DAF Unit Emissions

DAF, Uncontrolled Emission Factor for Benzene =					3.00E-03	lb benzene/million gallons processed	
Source: U.S. EPA Locating and Estimating Air Emissions of Benzene, EPA-454/R-98-011, June 1998							
Basis:	84,600	gallons of wastewater processed/day					
Benzene Emissions =			0.093	lb/yr			
VOC Emissions =		10.14	lbs/yr =	0.03	lb/day		
Speciation using Profile #1:			**Chemical**		**Wt. Frac.**	**lbs/year**	
			Benzene		0.0091	0.09	
			Butane		0.0919	0.93	
			Butane, iso-		0.0189	0.19	
			Ethane		0.0026	0.03	
			Ethylbenzene		0.0053	0.05	
			Ethylene		0.0006	0.01	
			Heptane		0.0087	0.09	
			Heptane, iso-		0.1042	1.06	
			Hexane		0.0691	0.70	
			Hexane, iso-		0.1943	1.97	
			Methane		0.0062	0.06	
			Methyl-tert-Butylether		0.1406	1.43	
			Methylene Chloride		0.0120	0.12	
			Pentane		0.0688	0.70	
			Pentane, iso-		0.1486	1.51	
			Propane		0.0124	0.13	
			Propene		0.0009	0.01	
			Tetrachloroethylene		0.0115	0.12	
			Toluene		0.0653	0.66	
			Trichloroethane, 1,1,1		0.0014	0.01	
			Trichloroethylene		0.0011	0.01	
			Xylenes (o-, m- & p-)		0.0262	0.27	
			Total		1.0000	10.14	

Drum Storage / Handling Emissions

Emissions from drum storage/handling (Mg/yr):		**$E = 10^{-4} \times I \times W_i \times V_i$**		(U.S. EPA, 1994)	
Estimated waste density = 1.04 Mg/m^3 (or 8.679 lbs/gal).					
Drum storage capacity = 840 drums with an estimated 456.2 turnovers per year.					
Throughput = 840 drums/day,					
	By evaluating the waste codes: 72% of wastes contain inorganic/non-volatile, 28% contain volatiles,				
	840 drums/day * 0.28 = 235.2 drums/day, about 1/3 of which are for transfer only (never opened),				
	Therefore, drum storage/handling throughput = 235.2 x 2/3 = 156.8 drums/day.				
Annual throughput (I) = 156.8 drums/day x 0.208 m^3 x 365 days/year x 1.04 Mg/m^3 = 12380.4 Mg/yr.					
Volatile compounds weight fraction in the waste stream, dimensionless, (W_i) = 0.3					
Volatilization fraction, dimensionless, (V_i) = 0.5 (EPA assumes that half of the spilled VOCs					
	will be recovered by RCRA spill plan response).				
E = 10^{-4} x 12380.4 Mg/yr x 0.3 x 0.5 = 0.1857 Mg/yr					
= 0.1857 Mg/yr x 2,205 lbs/Mg	=	409.48	lbs/yr		
	=	1.12	lbs/day		
Note:	All 200 drums are stored in one area where ignitable wastes can be handled.				
	To speciate, use speciation profile #6 (for worst-case scenario)				

Oil Treatment

	Count (1)	Emission Factor (lb/yr-pump)	Emissions (lb/yr)
LS Pumps	2	432	864
HS Pumps	8	86	688
LS Valves	14	47	658
HS Valves	56	12	672
LS Flanges	56	4.9	274.4
HS Flanges	224	4.9	1097.6
		LS Subtotal	1796.4
		HS Subtotal	2457.6
		Total	4254

Fuel Blending

	Count	Emission Factor (lb/yr-pump)	Emissions (lb/yr)
LS Pumps	1	432	432
HS Pumps	0	86	0
LS Valves	7	47	329
HS Valves	0	12	0
LS Flanges	28	4.9	137.2
HS Flanges	0	4.9	0
		LS Subtotal	898.2
		HS Subtotal	0
		Total	898.2

Wastewater Treatment System

	Count	Emission Factor (lb/yr-pump)	Emissions (lb/yr)
LS Pumps	0	432	0
HS Pumps	13	86	1118
LS Valves	0	47	0
HS Valves	91	12	1092
LS Flanges	0	4.9	0
HS Flanges	364	4.9	1783.6
		LS Subtotal	0
		HS Subtotal	3993.6
		Total	3993.6

Rail Loading/Unloading

	Count	Emission Factor (lb/yr-pump)	Emissions (lb/yr)
LS Pumps	0	432	0
HS Pumps	4	86	344
LS Valves	0	47	0
HS Valves	28	12	336
LS Flanges	0	4.9	0
HS Flanges	112	4.9	548.8
		LS Subtotal	0
		HS Subtotal	1228.8
		Total	1228.8

