IV-A-12

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BEST DEMONSTRATED AVAILABLE TECHNOLOGY (BDAT)

BACKGROUND DOCUMENT FOR

K103 AND K104

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Table 2-4 BOAT Constituent Analysis and Other Data

		Untreated Waste Concentration Range, mg/l [a]	
	BOAT ORGANICS	K103	K104
	Volatile	32 - 81	4.5 - 320
4.	Benzene		
	Semivolatile		
56.	Aniline	33,000 - 53,000	<150 - <300
101.	2,4-Dinitrophenol [b]	<7,500 - <15,000	750 - <1,500
125.	Nitrobenzene [b]	1,900 - 2,800 [c]	2,200 - 3,900
142.	Phenol	1,500 - <3,000	<150 - <300
	BOAT Metals		
155.	Arsenic	0.01 - 21	<0.01
156.	Barium	<.001	.0015 - .017
159.	Chromium	<.007	<.007 - .432
160.	Copper	<.006	<.006 - .012
161.	Lead	<.005 - 6	<.020
161.	Nickel	<.011	<.011 - .238
168.	Zinc	3 - 21	<.038 - .079
	BOAT Inorganics		
169.	Total Cyanides	<0.010 - 0.075	3.06 - 6.28
171.	Sulfide	62 - 89	<1.0
	Other Parameters		
	Total Dissolved Solids	d	10,200 - 27,200
	Total Suspended Solids	8 - 24	21 - 172
	Total Organic Carbon	33,500 - 36,300	1,420 - 2,990
	Chemical Oxygen Demand	97,800 - 111,000	5,290 - 48,200

[a] Values obtained from Onsite engineering report of Treatment Technology Performance for E.I. du Pont de Nemours, Inc., Beaumont, Texas. Tables 6-6 and 6-8.

[b] Data from the Effluent Limitations Guideline Data Base show untreated nitrobenzene in the range 87 - 5,460 ppm and untreated 2,4-dinitrophenol in the range 20 - 58 mg/l.

[c] Value represents the treated waste from the aniline liquid/liquid extractor. Nitrobenzene was used as a solvent in the aniline liquid/liquid extractor.

[d] Total dissolved solids could not be analyzed since the sample flashed before an analysis could be completed. This was the result of the amount of organics contained in the sample.

TABLE 4-1 TREATMENT DATA FOR SAMPLE SET 1 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION

BOAT	CONSTITUENTS DETECTED	UNTREATED WASTE K103 (mg/l)	UNTREATED WASTE K104 (mg/l)	TREATED WASTE K103 (mg/l)	TREATED WASTE K104 (mg/l)
	Volatile Organic Compounds				
4	Benzene	81	240	2.8	45
48	Trichloromonofluoromethane	<2.5	<10	<0.5	<0.5
	Semivolatile Organic Compounds				
56	Aniline	51,000	<150	<60	<75
101	2,4-Dinitrophenol	<7,500	<750	<300	<375
126	Nitrobenzene	<1,500	2,700	2,300	2,800
142	Phenol	<1,500	<150	<60	<75
	Metals				
155	Arsenic	<0.010	<0.010	NA	NA
156	Barium	<0.001	0.0078	NA	NA
159	Chromium	<0.007	0.432	NA	NA
160	Copper	<0.006	0.012	NA	NA
161	Lead	<0.005	<0.050	NA	NA
163	Nickel	<0.011	0.238	NA	NA
167	Vanadium	<0.006	<0.006	NA	NA
168	Zinc	0.021	0.079	NA	NA
	Inorganics				
169	Total Cyanides	0.0748	6.28	NA	NA
170	Fluorides	<0.20	<0.20	NA	NA
171	Sulfides	89.0	<1.0*	NA	NA

a - Onsite Engineering Report for E.I. Dupont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14

NA - Not Analyzed

* - Less than detection limit -- caused by interference

TABLE 4-1 (continued) TREATMENT DATA FOR SAMPLE SET 1 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING

