ATTACHMENT
Wafer Etching and Stripping Line 1

Control: 498038 A/N 498033
Previous: P/C 483797
Given:

Wind speed U (Applicant's data) 1.7 mph
1.7 mph*5280 ft/mile/60 minutes/hr = 150 fpm
150 ftm/60 seconds/minute = 2.493 ft/sec

Gas-phase mass transfer coefficient K, ft/sec[1]

K=0.00438*U^0.78*(18/MW)^1/3

Where: MW = Molecular weight, lb/lbmole

Evaporation rate W, lb/sec[1]

W = (MW*K*A*VP)/(R*(T+460))

Where: A = Tank surface area, ft^2
VP = Vapor pressure of chemical
R = Ideal gas constant
= 10.73 $psia*ft^3/^oR*lbmole$
T = Operating temperature, F

[1] Source: Preferred and Alternate Methods for Estimating Air Emissions from Semiconductor Manufacturing, Volume II: Chapter 6 (Prepared by Eastern Research Group, Inc. for Point Sources Committee of the Emission Inventory Improvement Program and EPA's Emission Factor and Inventory Group).

Wet scrubber control efficiency
For acids 95%
NH_3 0%
VOC control efficiency: 0%
Operating schedule:
hrs/day 24 hrs/day
days/wk 7 days/wk
wks/yr 52 wks/yr
PM10 factor: 96%
Tank 1:
Dimensions:

	ft	inches
W	0	9.5
L	1	4.5
H	0	11.5

Chemical (in BOE etchant) HF 7%
Molecular weight: 20.01 lb/lbmole
Operating temperature: 28 C 82 F
Vapor pressure: (Vapor pressure of BOE etchant) 0.4 mm Hg
0.4 mm Hg/(760 mm Hg/14.7 psia) = 0.00774 psia

Surface area: (0 ft+9.5 in/12 in/ft)*(1 ft+4.5 in/12 in/ft) = 1.09 ft^2

Computations:

Gas-phase mass transfer coefficient K:

0.00438*2.493 ft/sec^0.78*(18/20.01 lb/lbmole)^(1/3) = 0.00862 ft/sec

PM/HF:

Emission rates:

lb/sec (Uncontrolled)

20.01 lb/lbmole*0.0086 ft/sec*1.09 ft2*0.00774 psia/(10.73 psia*ft3/oR*lbmole*(82.004+460)) = 0.0000002 lb/sec

lb/hr

Uncontr. 0.0000002 lb/sec*3600 sec/hr = 0.0009 lb/hr

Controlled: 0.0009 lb/hr*(1-0.95) = 0.00004 lb/hr

lb/day

Uncontr. 0.0009 lb/hr*24 hrs/day = 0.02 lb/day

Controlled: 0.00004 lb/hr*24 hrs/day = 0.0011 lb/day

lb/yr 0.0011 lb/day*7 days/wk*52 wks/yr = 0.39 lb/yr

PM10:

lb/hr

Uncontr. 0.0009 lb/hr*0.96 = 0.0009 lb/hr

Controlled: 0.00004 lb/hr*0.96 = 0.00004 lb/hr

lb/day

Uncontr. 0.02 lb/day*0.96 = 0.021 lb/day

Controlled: 0.0011 lb/day*0.96 = 0.0010 lb/day

lb/yr 0.001 lb/day*7 days/wk*52 wks/yr = 0.38 lb/yr

Tank 4:

Dimensions:	ft	inches
W	0	9.5
L	1	4.5
H	0	11.5

Chemical H_2SO_4 5.60%

Molecular weight: 36.46 lb/lbmole

Operating temperature: 130 C 266 F

Vapor pressure: (Vapor pressure of 89.25% H_2SO_4 at 241.5 C is used) 5.3 mm Hg

Note: Vapor pressure at high temperature (241.5 C instead of 130 C) is used to over estimate PM emission from this tank so the temperature recording requirement becomes unnecessary.

5.3 mm Hg/(760 mm Hg/14.7 psia) = 0.103 psia

Surface area: (0 ft+9.5 in/12 in/ft)*(1 ft+4.5 in/12 in/ft) = 1.09 ft^2

Computations:

Gas-phase mass transfer coefficient K:

0.00438*2.493 ft/sec^0.78*(18/36.46 lb/lbmole)^(1/3) = 0.00706 ft/sec

PM/H2SO4:
Emission rates:
lb/sec (Uncontrolled)
36.46 lb/lbmole*0.0071 ft/sec*1.09 ft2*0.103 psia/(10.73 psia*ft3/oR*lbmole*(266+460)) = 0.000004 lb/sec
lb/hr
Uncontr. 0.000004 lb/sec*3600 sec/hr = 0.01327 lb/hr
Controlled: 0.01327 lb/hr*(1-0.95) = 0.00066 lb/hr
lb/day
Uncontr. 0.01327 lb/hr*24 hrs/day = 0.319 lb/day
Controlled: 0.000664 lb/hr*24 hrs/day = 0.01593 lb/day
lb/yr 0.01593 lb/day*7 days/wk*52 wks/yr = 5.80 lb/yr
PM10:
lb/hr
Uncontr. 0.01327 lb/hr*0.96 = 0.01274 lb/hr
Controlled: 0.000664 lb/hr*0.96 = 0.000637 lb/hr
lb/day
Uncontr. 0.319 lb/day*0.96 = 0.306 lb/day
Controlled: 0.01593 lb/day*0.96 = 0.01529 lb/day
lb/yr 0.01529 lb/day*7 days/wk*52 wks/yr = 5.57 lb/yr

Total particulate emissions:
PM:
lb/hr
Uncontr. (0.0009+0.01327) lb/hr = 0.0142 lb/hr
Controlled: (0.00004+0.000664) lb/hr = 0.00071 lb/hr
lb/day
Uncontr. (0.0216+0.3186) lb/day = 0.3402 lb/day
Controlled: (0.0011+0.01593) lb/day = 0.0170 lb/day
PM10:
lb/hr
Uncontr. (0.0009+0.01274) lb/hr = 0.0136 lb/hr
Controlled: (0.00004+0.000637) lb/hr = 0.00068 lb/hr
lb/day
Uncontr. (0.021+0.3058) lb/day = 0.3266 lb/day
Controlled: (0.0010+0.01529) lb/day = 0.0163 lb/day
lb/yr (0.38+5.57) lb/yr = 5.9 lb/yr

Tank 6:
IPA used: (Applicant's data) 10.0 gals/month
IPA Sp. Gr. 0.78505
Density of water @ 77 F 8.32 lb/gal

VOC:

lb/month	10 gals/month*0.78505*8.32 lb/gal =	65.30 lb/month
lb/hr		
Uncontr.	65.30 lb/month/30 days/month/24 hrs/day =	0.09 lb/hr
Controlled:	0.09 lb/hr*(1-0) =	0.0907 lb/hr
lb/day		
Uncontr.	0.09 lb/hr*24 hrs/day =	2.18 lb/day
Controlled:	0.0907 lb/hr*24 hrs/day =	2.18 lb/day
lb/yr	2.18 lb/day*7 days/wk*52 wks/yr =	792.32 lb/yr

Summary: VOC control: None

		PM	PM10	VOC	HF	H_2SO_4	IPA
lb/hr							
	Uncontr.	0.0142	0.01	0.09	0.0009	0.01	0.09
	Contr.	0.00071	0.0007	0.09	0.00004	0.0007	0.09
lb/day							
	Uncontr.	0.340	0.327	2.18	0.02	0.319	2.18
	Contr.	0.02	0.02	2.18	0.0011	0.016	2.18
lb/yr			5.94	792.32	0.39	5.80	792.32

Note: With the above method of calculating acid emissions from process tanks, no BOE etchant limit is necessary. IPA limit is still needed. Because the facility has an NSR bubble for VOC, zero will be recorded for VOC lb/day-30 day average.

IPA limit: 10 gals/month

TIER 2 SCREENING RISK ASSESSMENT

Application deemed complete date: 04/22/09

A/N: 498033
Fac: International Rectifier

Stack Data		Units
Hour/Day	24	hr/day
Day/Week	7	day/wk
Week/Year	52	wk/yr
Emission Units	lb/hr	
	0	
Control Efficiency	0.00	fraction range 0-1
Does source have TBACT?	NO	
Point or Volume Source ?	P	P or V
Stack Height or Building Height	10	feet
Area (For Volume Source Only)		ft^2
Distance-Residential	1000	meters
Distance-Commercial	50	meters
Meteorological Station	Norco	

Source Type:	O - Other	
Screening Mode	NO	

Emission Units	lb/hr	
Source output capacity	n/a	n/a

FOR USER-DEFINED CHEMICALS AND EMISSIONS, FILL IN THE TABLE BELOW

USER DEFINED CHEMICALS AND EMISSIONS				R1 - Uncontrolled	Efficiency Factor	R2 - Controlled
Code	Compound	lb/hr	Molecular Weight	lbs/hr	Fraction range 0-1	lbs/hr
f2	Hydrogen fluoride (hydrofluoric acid)	4.50E-05	20	4.49687E-05		4.49687E-05
s8	Sulfuric acid and oleum	6.64E-04	98.08	0.000663691		0.000663691
f2	Isopropyl alcohol	0.09	60.09	0.090695445		0.090695445
				0		
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TIER 1 SCREENING RISK ASSESSMENT

