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

Emissions Report for: July

T-406 Rev1 2 26 09 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Waste Sulfuric Acid	2.44	0.01	2.45

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

T-406 Rev1 2 26 09 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.0118			
Vapor Space Volume (cu ft):							8.0874			
Vapor Density (lb/cu ft):							0.0011			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.9713			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							8.0874			
Tank Diameter (ft):							2.5800			
Vapor Space Outage (ft):							1.5470			
Tank Shell Height (ft):							2.7500			
Average Liquid Height (ft):							1.3800			
Roof Outage (ft):							0.1770			
Roof Outage (Dome Roof)										
Roof Outage (ft):							0.1770			
Dome Radius (ft):							2.5800			
Shell Radius (ft):							1.2900			
Vapor Density										
Vapor Density (lb/cu ft):							0.0011			
Vapor Molecular Weight (lb/lb-mole):							18.0400			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.3600			
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):							0.3600			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.3600			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.3600			
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:							0.9713			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.3600			
Vapor Space Outage (ft):							1.5470			
Working Losses (lb):							2.4415			
Vapor Molecular Weight (lb/lb-mole):							18.0400			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.3600			
Net Throughput (gal/mo.):							93,132.0000			
Annual Turnovers:							10,444.7103			
Turnover Factor:							0.1695			
Maximum Liquid Volume (gal):							107.0000			
Maximum Liquid Height (ft):							2.7500			
Tank Diameter (ft):							2.5800			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							2.4533			

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

T-406 Rev1 2 26 09 - 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	0.3600	0.3600	0.3600	18.0400			0.00	

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

Identification

User Identification:	T-406 Rev1 2 26 09
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):	2.75
Diameter (ft):	2.58
Liquid Height (ft) :	2.75
Avg. Liquid Height (ft):	1.38
Volume (gallons):	107.00
Turnovers:	10,444.71
Net Throughput(gal/yr):	1,117,584.00
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: F62895 414236 A/N: 460744

Mixture Vapor Pressure
WASTE SULFURIC ACID
T-406

Operating temperature 70 F

Compounds	Amount, lb	Solution wt%*	Molecular Weight	VP mmHg	moles fraction	Weight Contribution	Wt% w/ water	Wt% w/o water
Columns	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
H_2SO_4	10	10.00%	98.07	0.00547	0.00029	0.029	0.16%	100%
Water	90	90%	18.02	18.8	1.00	18.01	99.84%	-
	100	100%		18.82	1.00	18.04	100%	100%
			psi	0.36		w/o water	0.16%	

Desired throughput 93,132 gals/month
1,117,584 gals/yr

	PM/PM10/H_2SO_4
lb/hr	
Uncontr.	5.21E-06
Contr.	2.60E-07
lb/day	
Uncontr.	1.25E-04
Contr.	6.25E-06
lb/yr (Contr.)	2.27E-03

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
H_2SO_4	2.60E-07	2.27E-03	0.12	86.70	2.17E-06	2.62E-05	Yes
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					2.17E-06	2.62E-05	

Monthly throughput limit: 108 gals*10348 times/yr/12 months/yr*1 = 93,132 gals/month

ATTACMENT
WASTE SULFURIC ACID
T-406
Vertical
Control: Scrubbers

Subsequent:	460744			A/N:	414236
Dimensions:	ft	inches	gals		
DIA.	2	7	108		
H	2	9			
Working volume				108	gals
Desired thoughput:				1,117,584	gals/yr
Turnovers per year				10,348	
Month selected for emission calculations:				July	
Number of days in July:				31	
Total pressure:				0.36	psia
Maximum emissions**					
Working				2.44	lb/month
Breathing				0.01	lb/month
Note: **From TANK 4.0.9d Emissions Report				2.45	
Weight% of acid in vapor:				0.16%	
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	(2.44 + 0.01) lb/month =	2.45 lb/month
PM/PM10/HCl		
lb/day		
Uncontrolled	2.45 lb/month/31 days/month*0.0016*1 =	0.000124931 lb/day
Controlled	0.000124931 lb/day*(1-0.95) =	0.000006247 lb/day
lb/hr		
Uncontrolled	0.000124931 lb/day/24 hrs/day =	0.0000052055 lb/hr
Controlled	0.000006247 lb/day/24 hrs/day =	0.0000002603 lb/hr
lb/yr	0.000006247 lb/day*7 days/wk*52 wks/yr =	0.002274 lb/yr

	PM/PM10/H_2SO_4
lb/hr	
Uncontr.	5.21E-06
Contr.	5.21E-06
lb/day	
Uncontr.	1.25E-04
Contr.	1.25E-04
lb/yr (Contr.)	4.55E-02

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
H_2SO_4	5.21E-06	4.55E-02	0.12	86.70	4.34E-05	5.25E-04	Yes
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					4.34E-05	5.25E-04	