Waste Solids Treatment

	Count	Emission Factor (lb/yr-pump)	Emissions (lb/yr)
LS Pumps	0	432	0
HS Pumps	1	86	86
LS Valves	0	47	0
HS Valves	7	12	84
LS Flanges	0	4.9	0
HS Flanges	28	4.9	137.2
		LS Subtotal	0
		HS Subtotal	307.2
		Total	307.2

Truck Loading/Unloading

	Count	Emission Factor (lb/yr-pump)	Emissions (lb/yr)
LS Pumps	2	432	864
HS Pumps	7	86	602
LS Valves	14	47	658
HS Valves	49	12	588
LS Flanges	56	4.9	274.4
HS Flanges	196	4.9	960.4
		LS Subtotal	1796.4
		HS Subtotal	2150.4
		Total	3946.8

Glycol Recovery(2)

	Count	Emission Factor (lb/yr-pump)	Emissions (lb/yr)
LS Pumps	0	432	0
HS Pumps	0.7	86	60.2
LS Valves	0	47	0
HS Valves	4.9	12	58.8
LS Flanges	0	4.9	0
HS Flanges	19.6	4.9	96.04
		LS Subtotal	0
		HS Subtotal	215.04
		Total	215.04

Totals

	Count	Emission Factor (lb/yr-pump)	Emissions (lb/yr)
LS Pumps	5	432	2160
HS Pumps	32.7	86	2812.2
LS Valves	35	47	1645
HS Valves	228.9	12	2746.8
LS Flanges	140	4.9	686
HS Flanges	915.6	4.9	4486.44
		LS Subtotal	4491
		HS Subtotal	10045.44
		Total	14536.44
		Total	39.83

(1) Pumps were accounted with a list of pumps. The number of valves was scaled up from a previous drawing count. Flanges = Valves x 4

(2) Ethylene glycol has no VOC emissions. VOC emissions are from 10% contamination from speciation #1 waste oil.

Loading/Unloading Emissions

Loading and unloading emission factor:							
L_L = (12.46 x S x M x [P/(Pa-P)])/T			Loading Loss, lb/10^3 gal, (L_L)				
			Saturation factor, dimensionless, (S)				
			Molecular weight of vapor, lb/lb-mole, (M)				
			True vapor pressure at bulk liquid conditions, psia, (P)				
			Average atmospheric pressure at tank location, psia, (P_a)				
			Temperature, ^{0}R, (T)				
Calculation for glycol loading/unloading emission factor (L_L):							
	(12.46 x 1.0 x 62.1 x [0.0012/(14.7-0.0012)])/537						
	1.18E-04	lb/1000gal					
Calculation for waste oil/water loading/unloading emission factor:							
	(12.46 x 1.0 x 0.0461 x [0.0087/(14.7-0.0087)])/537						
	6.33E-07	lb/1000gal					
Calculation for waste solvent loading/unloading emission factor:							
	(12.46 x 1.0 x 3.021 x [0.51/(14.7-0.51)])/537						
	2.52E-03	lb/1000gal					
Speciation	**Process Name**	**Max. Capacity (gal/day) x E.F.**			**Total Emissions**		
E.G.(1)	Ethylene glycol	86400	x 1.18E-04 lb/1000 gal =		0.0102	lbs/day	
			Emissions -->		**0.0927**	**lbs/yr**	
Spec. Profile #1	Waste oil/water	463200	x 6.33E-07 lb/1000 gal =		0.0003	lbs/day	
			Emissions -->		**0.0268**	**lbs/yr**	
Spec. Profile #6	Waste solvents	25000	x 3.81E-02 lb/1000 gal =		0.0630	lbs/day	
			Emissions -->		**5.7472**	**lbs/yr**	
			Total Emissions		**5.8667**	**lbs/yr**	
			Total Emissions		**0.0161**	**lbs/day**	
(1) Ethylene glycol has no VOC emissions. VOC emissions are from 10% contamination from speciation #1 waste oil.							