Receptor Distance (actual)	50
Receptor Distance (for X/Q lookup)	50

Tier 1 Results	
Cancer/Chronic ASI	Acute ASI
6.82E-02	3.41E-02
PASSED	PASSED

APPLICATION SCREENING INDEX CALCULATION

Compound	Average Annual Emission Rate (lbs/yr)	Max Hourly Emission Rate (lbs/hr)	Cancer / Chronic Pollutant Screening Level (lbs/yr)	Acute Pollutant Screening Level (lbs/hr)	Cancer / Chronic Pollutant Screening Index (PSI)	Acute Pollutant Screening Index (PSI)
Hydrogen fluoride (hydrofluoric acid)	3.93E-01	4.50E-05		2.40E-01		1.87E-04
Sulfuric acid and oleum	5.80E+00	6.64E-04	8.67E+01	1.20E-01	6.69E-02	5.53E-03
Isopropyl alcohol	7.92E+02	9.07E-02	6.07E+05	3.20E+00	1.31E-03	2.84E-02
TOTAL (APPLICATION SCREENING INDEX)					**6.82E-02**	**3.41E-02**

IPA Concentration
Tank No. 6

		A/N	498033
IPA		10	mL
Water		70	L
Sp. Gr. of IPA		0.79	
Density of water		1	g/mL
IPA in mixture	10 mL*0.79*1 g/mL =	7.9	g
Mixture volume	10 mL*10^-3 L/mL+70 L =	70.01	L
IPA content	7.9 g/70.01 L =	0.11	g/L
	0.11 g/L/119.83 [g/L]/[lb/gal]=	0.0009417	lb/gal

(Excerpted from A/N 483797)

Table 1
Concentrations
Fluid Ounces to % Weight

Basis: 1 gallon of solution
Water density: 8.326 lb/gal

						Weight	
		Sp. Gr.	Form	Fluid Ounces	% Volume	lbs	%
		(1)	(2)	(3)	(4)	(5)	(6)
-			-	-	-	-	-
H_2SO_4		1.84	Liquid	4	3.13%	0.48	5.60%
H_2O_2		1.11	Liquid	1	0.78%	0.07	0.84%
Water		1	Liquid	123	96%	8.00	93.56%
				128	100%	8.55	100.00%

(4) = (3)/128
(5) = (4)*(1)*8.326
(6) = (5)/8.55

Arsine Emissions
2 Ion Implanters Using Arsine

Given:	A/N 498034
1 Arsine flow rate to implanter	0.0256 L/min
2 Operating schedule:	
a Hours/day	24
b Days/week	7
c Weeks/year	52
3 Sensor analyzing time (collecting sample & analyzing) (6 times: 3 at breakthrough at main canister and 3 at breakthrough at standby canister, 60 sec each)	360 sec
4 Time period between the time sensor detects break through at outlet of main canister and the time that effluent from implanter is completely switched to standby canister (Interlocks for automatic switching are required) - 3 times at 30 seconds each.	90 sec
5 Time period between the time sensor detects break through at outlet of standby canister and the time that arsine flow to implanter is shut down (Interlocks for automatic shutdown are required) - 3 times at 30 seconds each.	90 sec
6 Scrubber replacements each year	3
7 Number of scrubbers in the permit unit	2
Molecular weights:	
Arsine	77.95 lb/lbmole
Arsenic	74.92 lb/lbmole
Ionization efficiency	90%
Arsenic in arsine	96%
Implant efficiency	45%
Control efficiency:	99%
Ideal gas molar volume @ 60 F & 1 atmosphere	379.49 ft^3/lbmole
Conversion from liters to ft^3:	0.035 ft^3/L
Arsine usage cushion factor	1

Note: Cushion factor is based on permit engineer's judgments and used to give the applicant a cushion to the permit limit(s) to insure compliance.

Computations:

For 1 resin can:

(a) During normal operation:

Arsine usage:

0.0256 L/min*0.035 cf/L*60 min/hr*24 hrs/day*7 days/wk*52 wks/yr/379.49 cf/lbmole*77.95 lb/lbmole = 97.3 lb/yr

Arsenic emissions:

Uncontrolled	97.25 lb/yr*0.96 arsenic in 1 arsine *((1-0.9)+0.9*(1-0.45)) =	55.62 lb/yr
	55.62 lb/yr/52 wks/yr/7 days/wk/24 hrs/day =	0.00637 lb/hr
Controlled	55.62 lb/yr*(1-0.99) =	0.556 lb/yr
	0.00637 lb/hr*(1-0.99) =	6.37E-05 lb/hr

(b) During other periods:

(Switching from main canister to standby canister and shutdown)

Amount of time when arsine is not controlled: (360 sec+90 sec+90 sec)*3 times/yr = 1620 sec/yr

Arsine used:

0.0256 L/min/60 sec/min*1620 sec/yr*0.035 cf/L/379.49 cf/lbmole*77.95 lb/lbmole = 0.00501 lb/yr

Arsenic emissions: 0.00501 lb/yr*0.96 lb arsenic/lb arsine*((1-0.9)+0.9*(1-0.45)) = 0.00287 lb/yr

(c) Total arsenic emissions:	0.556 lb/yr+0.00287 lb/yr =	0.559	lb/yr
	0.559 lb/yr/52 wks/yr/7 days/wk/24 hrs/day =	6.400E-05	lb/hr
Arsine usage	0.0256 L/min*60 min/hr*24 hrs/day*7 days/wk*52 wks/yr =	13,407.14	L/yr
	13407.14 L/yr*0.035 cf/L/379.49 cf/lbmole*77.95 lb/lbmole =	97.25	lb/yr
Overall control efficiency:	1-0.559/55.62 =	98.995%	

For a maximum of 2 cans:

Total arsenic emissions:	0.559 lb/yr-can *2 cans =	1.118	lb/yr
	1.118 lb/yr/52 wks/yr/7 days/wk/24 hrs/day =	1.28E-04	lb/hr

Results of risk analysis:

	Residential	Commercial
MICR	9.24E-07	3.18E-07

Arsine flow rate limit (per can) 0.0256 L/min

NSR input: lb/hr * 10^6

Uncontrolled arsenic emission	0.00637 lb/hr/can*2 cans* 10^6 =	12,733
Controlled arsenic emission	0.000128 lb/hr*10^6 =	128

A/N 498034

ATTACHMENT A

Integrated Circuit

Previous: 492802 G1977 A/N: 498034

Control: 498037

Given:

		MW	Process	Through Vector	lb/month	Breakdown Information(Note 1) Used Ui	Transformed To	Transformed Amount	Reacted to Form Acids
AsH_3		77.95							
PH_3	Diffusion	34.00		100%	3				
SiH_4	Diffusion	32.12	Poly		20				
SiH_4	Diffusion	32.12	LTO	100%	12				
SiH_2Cl_2		101.01			10				
BF_3		67.81			2				
BCl_3		117.169			4				
C_2F_6		138.01	Etch		30	0.6	CF4	0.4	0.2
CHF_3		70.0141	Etch		8	0.6	CF4	0.07	0.53
CF4		88.00	Etch		10	0.3			0.3
Cl_2		70.906			40				
SF_6		146.05	Etch		20	0.8			0.8
HBr		80.9119			22				
$SiCl_4$		169.90							
NH_3		17.03			12				
N_2O									
NF_3		71.0019	Etch		12	0.8			0.8
Metex L5B			-						
$POCl_3$	Diffusion	153.33			8				
Isopropanol			-						
Acetone			-						
CH_3CCl_3	(TCA)	133.40	-		45				
$CHCl_3$		119.38							
$C_8H_{20}SiO_4$ (TEOS)		208.33	Diffusion		3100				

Note 1: Information from 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Molecular weight (MW)

	AsH3	PH3	SiH4	BF3	CF4	POCl3	H3PO4	SiO2	H3BO3
MW	77.95	34.00	32.12	67.81	88.00	153.3322	98	60.08	61.83

	HCl	H_2SO_4	BCl3	C2F6	SF6	HBr	NH3	HF	CHCl3
MW	36.46	98.07	303.33	138.01	146.05	80.9119	17.03	20.01	119.3779

Operating schedule:

hrs/day	24 hrs/day
days/wk	7 days/wk
wks/yr	52 wks/yr

Main scrubber control efficiencies[a]

HCl	95%
HF	95%
H_2SO_4	95%
H_3PO_4	95%
HBr	95%
H_3BO_3	95%
SiO_2	90%

[a] Information from HEE Environmental Engineering.

Diffusion furnaces integrated filters control efficiency:

SiO_2	98%
P_2O_5	0%

PM10 in PM 96%

Note 2: Arsine emissions will be calculated separately.

Computations: Except where indicated, all chemicals are used up in the process.