BDAT CONSTITUENTS DETECTED	UNTREATED WASTE K103 (mg/l)	UNTREATED WASTE K104 (mg/l)	TREATED WASTE (mg/l)
Volatile Organic Compounds			
4 Benzene	81	240	<0.005
48 Trichloromonofluoromethane	<2.5	<10	0.010
Semivolatile Organic Compounds			
56 Aniline	51,000	<150	<3
101 2,4-Dinitrophenol	<7,500	<750	57
126 Nitrobenzene	<1,500	2,700	<3
127 4-Nitrophenol	<7,500	<750	<15
142 Phenol	<1,500	<150	<3
** Benzoic Acid	<7,500	<750	15
Metals			
155 Arsenic	<0.010	<0.010	NA
156 Barium	<0.001	0.0078	NA
159 Chromium	<0.007	0.432	NA
160 Copper	<0.006	0.012	NA
161 Lead	<0.005	<0.050	NA
163 Nickel	<0.011	0.238	NA
167 Vanadium	<0.006	<0.006	NA
168 Zinc	0.021	0.079	NA
Inorganics			
169 Total Cyanides	0.0748	6.28	4.77
170 Fluorides	<0.20	<0.20	NA
171 Sulfides	89.0	<1.0*	<1.0*

a - Onsite Engineering Report for E.I. Dupont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14

NA - Not Analyzed

* - Less than detection limit -- caused by interference

** - Not on BDAT list of constituents

TABLE 4-1 (continued) TREATMENT DATA FOR SAMPLE SET 1 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING AND ACTIVATED CARBON ADSORPTION

		UNTREATED WASTE		TREATED WASTE
		K103	K104	
	CONSTITUENTS DETECTED	(mg/l)		(mg/l)
	Volatile Organic Compounds			
4	Benzene	81	240	0.042
48	Trichloromonofluoromethane	<2.5	<10	0.007
	Semivolatile Organic Compounds			
56	Aniline	51,000	<150	<0.030
101	2,4-Dinitrophenol	<7,500	<750	0.380
126	Nitrobenzene	<1,500	2,700	<0.030
142	Phenol	<1,500	<150	<0.030
	Metals			
155	Arsenic	<0.010	<0.010	<0.010
156	Barium	<0.001	0.0078	0.032
159	Chromium	<0.007	0.432	0.0097
160	Copper	<0.006	0.012	<0.006
161	Lead	<0.005	<0.050	<0.500
163	Nickel	<0.011	0.238	<0.011
167	Vanadium	<0.006	<0.006	0.014
168	Zinc	0.021	0.079	0.058
	Inorganics			
169	Total Cyanides	0.0748	6.28	0.565
170	Fluorides	<0.20	<0.20	0.590
171	Sulfides	89.0	<1.0*	<1.0*

[a] Onsite Engineering Report for E. I. Dupont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14.

* Less than detection limit -- caused by interference

Continued

TABLE 4-1 (Continued) TREATMENT DATA FOR SAMPLE SET 1 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING AND ACTIVATED CARBON ADSORPTION

OPERATING PARAMETERS	Design Value	Operating Range
Aniline Liquid/Liquid Extractor :	Solvent - Nitrobenzene	
Feed Rate to the Extractor (lbs/hr)	7,000 - 25,000	14,400 - 14,500
Feed pH to the Extractor	9 - 10**	10.3
Feed Temperature to the Extractor (°C)	40.0**	13.0
Nitrobenzene Liquid/Liquid Extractor :	Solvent - Nitrobenzene	
Feed Rate to the Extractor (lbs/hr)	27,000 - 35,000	21,300 - 46,000*
Feed pH to the Extractor	Max. 2.4	0.2
Feed Temperature to the Extractor (°C)	25.0 - 65.0	39.0
Steam Stripper :		
Top Column Temperature (°C)	Min. 95.0	95***
Pressure Drop Across the Column(inches of water)	Max. 90.0	44.26 - 51.00
Feed Rate to Steam Stripper(lbs/hr)	Min. 20,000, Max. 90,000	59,400 - 59,480
Activated Carbon Adsorption:		
Feed Rate to the System (lbs/hr)	Max. 65,300	61,600 - 68,600*
Feed pH to the System	Min. 7.0	10.6
Feed Temperature to the System (°C)	40.0**	25.0
Total Organic Carbon in treated waste (mg/l)	Max. 250	79.3
Calculated Residence time (minutes)	Instantaneous Min. 85	81 - 90*

a - Onsite Engineering Report for E. I. duPont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14.

\- - Not controlled. Normal operating value is given.

** - Mid column substituted for top column temperature due to technical difficulties.

* - Values outside the design range are instantaneous maximum or minimum. Refer to strip charts in Appendix G.