Operational Vehicle Emissions

On Road Mobile Emission Factors from California ARB EMFAC2002 Scenario Year 2006 (Model Years 1965 to 2006)					
Vehicle Type	CO Emissions Factor (lb/mile)	VOC Emission Factor (lb/mile)	NOx Emissions Factor (lb/mile)	SOx Emissions Factor (lb/mile)	PM10 Emissions Factor (lb/mile)
Light Duty/Autos	0.013925	0.001497	0.001489	0.000009	0.00008
Heavy Diesel Trucks	0.019135	0.002779	0.026756	0.000248	0.000483
On Road Heavy Duty Emission Factors from California ARB EMFAC2002					
Scenario Year 2010 (Model Years 1965 to 2010)	0.013168	0.002141	0.019339	0.000033	0.000374
Scenario Year 2012 (Model Years 1965 to 2012)	0.010982	0.001909	0.01529	0.000034	0.000337

SCENARIO YEAR 2006

	Parameters			Peak Day Emissions, lbs/day				
Source	Number of Vehicles	Total Number of Trips	Distance Traveled per Trip	CO Emissions	VOC Emissions	NOx Emissions	SOx Emissions	PM10 Emissions
Workers Commuting	30	10	16.2	2.26	0.24	0.24	0.00	0.01
Daily Delivery Diesel Trucks	100	200	25	95.68	13.90	133.78	1.24	2.42
Total				97.93	14.14	134.02	1.24	2.43

Operational Vehicle Emissions

SCENARIO YEAR 2010

Source	Parameters			Peak Day Emissions, lbs/day				
	Number of Vehicles	Total Number of Trips	Distance Traveled per Trip	CO Emissions	VOC Emissions	NOx Emissions	SOx Emissions	PM10 Emissions
Workers Commuting	30	10	16.2	2.26	0.24	0.24	0.00	0.01
Daily Delivery Diesel Trucks	100	200	25	65.84	10.71	96.70	0.17	1.87
Total				68.10	10.95	96.94	0.17	1.88

SCENARIO YEAR 2012

Source	Parameters			Peak Day Emissions, lbs/day				
	Number of Vehicles	Total Number of Trips	Distance Traveled per Trip	CO Emissions	VOC Emissions	NOx Emissions	SOx Emissions	PM10 Emissions
Workers Commuting	30	10	16.2	2.26	0.24	0.24	0.00	0.01
Daily Delivery Diesel Trucks	100	200	25	54.91	9.55	76.45	0.17	1.69
Total				57.17	9.79	76.69	0.17	1.70

Fugitive Dust Emission Estimates
From Trucks and Employee Vehicles

Source Type	Number	Fuel	Peak Daily Trips	One-way Distance	Emission Factor (lb/vmt)	Peak PM-10 (lbs/day)
Passenger Vehicle/ On Paved Roadways	30	Gasoline	2	16.2	0.000856	0.83
Trucks on Paved Roadways	100	Diesel	2	25	0.0206	103.00
Total	130					103.83

* Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1

$E = k(sL/2)^{0.65} \times (W/3)^{1.5}$

Where: k = 0.016 lb/VMT for PM10, sL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for cars; 5 for pickup trucks, and 20 for heavy trucks)

**Emission Calculations for travel on unpaved roads from EPA AP-42 Section 13.2.2

$E = 2.6(s/12)^{0.8} \times (W/3)^{0.4}/(M/0.2)^{0.3}$

Where: s = surface silt content (assumed to be 11%, AP-42 Table 13.2.2-1), W = vehicle weight (tons) same assumptions as above, and M = material moisture content (assumed to be 10 percent since these emissions would only come from a water truck watering the site).

Railcar Emissions Associated with Delivery of Waste Oil, Recycled Oil and Hazardous Wastes

Cargo Weight (Rail Car and Freight)		
Volume Transported	200,000	gal/day
Gallons per railcar	20,000	gal
Number of Railcars	10	car/day
Rail car tare weight(1)	23.2	tons/one car
Weight of Product	1100	tons/day
Gross Weight	1332.00	tons
Fuel Consumption		
Distance within CA outside of Air Basin	160	miles
Fuel Factor(2)	1.329	gal/1000 GTM(3)
Total tons-mile	213120	ton-mile
Total Fuel consumption	283.24	gal/day
Distance within CA inside of Air Basin	60	miles
Fuel Factor(2)	1.329	gal/1000 GTM(3)
Total tons-mile	79920	ton-miles
Total Fuel consumption	106.21	gal/day

(1) Oteko, 2004. www.oteko.com

(2) Port of Los Angeles, 2004

(3) GTM = gross ton miles

EMISSION FACTORS(4)	CO	VOC	NOx	SOx	PM10
gram/gallon	27.4	10.4	199.8	17	6.6
lbs/gallon	0.0604	0.0229	0.4405	0.0375	0.0146

(4) Emission factors are based on Emission Factors for Locomotives, U.S. EPA 420-F-97-05, December 1997, Table 9.