Emissions, lb/hr:

H3PO4 from PH3 The ratio 1/1 means 1 mole of H3PO4 is created per mole of PH3

PM

Uncontrolled With diffusion furnaces integrated filters control efficiency being counted

3 lb/month/30 days/month/24 hrs/day*(1/1)*98 lb/lbmole/34 lb/lbmole*(1-0) = 0.01 lb/hr

Controlled 0.01 lb/hr*(1-0.95) = 0.0006 lb/hr

PM10

Uncontrolled 0.01 lb/hr*0.96 = 0.0115 lb/hr

Controlled 0.0006 lb/hr*0.96 = 0.00058 lb/hr

SiO2 from SiH4 Poly

PM

Uncontrolled With diffusion furnaces integrated filters control efficiency being counted

20 lb/month/30 days/month/24 hrs/day*(1/1)*60.08 lb/lbmole/32.12 lb/lbmole*(1-0.98) = 0.001 lb/hr

Controlled 0 lb/hr*(1-0.9) = 0.0001 lb/hr

PM10

Uncontrolled 0 lb/hr*0.96 = 0.001 lb/hr

Controlled 0.0001 lb/hr*0.96 = 0.0001 lb/hr

SiO2 from SiH4 LTO

Uncontrolled With diffusion furnaces integrated filters control efficiency being counted

12 lb/month/30 days/month/24 hrs/day*(1/1)*60.08 lb/lbmole/32.12 lb/lbmole*(1-0.98) = 0.001 lb/hr

Controlled 0.001 lb/hr*(1-0.9) = 0.0001 lb/hr

PM10

Uncontrolled 0.001 lb/hr*0.96 = 0.001 lb/hr

Controlled 0.0001 lb/hr*0.96 = 0.0001 lb/hr

SiO2 from SiH2Cl2

PM

Uncontrolled With diffusion furnaces integrated filters control efficiency being counted

10 lb/month/30 days/month/24 hrs/day*(1/1)*60.08 lb/lbmole/101.01 lb/lbmole*(1-0.98) = 0.00017

Controlled 0.00017 lb/hr*(1-0.9) = 0.00002

PM10

Uncontrolled 0.00017 lb/hr*0.96 = 0.0002

Controlled 0.00002 lb/hr*0.96 = 0.00002

HCl from SiH2Cl2		
PM		
Uncontrolled	10 lb/month/30 days/month/24 hrs/day*(2/1)*36.46 lb/lbmole/101.01 lb/lbmole =	0.0100
Controlled	0.01 lb/hr*(1-0.95) =	0.0005
PM10		
Uncontrolled	0.01 lb/hr*0.96 =	0.010
Controlled	0.001 lb/hr*0.96 =	0.0005
H3BO3 from BF3		
PM		
Uncontrolled	2 lb/month/30 days/month/24 hrs/day*(1/1)*61.83 lb/lbmole/67.81 lb/lbmole =	0.003 lb/hr
Controlled	0.0025 lb/hr*(1-0.95) =	0.0001 lb/hr
PM10		
Uncontrolled	0.0025 lb/hr*0.96 =	0.002 lb/hr
Controlled	0 lb/hr*0.96 =	0.0001 lb/hr
HF from BF3		
PM		
Uncontrolled	2 lb/month/30 days/month/24 hrs/day*(3/1)*20.01 lb/lbmole/67.81 lb/lbmole =	0.002 lb/hr
Controlled	0.0025 lb/hr*(1-0.95) =	0.00012 lb/hr
PM10		
Uncontrolled	0.0025 lb/hr*0.96 =	0.002 lb/hr
Controlled	0.00012 lb/hr*0.96 =	0.00012 lb/hr
H3BO3 from BCl3		
PM		
Uncontrolled	4 lb/month/30 days/month/24 hrs/day*(3/1)*61.83 lb/lbmole/117.17 lb/lbmole =	0.002932 lb/hr
Controlled	0.0029 lb/hr*(1-0.95) =	0.0001 lb/hr
PM10		
Uncontrolled	0.0029 lb/hr*0.96 =	0.003 lb/hr
Controlled	0.003 lb/hr*0.96 =	0.0001 lb/hr
HCl from BCl3		
PM		
Uncontrolled	4 lb/month/30 days/month/24 hrs/day*(3/1)*36.46 lb/lbmole/117.17 lb/lbmole =	0.005186 lb/hr
Controlled	0.0052 lb/hr*(1-0.95) =	0.0003 lb/hr
PM10		
Uncontrolled	0.0052 lb/hr*0.96 =	0.005 lb/hr
Controlled	0.005 lb/hr*0.96 =	0.0002 lb/hr
HF from C2F6		
PM		
Uncontrolled	30 lb/month/30 days/month/24 hrs/day*(6/1)*20.01 lb/lbmole/138.01 lb/lbmole*0.2 =	0.007249
Controlled	0.0072 lb/hr*(1-0.95) =	0.0004
PM10		
Uncontrolled	0.0072 lb/hr*0.96 =	0.007
Controlled	0.007 lb/hr*0.96 =	0.0003
HF from CHF3		
PM		
Uncontrolled	8 lb/month/30 days/month/24 hrs/day*(3/1)*20.01 lb/lbmole/70.01 lb/lbmole*0.53 =	0.0050 lb/hr
Controlled	0.005 lb/hr*(1-0.95) =	0.00025 lb/hr
PM10		
Uncontrolled	0.005 lb/hr*0.96 =	0.005 lb/hr
Controlled	0.00025 lb/hr*0.96 =	0.00024 lb/hr

HF from CF4		
PM		
Uncontrolled	10 lb/month/30 days/month/24 hrs/day*(4/1)*20.01 lb/lbmole/88 lb/lbmole*0.3 =	0.004 lb/hr
Controlled	0.004 lb/hr*(1-0.95) =	0.00019 lb/hr
PM10		
Uncontrolled	0.004 lb/hr*0.96 =	0.004 lb/hr
Controlled	0.00019 lb/hr*0.96 =	0.00018 lb/hr
HCl from Cl2		
PM		
Uncontrolled	40 lb/month/30 days/month/24 hrs/day*(2/1)*36.46 lb/lbmole/70.91 lb/lbmole =	0.0571 lb/hr
Controlled	0.0571 lb/hr*(1-0.95) =	0.0029 lb/hr
PM10		
Uncontrolled	0.0571 lb/hr*0.96 =	0.055 lb/hr
Controlled	0.0029 lb/hr*0.96 =	0.0027 lb/hr
HF from SF6		
PM		
Uncontrolled	20 lb/month/30 days/month/24 hrs/day*(6/1)*20.01 lb/lbmole/146.05 lb/lbmole*0.8 =	0.0183 lb/hr
Controlled	0.0183 lb/hr*(1-0.95) =	0.0009 lb/hr
PM10		
Uncontrolled	0.0183 lb/hr*0.96 =	0.018 lb/hr
Controlled	0.0009 lb/hr*0.96 =	0.0009 lb/hr
H2SO4 from SF6		
PM		
Uncontrolled	20 lb/month/30 days/month/24 hrs/day*(1/1)*98.07 lb/lbmole/146.05 lb/lbmole*0.8 =	0.015 lb/hr
Controlled	0.0149 lb/hr*(1-0.95) =	0.00075 lb/hr
PM10		
Uncontrolled	0.0149 lb/hr*0.96 =	0.014 lb/hr
Controlled	0.000746 lb/hr*0.96 =	0.0007 lb/hr
HBr from HBr		
PM		
Uncontrolled	22 lb/month/30 days/month/24 hrs/day*(1/1)*80.91 lb/lbmole/80.91 lb/lbmole =	0.031 lb/hr
Controlled	0.031 lb/hr*(1-0.95) =	0.0015 lb/hr
PM10		
Uncontrolled	0.031 lb/hr*0.96 =	0.029 lb/hr
Controlled	0.0015 lb/hr*0.96 =	0.0015 lb/hr
HF from NF3		
PM		
Uncontrolled	12 lb/month/30 days/month/24 hrs/day*(3/1)*20.01 lb/lbmole/71 lb/lbmole*0.8 =	0.0113 lb/hr
Controlled	0.0113 lb/hr*(1-0.95) =	0.0006 lb/hr
PM10		
Uncontrolled	0.0113 lb/hr*0.96 =	0.011 lb/hr
Controlled	0.0006 lb/hr*0.96 =	0.0005 lb/hr
H_3PO_4 from $POCl_3$		
PM		
Uncontrolled	1/1 means 1 mole of H_3PO_4 is produced per mole of $POCl_3$	
	8 lb/month/30 days/month/24 hrs/day*(1/1)*98 lb/lbmole/153.33 lb/lbmole =	0.007 lb/hr
Controlled	0.007 lb/hr*(1-0.95) =	0.00036 lb/hr

PM10

Uncontrolled 0.007 lb/hr*0.96 = 0.007 lb/hr

Controlled 0.00036 lb/hr*0.96 = 0.0003409 lb/hr

HCl from $POCl_3$

PM

Uncontrolled

8 lb/month/30 days/month/24 hrs/day*(3/1)*36.46 lb/lbmole/153.33 lb/lbmole = 0.008 lb/hr

Controlled 0.008 lb/hr*(1-0.95) = 0.00040 lb/hr

PM10

Uncontrolled 0.008 lb/hr*0.96 = 0.008 lb/hr

Controlled 0.0004 lb/hr*0.96 = 0.00038 lb/hr

HCl from CH_3CCl_3

PM

Uncontrolled 45 lb/month/30 days/month/24 hrs/day*(3/1)*36.46 lb/lbmole/133.4 lb/lbmole = 0.051 lb/hr