Monthly throughput limit: 108 gals*10348 times/yr/12 months/yr*1 = 93,132 gals/month

ATTACMENT
WASTE SULFURIC ACID
T-406
Vertical
Control: None

Previous:	F62895	414236		A/N:	460744
Dimensions:	ft	inches	gals		
DIA.	2	7	108		
H	2	9			

Working volume	108	gals
Desired thoughput:	1,117,584	gals/yr
Turnovers per year	10,348	
Month selected for emission calculations:	July	
Number of days in July:	31	
Total pressure:	0.36	psia
Maximum emissions**		
Working	2.44	lb/month
Breathing	0.01	lb/month
Note: **From TANK 4.0.9d Emissions Report	2.45	
Weight% of acid in vapor:	0.16%	
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	(2.44 + 0.01) lb/month =	2.45 lb/month
PM/PM10/HCl		
lb/day		
Uncontrolled	2.45 lb/month/31 days/month*0.0016*1 =	0.000124931 lb/day
Controlled	0.000124931 lb/day*(1-0) =	0.000124931 lb/day
lb/hr		
Uncontrolled	0.000124931 lb/day/24 hrs/day =	0.0000052055 lb/hr
Controlled	0.000124931 lb/day/24 hrs/day =	0.0000052055 lb/hr
lb/yr	0.000124931 lb/day*7 days/wk*52 wks/yr =	0.045475 lb/yr

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

Emissions Report for: July

T-405 Rev2 2 26 09 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Waste Sulfuric Acid	3.33	0.02	3.34

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

T-405 Rev2 2 26 09 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.0154			
Vapor Space Volume (cu ft):							10.6592			
Vapor Density (lb/cu ft):							0.0011			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.9602			
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):							18.0400			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.3600			
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):							0.3600			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.3600			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.3600			
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:							0.9602			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.3600			
Vapor Space Outage (ft):							2.1715			
Working Losses (lb):							3.3272			
Vapor Molecular Weight (lb/lb-mole):							18.0400			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.3600			
Net Throughput (gal/mo.):							126,900.0000			
Annual Turnovers:							10,359.1837			
Turnover Factor:							0.1696			
Maximum Liquid Volume (gal):							147.0000			
Maximum Liquid Height (ft):							4.0000			
Tank Diameter (ft):							2.5000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							3.3426			

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

T-405 Rev2 2 26 09 - 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	0.3600	0.3600	0.3600	18.0400			0.00	

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

Identification

User Identification:	T-405 Rev2 2 26 09
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:	10,359.18
Net Throughput(gal/yr):	1,522,800.00
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)

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
H_2SO_4	3.56E-07	3.11E-03	0.12	86.70	2.97E-06	3.59E-05	Yes
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					2.97E-06	3.59E-05	

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:				0.3641	psia
Maximum emissions**					
Working				3.33	lb/month
Breathing				0.02	lb/month
Note: **From TANK 4.0.9d Emissions Report					
Weight% of acid in vapor:				0.16%	
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	(3.33 + 0.02) lb/month =	3.35	lb/month
PM/PM10/HCl			
lb/day			
Uncontrolled	3.35 lb/month/31 days/month*0.001581*1 =	0.000170824	lb/day
Controlled	0.000170824 lb/day*(1-0.95) =	0.000008541	lb/day
lb/hr			
Uncontrolled	0.000170824 lb/day/24 hrs/day =	0.0000071177	lb/hr
Controlled	0.000008541 lb/day/24 hrs/day =	0.0000003559	lb/hr
lb/yr	0.000008541 lb/day*7 days/wk*52 wks/yr =	0.003109	lb/yr

	$PM/PM10/H_2SO_4$
lb/hr	
Uncontr.	7.12E-06
Contr.	3.56E-07
lb/day	
Uncontr.	1.71E-04
Contr.	8.54E-06
lb/yr (Contr.)	3.11E-03

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
H_2SO_4	7.12E-06	6.22E-02	0.12	86.70	5.93E-05	7.17E-04	Yes
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					5.93E-05	7.17E-04	

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:				0.3641	psia
Maximum emissions**					
Working				3.33	lb/month
Breathing				0.02	lb/month
Note: **From TANK 4.0.9d Emissions Report					
Weight% of acid in vapor:				0.1581%	
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	(3.33 + 0.02) lb/month =	3.35	lb/month
PM/PM10/HCl			
lb/day			
Uncontrolled	3.35 lb/month/31 days/month*0.001581*1 =	0.000170824	lb/day
Controlled	0.000170824 lb/day*(1-0) =	0.000170824	lb/day
lb/hr			
Uncontrolled	0.000170824 lb/day/24 hrs/day =	0.0000071177	lb/hr
Controlled	0.000170824 lb/day/24 hrs/day =	0.0000071177	lb/hr
lb/yr	0.000170824 lb/day*7 days/wk*52 wks/yr =	0.062180	lb/yr