Link	EMISSIONS				
	CO	VOC	NOx	SOx	PM10
Within Basin (lbs/day)	6.416	2.435	46.785	3.981	1.545
Outside Basin (lbs/day)	17.109	6.494	124.759	10.615	4.121

Idling Emissions at Site(5)	EMISSIONS				
	CO	VOC	NOx	SOx	PM10
Locomotive Idling (lbs/day)	0.076	0.029	0.551	0.047	0.018

(5) Idling Emissions = Emission factor (lbs/gal) x Fuel Use (gal/hr) x Idling Time (hr/day)

Where: Fuel use = 5 gallons/hour (SCAQMD, 2003b) and idling time is a maximum of 15 minutes per day.

TOTAL RAILCAR EMISSIONS	EMISSIONS				
	CO	VOC	NOx	SOx	PM10
Within Basin (lbs/day)	6.491	2.464	47.335	4.028	1.564
Outside Basin (lbs/day)	17.109	6.494	124.759	10.615	4.121

DBSWORD:2313:Polychemie Const Emiss Calcs.xls

Annual Throughput Calculation for Storage Tanks

Tank No.	Function	Speciation Profile	Product	Tank Capacity (gallons)	New Tank Throughput (barrels/yr)	Throughput Data from Part B
			Receiving[1] and Treatment[2] Tanks			
4	S	1	Used Oil / Glycol Product / Chemical Reagent	2114	17641	
5	S	1	Used Oil / Glycol Product / Chemical Reagent	2114	17641	
43	R/S	1	Used Oil	19458	162378	
55	R/S	1	Glycol Products	10000	83450	
21	*R/S/T*	*2*	*Used Oil*	*28064*	234195	
22	*R/S/T*	*2*	*Used Oil*	*31071*	259288	
23	*R/S/T*	*2*	*Used Oil*	*31071*	259288	
24	*R/S/T*	*2*	*Used Oil*	*28064*	234195	
25	*R/S/T*	*2*	*Used Oil*	*28064*	234195	
26	*R/S/T*	*2*	*Used Oil*	*28064*	234195	
27	*R/S/T*	*2*	*Used Oil*	*28064*	234195	
50	*S/T*	*1*	*Used Oil & Water*	*6143*	51264	
			Total	238063	1986643	**<-- 228600 gal/day**
			Recycled Oil Storage[3]			
100	S	3	Used / Recycled Oil	71025	331107	
200	S	3	Used / Recycled Oil	71025	331107	
300	S	3	Used / Recycled Oil	71025	331107	
400	S	3	Used / Recycled Oil	71025	331107	
500	S	3	Used / Recycled Oil	71025	331107	
700	S	3	Used / Recycled Oil	71025	331107	
			Total	426150	1986643	**<-- 228600 gal/day**
			Waste Solids			
56	R/S/T	1	Sludge Thickening	10000	125143	
			Total	10000	125143	**<--14400 gal/day**
			Standby			
800	S	1	Spill Containment Standby	58748		
			Total	58748		
			Glycol Recycling[3]			
40	R/S	1	Oily Wastewater / Antifreeze / Waste Glycol	20093	102538	
44	R/S	1	Wastewater / Antifreeze / Waste Glycol	20150	102828	
45	R/S	1	Wastewater / Antifreeze / Waste Glycol	20150	102828	
46	S	1	Oily Wastewater / Antifreeze / Waste Glycol	20150	102828	
47	R/S	1	Antifreeze / Chemical Product	6143	31349	
48	R/S	1	Oily Wastewater / Antifreeze / Waste Glycol	20150	102828	
49	R/S	1	Oily Wastewater / Antifreeze / Waste Glycol	20150	102828	
51	R/S	1	Antifreeze / Glycol Waste	20150	102828	
			Total	147136	750857	**<-- 86400 gal/day**
			Wastewater Treatment			
41	R/S	1	Oil Treatment	20093	147725	
42	R/S	1	Oil Treatment / Oxidation	19458	143057	
52	S/T	1	Oily Wastewater Treatment / Oxidation	20150	148144	
53	S/T	1	Oily Wastewater Treatment / Oxidation	20150	148144	
54	S/T	1	Oily Wastewater Treatment / Oxidation	20150	148144	
			Total	100001	735214	**<-- 84600 gal/day**
			RCRA Fuel Blending			
600	R/S/T	6	Used / Recycled Oil / RCRA Waste	71025	217262	
			Total	71025	217262	**<-- 25000 gal/day**

* 1 BBL = 42 GAL, 365 days/yr.

Red text denotes heated tank.

Italic text denotes Treatment Tanks.

