	-	607.00	-	0.000001	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					0.00002	0.000001	

Monthly throughput limit: 654 gals*17 times/yr/12 months/yr*1 = 917 gals/month

ATTACMENT
ALUMINUM ETCH
T-191
Vertical
Control: Scrubbers

Subsequent:	460732			A/N:	381815
Given:					
Tank dimentior	ft	in	gals		
DIA.	4	6	654		
H	5	6			
Working volume				654	gals
Desired thoughput:				11,004	gals/yr
Turnovers per year				17	
*Diameter of a circle whose area is equal to the surface cross section area.					
Month selected for emission calculations:				July	
Number of days in July:				31	
Total pressure:				0.199102	psia
Maximum emissions**					
Working				0.1	lb/month
Breathing				0.05	lb/month
Note: **From TANK 4.0.9d Emissions Report					
Weight fraction of all acids in vapor:				33.98%	
Weight fraction of acids (excluding acetic acid) in vapor:				13.40%	
Control efficiency:					
PM acids				95%	
Acetic acid				0%	
Operating Schedule:					
hrs/day				24	hrs/day
days/wk				7	days/wk
weeks/yr				52	wks/yr
PM10 in PM				100%	
Cushion factor:				1.0	
Calculations:					
Emissions:				11,004	gals
Total emission (working + breathing), lb/month			(0.1 + 0.05) lb/month =	0.15	lb/month
PM					
lb/day					
Uncontrolled			0.15 lb/month/31 days/month*0.134*1 =	0.001	lb/day
Controlled			0.001 lb/day*(1-0.95) =	0.0000	lb/day
lb/hr					
Uncontrolled			0.001 lb/day/24 hrs/day =	0.00003	lb/hr
Controlled			0 lb/day/24 hrs/day =	0.00000	lb/hr
lb/yr			0 lb/day*7 days/wk*52 wks/yr =	0.01	lb/yr
HNO_3	96.02% of PM				
lb/day					
Uncontrolled			0.001 lb/day*0.9602 =	0.001	lb/day
Controlled			0.001 lb/day*(1-0.95) =	0.0000	lb/day
lb/hr					
Uncontrolled			0.001 lb/day/24 hrs/day =	0.0000	lb/hr
Controlled			0 lb/day/24 hrs/day =	0.00000	lb/hr
lb/yr			0 lb/day*7 days/wk*52 wks/yr =	0.01	lb/yr

H_3PO_4 3.98% of PM

lb/day

Uncontrolled 0.001 lb/day*0.0398 = 0.0001 lb/day

Controlled 0.0001 lb/day*(1-0.95) = 0.00000 lb/day

lb/hr

Uncontrolled 0.0001 lb/day/24 hrs/day = 0.00000 lb/hr

Controlled 0 lb/day/24 hrs/day = 1.22E-07 lb/hr

lb/yr 0 lb/day*7 days/wk*52 wks/yr = 0.001 lb/yr

$C_2H_4O_2$

lb/day

Uncontrolled 0.34 lb/month/31 days/month*0.3398*1 = 0.004 lb/day

Controlled 0.004 lb/day*(1-0) = 0.0037 lb/day

lb/hr

Uncontrolled 0.004 lb/day/24 hrs/day = 0.0002 lb/hr

Controlled 0.0037 lb/day/24 hrs/day = 0.00016 lb/hr

lb/yr 0.0037 lb/day*7 days/wk*52 wks/yr = 1.36 lb/yr

	PM/PM10	HNO_3	H_3PO_4	$C_2H_4O_2$
lb/hr				
Uncontr.	6.12E-05	5.88E-05	2.44E-06	1.55E-04
Contr.	3.06E-06	2.94E-06	1.22E-07	1.55E-04
lb/day				
Uncontr.	1.47E-03	1.41E-03	5.85E-05	3.73E-03
Contr.	7.35E-05	7.05E-05	2.92E-06	3.73E-03
lb/yr (Contr.)	0.03	0.03	0.001	1.36