	$PM/PM10/H_2SO_4$
lb/hr	
Uncontr.	7.12E-06
Contr.	7.12E-06
lb/day	
Uncontr.	1.71E-04
Contr.	1.71E-04
lb/yr (Contr.)	6.22E-02

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

Emissions Report for: July

T-14 Rev1 2 26 09 - Horizontal Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Waste Acids	184.02	2.24	186.25

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

T-14 Rev1 2 26 09 - Horizontal Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							2.2367			
Vapor Space Volume (cu ft):							550.2790			
Vapor Density (lb/cu ft):							0.0039			
Vapor Space Expansion Factor:							0.0418			
Vented Vapor Saturation Factor:							0.8144			
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):							0.0039			
Vapor Molecular Weight (lb/lb-mole):							25.5400			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.8600			
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:							0.0418			
Daily Vapor Temperature Range (deg. R):							24.8571			
Daily Vapor Pressure Range (psia):							-0.0100			
Breather Vent Press. Setting Range(psia):							0.0600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.8600			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.8600			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.8500			
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:							0.8144			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.8600			
Vapor Space Outage (ft):							5.0000			
Working Losses (lb):							184.0172			
Vapor Molecular Weight (lb/lb-mole):							25.5400			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.8600			
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):							186.2539			

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

T-14 Rev1 2 26 09 - 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
Waste Acids	Jul	71.26	65.04	77.47	64.33	0.8600	0.8600	0.8500	25.5400			0.00	

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

Identification

User Identification:	T-14 Rev1 2 26 09
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 fraction	Weight 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)
H_3PO_4	221,514	22%	98.00	0.03	0.000678	0.07	0.2%	0.3%	1.0%
Acetic acid	5,821	0.58%	60.05	11.40	0.257601	15.47	52.4%	71%	-
HNO_3	235,180	24%	63.01	-	-	-	-	-	-
HBF_4	2,499	0.25%	87.81	0.00055	0.000012	0.001	0.004%	0.005%	0.02%
HF	115,127	12%	20.01	14.00	0.316352	6.33	21.4%	29%	98.76%
H_2O_2*	19	0.0019%	34.01	-	-	-	-	-	-
H_2SO_4	81,510	8%	98.07	0.0055	0.000124	0.01	0.04%	0.1%	0.19%
NH_4OH**	16,823	1.68%	35.05	-	-	-	-	-	-
NH_4F (Solid salt)	1,017	0.10%	37.04	-	-	-	-	-	-
H_2O	320,031	32%	18.02	18.8	0.425232	7.66	25.9%	-	-
	999,543	100%		44.25	1.00	29.5389	100%	100%	100%
			psi	0.85597		W/o water	74%	W/o acetic	21.70%

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

Notes:

+For HF, the vapor pressure is vapor pressure of 48% HF solution
*Small amount, vapor pressure is negligible.
**At 1 - 2 pH, it is expected that all NH_4OH is competely neutralized.

ATTACHMENT
WASTE ACIDS
T-14

	PM	PM10	H_3PO_4	HNO_3	HBF_4	HF	H_2SO_4	VOC CH_3COOH
lb/hr								
Uncontr.	0.05	0.05	0.00056	-	9.20E-06	0.05	1.03E-04	6.87E-02
Contr.	0.00	0.00	0.000028	-	4.60E-07	0.003	5.14E-06	6.87E-02
lb/day								
Uncontr.	1	1	0.014	-	2.21E-04	1.29	2.47E-03	1.6479
Contr.	0.07	0.06	0.00068	-	1.10E-05	0.06	1.23E-04	1.6479
lb/yr (Contr.)		22.78	0.25	-	4.02E-03	23.43	4.49E-02	599.83

Rule 1401 Evaluation:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
HNO_3	-	-	0.0859	-	0.00E+00	-	Yes
H_3PO_4	0.000028	0.25	-	607.00	-	4.05E-04	
HF	0.003	23.43	0.24	-	1.12E-02	-	
H_2SO_4	5.14E-06	4.49E-02	0.12	86.70	4.28E-05	5.18E-04	
Total					1.12E-02	9.23E-04	