(1) Waste oil/water tank's annual throughput is scaled using the capacity: Qx = Q1*Vx/V1, where Q1 and V1 is the total annual throughput and total capacity, respectively.
Maximum tank emissions based on all railcar offloading going through receiving tanks (none directly to treatment as shown in Figure IV-28 of Part B 9/2000 Rev. 0).

(2) Assumes all material received is treated.

(3) Worst case assumption that 100% of waste received is recovered during recycle.

Speciation Profile #1						
Derived from tank vapor testing (Tank #24);						
Applicable to waste oil/water mixture at ambient temperature.						
Liquid Temperature, deg.F	75					
Vapor Temperature, deg.F	75					
Moisture, % v/v	<3					
VOC, % vol. as C_3 (Propane)	0.22					**psia**
			Total MW_v -->	**0.05**	***Total P_v -->***	**0.0087171**
Lab Chemical List	**Vapor Conc. (ppmv)**	**MW_i**	**Vapor Mol. Frac., Y_i**	**Y_i*MW_i**	**Vapor Wt. Frac., W_i**	**Vapor Partial Pressure Pi=14.7*Yi**
Benzene	5.4	78.1	0.0000054	0.000422	0.0091	0.00007938
Butane	73	58.1	0.000073	0.004241	0.0919	0.0010731
Butane, iso-	15	58.1	0.000015	0.000872	0.0189	0.0002205
Ethane	4	30	0.000004	0.00012	0.0026	0.0000588
Ethylbenzene	2.3	106.2	0.0000023	0.000244	0.0053	0.00003381
Ethylene	1	28	0.000001	0.000028	0.0006	0.0000147
Heptane	4	100.2	0.000004	0.000401	0.0087	0.0000588
Heptane, iso-	48	100.2	0.000048	0.00481	0.1042	0.0007056
Hexane	37	86.2	0.000037	0.003189	0.0691	0.0005439
Hexane, iso-	104	86.2	0.000104	0.008965	0.1943	0.0015288
Methane	18	16	0.000018	0.000288	0.0062	0.0002646
Methyl-tert-Butylether (MTBE)	73.6	88.17	0.0000736	0.006489	0.1406	0.00108192
Methylene Chloride	6.5	84.9	0.0000065	0.000552	0.0120	0.00009555
Pentane	44	72.2	0.000044	0.003177	0.0688	0.0006468
Pentane, iso-	95	72.2	0.000095	0.006859	0.1486	0.0013965
Propane	13	44.1	0.000013	0.000573	0.0124	0.0001911
Propene	1	42.1	0.000001	4.21E-05	0.0009	0.0000147
Tetrachloroethylene	3.2	165.8	0.0000032	0.000531	0.0115	0.00004704
Toluene	32.7	92.1	0.0000327	0.003012	0.0653	0.00048069
Trichloroethane, 1,1,1-	0.5	133.4	0.0000005	6.67E-05	0.0014	0.00000735
Trichloroethylene	0.4	131.4	0.0000004	5.26E-05	0.0011	0.00000588
Xylenes (o-, m- & p-)	11.4	106.2	0.0000114	0.001211	0.0262	0.00016758
Total	**593**	**1779.87**	**0.000593**	**0.046144**	**1.0000**	**0.0087171**
H2O Vapor	3.00%	18	0.03	0.54		0.441
Air	96.94%	29	0.9694	28.1126		14.25018
Total	**1.00**		**1.00**	**28.70**		**14.70**