TABLE 4-2 TREATMENT DATA FOR SAMPLE SET 2 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION

HOAT	CONSTITUENTS DETECTED	UNTREATED WASTE K103 (mg/l)	UNTREATED WASTE K104 (mg/l)	TREATED WASTE K103 (mg/l)	TREATED WASTE K104 (mg/l)
	Volatile Organic Compounds				
4	Benzene	73	320	6.3	58
48	Trichloromonofluoromethane	<5	<20	<5	<5
	Semivolatile Organic Compounds				
56	Aniline	33,000	<150	95	<150
131	2,4-Dinitrophenol	<7,500	<750	<300	<750
126	Nitrobenzene	<1,500	2,200	2,800	3,200
142	Phenol	<1,500	<150	<60	<150
	Metals				
155	Arsenic	<0.010	<0.100	NA	NA
156	Barium	<0.001	0.0015	NA	NA
159	Chromium	<0.007	0.097	NA	NA
160	Copper	<0.006	<0.006	NA	NA
161	Lead	<0.005	<0.100	NA	NA
153	Nickel	<0.011	0.055	NA	NA
167	Vanadium	<0.006	<0.006	NA	NA
168	Zinc	0.003	0.011	NA	NA
	Inorganics				
169	Total Cyanides	0.0595	3.30	NA	NA
172	Fluorides	<0.20	<0.20	NA	NA
171	Sulfides	89.0	<1.0*	NA	NA

a - Onsite Engineering Report for E.I. Dupont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3; 6-6, 6-8, and 6-14

NA - Not Analyzed

* - Less than detection limit -- caused by interference

TABLE 4-2 (continued) TREATMENT DATA FOR SAMPLE SET 2 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING

BDAT	CONSTITUENTS DETECTED	UNTREATED WASTE K103 (mg/l)	UNTREATED WASTE K104 (mg/l)	TREATED WASTE (mg/l)
	Volatile Organic Compounds			
4	Benzene	73	320	0.008
48	Trichloromonofluoromethane	<5	<20	<0.5
	Semivolatile Organic Compounds			
56	Aniline	33,000	<150	<3
101	2,4-Dinitrophenol	<7,500	<750	36
126	Nitrobenzene	<1,500	2,200	<3
127	4-Nitrophenol	<7,500	<750	<15
142	Phenol	<1,500	<150	<3
**	Benzoic Acid	<7,500	<750	25
	Metals			
155	Arsenic	<0.010	<0.100	NA
156	Barium	<0.001	0.0015	NA
159	Chromium	<0.007	0.097	NA
160	Copper	<0.006	<0.006	NA
161	Lead	<0.005	<0.100	NA
163	Nickel	<0.011	0.055	NA
167	Vanadium	<0.006	<0.006	NA
168	Zinc	0.003	0.011	NA
	Inorganics			
169	Total Cyanides	0.0595	3.30	3.87
170	Fluorides	<0.20	<0.20	NA
171	Sulfides	89.0	<1.0*	<1.0*

a - Onsite Engineering Report for E.I. Dupont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14

NA - Not Analyzed

* - Less than detection limit -- caused by interference

** - Not on BDAT list of constituents

TABLE 4-2 (continued) TREATMENT DATA FOR SAMPLE SET 2 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING AND ACTIVATED CARBON ADSORPTION

CAS#	CONSTITUENTS DETECTED	UNTREATED WASTE K103 (mg/l)	UNTREATED WASTE K104 (mg/l)	TREATED WASTE (mg/l)
	Volatile Organic Compounds			
4	Benzene	73	320	<0.005
43	Trichloromonofluoromethane	<5	<20	0.010
	Semivolatile Organic Compounds			
56	Aniline	33,000	<150	<0.030
131	2,4-Dinitrophenol	<7,500	<750	0.320
126	Nitrobenzene	<1,500	2,200	<0.030
142	Phenol	<1,500	<150	<0.030
	Metals			
155	Arsenic	<0.010	<0.100	<0.100
156	Barium	<0.001	0.0015	0.042
159	Chromium	<0.007	0.097	0.024
162	Copper	<0.006	<0.006	<0.006
161	Lead	<0.005	<0.100	<0.050
163	Nickel	<0.011	0.055	<0.011
167	Vanadium	<0.006	<0.006	0.012
168	Zinc	0.003	0.011	0.052
	Inorganics			
168	Total Cyanides	0.0595	3.30	0.597
171	Fluorides	<0.20	<0.20	0.420
171	Sulfides	89.0	<1.0*	<1.0*

a - Onsite Engineering Report for E. I. duPont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14.