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

ATTACHMENT
WASTE ACIDS
T-14

lb/yr	1.6479 lb/day*7 days/wk*52 wks/yr =	599.83 lb/yr

ATTACHMENT
WASTE ACIDS
T-14

H_3PO_4	1.04% of PM		
lb/day			
Uncontrolled		1.3 lb/day*0.0104 =	0.0135124 lb/day
Controlled		0.07 lb/day*0.0104 =	0.0006756 lb/day
lb/hr			
Uncontrolled		0.05 lb/day*0.0104 =	0.000563 lb/hr
Controlled		0 lb/day*0.0104 =	2.815E-05 lb/hr
lb/yr		23.72 lb/day*0.0104 =	0.2459255 lb/yr
HNO_3	0% of PM		
lb/day			
Uncontrolled		1.3 lb/day*0 =	0 lb/day
Controlled		0.07 lb/day*0 =	0 lb/day
lb/hr			
Uncontrolled		0.05 lb/day*0 =	0 lb/hr
Controlled		0 lb/day*0 =	0 lb/hr
lb/yr		22.78 lb/day*0 =	0 lb/yr
HBF_4	0.02% of PM		
lb/day			
Uncontrolled		1.3 lb/day*0.0001694549 =	0.0002209 lb/day
Controlled		0.07 lb/day*0.0001694549 =	1.104E-05 lb/day
lb/hr			
Uncontrolled		0.05 lb/day*0.0001694549 =	9.204E-06 lb/hr
Controlled		0 lb/day*0.0001694549 =	4.602E-07 lb/hr
lb/yr		0.25 lb/day*0.0001694549 =	0.0040203 lb/yr
HF	98.76% of PM		
lb/day			
Uncontrolled		1.3 lb/day*0.9876 =	1.2873643 lb/day
Controlled		0.07 lb/day*0.9876 =	0.0643682 lb/day
lb/hr			
Uncontrolled		0.05 lb/day*0.9876 =	0.0536402 lb/hr
Controlled		0 lb/day*0.9876 =	0.002682 lb/hr
lb/yr		0 lb/day*0.9876 =	23.43003 lb/yr
H_2SO_4	0.2% of PM		
lb/day			
Uncontrolled		1.3 lb/day*0.001893 =	0.0024671 lb/day
Controlled		0.07 lb/day*0.001893 =	0.0001234 lb/day
lb/hr			
Uncontrolled		0.05 lb/day*0.001893 =	0.0001028 lb/hr
Controlled		0 lb/day*0.001893 =	5.14E-06 lb/hr
lb/yr		0 lb/day*0.001893 =	0.0449006 lb/yr
CH_3COOH	52.37% of all emissions		
lb/day			
Uncontrolled		186.26 lb/month/31 days/month*0.5237*0.5237*1 =	1.6479 lb/day
Controlled		1.6479 lb/day*(1-0) =	1.6479 lb/day
lb/hr			
Uncontrolled		1.6479 lb/day/24 hrs/day =	0.0687 lb/hr
Controlled		1.6479 lb/day/24 hrs/day =	0.0687 lb/hr

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:				0.85597	psia
Maximum month emission*					
Working				184.02	lb/month
Breathing				2.24	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)	74.07%	
Weight% of all acids, except acetic acid, in vapor:			(PM)	21.70%	
Weight% of acetic:				52.37%	
Cushion factor:				1.00	
Calculations					
Tank volume:				6,750	gallons
Turnovers per year				3,573	
Emissions:					
Total emission (working + breathing), lb/month			(184.02 + 2.24) lb/month =	186.26	lb/month
PM					
lb/day					
Uncontrolled			186.26 lb/month/31 days/month*0.217*1 =	1.30	lb/day
Controlled			1.3 lb/day*(1-0.95) =	0.07	lb/day
lb/hr					
Uncontrolled			1.3 lb/day/24 hrs/day =	0.05	lb/hr
Controlled			0.07 lb/day/24 hrs/day =	0.003	lb/hr
lb/yr			0.07 lb/day*7 days/wk*52 wks/yr =	23.72	lb/yr
PM10					
lb/day					
Uncontrolled			1.3 lb/day*0.96 =	1.25	lb/day
Controlled			0.07 lb/day*0.96 =	0.06	lb/day
lb/hr					
Uncontrolled			0.05 lb/day*0.96 =	0.05	lb/hr
Controlled			0 lb/day*0.96 =	0.00	lb/hr
lb/yr			0.06 lb/day*7 days/wk*52 wks/yr =	22.78	lb/yr

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

Emissions Report for: July

T-195 Prev 2 26 09 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Aluminum Etch	0.32	0.15	0.47

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

T-195 Prev 2 26 09 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.1499			
Vapor Space Volume (cu ft):							48.6458			
Vapor Density (lb/cu ft):							0.0026			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.9141			
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):							0.0026			
Vapor Molecular Weight (lb/lb-mole):							25.1000			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5800			
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):							0.5800			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.5800			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.5800			
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:							0.9141			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.5800			
Vapor Space Outage (ft):							3.0587			
Working Losses (lb):							0.3178			
Vapor Molecular Weight (lb/lb-mole):							25.1000			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5800			
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):							0.4678			

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

T-195 Prev 2 26 09 - 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	0.5800	0.5800	0.5800	25.1000			0.00	

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

Identification

User Identification:	T-195 Prev 2 26 09
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 Rev1 2 26 09 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Aluminum Etch	0.93	0.15	1.08