Speciation Profile #2						
Derived from tank vapor testing (Process/Treatment Tank #27);						
Applicable to waste oil/water mixture at elevated temperature (180 °F).						
Liquid Temperature, deg.F	180					
Vapor Temperature, deg.F	182					
Moisture, % v/v	51.7					
VOC, % vol. as C_3 (Propane)	10.3					**psia**
			Total MW_v -->	**2.99**	***Total P_v -->***	**0.54260346**
Lab Chemical List	**Vapor Conc. (ppmv)**	**MW_i**	**Vapor Mol. Frac., Y_i**	**Y_i*MW_i**	**Vapor Wt. Frac., W_i**	**Vapor Partial Pressure Pi=14.7*Yi**
Benzene	306	78.1	0.000306	0.023899	0.0080	0.0044982
Butane	3483	58.1	0.003483	0.202362	0.0676	0.0512001
Butane, iso-	501	58.1	0.000501	0.029108	0.0097	0.0073647
Ethane	10	30	0.00001	0.000300	0.0001	0.000147
Ethylbenzene	106	106.2	0.000106	0.011257	0.0038	0.0015582
Ethylene	5	28	0.000005	0.000140	0.0000	0.0000735
Heptane	303	100.2	0.000303	0.030361	0.0101	0.0044541
Heptane, iso-	3527	100.2	0.003527	0.353405	0.1181	0.0518469
Hexane	1976	86.2	0.001976	0.170331	0.0569	0.0290472
Hexane, iso-	9966	86.2	0.009966	0.859069	0.2870	0.1465002
Methane	33	16	0.000033	0.000528	0.0002	0.0004851
Methyl-tert-Butylether (MTBE)	4013	88.17	0.004013	0.353826	0.1182	0.0589911
Methylene Chloride	190	84.9	0.00019	0.016131	0.0054	0.002793
Pentane	2981	72.2	0.002981	0.215228	0.0719	0.0438207
Pentane, iso-	8170	72.2	0.00817	0.589874	0.1971	0.120099
Propane	37	44.1	0.000037	0.001632	0.0005	0.0005439
Propene	17	42.1	0.000017	0.000716	0.0002	0.0002499
Tetrachloroethylene	128	165.8	0.000128	0.021222	0.0071	0.0018816
Toluene	703	92.1	0.000703	0.064746	0.0216	0.0103341
Trichloroethane, 1,1,1-	21.9	133.4	0.0000219	0.002921	0.0010	0.00032193
Trichloroethylene	7.9	131.4	0.0000079	0.001038	0.0003	0.00011613
Xylenes (o-, m- & p-)	427	106.2	0.000427	0.045347	0.0151	0.0062769
Total	**36911.8**	**1779.87**	**0.0369118**	**2.993443**	**1.0000**	**0.5426**
H2O Vapor	51.70%	18	0.517	9.306		7.5999
Air	44.61%	29	0.4461	12.9369		6.55767
Total	**1.00**		**1.00**	**25.24**		**14.70**

Speciation Profile #3						
Derived from tank vapor testing (Product Oil Tank #600);						
Note that tank #600 is proposed to be used as fuel blending in the future (not a product oil tank);						
Applicable to treated product oil mixture at ambient temperature.						
Liquid Temperature, deg.F	85					
Vapor Temperature, deg.F	85					
Moisture, % v/v	<4					
VOC, % vol. as C_3 (Propane)	0.19					**psia**
			Total MW_v -->	**0.03**	***Total P_v -->***	**0.005197038**
Lab Chemical List	**Vapor Conc. (ppmv)**	**MW_i**	**Vapor Mol. Frac., Y_i**	**Y_i*MW_i**	**Vapor Wt. Frac., W_i**	**Vapor Partial Pressure Pi=14.7*Yi**
Benzene	6.0	78.1	0.000006	4.69E-04	0.0154	0.0000882
Butane	19	58.1	0.000019	1.10E-03	0.0362	0.0002793
Butane, iso-	2	58.1	0.000002	1.16E-04	0.0038	0.0000294
Ethane	1	30	0.000001	3.00E-05	0.0010	0.0000147
Ethylbenzene	3.5	106.2	0.0000035	3.72E-04	0.0122	0.00005145
Ethylene	1	28	0.000001	2.80E-05	0.0009	0.0000147
Heptane	5	100.2	0.000005	5.01E-04	0.0164	0.0000735
Heptane, iso-	61	100.2	0.000061	6.11E-03	0.2002	0.0008967
Hexane	21	86.2	0.000021	1.81E-03	0.0593	0.0003087
Hexane, iso-	80	86.2	0.00008	6.90E-03	0.2259	0.001176
Methane	1	16	0.000001	1.60E-05	0.0005	0.0000147
Methyl-tert-Butylether (MTBE)	1.8	88.17	0.0000018	1.59E-04	0.0052	0.00002646
Methylene Chloride	7.2	84.9	0.0000072	6.11E-04	0.0200	0.00010584
Pentane	22	72.2	0.000022	1.59E-03	0.0520	0.0003234
Pentane, iso-	54	72.2	0.000054	3.90E-03	0.1277	0.0007938
Propane	1	44.1	0.000001	4.41E-05	0.0014	0.0000147
Propene	1	42.1	0.000001	4.21E-05	0.0014	0.0000147
Tetrachloroethylene	4.9	165.8	0.0000049	8.12E-04	0.0266	0.00007203
Toluene	42.9	92.1	0.0000429	3.95E-03	0.1294	0.00063063
Trichloroethane, 1,1,1-	0.7	133.4	0.0000007	9.34E-05	0.0031	0.00001029
Trichloroethylene	0.24	131.4	0.00000024	3.15E-05	0.0010	0.000003528
Xylenes (o-, m- & p-)	17.3	106.2	0.0000173	1.84E-03	0.0602	0.00025431
Total	**354**	**1779.9**	**0.00035354**	**0.030523**	**1**	**0.005197038**
H2O Vapor	4.00%	18	0.04	0.72		0.588
Air	95.96%	29	0.9596	27.8284		14.10612
Total	**1.00**		**1.00**	**28.58**		**14.70**