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
HNO_3	2.94E-06	0.03	0.0859	-	0.00003	-	Yes
H_3PO_4	1.22E-07	0.001	-	607.00	-	0.000002	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					0.00003	0.000002	

Monthly throughput limit: 654 gals*115 times/yr/12 months/yr*1 = 6,244 gals/month

ATTACMENT
ALUMINUM ETCH
T-191
Vertical
Control: 492806

Previous:	F54715	381815		A/N:	460732
Given:					
Tank dimentior	ft	in	gals		
DIA.	4	6	654		
H	5	6			
Working volume				654	gals
Desired thoughput:				74,928	gals/yr
Turnovers per year				115	
*Diameter of a circle whose area is equal to the surface cross section area.					
Month selected for emission calculations:				July	
Number of days in July:				31	
Total pressure:				0.199102	psia
Maximum emissions**					
Working				0.29	lb/month
Breathing				0.05	lb/month
Note: **From TANK 4.0.9d Emissions Report					
Weight fraction of all acids in vapor:				33.98%	
Weight fraction of acids (excluding acetic acid) in vapor:				13.40%	
Control efficiency:					
PM acids				95%	
Acetic acid				0%	
Operating Schedule:					
hrs/day				24	hrs/day
days/wk				7	days/wk
weeks/yr				52	wks/yr
PM10 in PM				100%	
Cushion factor:				1.0	
Calculations:					
Emissions:				74,928	gals
Total emission (working + breathing), lb/month			(0.29 + 0.05) lb/month =	0.34	lb/month
PM					
lb/day					
Uncontrolled			0.34 lb/month/31 days/month*0.134*1 =	0.001	lb/day
Controlled			0.001 lb/day*(1-0.95) =	0.0001	lb/day
lb/hr					
Uncontrolled			0.001 lb/day/24 hrs/day =	0.00006	lb/hr
Controlled			0.0001 lb/day/24 hrs/day =	0.00000	lb/hr
lb/yr			0.0001 lb/day*7 days/wk*52 wks/yr =	0.03	lb/yr
HNO_3	96.02% of PM				
lb/day					
Uncontrolled			0.001 lb/day*0.9602 =	0.001	lb/day
Controlled			0.001 lb/day*(1-0.95) =	0.0001	lb/day
lb/hr					
Uncontrolled			0.001 lb/day/24 hrs/day =	0.0001	lb/hr
Controlled			0.0001 lb/day/24 hrs/day =	0.00000	lb/hr
lb/yr			0.0001 lb/day*7 days/wk*52 wks/yr =	0.03	lb/yr

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

Emissions Report for: July

T-155 Previous A/N 383502 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Poly Etch	0.50	0.24	0.73

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

T-155 Previous A/N 383502 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.2350			
Vapor Space Volume (cu ft):							48.6458			
Vapor Density (lb/cu ft):							0.0040			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.9181			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							48.6458			
Tank Diameter (ft):							4.5000			
Vapor Space Outage (ft):							3.0587			
Tank Shell Height (ft):							5.5000			
Average Liquid Height (ft):							2.7500			
Roof Outage (ft):							0.3087			
Roof Outage (Dome Roof)										
Roof Outage (ft):							0.3087			
Dome Radius (ft):							4.5000			
Shell Radius (ft):							2.2500			
Vapor Density										
Vapor Density (lb/cu ft):							0.0040			
Vapor Molecular Weight (lb/lb-mole):							41.2800			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5503			
Daily Avg. Liquid Surface Temp. (deg. R):							530.9285			
Daily Average Ambient Temp. (deg. F):							73.0500			
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731			
Liquid Bulk Temperature (deg. R):							523.9983			
Tank Paint Solar Absorptance (Shell):							0.1700			
Tank Paint Solar Absorptance (Roof):							0.1700			
Daily Total Solar Insulation Factor (Btu/sqft day):							2,302.7457			
Vapor Space Expansion Factor										
Vapor Space Expansion Factor:							0.0426			
Daily Vapor Temperature Range (deg. R):							24.8571			
Daily Vapor Pressure Range (psia):							0.0000			
Breather Vent Press. Setting Range(psia):							0.0600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5503			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.5503			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.5503			
Daily Avg. Liquid Surface Temp. (deg R):							530.9285			
Daily Min. Liquid Surface Temp. (deg R):							524.7142			
Daily Max. Liquid Surface Temp. (deg R):							537.1427			
Daily Ambient Temp. Range (deg. R):							19.3000			
Vented Vapor Saturation Factor										
Vented Vapor Saturation Factor:							0.9181			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.5503			
Vapor Space Outage (ft):							3.0587			
Working Losses (lb):							0.4960			
Vapor Molecular Weight (lb/lb-mole):							41.2800			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5503			
Net Throughput (gal/mo.):							917.0000			
Annual Turnovers:							16.8257			
Turnover Factor:							1.0000			
Maximum Liquid Volume (gal):							654.0000			
Maximum Liquid Height (ft):							5.5000			
Tank Diameter (ft):							4.5000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							0.7310			