Controlled 0.051 lb/hr*(1-0.95) = 0.00256 lb/hr

PM10

Uncontrolled 0.051 lb/hr*0.96 = 0.049 lb/hr

Controlled 0.00256 lb/hr*0.96 = 0.00246 lb/hr

SiO2 from C8H20SiO4

PM

Uncontrolled

3100 lb/month/30 days/month/24 hrs/day*(1/1)*60.08 lb/lbmole/208.33 lb/lbmole*(1-0.98) = 0.0248 lb/hr

Controlled 0.0248 lb/hr*(1-0.95) = 0.00124 lb/hr

PM10

Uncontrolled 0.0248 lb/hr*0.96 = 0.0238 lb/hr

Controlled 0.00124 lb/hr*0.96 = 0.00119 lb/hr

			PM		PM10	
	Emission	From	Uncontr.	Contr.	Uncontr.	Contr.
lb/hr	H_3PO_4	PH_3	0.012	0.0006	0.012	0.00058
	SiO_2	$SiH_{4\ Poly}$	0.001	0.0001	0.001	0.00010
	SiO_2	$SiH_{4\ LTO}$	0.001	0.0001	0.001	0.00006
	SiO_2	SiH_2Cl_2	0.00	0.00002	0.0002	0.000016
	HCl	SiH_2Cl_2	0.01	0.00050	0.0096	0.00048
	H_3BO_3	BF_3	0.003	0.0001	0.002	1.22E-04
	HF	BF_3	0.002	0.0001	0.002	1.18E-04
	H_3BO_3	BCl_3	0.003	0.000	0.003	0.0001
	HCl	BCl_3	0.005	0.0003	0.005	0.0002
	HF	C_2F_6	0.007	0.000	0.01	0.000
	HF	CHF3	0.005	0.0003	0.005	2.42E-04
	HF	CF4	0.004	0.0002	0.004	1.82E-04
	HCl	Cl_2	0.057	0.003	0.055	0.0027
	HF	SF_6	0.01827	0.0009	1.75E-02	0.0009
	H_2SO_4	SF_6	0.015	0.0007	1.43E-02	0.0007
	HBr	HBr	0.03	0.002	0.03	0.0015
	HF	NF_3	0.01	0.001	0.01	0.0005
	H_3PO_4	$POCl_3$	0.007	0.0004	0.007	0.0003
	HCl	$POCl_3$	0.008	0.0004	0.008	0.00038

	HCl	CH_3CCl_3	0.05	0.0026	0.05	0.0025
	HCl	$CHCl_3$	-	-	-	-
	SiO_2	$C_8H_2OSiO_4$	0.02	0.0012	0.02	0.0012
	Total		0.25	0.01	0.24	0.01
lb/day					5.79	0.29
lb/yr						106.22

Uncontrolled PM10 emissions:

lb/hr	(From the table above)		0.24	lb/hr
lb/day		0.24 lb/hr*24 hrs/day =	5.79	lb/day

Controlled PM10 emissions:

lb/hr	(From the table above)		0.01	lb/hr
lb/day		0.01 lb/hr*24 hrs/day =	0.29	lb/day
lb/yr		0.29 lb/day*7 days/wk*52 wks/yr =	106.22	lb/yr

Rule 1401 chemicals

(lb/hr from the table above)

H_3PO_4	lb/hr	0.0006+0 =	0.001	lb/hr
	lb/yr	0.001 lb/hr*24 hrs/day*7 days/wk*52 wks/yr =	8.35	lb/yr
HCl	lb/hr	0.0005+0.0003+0.003+0.0004+0.0026+0 =	0.007	lb/hr
	lb/yr	0.007 lb/hr*24 hrs/day*7 days/wk*52 wks/yr =	57.45	lb/yr
HF	lb/hr	0.00012+0.00036+0.00025+0.00019+0.0009+0.001 =	0.0024	lb/hr
	lb/yr	0.0024 lb/hr*24 hrs/day*7 days/wk*52 wks/yr =	21.00	lb/yr
H_2SO_4	lb/hr		0.00075	lb/hr
	lb/yr	0.0007 lb/hr*24 hrs/day*7 days/wk*52 wks/yr =	6.52	lb/yr

NSR & AEIS Inputs:

	PM	PM10
lb/hr		
Uncontr.	0.25	0.24
Contr.	0.01	0.01
lb/day		
Uncontr.		6
Contr.		0.292
lb/yr (Contr.)		106.22

Permit limits:

PH_3		3	lb/month
SiH_4	20+12 =	32	lb/month
SiH_2Cl_2		10	lb/month
BF_3		2	lb/month
BCl_3		4	lb/month
C_2F_6		30	lb/month
CHF_3		8	lb/month
CF4		10	lb/month
Cl_2		40	lb/month
SF_6		20	lb/month
HBr		22	lb/month
NH_3		12	lb/month
NF3		12	lb/month

$POCl_3$	8 lb/month
CH_3CCl_3	45 lb/month
$C_8H_2OSiO_4$	3100 lb/month

For Tier 2 Risk Analysis
AN 498034

10/28/08
12:53:25

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

Scrubbers 1 & 2

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE              =        POINT
   EMISSION RATE (G/S)      =      1.00000
   STACK HEIGHT (M)         =      15.2400
   STK INSIDE DIAM (M)      =       1.8300
   STK EXIT VELOCITY (M/S)=        10.7660
   STK GAS EXIT TEMP (K)    =     297.0000
   AMBIENT AIR TEMP (K)     =     293.0000
   RECEPTOR HEIGHT (M)      =        .0000
   URBAN/RURAL OPTION       =        URBAN
   BUILDING HEIGHT (M)      =        .0000
   MIN HORIZ BLDG DIM (M) =          .0000
   MAX HORIZ BLDG DIM (M) =          .0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =   60000.000      (ACFM)

BUOY. FLUX =    1.190 M**4/S**3;  MOM. FLUX =   95.732 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
25.	1.110	3	10.0	10.9	3200.0	18.80	5.55	5.08	NO
100.	60.22	3	4.0	4.4	1280.0	28.82	21.92	20.37	NO
200.	55.52	4	2.5	2.8	800.0	36.52	31.39	27.87	NO
300.	67.71	6	1.0	1.1	10000.0	40.30	31.99	21.18	NO
400.	79.46	6	1.0	1.1	10000.0	40.30	41.48	26.29	NO
500.	76.76	6	1.0	1.1	10000.0	40.30	50.72	31.07	NO
600.	69.51	6	1.0	1.1	10000.0	40.30	59.70	35.55	NO
700.	61.68	6	1.0	1.1	10000.0	40.30	68.43	39.76	NO
800.	54.53	6	1.0	1.1	10000.0	40.30	76.93	43.74	NO
900.	48.36	6	1.0	1.1	10000.0	40.30	85.19	47.51	NO
1000.	43.14	6	1.0	1.1	10000.0	40.30	93.24	51.10	NO
1100.	38.73	6	1.0	1.1	10000.0	40.30	101.09	54.53	NO
1200.	35.00	6	1.0	1.1	10000.0	40.30	108.74	57.82	NO
1300.	31.82	6	1.0	1.1	10000.0	40.30	116.21	60.97	NO
1400.	29.10	6	1.0	1.1	10000.0	40.30	123.51	64.01	NO
1500.	26.76	6	1.0	1.1	10000.0	40.30	130.64	66.95	NO
1600.	24.72	6	1.0	1.1	10000.0	40.30	137.62	69.79	NO
1700.	22.94	6	1.0	1.1	10000.0	40.30	144.45	72.54	NO
1800.	21.38	6	1.0	1.1	10000.0	40.30	151.14	75.20	NO
1900.	19.99	6	1.0	1.1	10000.0	40.30	157.70	77.80	NO
2000.	18.76	6	1.0	1.1	10000.0	40.30	164.13	80.32	NO
2100.	17.66	6	1.0	1.1	10000.0	40.30	170.45	82.78	NO