Speciation Profile #6

Waste Code Description	Molecular Weight	Vapor Pressure	Vapor Mole Fraction	Vapor Weight Fraction
acrylonitrile	53.0634	7.74E-01	0.0045	0.0039
aniline	93.1280	6.20E-03	0.0000	0.0001
benzene	78.1134	1.45E+00	0.0084	0.0109
carbon tetrachloride	153.8230	1.78E+00	0.0103	0.0263
chloroethene (1,1,1-TCA and vinyl chloride)	62.4987	5.14E+01	0.2980	0.3083
chloroform	119.3779	3.00E+00	0.0174	0.0344
dichlorobenzene, 1,4 (dichlorobenzene, p)	147.0036	2.43E-02	0.0001	0.0003
dichloroethane, 1,1	98.9596	3.55E+00	0.0206	0.0337
dichloroethylene, 1,1 (vinylidene chloride)	96.9438	9.64E+00	0.0559	0.0897
dichloromethane (methylene chloride)	84.9328	6.82E+00	0.0396	0.0556
dimethylhydrazine, 1,1 (UDMH)	60.0986	2.07E-01	0.0012	0.0012
dioxane, 1,4	88.1060	5.71E-01	0.0033	0.0048
epichlorohydrin	92.5249	2.50E-01	0.0014	0.0022
Ethylbenzene	106.167	1.40E-01	0.0008	0.0014
ethylene dibromide	187.8616	1.71E-01	0.0010	0.0031
ethylene dichloride	98.9596	1.24E+00	0.0072	0.0118
formaldehyde	30.0262	6.77E+01	0.3925	0.1951
tetrachloroethylene (perchloroethylene)	165.8340	2.71E-01	0.0016	0.0043
Toluene	92.1402	2.20E+01	0.1276	0.1945
trichloroethane	133.4047	3.43E-01	0.0020	0.0044
trichloroethylene	131.3889	1.04E+00	0.0060	0.0131
Xylenes (o-, m- & p-)	106.167	9.42E-02	0.0005	0.0010
Totals	**60.4192**	**4.57E+01**	**1.0000**	**1.0000**

Speciation Profile Filter Press

Chemical	Vapor Weight Fraction
Benzene	0.07
Ethylbenzene	0.04
Methylene chloride	0.10
Tetrachloroethylene	0.08
Toluene	0.50
Trichoroethane	0.01
Trichloroethylene	0.01
Xylenes (o-, m- & p-)	0.20
Total	**1**

Speciation Profile Drums

Waste Code Description	Molecular Weight	Partial Vapor Pressure(1)	Vapor Mole Fraction(1)	Vapor Weight Fraction
acrylonitrile	53.0634	3.87E-02	0.0001	0.0038
aniline	93.1280	3.10E-04	0.0000	0.0001
benzene	78.1134	7.26E-02	0.0004	0.0217
carbon tetrachloride	153.8230	8.91E-02	0.0001	0.0110
chloroethene (1,1,1-TCA and vinyl chloride)	62.4987	2.57E+00	0.0001	0.0045
chloroform	119.3779	1.50E-01	0.0008	0.0684
dichlorobenzene, 1,4 (dichlorobenzene, p)	147.0036	1.22E-03	0.0000	0.0007
dichloroethane, 1,1	98.9596	1.77E-01	0.0009	0.0670
dichloroethylene, 1,1 (vinylidene chloride)	96.9438	4.82E-01	0.0026	0.1786
dichloromethane (methylene chloride)	84.9328	3.41E-01	0.0018	0.1107
dimethylhydrazine, 1,1 (UDMH)	60.0986	1.03E-02	0.0001	0.0024
dioxane, 1,4	88.1060	2.86E-02	0.0002	0.0096
epichlorohydrin	92.5249	1.25E-02	0.0001	0.0044
Ethylbenzene	106.167	7.00E-03	0.0000	0.0028
ethylene dibromide	187.8616	8.53E-03	0.0000	0.0061
ethylene dichloride	98.9596	6.20E-02	0.0003	0.0234
formaldehyde	30.0262	3.39E+00	0.0001	0.0022
hydrofluoric acid	20.0063	7.55E-01	0.0040	0.0577
tetrachloroethylene (perchloroethylene)	165.8340	1.35E-02	0.0001	0.0086
Toluene	92.1402	1.10E+00	0.0054	0.3542
trichloroethane	133.4047	1.72E-02	0.0001	0.0088
trichloroethylene	131.3889	5.18E-02	0.0003	0.0260
Xylenes (o-, m- & p-)	106.167	4.71E-03	0.0000	0.0019
chlorine	70.9060	5.00E+00	0.0005	0.0254
Totals	**1.3955**	**1.43E-02**	**0.0180**	**1.0000**

(1) Toxics taken at 5% concentration of total RCRA waste. Acrylonitrile, Carbon Tetrachloride, Formaldehyde and Vinyl chloride are taken at 100 parts per million.