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

T-195 Rev1 2 26 09 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.1499			
Vapor Space Volume (cu ft):							48.6458			
Vapor Density (lb/cu ft):							0.0026			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.9141			
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):							0.0026			
Vapor Molecular Weight (lb/lb-mole):							25.1000			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5800			
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):							0.5800			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.5800			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.5800			
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:							0.9141			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.5800			
Vapor Space Outage (ft):							3.0587			
Working Losses (lb):							0.9274			
Vapor Molecular Weight (lb/lb-mole):							25.1000			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5800			
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):							1.0774			

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

T-195 Rev1 2 26 09 - 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	0.5800	0.5800	0.5800	25.1000			0.00	

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

Identification

User Identification:	T-195 Rev1 2 26 09
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 fraction	Weight 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)
HNO_3	1	1%	63.01	-	-	-	-	-	-
H_3PO_4	76	76%	98.00	0.03	0.001	0.10	0.4%	1%	1.00
CH_3COOH	8	8%	37.04	11.00	0.37	13.65	54.4%	99%	-
Water	15	15%	18.02	18.8	0.63	11.36	45.2%	-	-
	100	100%		29.85	1.00	25.1056	100%	100%	100%
			psi	0.58		W/o water	55%	W/o acetic	0.39%
				Previous					
Desired throughput	6244 gals/month			917					
	74,928 gals/yr			11,004					

lb/yr		0 lb/day*7 days/wk*52 wks/yr =	0.00 lb/yr
H_3PO_4	100% of PM		
lb/day			
Uncontrolled		0.000065 lb/day*1 =	0.00007 lb/day
Controlled		0.000065 lb/day*(1-0.95) =	0.000003 lb/day
lb/hr			
Uncontrolled		0.000065 lb/day/24 hrs/day =	0.00000 lb/hr
Controlled		0.000003 lb/day/24 hrs/day =	1.36E-07 lb/hr
lb/yr		0.000003 lb/day*7 days/wk*52 wks/yr =	0.001 lb/yr
$C_2H_4O_2$			
lb/day			
Uncontrolled		0.47 lb/month/31 days/month*0.5437*1.1 =	0.009 lb/day
Controlled		0.009 lb/day*(1-0) =	0.0091 lb/day
lb/hr			
Uncontrolled		0.009 lb/day/24 hrs/day =	0.0004 lb/hr
Controlled		0.0091 lb/day/24 hrs/day =	0.00038 lb/hr
lb/yr		0.0091 lb/day*7 days/wk*52 wks/yr =	3.30 lb/yr

	PM/PM10	HNO_3	H_3PO_4	$C_2H_4O_2$
lb/hr				
Uncontr.	2.73E-06	-	2.73E-06	3.78E-04
Contr.	1.36E-07	-	1.36E-07	3.78E-04
lb/day				
Uncontr.	6.54E-05	-	6.54E-05	9.07E-03
Contr.	3.27E-06	-	3.27E-06	9.07E-03
lb/yr (Contr.)	0.0012	-	0.0012	3.30

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
HNO_3	-	-	0.0859	-	-	-	Yes
H_3PO_4	1.36E-07	0.001	-	607.00	-	0.000002	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					-	0.000002	

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:				0.58	psia
Maximum emissions**					
Working				0.32	lb/month
Breathing				0.15	lb/month
Note: **From TANK 4.0.9d Emissions Report				0.47	
Weight fraction of all acids in vapor:				0.58	
Weight fraction of acids (excluding acetic acid) in vapor:				0.39%	
Weight fraction of acetic:				54.37%	
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		(0.32 + 0.15) lb/month =	0.47 lb/month
PM			
lb/day			
Uncontrolled	0.47 lb/month/31 days/month*0.0039*1.1 =		0.000 lb/day
Controlled	0 lb/day*(1-0.95) =		0.0000 lb/day
lb/hr			
Uncontrolled	0 lb/day/24 hrs/day =		0.00000 lb/hr
Controlled	0 lb/day/24 hrs/day =		0.00000 lb/hr
lb/yr	0 lb/day*7 days/wk*52 wks/yr =		0.00 lb/yr
HNO_3	0% of PM		
lb/day			
Uncontrolled	0 lb/day*0 =		0.000 lb/day
Controlled	0 lb/day*(1-0.95) =		0.0000 lb/day
lb/hr			
Uncontrolled	0 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 =	0.00 lb/yr
H_3PO_4	100% of PM		
lb/day			
Uncontrolled		0.0002 lb/day*1 =	0.0002 lb/day
Controlled		0.0002 lb/day*(1-0.95) =	0.00001 lb/day
lb/hr			
Uncontrolled		0.0002 lb/day/24 hrs/day =	0.00001 lb/hr
Controlled		0.00001 lb/day/24 hrs/day =	3.13E-07 lb/hr
lb/yr		0.00001 lb/day*7 days/wk*52 wks/yr =	0.003 lb/yr
$C_2H_4O_2$			
lb/day			
Uncontrolled		1.08 lb/month/31 days/month*0.5437*1.1 =	0.021 lb/day
Controlled		0.021 lb/day*(1-0) =	0.0208 lb/day
lb/hr			
Uncontrolled		0.021 lb/day/24 hrs/day =	0.0009 lb/hr
Controlled		0.0208 lb/day/24 hrs/day =	0.00087 lb/hr
lb/yr		0.0208 lb/day*7 days/wk*52 wks/yr =	7.58 lb/yr