2200.	16.67	6	1.0	1.1	10000.0	40.30	176.64	85.18	NO
2300.	15.78	6	1.0	1.1	10000.0	40.30	182.73	87.52	NO
2400.	14.97	6	1.0	1.1	10000.0	40.30	188.71	89.81	NO
2500.	14.23	6	1.0	1.1	10000.0	40.30	194.59	92.05	NO
2600.	13.56	6	1.0	1.1	10000.0	40.30	200.37	94.24	NO
2700.	12.94	6	1.0	1.1	10000.0	40.30	206.06	96.39	NO
2800.	12.38	6	1.0	1.1	10000.0	40.30	211.66	98.49	NO
2900.	11.85	6	1.0	1.1	10000.0	40.30	217.17	100.56	NO
3000.	11.37	6	1.0	1.1	10000.0	40.30	222.60	102.59	NO
3500.	9.426	6	1.0	1.1	10000.0	40.30	248.62	112.23	NO
4000.	8.025	6	1.0	1.1	10000.0	40.30	272.97	121.16	NO
4500.	6.974	6	1.0	1.1	10000.0	40.30	295.91	129.51	NO
5000.	6.158	6	1.0	1.1	10000.0	40.30	317.62	137.39	NO
5500.	5.507	6	1.0	1.1	10000.0	40.30	338.28	144.85	NO
6000.	4.978	6	1.0	1.1	10000.0	40.30	358.01	151.96	NO
6500.	4.539	6	1.0	1.1	10000.0	40.30	376.91	158.76	NO
7000.	4.170	6	1.0	1.1	10000.0	40.30	395.07	165.29	NO
7500.	3.855	6	1.0	1.1	10000.0	40.30	412.56	171.58	NO
8000.	3.583	6	1.0	1.1	10000.0	40.30	429.46	177.65	NO
8500.	3.347	6	1.0	1.1	10000.0	40.30	445.80	183.52	NO
9000.	3.139	6	1.0	1.1	10000.0	40.30	461.65	189.22	NO
9500.	2.956	6	1.0	1.1	10000.0	40.30	477.03	194.75	NO
10000.	2.792	6	1.0	1.1	10000.0	40.30	491.99	200.13	NO
15000.	1.792	6	1.0	1.1	10000.0	40.30	623.68	247.64	NO
20000.	1.318	6	1.0	1.1	10000.0	40.30	733.37	287.46	NO
25000.	1.041	6	1.0	1.1	10000.0	40.30	829.19	322.41	NO
30000.	.8603	6	1.0	1.1	10000.0	40.30	915.28	353.93	NO
40000.	.7228	4	1.0	1.1	320.0	68.44	1552.30	1553.23	NO
50000.	.6427	4	1.0	1.1	320.0	68.44	1745.81	1750.07	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 25. M:

418.	79.65	6	1.0	1.1	10000.0	40.30	43.25	27.23	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
50.	46.36	3	10.0	10.9	3200.0	18.80	10.95	10.07	NO
1000.	43.14	6	1.0	1.1	10000.0	40.30	93.24	51.10	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	79.65	418.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

Modeling Data
Scrubbers 1 & 2

Exhaust flow rate:	
acfm	60,000
scfm	
Stack diameter, in	72
Stack height, ft	50
Temperature, F	75
Catalytic	

	Yes	No*
Rain cap?		x

*Or with a swing rain cap fully open when operated.

Data for modeling:

Actual volume flow rate (ACFM)	60,000
Stack diameter, m	1.83
Stack height, m	15.24
Temperature, K	297

ATTACHMENT
Wet Chemical/Solvent Cleaning System

Control: 498037 A/N 498035
Previous: G1985 492803

The amount of acids used after the modification is a lot lower than before modification (Per applicant, 28,455 gallons/month before and 5,995 gallons/month after). PM10 emissions after the modification are expected to be lower. We will use PM10 emissions as recorded before modification as PM10 emissions after modification.

Because this facility has a VOC cap of 1,800 lbs in any one calendar month, we will use VOC emissions for the previous A/N 492803 for emission recording purpose.

Below are excerpts from A/N 492803 folder:
Emissions:

		VOC	PM/PM10
lb/hr			
	Uncontr.	0.23	6.41
	Contr.	0.002	0.08
lb/day			
	Uncontr.	6	154
	Contr.	0	1.92
lb/yr		20.30	698.88

Rule 1401:
Because chemical usage is less than that for previous application., there is no emission increases for toxic air contaminants due to the modification. No Rule 1401 analysis is necessary.

Calculations
Photolithographic System

Previous: G1979 492805 A/N: 498036
Control: 498039

Given:

Total resist used, lbs/day**	158
Volatile percent*	85%
VOC control efficiency+	95%
Operating schedule:	
hrs/day	24 hrs/day
days/wk	7 days/wk
wks/yr	52 wks/yr

*Information from A/N 381809 (Previous to 492805).

+Minimum of all control equipment control efficiencies.

Note: Reported VOC emissions will be calculated based on the control efficiency of the oxidizer the equipment vents to during the reporting period (95% for McGill oxidizer and 98.7% for John Zink oxidizer).

Computations:

VOC:

lb/day		
Uncontrolled	158 lb/day*0.85 =	134.65 lb/day
Controlled	134.65 lb/day*(1-0.95) =	6.73 lb/day
lb/hr		
Uncontrolled	134.65 lb/day/24 hrs/day =	5.61 lb/hr
Controlled	6.73 lb/day/24 hrs/day =	0.28 lb/hr
lb/yr	6.73 lb/day*7 days/wk*52 wks/yr =	2450.6 lb/yr

	VOC	
	Uncontr.	Controlled
lb/hr	5.61	0.28
lb/day	135	6.7
lb/yr	-	2,450.61

**Note: This facility has a VOC cap of 1,800 lbs in any one calendar month. VOC emissions are calculated using the amount of solvent used (excluding salvage solvent) and VOC control efficiencies. For emission calculation purpose, controlled VOC emissions from the previous applications are used to calculate the

Rule 1401: Tier 1 Analysis

To simplify our risk analysis, we use cresol emissions = total VOC emissions (conservative).

	Emissions		Screening Levels		Contributions		Compliance
	lb/hr	lb/yr	lb/hr	lb/yr	Acute	Cancer/ Chronic	
Cresol	0.28	2,450.61	-	1.98E+04	-	1.24E-01	Yes
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
Total					-	1.24E-01	

TIER 2 SCREENING RISK ASSESSMENT

Application deemed complete date: 04/22/09

A/N: 498035
Fac: International Rectifier

Stack Data		Units
Hour/Day	24	hr/day
Day/Week	7	day/wk
Week/Year	52	wk/yr
Emission Units	lb/hr	
	0	0
Control Efficiency	0.00	fraction range 0-1
Does source have TBACT?	NO	
Point or Volume Source ?	P	P or V
Stack Height or Building Height	10	feet
Area (For Volume Source Only)		ft^2
Distance-Residential	1000	meters
Distance-Commercial	50	meters
Meteorological Station	Norco	

Source Type:	O - Other	
Screening Mode	NO	

Emission Units	lb/hr	
Source output capacity	n/a	n/a

FOR USER-DEFINED CHEMICALS AND EMISSIONS, FILL IN THE TABLE BELOW

USER DEFINED CHEMICALS AND EMISSIONS				R1 - Uncontrolled	Efficiency Factor	R2 - Controlled
Code	Compound	lb/hr	Molecular Weight	lbs/hr	Fraction range 0-1	lbs/hr
c30	Cresol mixtures	0.28	108.14	0.2805183		0.2805183
				0		
				0		
				0		
				0		
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TIER 1 SCREENING RISK ASSESSMENT

Receptor Distance (actual)	50
Receptor Distance (for X/Q lookup)	50

Tier 1 Results	
Cancer/Chronic ASI	Acute ASI
4.71E-02	
PASSED	PASSED

APPLICATION SCREENING INDEX CALCULATION

Compound	Average Annual Emission Rate (lbs/yr)	Max Hourly Emission Rate (lbs/hr)	Cancer / Chronic Pollutant Screening Level (lbs/yr)	Acute Pollutant Screening Level (lbs/hr)	Cancer / Chronic Pollutant Screening Index (PSI)	Acute Pollutant Screening Index (PSI)
Cresol mixtures	2.45E+03	2.81E-01	5.20E+04		4.71E-02	
TOTAL (APPLICATION SCREENING INDEX)					4.71E-02	

ATTACHMENT
Oxidizer

A/N 498039

Previous: G1983 492810

Because there is no change to the oxidizer and the emissions for the previous application were calculated at the oxidizer full load, its emissions are the same.

Below are excerpts from NSR Application Emission Report for A/N 492803:

Emissions:

	ROG	NOx	SOx	CO	PM10
lb/hr	0.03	0.24	0	0.09	0.01
lb/day	0.72	5.76	0	2.16	0.24
lb/yr	109	1036	12	411	87.36

ATTACHMENT
Storage Tank
T-121
Mixed Acids
Horizontal

Control:	497037			A/N	498040
Previous:	None				
Given:					
Tank dimensions:	ft	in	gals		
DIA.	7	0	1,967		
L	6	10			
Working volume				1,967	gals
Desired throughput:				12,000	gals/yr
Turnovers per year				6.10	
Month selected for emission calculations:				July	
Number of days in July:				31	
Total vapor pressure:				0.58	psia
Maximum emissions**					
Working				0.35	lb/month
Breathing				0.51	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 acid in vapor:				54.37%	
Control efficiency:					
PM acids				95%	
Acetic acid				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) (0.35 + 0.51) lb/month = 0.86 lb/month

PM

lb/day

Uncontrolled 0.86 lb/month/31 days/month*0.0039 = 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 = 0.000005 lb/hr

Controlled 0.000005 lb/day/24 hrs/day = 0.0000002 lb/hr

lb/yr 0.00001 lb/day*7 days/wk*52 wks/yr = 0.002 lb/yr

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) = 0.00001 lb/day

lb/hr

Uncontrolled 0.0001 lb/day/24 hrs/day = 0.000005 lb/hr

Controlled 0.00001 lb/day/24 hrs/day = 0.0000002 lb/hr

lb/yr 0.00001 lb/day*7 days/wk*52 wks/yr = 0.002 lb/yr

$C_2H_4O_2$

lb/day

Uncontrolled 0.86 lb/month/31 days/month*0.5437 = 0.015 lb/day

Controlled 0.015 lb/day*(1-0.95) = 0.0008 lb/day

lb/hr

Uncontrolled 0.015 lb/day/24 hrs/day = 0.0006 lb/hr

Controlled 0.0008 lb/day/24 hrs/day = 0.00003 lb/hr

lb/yr 0.0008 lb/day*7 days/wk*52 wks/yr = 0.27 lb/yr

	PM/PM10	HNO_3	H_3PO_4	$C_2H_4O_2$
lb/hr				
Uncontr.	4.53E-06	-	4.5E-06	6.28E-04
Contr.	2.27E-07	-	2.27E-07	3.14E-05
lb/day				
Uncontr.	1.09E-04	-	1.09E-04	1.51E-02
Contr.	5.44E-06	-	5.44E-06	7.54E-04
lb/yr (Contr.)	0.002	-	0.002	0.27