* - Less than detection limit -- caused by interference

Continued

TABLE 4-2 (Continued) TREATMENT DATA FOR SAMPLE SET 2 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING AND ACTIVATED CARBON ADSORPTION

OPERATING PARAMETERS	Design Value	Operating Range
Aniline Liquid/Liquid Extractor :	Solvent - Nitrobenzene	
Feed Rate to the Extractor (lbs/hr)	7,000 - 25,000	15,900 - 16,000
Feed pH to the Extractor	9 - 10**	10.3
Feed Temperature to the Extractor (°C)	40.0**	22.0
Nitrobenzene Liquid/Liquid Extractor :	Solvent - Nitrobenzene	
Feed Rate to the Extractor (lbs/hr)	27,000 - 35,000	9,800 - 26,000*
Feed pH to the Extractor	Max. 2.4	0.2
Feed Temperature to the Extractor (°C)	25.0 - 65.0	43.0
Steam Stripper :		
Top Column Temperature (°C)	Min. 95.0	102.2 - 103.3
Pressure Drop Across the Column(inches of water)	Max. 90.0	42.00 - 58.00
Feed Rate to Steam Stripper(lbs/hr)	Min. 20,000, Max. 90,000	49,000 - 60,100
Activated Carbon Adsorption:		
Feed Rate to the System (lbs/hr)	Max. 65,300	63,000 - 76,000
Feed pH to the System	Min. 7.0	4.6*
Feed Temperature to the System (°C)	40.0**	28.0
Total Organic Carbon in treated waste (mg/l)	Max. 250 Instantaneous	73.5
Calculated Residence time (minutes)	Min. 85	73 - 88*

a - Onsite Engineering Report for E. I. duPont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14.

* - Not controlled. Normal operating value is given.

** - Values outside the design range are instantaneous maximum or minimum. Refer to strip charts in Appendix C.

TABLE 4-3 TREATMENT DATA FOR SAMPLE SET 3 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION

BDAT	CONSTITUENTS DETECTED	UNTREATED WASTE (mg/l) K103	UNTREATED WASTE (mg/l) K104	TREATED WASTE (mg/l) K103	TREATED WASTE (mg/l) K104
	Volatile Organic Compounds				
4	Benzene	65	70	3.6	34
48	Trichlorofluoromethane	<2.5	<1	<0.25	<5
	Semivolatile Organic Compounds				
56	Aniline	39,000	<150	<75	<150
101	2,4-Dinitrophenol	<15,000	<750	<374	<750
126	Nitrobenzene	<3,000	2,300	1,900	1,800
142	Phenol	<3,000	<150	<74	<150
	Metals				
155	Arsenic	<0.010	<0.010	NA	NA
156	Barium	<0.001	0.011	NA	NA
159	Chromium	<0.007	<0.007	NA	NA
160	Copper	<0.006	0.0075	NA	NA
161	Lead	<0.005	<0.005	NA	NA
163	Nickel	<0.011	<0.011	NA	NA
167	Vanadium	<0.006	<0.006	NA	NA
168	Zinc	0.0099	0.031	NA	NA
	Inorganics				
169	Total Cyanides	0.0411	5.70	NA	NA
170	Fluorides	<0.20	<0.20	NA	NA
171	Sulfides	74.0	<1.0*	NA	NA

a - Onsite Engineering Report for E.I. Dupont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14

NA - Not Analyzed

* - Less than detection limit -- caused by interference

TABLE 4-3 (continued) TREATMENT DATA FOR SAMPLE SET 3 - EPA COLLECTED DATA[B]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING

BOAT	CONSTITUENTS DETECTED	UNTREATED WASTE K103 (mg/l)	UNTREATED WASTE K104 (mg/l)	TREATED WASTE (mg/l)
	Volatile Organic Compounds			
4	Benzene	65	70	<0.005
48	Trichloromonofluoromethane	<2.5	<5	<0.005
	Semivolatile Organic Compounds			
56	Aniline	39,000	<150	<1.5
101	2,4-Dinitrophenol	<15,000	<750	47
126	Nitrobenzene	<3,000	2,300	<1.5
127	4-Nitrophenol	<15,000	<750	13
142	Phenol	<3,000	<150	<1.5
**	Benzoic Acid	<15,000	<750	7.9
	Metals			
155	Arsenic	<0.010	<0.010	NA
156	Barium	<0.001	0.011	NA
159	Chromium	<0.007	<0.007	NA
160	Copper	<0.006	0.0075	NA
161	Lead	<0.005	<0.005	NA
163	Nickel	<0.011	<0.011	NA
167	Vanadium	<0.006	<0.006	NA
168	Zinc	0.0099	0.031	NA
	Inorganics			
169	Total Cyanides	0.0411	5.70	2.36
170	Fluorides	<0.20	<0.20	NA
171	Sulfides	74.0	<1.0*	<1.0*

A - Onsite Engineering Report for E.I. Dupont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14

NA - Not Analyzed

* - Less than detection limit -- caused by interference

** - Not on BOAT list of constituents

TABLE 4-3 (continued) TREATMENT DATA FOR SAMPLE SET 3 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING AND ACTIVATED CARBON ADSORPTION

STAT	CONSTITUENTS DETECTED	UNTREATED WASTE K103 (mg/l)	UNTREATED WASTE K104 (mg/l)	TREATED WASTE (mg/l)
	Volatile Organic Compounds			
4	Benzene	65	70	0.018
48	Trichlorofluoromethane	<2.5	<5	<0.005
	Semivolatile Organic Compounds			
56	Aniline	39,000	<150	4.20
131	2,4-Dinitrophenol	<15,000	<750	<0.760
126	Nitrobenzene	<3,000	2,300	<0.150
42	Phenol	<3,000	<150	<0.150
	Metals			
55	Arsenic	<0.010	<0.010	<0.010
56	Barium	<0.001	0.011	0.068
59	Chromium	<0.007	<0.007	0.008
40	Copper	<0.006	0.0075	<0.006
51	Lead	<0.005	<0.005	<0.005
63	Nickel	<0.011	<0.011	<0.011
67	Vanadium	<0.006	<0.006	0.0091
68	Zinc	0.0099	0.031	0.016
	Inorganics			
69	Total Cyanides	0.0411	5.70	0.201
79	Fluorides	<0.20	<0.20	0.220
71	Sulfides	74.0	<1.0*	<1.0*

a - Onsite Engineering Report for E. I. duPont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14.

* - Less than detection limit -- caused by interference

Continued

TABLE 4-3 (Continued) TREATMENT DATA FOR SAMPLE SET 3 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING AND ACTIVATED CARBON ADSORPTION

OPERATING PARAMETERS	Design Value	Operating Range
Aniline Liquid/Liquid Extractor :	Solvent - Nitrobenzene	
Feed Rate to the Extractor (lbs/hr)	7,000 - 25,000	17,600 - 17,800
Feed pH to the Extractor	9 - 10**	10.1
Feed Temperature to the Extractor (°C)	40.0**	24.0
Nitrobenzene Liquid/Liquid Extractor :	Solvent - Nitrobenzene	
Feed Rate to the Extractor (lbs/hr)	27,000 - 35,000	24,100 - 33,000*
Feed pH to the Extractor	Max. 2.4	5.7
Feed Temperature to the Extractor (°C)	25.0 - 65.0	42.5
Steam Stripper :		
Top Column Temperature (°C)	Min. 95.0	102.6 - 103.0
Pressure Drop Across the Column(inches of water)	Max. 90.0	46.42 - 50.33
Feed Rate to Steam Stripper(lbs/hr)	Min. 20,000, Max. 90,000	60,200 - 60,400
Activated Carbon Adsorption:		
Feed Rate to the System (lbs/hr)	Max. 65,300	57,700 - 58,140
Feed pH to the System	Min. 7.0	3.1*
Feed Temperature to the System (°C)	40.0**	44.0
Total Organic Carbon in treated waste (mg/l)	Max. 250	10.8
Calculated Residence time (minutes)	Min. 85	96 - 97

a - Onsite Engineering Report for E. I. duPont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14.

** - Not controlled. Normal operating value is given.

* - Values outside the design range are instantaneous maximum or minimum. Refer to strip charts in Appendix G.