	PM/PM10	HNO_3	H_3PO_4	$C_2H_4O_2$
lb/hr				
Uncontr.	6.26E-06	-	6.26E-06	8.68E-04
Contr.	3.13E-07	-	3.13E-07	8.68E-04
lb/day				
Uncontr.	1.50E-04	-	1.50E-04	2.08E-02
Contr.	7.52E-06	-	7.52E-06	2.08E-02
lb/yr (Contr.)	0.003	-	0.003	7.58

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
HNO_3	-	-	0.0859	-	-	-	Yes
H_3PO_4	3.13E-07	0.003	-	607.00	-	0.000005	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					-	0.000005	

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:				0.547591	psia
Maximum emissions**					
Working				0.93	lb/month
Breathing				0.15	lb/month
Note: **From TANK 4.0.9d Emissions Report				1.08	
Weight fraction of all acids in vapor:				0.58	
Weight fraction of acids (excluding acetic acid) in vapor:				0.39%	
Weight fraction of acetic:				54.37%	
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		(0.93 + 0.15) lb/month =	1.08 lb/month
PM			
lb/day			
Uncontrolled	1.08 lb/month/31 days/month*0.0039*1.1 =		0.000 lb/day
Controlled	0 lb/day*(1-0.95) =		0.0000 lb/day
lb/hr			
Uncontrolled	0 lb/day/24 hrs/day =		0.00001 lb/hr
Controlled	0 lb/day/24 hrs/day =		0.00000 lb/hr
lb/yr	0 lb/day*7 days/wk*52 wks/yr =		0.00 lb/yr
HNO_3	0% of PM		
lb/day			
Uncontrolled	0 lb/day*0 =		0.000 lb/day
Controlled	0 lb/day*(1-0.95) =		0.0000 lb/day
lb/hr			
Uncontrolled	0 lb/day/24 hrs/day =		0.0000 lb/hr
Controlled	0 lb/day/24 hrs/day =		0.00000 lb/hr

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

Emissions Report for: July

T-191 Prev 2 26 09 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Aluminum Etch	0.32	0.19	0.51

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

T-191 Prev 2 26 09 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.1935			
Vapor Space Volume (cu ft):							64.5502			
Vapor Density (lb/cu ft):							0.0026			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.8891			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							64.5502			
Tank Diameter (ft):							4.5000			
Vapor Space Outage (ft):							4.0587			
Tank Shell Height (ft):							6.5000			
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):							0.0026			
Vapor Molecular Weight (lb/lb-mole):							25.1000			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5800			
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):							0.5800			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.5600			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.5800			
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:							0.8891			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.5800			
Vapor Space Outage (ft):							4.0587			
Working Losses (lb):							0.3178			
Vapor Molecular Weight (lb/lb-mole):							25.1000			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5800			
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):							0.5114			

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

T-191 Prev 2 26 09 - 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	0.5800	0.5800	0.5800	25.1000			0.00	

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

Identification

User Identification:	T-191 Prev 2 26 09
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):	6.50
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 Rev1 2 26 09 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Aluminum Etch	0.93	0.19	1.12

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

T-191 Rev1 2 26 09 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.1935			
Vapor Space Volume (cu ft):							64.5502			
Vapor Density (lb/cu ft):							0.0026			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.8891			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							64.5502			
Tank Diameter (ft):							4.5000			
Vapor Space Outage (ft):							4.0587			
Tank Shell Height (ft):							6.5000			
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):							0.0026			
Vapor Molecular Weight (lb/lb-mole):							25.1000			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5800			
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):							0.5800			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.5800			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.5800			
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:							0.8891			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.5800			
Vapor Space Outage (ft):							4.0587			
Working Losses (lb):							0.9277			
Vapor Molecular Weight (lb/lb-mole):							25.1000			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5800			
Net Throughput (gal/mo.):							6,244.0000			
Annual Turnovers:							114.5073			
Turnover Factor:							0.4287			
Maximum Liquid Volume (gal):							654.3510			
Maximum Liquid Height (ft):							5.5000			
Tank Diameter (ft):							4.5000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							1.1213			