Monthly throughput limit: 1967 gals*6.1 times/yr/12 months/yr = 1,000 gals/month

TIER 2 SCREENING RISK ASSESSMENT

Application deemed complete date: 04/22/09

A/N: 498040
Fac: International Rectifier

Stack Data		Units
Hour/Day	24	hr/day
Day/Week	7	day/wk
Week/Year	52	wk/yr
Emission Units	lb/hr	
		0
Control Efficiency	0.00	fraction range 0-1
Does source have TBACT?	NO	
Point or Volume Source ?	P	P or V
Stack Height or Building Height	10	feet
Area (For Volume Source Only)		ft^2
Distance-Residential	1000	meters
Distance-Commercial	50	meters
Meteorological Station	Norco	

Source Type:	O - Other	
Screening Mode	NO	

Emission Units	lb/hr	
Source output capacity	n/a	n/a

FOR USER-DEFINED CHEMICALS AND EMISSIONS, FILL IN THE TABLE BELOW

USER DEFINED CHEMICALS AND EMISSIONS				R1 - Uncontrolled	Efficiency Factor	R2 - Controlled
Code	Compound	lb/hr	Molecular Weight	lbs/hr	Fraction range 0-1	lbs/hr
p7	Phosphoric acid	2.27E-07	98	2.26741E-07		2.26741E-07
				0		
				0		
				0		
				0		
				0		
				0		
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				0		
				0		
				0		
				0		
				0		
				0		
				0		

TIER 1 SCREENING RISK ASSESSMENT

Receptor Distance (actual)	50
Receptor Distance (for X/Q lookup)	50

Tier 1 Results	
Cancer/Chronic ASI	Acute ASI
3.26E-06	
PASSED	PASSED

APPLICATION SCREENING INDEX CALCULATION

Compound	Average Annual Emission Rate (lbs/yr)	Max Hourly Emission Rate (lbs/hr)	Cancer / Chronic Pollutant Screening Level (lbs/yr)	Acute Pollutant Screening Level (lbs/hr)	Cancer / Chronic Pollutant Screening Index (PSI)	Acute Pollutant Screening Index (PSI)
Phosphoric acid	1.98E-03	2.27E-07	6.07E+02		3.26E-06	

TOTAL (APPLICATION SCREENING INDEX) **3.26E-06**

Mixture Vapor Pressure
Storage Tank
T-121

Previous: None A/N 498040

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	0.98	1%	63.01	-	-	-	-	-	-
H_3PO_4	74.00	74%	98.00	0.03	0.001	0.10	0.39%	1%	100%
CH_3COOH	7.10	7%	37.04	11.00	0.37	13.65	54.4%	99%	-
Water	17.92	18%	18.02	18.8	0.63	11.36	45%	-	-
Total	100.00	100%		29.85	1.00	25.11	100%	100%	100%
				0.58		W/o water	54.8%	W/o acetic	0.39%

Desired throughput 8648 gals/month
103,776 gals/yr

Assumption: Effects of interactions between acids are minimum.

*Vapor pressure of each component in aqueous solution (as if it is the only component in water) is used.

Vapor pressures at 55 - 95% H_3PO_4 and 100% CH_3COOH are used.

For water, vapor pressure of pure water is used.

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

Identification

User Identification:	T-121
City:	
State:	
Company:	
Type of Tank:	Horizontal Tank
Description:	

Tank Dimensions

Shell Length (ft):		6.83
Diameter (ft):		7.00
Volume (gallons):		1,967.00
Turnovers:		6.10
Net Throughput(gal/yr):		12,000.00
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)

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

T-121 - 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
Mixed Acids	Jul	71.26	65.04	77.47	64.33	0.5800	0.5800	0.5800	25.1100			0.00	

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

T-121 - Horizontal Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.5099			
Vapor Space Volume (cu ft):							167.4199			
Vapor Density (lb/cu ft):							0.0026			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.9029			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							167.4199			
Tank Diameter (ft):							7.0000			
Effective Diameter (ft):							7.8041			
Vapor Space Outage (ft):							3.5000			
Tank Shell Length (ft):							6.8300			
Vapor Density										
Vapor Density (lb/cu ft):							0.0026			
Vapor Molecular Weight (lb/lb-mole):							25.1100			
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			
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:							0.9029			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.5800			
Vapor Space Outage (ft):							3.5000			
Working Losses (lb):							0.3468			
Vapor Molecular Weight (lb/lb-mole):							25.1100			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5800			
Net Throughput (gal/mo.):							1,000.0000			
Annual Turnovers:							6.1007			
Turnover Factor:							1.0000			
Tank Diameter (ft):							7.0000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							0.8567			

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

Emissions Report for: July

T-121 - Horizontal Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Mixed Acids	0.35	0.51	0.86

ATTACHMENT
Storage Tank
T-411
Scale Inhibitor
Vertical

Control:	None			A/N	498041
Previous:	None				
Given:					
Tank dimensions:	ft	in	gals		
DIA.	2	0	59		
L	2	6			
Working volume				50	gals
Desired throughput:				600	gals/yr
Turnovers per year				12	
Month selected for emission calculations:				July	
Number of days in July:				31	
Total vapor pressure:				0.36	psia
Maximum emissions**					
Working				0.01	lb/month
Breathing				0	lb/month
Note: **From TANK 4.0.9d Emissions Report				0.01	
Weight% of PM in vapor:				1.06%	
Acids in PM:					
H_3PO_4				80.95%	
H_2SO_4				14.78%	
HCl				4.27%	
Control efficiency:				0%	
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)	(0.01 + 0) lb/month =	0.01	lb/month
PM/PM10			
lb/day			
Uncontrolled	0.01 lb/month/31 days/month*0.0106 =	0.000003	lb/day
Controlled	0.000003 lb/day*(1-0) =	0.000003	lb/day
lb/hr			
Uncontrolled	0.000003 lb/day/24 hrs/day =	0.0000001	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

H_3PO_4

lb/day

Uncontrolled	80.95%*0.000003 =	2.8E-06 lb/day
Controlled	80.95%*0.000003 =	2.8E-06 lb/day

lb/hr

Uncontrolled	80.95%*0.0000001 =	1.2E-07 lb/hr
Controlled	80.95%*0.0000001 =	1.2E-07 lb/hr
lb/yr	80.95%*0.001 =	0.00101 lb/yr

H_2SO_4

lb/day

Uncontrolled	14.78%*0.000003 =	5.1E-07 lb/day
Controlled	14.78%*0.000003 =	5.1E-07 lb/day

lb/hr

Uncontrolled	14.78%*0.0000001 =	2.1E-08 lb/hr
Controlled	14.78%*0.0000001 =	2.1E-08 lb/hr
lb/yr	14.78%*0.001 =	0.00018 lb/yr

HCl

lb/day

Uncontrolled	4.27%*0.000003 =	1.5E-07 lb/day
Controlled	4.27%*0.000003 =	1.5E-07 lb/day

lb/hr

Uncontrolled	4.27%*0.0000001 =	6.1E-09 lb/hr
Controlled	4.27%*0.0000001 =	6.1E-09 lb/hr
lb/yr	4.27%*0.001 =	0.0001 lb/yr

	PM/PM10	H_3PO_4	H_2SO_4	HCl
lb/hr				
Uncontr.	1.42E-07	1E-07	2E-08	6.08E-09
Contr.	1.42E-07	1E-07	2E-08	6.08E-09
lb/day				
Uncontr.	0.000003	3E-06	5E-07	1.46E-07
Contr.	0.000003	3E-06	5E-07	1.46E-07
lb/yr (Contr.)	0.001	0.001	0.0002	0.0001

Monthly throughput limit: 50 gals/month

TIER 2 SCREENING RISK ASSESSMENT

Application deemed complete date: 04/22/09

A/N: 498041
Fac: International Rectifier

Stack Data		Units
Hour/Day	24	hr/day
Day/Week	7	day/wk
Week/Year	52	wk/yr
Emission Units	lb/hr	
		0
Control Efficiency	0.00	fraction range 0-1
Does source have TBACT?	NO	
Point or Volume Source ?	P	P or V
Stack Height or Building Height	10	feet
Area (For Volume Source Only)		ft^2
Distance-Residential	1000	meters
Distance-Commercial	50	meters
Meteorological Station	Norco	