TABLE 4-4 TREATMENT DATA FOR SAMPLE SET 4 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION

BDAT	CONSTITUENTS DETECTED	UNTREATED WASTE K103 (mg/l)	UNTREATED WASTE K104 (mg/l)	TREATED WASTE K103 (mg/l)	TREATED WASTE K104 (mg/l)
	Volatile Organic Compounds				
4	Benzene	55	11	2.35	26
48	Trichlorofluoromethane	<2.5	<0.5	<0.25	<1
	Semivolatile Organic Compounds				
56	Aniline	39,000	<300	<74	<150
101	2,4-Dinitrophenol	<15,000	<1,500	<374	<750
126	Nitrobenzene	<3,000	2,900	2000	2500
142	Phenol	<3,000	<300	<74	<150
	Metals				
155	Arsenic	0.021	<0.010	NA	NA
156	Barium	<0.001	0.017	NA	NA
159	Chromium	<0.007	<0.007	NA	NA
160	Copper	<0.006	<0.006	NA	NA
161	Lead	<0.005	<0.005	NA	NA
163	Nickel	<0.011	<0.011	NA	NA
167	Vanadium	<0.006	<0.006	NA	NA
168	Zinc	0.018	0.064	NA	NA
	Inorganics				
169	Total Cyanides	<0.0100	3.06	NA	NA
170	Fluorides	<0.20	<0.20	NA	NA
171	Sulfides	62.0	<1.0*	NA	NA

a - Onsite Engineering Report for E.I. Dupont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14

NA - Not Analyzed

* - Less than detection limit -- caused by interference

TABLE 4-4 (continued) TREATMENT DATA FOR SAMPLE SET 4 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING

BDAT	CONSTITUENTS DETECTED	UNTREATED WASTE K103 (mg/l)	UNTREATED WASTE K104 (mg/l)	TREATED WASTE (mg/l)
	Volatile Organic Compounds			
4	Benzene	55	11	<0.005
48	Trichloromonofluoromethane	<2.5	<0.5	<0.005
	Semivolatile Organic Compounds			
56	Aniline	39,000	<300	<1.5
121	2,4-Dinitrophenol	<15,000	<1,500	52
126	Nitrobenzene	<3,000	2,900	<1.5
127	4-Nitrophenol	<15,000	<1,500	13
142	Phenol	<3,000	<300	<1.5
	Metals			
155	Arsenic	0.021	<0.010	NA
156	Barium	<0.001	0.017	NA
159	Chromium	<0.007	<0.007	NA
160	Copper	<0.006	<0.006	NA
161	Lead	<0.005	<0.005	NA
163	Nickel	<0.011	<0.011	NA
167	Vanadium	<0.006	<0.006	NA
168	Zinc	0.018	0.064	NA
	Inorganics			
169	Total Cyanides	<0.0100	3.06	2.08
170	Fluorides	<0.20	<0.20	NA
171	Sulfides	62.0	<1.0*	<1.0*

[a] - Onsite Engineering Report for E.I. Dupont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14

NA - Not Analyzed

* - Less than detection limit -- caused by interference

** - Not on BDAT list of constituents

TABLE 4-4 (continued) TREATMENT DATA FOR SAMPLE SET 4 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING AND ACTIVATED CARBON ADSORPTION

SOAT	CONSTITUENTS DETECTED	UNTREATED WASTE K103 (mg/l)	UNTREATED WASTE K104 (mg/l)	TREATED WASTE (mg/l)
	Volatile Organic Compounds			
4	Benzene	55	11	0.019
48	Trichlorofluoromethane	<2.5	<0.5	<0.005
	Semivolatile Organic Compounds			
56	Aniline	39,000	<300	<0.030
101	2,4-Dinitrophenol	<15,000	<1,500	0.260
126	Nitrobenzene	<3,000	2,900	<0.030
142	Phenol	<3,000	<300	<0.030
	Metals			
155	Arsenic	0.021	<0.010	<0.500
156	Barium	<0.001	0.017	0.076
159	Chromium	<0.007	<0.007	<0.007
160	Copper	<0.006	<0.006	<0.006
161	Lead	<0.005	<0.005	<0.005
163	Nickel	<0.011	<0.011	0.015
167	Vanadium	<0.006	<0.006	<0.006
168	Zinc	0.018	0.064	0.033
	Inorganics			
169	Total Cyanides	<0.0100	3.06	0.156
170	Fluorides	<0.20	<0.20	0.220
171	Sulfides	62.0	<1.0*	<1.0*

[a] - Onsite Engineering Report for E. I. duPont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14.