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

T-155 Previous A/N 383502 - Vertical Fixed Roof Tank

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 Press Calculations
Poly Etch	Jul	71.26	65.04	77.47	64.33	0.5503	0.5503	0.5503	41.2800			0.00	

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

Identification

User Identification:	T-155 Previous A/N 383502
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):		5.50
Diameter (ft):		4.50
Liquid Height (ft) :		5.50
Avg. Liquid Height (ft):		2.75
Volume (gallons):		654.00
Turnovers:		16.83
Net Throughput(gal/yr):		11,004.00
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
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

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

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

Emissions Report for: July

T-155 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Poly Etch	1.91	0.24	2.14

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

T-155 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.2350			
Vapor Space Volume (cu ft):							48.6458			
Vapor Density (lb/cu ft):							0.0040			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.9181			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							48.6458			
Tank Diameter (ft):							4.5000			
Vapor Space Outage (ft):							3.0587			
Tank Shell Height (ft):							5.5000			
Average Liquid Height (ft):							2.7500			
Roof Outage (ft):							0.3087			
Roof Outage (Dome Roof)										
Roof Outage (ft):							0.3087			
Dome Radius (ft):							4.5000			
Shell Radius (ft):							2.2500			
Vapor Density										
Vapor Density (lb/cu ft):							0.0040			
Vapor Molecular Weight (lb/lb-mole):							41.2800			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5503			
Daily Avg. Liquid Surface Temp. (deg. R):							530.9285			
Daily Average Ambient Temp. (deg. F):							73.0500			
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731			
Liquid Bulk Temperature (deg. R):							523.9983			
Tank Paint Solar Absorptance (Shell):							0.1700			
Tank Paint Solar Absorptance (Roof):							0.1700			
Daily Total Solar Insulation Factor (Btu/sqft day):							2,302.7457			
Vapor Space Expansion Factor										
Vapor Space Expansion Factor:							0.0426			
Daily Vapor Temperature Range (deg. R):							24.8571			
Daily Vapor Pressure Range (psia):							0.0000			
Breather Vent Press. Setting Range(psia):							0.0600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5503			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.5503			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.5503			
Daily Avg. Liquid Surface Temp. (deg R):							530.9285			
Daily Min. Liquid Surface Temp. (deg R):							524.7142			
Daily Max. Liquid Surface Temp. (deg R):							537.1427			
Daily Ambient Temp. Range (deg. R):							19.3000			
Vented Vapor Saturation Factor										
Vented Vapor Saturation Factor:							0.9181			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.5503			
Vapor Space Outage (ft):							3.0587			
Working Losses (lb):							1.9072			
Vapor Molecular Weight (lb/lb-mole):							41.2800			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5503			
Net Throughput (gal/mo.):							11,348.0000			
Annual Turnovers:							208.2202			
Turnover Factor:							0.3107			
Maximum Liquid Volume (gal):							654.0000			
Maximum Liquid Height (ft):							5.5000			
Tank Diameter (ft):							4.5000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							2.1423			