Source Type:	O - Other	
Screening Mode	NO	

Emission Units	lb/hr	
Source output capacity	n/a	n/a

FOR USER-DEFINED CHEMICALS AND EMISSIONS, FILL IN THE TABLE BELOW

USER DEFINED CHEMICALS AND EMISSIONS				R1 - Uncontrolled	Efficiency Factor	R2 - Controlled
Code	Compound	lb/hr	Molecular Weight	lbs/hr	Fraction range 0-1	lbs/hr
p7	Phosphoric acid	1.15E-07	98	1.1532E-07		1.1532E-07
s8	Sulfuric acid and oleum	2.11E-08	98.08	2.10548E-08		2.10548E-08
h11	Hydrogen chloride (hydrochloric acid)	6.08E-09	36.46	6.08075E-09		6.08075E-09
				0		
				0		
				0		
				0		
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TIER 1 SCREENING RISK ASSESSMENT

Receptor Distance (actual)	50
Receptor Distance (for X/Q lookup)	50

Tier 1 Results	
Cancer/Chronic ASI	Acute ASI
3.85E-06	1.78E-07
PASSED	PASSED

APPLICATION SCREENING INDEX CALCULATION

Compound	Average Annual Emission Rate (lbs/yr)	Max Hourly Emission Rate (lbs/hr)	Cancer / Chronic Pollutant Screening Level (lbs/yr)	Acute Pollutant Screening Level (lbs/hr)	Cancer / Chronic Pollutant Screening Index (PSI)	Acute Pollutant Screening Index (PSI)
Phosphoric acid	1.01E-03	1.15E-07	6.07E+02		1.66E-06	
Sulfuric acid and oleum	1.84E-04	2.11E-08	8.67E+01	1.20E-01	2.12E-06	1.76E-07
Hydrogen chloride (hydrochloric acid)	5.31E-05	6.08E-09	7.80E+02	2.10E+00	6.81E-08	2.90E-09
TOTAL (APPLICATION SCREENING INDEX)					**3.85E-06**	**1.78E-07**

Mixture Vapor Pressure
Storage Tank
T-411

Previous: None A/N 498041

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_3PO_4	10	10%	98.00	0.03	0.00159	0.16	0.86%	80.95%
H_2SO_4	10	10%	98.07	0.00547	0.00029	0.03	0.16%	15%
HCl	10	10%	36.46	0.004	0.00023	0.01	0.05%	4%
Water	70	70%	18.02	18.8	0.99789	17.98	98.94%	-
	100	100%		18.86	1.0000	18.17	100%	100%
			psia	0.36		w/o water	1.06%	

Desired throughput 150 gals/month
1,800 gals/yr

Assumption: Effects of interactions between acids are minimum.
*Vapor pressure of each component in aqueous solution (as if it is the only component in water) is used.
For water, vapor pressure of pure water is used.
Vapor pressure of 90% H_2SO_4 is used.

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

Identification

User Identification:	T-411
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):	2.50
Diameter (ft):	2.00
Liquid Height (ft) :	2.50
Avg. Liquid Height (ft):	2.00
Volume (gallons):	58.75
Turnovers:	10.21
Net Throughput(gal/yr):	600.00
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
Liquid Contents of Storage Tank

T-411 - 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
Mixed Acids	Jul	71.26	65.04	77.47	64.33	0.3600	0.3600	0.3600	18.1700			0.00	

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

T-411 - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							0.0030			
Vapor Space Volume (cu ft):							2.0018			
Vapor Density (lb/cu ft):							0.0011			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.9880			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							2.0018			
Tank Diameter (ft):							2.0000			
Vapor Space Outage (ft):							0.6372			
Tank Shell Height (ft):							2.5000			
Average Liquid Height (ft):							2.0000			
Roof Outage (ft):							0.1372			
Roof Outage (Dome Roof)										
Roof Outage (ft):							0.1372			
Dome Radius (ft):							2.0000			
Shell Radius (ft):							1.0000			
Vapor Density										
Vapor Density (lb/cu ft):							0.0011			
Vapor Molecular Weight (lb/lb-mole):							18.1700			
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:							0.9880			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.3600			
Vapor Space Outage (ft):							0.6372			
Working Losses (lb):							0.0078			
Vapor Molecular Weight (lb/lb-mole):							18.1700			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.3600			
Net Throughput (gal/mo.):							50.0000			
Annual Turnovers:							10.2124			
Turnover Factor:							1.0000			
Maximum Liquid Volume (gal):							58.7521			
Maximum Liquid Height (ft):							2.5000			
Tank Diameter (ft):							2.0000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							0.0108			

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

Emissions Report for: July

T-411 - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Mixed Acids	0.01	0.00	0.01

ATTACHMENT
Storage Tank
T-14
Horizontal

Previous:	G1999				A/N 498761
Control:	498037				
Given:					
Tank dimensions:	ft	in			
DIA.	10	0	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:				0.58	psia
Maximum month emission*					
Working				163.08	lb/month
Breathing				2.25	lb/month
Note: *From TANK 4.0.9d Emissions Report					
Control efficiency:					
Acid PM (including acetic acid)				95%	
Acetic acid				95%	
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)	66.26%	
Weight% of all acids, except acetic acid, in			(PM)	0.51%	
Weight% of acetic:				65.75%	
Calculations					
Tank volume:				6,750	gallons
Turnovers per year				3,573	
Emissions:					
Total emission (working + breathing), lb/month (163.08 + 2.25) lb/month =				165.33	lb/month
PM					
lb/day					
Uncontrolled			165.33 lb/month/31 days/month*0.0051 =	0.03	lb/day
Controlled			0.03 lb/day*(1-0.95) =	0.001	lb/day
lb/hr					
Uncontrolled			0.03 lb/day/24 hrs/day =	0.001	lb/hr
Controlled			0.001 lb/day/24 hrs/day =	0.0001	lb/hr
lb/yr			0.001 lb/day*7 days/wk*52 wks/yr =	0.50	lb/yr

ATTACHMENT
Storage Tank
T-14

PM10

lb/day		
Uncontrolled	0.03 lb/day*0.96 =	0.03 lb/day
Controlled	0.001 lb/day*0.96 =	0.001 lb/day
lb/hr		
Uncontrolled	0.001 lb/day*0.96 =	0.001 lb/hr
Controlled	0.0001 lb/day*0.96 =	0.0001 lb/hr
lb/yr	0.001 lb/day*7 days/wk*52 wks/yr =	0.48 lb/yr

H_3PO_4 57.02% of PM

lb/day		
Uncontrolled	0.03 lb/day*0.5702 =	0.016 lb/day
Controlled	0.001 lb/day*0.5702 =	0.0008 lb/day
lb/hr		
Uncontrolled	0.001 lb/day*0.5702 =	0.0007 lb/hr
Controlled	0.0001 lb/day*0.5702 =	3.25E-05 lb/hr
lb/yr	0.5 lb/day*0.5702 =	0.284007 lb/yr

HBF_4 0.93% of PM

lb/day		
Uncontrolled	0.03 lb/day*0.0093 =	0.0003 lb/day
Controlled	0.001 lb/day*0.0093 =	0.00001 lb/day
lb/hr		
Uncontrolled	0.001 lb/day*0.0093 =	0.00001 lb/hr
Controlled	0.0001 lb/day*0.0093 =	0.000001 lb/hr
lb/yr	0.5 lb/day*0.0093 =	0.005 lb/yr

HF 31.04% of PM

lb/day		
Uncontrolled	0.03 lb/day*0.3104 =	0.008 lb/day
Controlled	0.001 lb/day*0.3104 =	0.0004 lb/day
lb/hr		
Uncontrolled	0.001 lb/day*0.3104 =	0.000354 lb/hr
Controlled	0.0001 lb/day*0.3104 =	1.77E-05 lb/hr
lb/yr	0.5 lb/day*0.3104 =	0.154618 lb/yr

H_2SO_4 10.4% of PM

lb/day		
Uncontrolled	0.03 lb/day*0.1041 =	0.002849 lb/day
Controlled	0.001 lb/day*0.1041 =	0.000142 lb/day
lb/hr		
Uncontrolled	0.001 lb/day*0.1041 =	0.000119 lb/hr
Controlled	0.0001 lb/day*0.1041 =	5.94E-06 lb/hr
lb/yr	0.498 lb/day*0.1041 =	0.05 lb/yr

ATTACHMENT
Storage Tank
T-14

HCl 0.59% of PM

lb/day

Uncontrolled	0.03 lb/day*0.0059 =	0.000163 lb/day
Controlled	0.001 lb/day*0.0059 =	0.00001 lb/day

lb/hr

Uncontrolled	0.001 lb/day*0.0059 =	0.00001 lb/hr
Controlled	0.0001 lb/day*0.0059 =	0.0000003 lb/hr

lb/yr	0.498 lb/day*0.0059 =	0.003 lb/yr

CH_3COOH 65.75% of all emissions

lb/day 65.75%

Uncontrolled	165.33 lb/month/31 days/month*0.6575 =	3.51 lb/day
Controlled	3.51 lb/day*(1-0.95) =	0.18 lb/day

lb/hr

Uncontrolled	3.51 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 =	63.82 lb/yr