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

T-191 Rev1 2 26 09 - 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	0.5800	0.5800	0.5800	25.1000			0.00	

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

Identification

User Identification:	T-191 Rev1 2 26 09
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):		6.50
Diameter (ft):		4.50
Liquid Height (ft) :		5.50
Avg. Liquid Height (ft):		2.75
Volume (gallons):		654.35
Turnovers:		114.51
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 fraction	Weight 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)
HNO_3	1	1%	63.01	-	-	-	-	-	-
H_3PO_4	76	76%	98.00	0.03	0.001	0.10	0.4%	1%	1.00
CH_3COOH	8	8%	37.04	11.00	0.37	13.65	54.4%	99%	-
Water	15	15%	18.02	18.8	0.63	11.36	45.2%	-	-
	100	100%		29.85	1.00	25.1056	100%	100%	100%
			psia	0.58		W/o water	55%	W/o acetic	0.39%

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

H_3PO_4 100% of PM

lb/day

Uncontrolled 0.0001 lb/day*1 = 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 = 0.000003 lb/hr

Controlled 0.000003 lb/day/24 hrs/day = 1.34E-07 lb/hr

lb/yr 0.000003 lb/day*7 days/wk*52 wks/yr = 0.001 lb/yr

$C_2H_4O_2$

lb/day

Uncontrolled 0.51 lb/month/31 days/month*0.5437*1 = 0.009 lb/day

Controlled 0.009 lb/day*(1-0) = 0.009 lb/day

lb/hr

Uncontrolled 0.009 lb/day/24 hrs/day = 0.0004 lb/hr

Controlled 0.0089 lb/day/24 hrs/day = 0.00037 lb/hr

lb/yr 0.0089 lb/day*7 days/wk*52 wks/yr = 3.26 lb/yr

	PM/PM10	HNO_3	H_3PO_4	$C_2H_4O_2$
lb/hr				
Uncontr.	2.69E-06	-	2.69E-06	3.73E-04
Contr.	1.34E-07	-	1.34E-07	3.73E-04
lb/day				
Uncontr.	6.45E-05	-	6.45E-05	8.94E-03
Contr.	3.23E-06	-	3.23E-06	8.94E-03
lb/yr (Contr.)	0.00	-	0.001	3.26

Rule 1401:

HIs:

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

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: 0.58 psia
Maximum emissions**
Working 0.32 lb/month
Breathing 0.19 lb/month
Note: **From TANK 4.0.9d Emissions Report
Weight fraction of all acids in vapor: 54.76%
Weight fraction of acids (excluding acetic acid) in vapor: 0.39%
Weight fraction of acetic: 54.37%
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 (0.32 + 0.19) lb/month = 0.51 lb/month

PM
lb/day
Uncontrolled 0.51 lb/month/31 days/month*0.0039*1 = 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 = 0.000003 lb/hr
Controlled 0.000003 lb/day/24 hrs/day = 0.0000001 lb/hr
lb/yr 0.000003 lb/day*7 days/wk*52 wks/yr = 0.001 lb/yr

HNO_3 0% of PM
lb/day
Uncontrolled 0.0001 lb/day*0 = 0.000 lb/day
Controlled 0 lb/day*(1-0.95) = 0.0000 lb/day
lb/hr
Uncontrolled 0 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 = 0.00 lb/yr

H_3PO_4 100% of PM

lb/day

Uncontrolled 0 lb/day*1 = 0.0001 lb/day

Controlled 0.0001 lb/day*(1-0.95) = 0.00001 lb/day

lb/hr

Uncontrolled 0.0001 lb/day/24 hrs/day = 0.00001 lb/hr

Controlled 0.00001 lb/day/24 hrs/day = 2.95E-07 lb/hr

lb/yr 0.00001 lb/day*7 days/wk*52 wks/yr = 0.003 lb/yr

$C_2H_4O_2$

lb/day

Uncontrolled 1.12 lb/month/31 days/month*0.5437*1 = 0.020 lb/day

Controlled 0.02 lb/day*(1-0) = 0.0196 lb/day

lb/hr

Uncontrolled 0.02 lb/day/24 hrs/day = 0.0008 lb/hr

Controlled 0.0196 lb/day/24 hrs/day = 0.00082 lb/hr

lb/yr 0.0196 lb/day*7 days/wk*52 wks/yr = 7.15 lb/yr

	PM/PM10	HNO_3	H_3PO_4	$C_2H_4O_2$
lb/hr				
Uncontr.	5.91E-06	-	5.91E-06	8.18E-04
Contr.	2.95E-07	-	2.95E-07	8.18E-04
lb/day				
Uncontr.	1.42E-04	-	1.42E-04	1.96E-02
Contr.	7.09E-06	-	7.09E-06	1.96E-02
lb/yr (Contr.)	0.00	-	0.003	7.15