ISOCI Tank Vapor Space Testing Results

Samples taken by Pacific Environmental Services on 1/24/1997
Samples analyzed by Truesdail Laboratories on 2/2/1997
ASTM D2820 / EPA Method 8240 - GCMS

Tank No.	**#24 Waste Oil/Water Receiving Tank**	**#600 Treated Product Oil Tank**	**#27 Process/Treatment Tank**
Sample ID	#112	#115	#106
Liquid Temperature, deg.F	75	85	180
Vapor Temperature, deg.F	75	85	182
Moisture, % v/v	<3	<4	51.7
VOC, % vol. as C_3 (Propane)	0.22	0.19	10.3

VOC Emission Rate, Uncontrolled (see following pages for derivation)

lbs VOC / 1000 gal liquid	0.011	0.0077	
lbs VOC / hour of heating			35

VOC Speciation, ppmv

Benzene	5.4	6.0	306
Methyl-tert-Butylether (MTBE)	73.6	<1.8	4013
Ethylbenzene	2.3	3.5	106
Methylene Chloride	6.5	7.2	190
Tetrachloroethylene	3.2	4.9	128
Toluene	32.7	42.9	703
1,1,1-Trichloroethane	0.5	0.7	21.9
Trichloroethylene	0.4	<0.24	7.9
Xylenes (o-, m- & p-)	11.4	17.3	427
Methane	18	<1	33
Ethane	4	<1	10
Ethylene	1	<1	5
Propane	13	<1	37
Propene	<1	<1	17
Iso-butane	15	2	501
Butane	73	19	3483
Iso-pentane	95	54	8170
Pentane	44	22	2981
Iso-hexane	104	80	9966
Hexane	37	21	1976
Iso-Heptane	48	61	3527
Heptane	4	5	303

PROJECT EMISSION SUMMARY - 2006

Operational Emissions	Estimated Emissions				
	CO	VOC	NOx	SOx	PM10
On-site Emissions (lbs/day)					
Boiler and Heater Emissions	18.90	3.22	24.78	0.87	3.57
Backup Generator	0.49	0.18	2.25	0.03	0.16
Storage Tank Emissions		2.11			
Oil Water Separator		16.92			
Centrifuge		0.02			
Filter Press		0.46			
DAF		0.03			
Drum Storage/Handling		1.12			
Fugitive Emissions		39.83			
Loading/Unloading Emissions		0.02			
Total On-site Emissions (lbs/day)	19.38	63.91	27.03	0.90	3.73
Off-site Emissions (lbs/day)					
Trip Emissions	97.93	14.14	134.02	1.24	2.43
Fugitive Vehicle Emissions					103.83
Railcar Emissions	6.49	2.46	47.34	4.03	1.56
Total On-site Emissions (lbs/day)	104.42	16.60	181.36	5.27	107.82
Total Emissions (lbs/day)	123.81	80.51	208.39	6.17	111.55

PROJECT EMISSION SUMMARY - 2012

Operational Emissions	Estimated Emissions				
	CO	VOC	NOx	SOx	PM10
On-site Emissions (lbs/day)					
Boiler and Heater Emissions	18.90	3.22	24.78	0.87	3.57
Backup Generator	0.49	0.18	2.25	0.03	0.16
Storage Tank Emissions		2.11			
Oil Water Separator		16.92			
Centrifuge		0.02			
Filter Press		0.46			
DAF		0.03			
Drum Storage/Handling		1.12			
Fugitive Emissions		39.83			
Loading/Unloading Emissions		0.02			
Total On-site Emissions (lbs/day)	19.38	63.91	27.03	0.90	3.73
Off-site Emissions (lbs/day)					
Trip Emissions	57.17	9.79	76.69	0.17	1.70
Fugitive Vehicle Emissions					103.83
Railcar Emissions	6.49	2.46	47.34	4.03	1.56
Total On-site Emissions (lbs/day)	63.66	12.25	124.03	4.20	107.09
Total Emissions (lbs/day)	83.04	76.16	151.06	5.10	110.82