* - Less than detection limit -- caused by interference

Continued

TABLE 4-4 (Continued) TREATMENT DATA FOR SAMPLE SET 4 - EPA COLLECTED DATA[a]

LIQUID/LIQUID EXTRACTION FOLLOWED BY STEAM STRIPPING AND ACTIVATED CARBON ADSORPTION

OPERATING PARAMETERS	Design Value	Operating Range
Aniline Liquid/Liquid Extractor :	Solvent - Nitrobenzene	
Feed Rate to the Extractor (lbs/hr)	7,000 - 25,000	14,900 - 15,200
Feed pH to the Extractor	9 - 10**	10.0
Feed Temperature to the Extractor (°C)	40.0**	31.0
Nitrobenzene Liquid/Liquid Extractor :	Solvent - Nitrobenzene	
Feed Rate to the Extractor (lbs/hr)	27,000 - 35,000	12,800 - 35,000*
Feed pH to the Extractor	Max. 2.4	0.8
Feed Temperature to the Extractor (°C)	25.0 - 65.0	50.0
Steam Stripper :		
Top Column Temperature (°C)	Min. 95.0	102.9 - 103.0
Pressure Drop Across the Column(inches of water)	Max. 90.0	44.05 - 46.10
Feed Rate to Steam Stripper(lbs/hr)	Min. 20,000, Max. 90,000	60,300
Activated Carbon Adsorption:		
Feed Rate to the System (lbs/hr)	Max. 65,300	59,900 - 60,000
Feed pH to the System	Min. 7.0	4.0*
Feed Temperature to the System (°C)	40.0**	38.0
Total Organic Carbon in treated waste (mg/l)	Max. 250	10.0
Calculated Residence time (minutes)	Instantaneous Min. 85	90 - 93

a - Onsite Engineering Report for E. I. duPont de Nemours, Inc., Beaumont, Texas, Tables 4-1 through 4-3, 6-6, 6-8, and 6-14.

** - Not controlled. Normal operating value is given.

* - Values outside the design range are instantaneous maximum or minimum. Refer to strip charts in Appendix G.

TABLE 5-1 K103 and K104 Wastewater Data Showing Substantial Treatment*

DATA TYPE	Source	Benzene	Aniline	2,4-Dinitrophenol	Nitrobenzene	Phenol	Total Cyanides
Untreated K103	(1)	32 - 81	33,000 - 53,000	<7,500 - <15,000	1,500 - <3,000	<300 - <3,000	0.038 - 0.075
Untreated K104	(1)	4.5 - 320	<150 - <300	<750 - <1,500	2,200 - 3,900	<150 - <300	3.06 - 6.28
Accuracy-Corrected Treated	(2)	0.007 - 0.055	0.033 - 1.056	0.288 - 0.475	0.026	0.143 - 0.714	0.179 - 0.830

* - Range of data points given in mg/l. For individual sample points see Tables 4-1 thru 4-5.

1. Onsite Engineering Report for E.I. du Pont de Nemours, Inc., Beaumont, Texas, Tables 6-6, 6-8 and 6-14.

2. Calculations shown in Appendix D of this Background Document.

Table 7-1 Regulated Constituents and Calculated Treatment Standards for K103 and K104 Wastewaters

Constituent	Accuracy-Corrected Concentration (mg/l) Sample Set #1	Sample Set #2	Sample Set #4	Sample Set #5	Average Treated Waste Concentration (mg/l)	Variability Factor (VF)	Treatment Standard (mg/l) (Average X VF)
Volatiles:							
4. Benzene	0.055	0.007	0.025	0.015	0.026	5.654	0.15
Semivolatiles:							
56. Aniline	0.033	0.033	0.033	1.056	0.289	15.398	4.5
101. 2,4-Dinitrophenol*	0.475	0.400	0.325	0.288	0.372	1.648	0.61
126. Nitrobenzene	0.026	0.026	0.026	0.026	0.026	2.800	0.073
142. Phenol	0.143	0.143	0.143	0.714	0.286	4.864	1.4
Inorganics:							
169. Total Cyanides**	0.785	0.830	0.217	0.179	0.503	5.334	2.7

* - Percent recovery of 4-Nitrophenol was used in the calculation of the standard for 2,4-Dinitrophenol.

** - Total cyanides are regulated for K104 only.