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
HNO_3	0.00E+00	-	0.0859	-	-	-	Yes
H_3PO_4	2.95E-07	0.003	-	607.00	-	0.000004	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					-	0.000004	

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:				0.58	psia
Maximum emissions**					
Working				0.93	lb/month
Breathing				0.19	lb/month
Note: **From TANK 4.0.9d Emissions Report					
Weight fraction of all acids in vapor:				54.76%	
Weight fraction of acids (excluding acetic acid) in vapor:				0.39%	
Weight fraction of acetic:				54.37%	
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			(0.93 + 0.19) lb/month =	1.12	lb/month
PM					
lb/day					
Uncontrolled			1.12 lb/month/31 days/month*0.0039*1 =	0.000	lb/day
Controlled			0 lb/day*(1-0.95) =	0.0000	lb/day
lb/hr					
Uncontrolled			0 lb/day/24 hrs/day =	0.00001	lb/hr
Controlled			0 lb/day/24 hrs/day =	0.00000	lb/hr
lb/yr			0 lb/day*7 days/wk*52 wks/yr =	0.00	lb/yr
HNO_3	0% of PM				
lb/day					
Uncontrolled			0 lb/day*0 =	0.000	lb/day
Controlled			0 lb/day*(1-0.95) =	0.0000	lb/day
lb/hr					
Uncontrolled			0 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 =	0.00	lb/yr

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

Emissions Report for: July

T-155 Prev 2 26 09 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Poly Etch	0.16	0.08	0.24

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

T-155 Prev 2 26 09 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.0782			
Vapor Space Volume (cu ft):							48.6458			
Vapor Density (lb/cu ft):							0.0013			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.9420			
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):							0.0013			
Vapor Molecular Weight (lb/lb-mole):							19.3600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.3800			
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):							0.3800			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.3800			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.3800			
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:							0.9420			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.3800			
Vapor Space Outage (ft):							3.0587			
Working Losses (lb):							0.1606			
Vapor Molecular Weight (lb/lb-mole):							19.3600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.3800			
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):							0.2388			

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

T-155 Prev 2 26 09 - 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	0.3800	0.3800	0.3800	19.3600			0.00	

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

Identification

User Identification:	T-155 Prev 2 26 09
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 Rev1 2 26 09 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Poly Etch	0.62	0.08	0.70

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

T-155 Rev1 2 26 09 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.0782			
Vapor Space Volume (cu ft):							48.6458			
Vapor Density (lb/cu ft):							0.0013			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.9420			
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):							0.0013			
Vapor Molecular Weight (lb/lb-mole):							19.3600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.3800			
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):							0.3800			
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.3800			
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.3800			
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:							0.9420			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.3800			
Vapor Space Outage (ft):							3.0587			
Working Losses (lb):							0.6177			
Vapor Molecular Weight (lb/lb-mole):							19.3600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.3800			
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):							0.6959			

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

T-155 Rev1 2 26 09 - 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	0.3800	0.3800	0.3800	19.3600			0.00	

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

Identification

User Identification:	T-155 Rev1 2 26 09
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 fraction	Weight Contribution	wt% w/ water	wt% w/o water
Columns	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HNO_3	56	56.0%	63.01	0.58	0.030	1.89	9.7%	100%
NH_4F	0.3	0.3%	37.04	-	-	-	-	-
Water	44	43.7%	18.02	18.8	0.970	17.48	90.3%	-
	100	100.0%		19.40	1.00	19.36	100.0%	100%
			psia	0.38		w/o water	9.7%	

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

Rule 1401:

HIs:

	Emissions		Screening Levels		HIs Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Chronic	
HNO_3	1.57E-06	0.01	0.086	-	1.83E-05	-	Yes
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					1.83E-05	-	

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:			0.38	psia
Maximum emissions**				
Working			0.16	lb/month
Breathing			0.08	lb/month
Note: **From TANK 4.0.9d Emissions Report			0.24	
Weight% of PM in vapor:			9.75%	
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	(0.16 + 0.08) lb/month =	0.24	lb/month
PM/HNO_3			
lb/day			
Uncontrolled	0.24 lb/month/31 days/month*0.0975 =	0.001	lb/day
Controlled	0.001 lb/day*(1-7) =	0.0000	lb/day
lb/hr			
Uncontrolled	0.001 lb/day/ hrs/day =	0.00003	lb/hr
Controlled	0 lb/day/ hrs/day =	0.00000	lb/hr
lb/yr	0 lb/day* days/wk*0.24 wks/yr =	0.01	lb/yr

	PM/PM10	HNO_3
lb/hr		
Uncontr.	3.14E-05	3.14E-05
Contr.	1.57E-06	1.57E-06
lb/day		
Uncontr.	7.55E-04	7.55E-04
Contr.	3.77E-05	3.77E-05
lb/yr (Contr.)	0.01	0.01