	PM	PM10	H_3PO_4	HNO_3	HBF_4	HF	H_2SO_4	HCl
lb/hr								
Uncontr.	0.001	0.001	0.00065	-	1.06E-05	3.54E-04	1.19E-04	6.77E-06
Contr.	0.0001	0.0001	0.000033	-	5.31E-07	1.77E-05	5.94E-06	8.13E-06
lb/day								
Uncontr.	0.03	0.03	0.016	-	2.55E-04	0.01	2.85E-03	1.63E-04
Contr.	0.001	0.001	0.00078	-	1.28E-05	4.25E-04	1.42E-04	8.13E-06
lb/yr (Contr.)		0.48	0.28	-	4.64E-03	0.15	5.19E-02	2.96E-03

	VOC
	CH_3COOH
lb/hr	
Uncontr.	0.15
Contr.	0.01
lb/day	
Uncontr.	3.51
Contr.	0.18
lb/yr (Contr.)	63.82

Throughput limit: 24,120,000 gals/yr/12 months/yr = 2,010,000 gals/month

TIER 2 SCREENING RISK ASSESSMENT

Application deemed complete date: 05/13/09

A/N: 498761
Fac: International Rectifier

Stack Data

		Units
Hour/Day	24	hr/day
Day/Week	7	day/wk
Week/Year	52	wk/yr
Emission Units	lb/hr	
		0
Control Efficiency	0.00	fraction range 0-1
Does source have TBACT?	NO	
Point or Volume Source ?	P	P or V
Stack Height or Building Height	10	feet
Area (For Volume Source Only)		ft^2
Distance-Residential	1000	meters
Distance-Commercial	50	meters
Meteorological Station	Norco	

Source Type:	O - Other	
Screening Mode	NO	

Emission Units	lb/hr	
Source output capacity	n/a	n/a

FOR USER-DEFINED CHEMICALS AND EMISSIONS, FILL IN THE TABLE BELOW

USER DEFINED CHEMICALS AND EMISSIONS				R1 - Uncontrolled	Efficiency Factor	R2 - Controlled
Code	Compound	lb/hr	Molecular Weight	lbs/hr	Fraction range 0-1	lbs/hr
p7	Phosphoric acid	3.25E-05	98	3.251E-05		3.251E-05
f2	Hydrogen fluoride (hydrofluoric acid)	1.77E-05	20	1.7699E-05		1.7699E-05
s8	Sulfuric acid and oleum	5.94E-06	98.08	5.93561E-06		5.93561E-06
h11	Hydrogen chloride (hydrochloric acid)	8.13E-06	36.46	8.12847E-06		8.12847E-06
				0		
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TIER 1 SCREENING RISK ASSESSMENT

Receptor Distance (actual)	50
Receptor Distance (for X/Q lookup)	50

Tier 1 Results	
Cancer/Chronic ASI	Acute ASI
1.16E-03	1.27E-04
PASSED	PASSED

APPLICATION SCREENING INDEX CALCULATION

Compound	Average Annual Emission Rate (lbs/yr)	Max Hourly Emission Rate (lbs/hr)	Cancer / Chronic Pollutant Screening Level (lbs/yr)	Acute Pollutant Screening Level (lbs/hr)	Cancer / Chronic Pollutant Screening Index (PSI)	Acute Pollutant Screening Index (PSI)
Phosphoric acid	2.84E-01	3.25E-05	6.07E+02		4.68E-04	
Hydrogen fluoride (hydrofluoric acid)	1.55E-01	1.77E-05		2.40E-01		7.38E-05
Sulfuric acid and oleum	5.19E-02	5.94E-06	8.67E+01	1.20E-01	5.98E-04	4.95E-05
Hydrogen chloride (hydrochloric acid)	7.10E-02	8.13E-06	7.80E+02	2.10E+00	9.10E-05	3.87E-06
TOTAL (APPLICATION SCREENING INDEX)					**1.16E-03**	**1.27E-04**

Thoughput
T-14

A/N: 498761

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%	296,287
H_2O		68%	629,610

*Combined

6. HF 49%

Usage		16,843 gals/yr	
Sp. Gr.		1.2	
Ingredients	mm Hg		lbs/yr
HF	15.05	49%	82,498
H_2O		51%	85,865

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%	1,526

10. Acetic acid

Usage		3,740 gals/yr	
Sp. Gr.		1.05	
Ingredients	mm Hg		lbs/yr
Acetic acid	11	10%	3,271
H_2O		90%	29,441

11. HCl 38%

Usage		27,210 gals/yr	
Sp. Gr.		1.19	
Ingredients	mm Hg		lbs/yr
HCl	30	38%	102,495
H_2O		62%	167,229

12. NaOH 50%

Usage		510,398 gals/yr	
Sp. Gr.		1.53	
Ingredients	mm Hg		lbs/yr
NaOH		50%	3,252,486
H_2O		50%	3,252,486

13. Additional H_2O

Usage		14,600,000 gals/yr	
Sp. Gr.		1	
			lbs/yr

H_2O	100%	121,618,000

Summary:

Mass:

	mm Hg	lb/yr
H_3PO_4	0.03	221,514
Acetic acid	11	5,771
HNO_3	55	235,180
HBF_4	7	2,499
HF	14.00	115,108
H_2O_2	25.00	296,287
H_2SO_4	0.0055	81,510
NH_4OH	561	16,823
NH_4F	0.5	1,017
HCl	30	102,495
NaOH		3,252,486
H_2O		125,939,627
		130,270,318

Volume:	gals/yr
1. SPEC Etch	3,798
2. 85% H3PO4	18,303
3. 70% HNO3	22,190
4. M. A. E.	5
5. H2O2 30%	100,137
6. HF 49%	16,843
7. FS Etch	11,183
8. NH4OH	7,480
9. NH4F	275
10. Acetic acid	3,740
11. NaOH	510,398
12. Additional H2O	14,600,000
	15,294,352

Water alone:

In aqueous solutions:	15,118,803
Additional	14,600,000
Total	29,718,803

Previous: 460734 G1999 A/N: 498761

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	0.2%	98.00	0.03	0.001002	0.10	0.3%	0.4%	57.02%
Acetic acid	5,771	0.004%	60.05	11.00	0.367459	22.07	65.7%	99%	-
HNO_3	235,180	0.2%	63.01	-	-	-	-	-	-
HBF_4	2,499	0.002%	87.81	0.00055	0.000018	0.002	0.005%	0.007%	0.93%
HF	115,108	0.1%	20.01	0.08	0.002672	0.05	0.2%	0.2%	31.04%
H_2O_2*	296,287	0.23%	34.01	-	-	-	-	-	-
H_2SO_4	81,510	0.1%	98.07	0.0055	0.000183	0.02	0.05%	0.1%	10.41%
NH_4OH**	16,823	0.01%	35.05	-	-	-	-	-	-
NH_4F (Solid salt)	1,017	0.001%	37.04	-	-	-	-	-	-
HCl	102,495	0.08%	36.46	0.00084	0.000028	0.00	0.00%	0.005%	0.59%
NaOH**	3,252,486	2.50%	40.00	-	-	-	-	-	-
H_2O	125,939,627	97%	18.02	18.8	0.628637	11.33	33.7%	-	-
	130,270,318	100%		29.94	1.00	33.56	100%	100%	100%
			psia	0.58		W/o water	66.26%	W/o acetic	0.51%

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

Notes:

*Small amount, vapor pressure is negligible.

**At 1 - 2 pH, it is expected that all NH_4OH and NaOH are completely neutralized.

Assumption: Effects of interactions between acids are minimum.

*Vapor pressure of each component in aqueous solution (as if it is the only component in water) is used.

For water, vapor pressure of pure water is used.

Vapor pressure of 90% H_2SO_4 is used.

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

Identification

User Identification:	T-14 New 6-7-09
City:	
State:	
Company:	
Type of Tank:	Horizontal Tank
Description:	

Tank Dimensions

Shell Length (ft):		11.50
Diameter (ft):		10.00
Volume (gallons):		6,757.00
Turnovers:		3,569.63
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)

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

T-14 New 6-7-09 - 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	0.5800	0.5800	0.5800	33.5600			0.00	

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

T-14 New 6-7-09 - Horizontal Tank

Month:	January	February	March	April	May	June	July	August	September	Oct
Standing Losses (lb):							2.2482			
Vapor Space Volume (cu ft):							575.2916			
Vapor Density (lb/cu ft):							0.0034			
Vapor Space Expansion Factor:							0.0426			
Vented Vapor Saturation Factor:							0.8668			
Tank Vapor Space Volume:										
Vapor Space Volume (cu ft):							575.2916			
Tank Diameter (ft):							10.0000			
Effective Diameter (ft):							12.1036			
Vapor Space Outage (ft):							5.0000			
Tank Shell Length (ft):							11.5000			
Vapor Density										
Vapor Density (lb/cu ft):							0.0034			
Vapor Molecular Weight (lb/lb-mole):							33.5600			
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			
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:							0.8668			
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.5800			
Vapor Space Outage (ft):							5.0000			
Working Losses (lb):							163.0837			
Vapor Molecular Weight (lb/lb-mole):							33.5600			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.5800			
Net Throughput (gal/mo.):							2,010,000.0000			
Annual Turnovers:							3,569.6315			
Turnover Factor:							0.1751			
Tank Diameter (ft):							10.0000			
Working Loss Product Factor:							1.0000			
Total Losses (lb):							165.3319			

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

Emissions Report for: July

T-14 New 6-7-09 - Horizontal Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Waste Acids	163.08	2.25	165.33