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

T-155 - Vertical Fixed Roof Tank

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 Press Calculations
Poly Etch	Jul	71.26	65.04	77.47	64.33	0.5503	0.5503	0.5503	41.2800			0.00	

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

Identification

User Identification:	T-155
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):	5.50
Diameter (ft):	4.50
Liquid Height (ft) :	5.50
Avg. Liquid Height (ft):	2.75
Volume (gallons):	654.00
Turnovers:	208.22
Net Throughput(gal/yr):	136,176.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
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

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

Previous: F54707 383502 A/N: 460730

Mixture Vapor Pressure
POLY ETCH
T-155

Operating temperature 70 F

Compounds	Amount, lb	Solution wt%	Molecular Weight	VP mmHg	# moles (L)	mole fraction (L)	Partial VP mmHg	Mole Fraction (V)	Wt Contribution	wt% w/ water	wt% w/o water
Columns	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
HNO_3	56	56.0%	63.01	55.00	0.0088871	2.67E-01	1.47E+01	5.17E-01	32.5832	78.93%	100.00%
NH_4F	0.3	0.3%	37.04	-	8.1E-05	2.44E-03	-	-	-	-	-
Water	44	43.7%	18.02	18.8	0.024257	0.7301	13.7390	0.48291	8.6998	21.07%	-
	100	100.0%			0.033225	1.0000	28.4503	1.0000	41.28	100.00%	100.00%
						psia	0.55029		W/o water	78.93%	

		Previous
Desired throughput	11348 gals/month	917
	136,176 gals/yr	11,004

L = Liquid

(2)=(1)/100
(5)=(2)/(3)
(6)=(5)/0.033225
(7)=(4)*(6)
(8)=(7)/28.4503
(9)=(3)*(8)

(10)=(9)/41.28
(11)=(10)/78.93%

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
HNO_3	3.93E-05	0.34	0.086	-	4.57E-04	-	Yes
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					4.57E-04	-	

Monthly throughput limit: 917 gals/month

ATTACMENT
POLY ETCH
T-155
Vertical
Control: Scrubbers

Subsequent: 460730 A/N: 383502

Given:

Tank dimentior	ft	in
DIA.	4	6
H	5	6

Working volume	375	gals
Desired thoughput:	11,004	gals/yr
Turnovers per year	29	
Month selected for emission calculations:	July	
Number of days in July:	31	
Total pressure:	0.55029	psia
Maximum emissions**		
Working	0.50	lb/month
Breathing	0.24	lb/month
Note: **From TANK 4.0.9d Emissions Report	0.74	
Weight% of PM in vapor:	78.93%	
Control efficiency:	95%	
Operating Schedule:		
hrs/day	24	hrs/day
days/wk	7	days/wk
weeks/yr	52	wks/yr
PM10 in PM	100%	

Calculations:

Emissions:

Total emission (working + breathing), lb/month (0.5 + 0.24) lb/month = 0.74 lb/month

PM/HNO_3

lb/day			
Uncontrolled	0.74 lb/month/31 days/month*0.7893 =	0.019	lb/day
Controlled	0.019 lb/day*(1-7) =	0.0009	lb/day
lb/hr			
Uncontrolled	0.019 lb/day/ hrs/day =	0.00079	lb/hr
Controlled	0.0009 lb/day/ hrs/day =	0.00004	lb/hr
lb/yr	0.0009 lb/day* days/wk*0.74 wks/yr =	0.34	lb/yr

	PM/PM10	HNO_3
lb/hr		
Uncontr.	7.85E-04	7.85E-04
Contr.	3.93E-05	3.93E-05
lb/day		
Uncontr.	1.88E-02	1.88E-02
Contr.	9.42E-04	9.42E-04
lb/yr (Contr.)	0.34	0.34