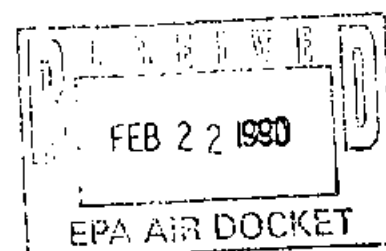


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FINAL



BEST DEMONSTRATED AVAILABLE TECHNOLOGY (BDAT)

BACKGROUND DOCUMENT FOR

K048, K049, K050, K051, K052

James R. Berlow, Chief
Treatment Technology Section

Jerry Vorbach
Project Manager

U.S. Environmental Protection Agency
Office of Solid Waste
401 M Street, S.W.
Washington, D.C. 20460

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Best Demonstrated Available Technology
(BDAT) Background Document for K048
K049, K050, K051, K052

(U.S.) Environmental Protection Agency
Washington, DC

AUG 88

U.S. Department of Commerce
National Technical Information Service



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Table 2-4

AVAILABLE CHARACTERIZATION DATA FOR K048

Source of Data:	Unfractionated waste concentration, (µg/m)							
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	Range
SOAL LIST ORGANICS								
Volatiles								
4. Benzene	<14	---	---	---	---	---	---	---
21. Dichlorodifluoromethane	<14-310	---	---	---	---	---	13-16	<14-16
228. Ethyl benzene	<14-120	---	---	---	---	---	---	<14-120
43. Toluene	22-120	---	---	---	---	---	47-46	<14-120
215-217. Xylene (total)	<14-120	---	---	---	---	---	130-150	27-150
Semivolatiles								
67. Benzo(a)pyrene	<20	0.004-1.75	---	---	---	---	---	---
70. Bis(2-ethylhexyl) phthalate	<20-50	---	---	---	---	---	---	0.004-1.75
80. Chrysene	<20-22	---	---	---	---	---	---	<20-50
98. Di-n-butylphthalate	67-180	---	---	---	---	---	---	---
109. Fluorene	31-32	---	---	---	---	---	<0.60-50	<0.60-50
121. Naphthalene	93-110	---	---	---	---	---	---	67-190
141. Phenanthrene	77-86	---	---	---	---	---	<0.60-50	<0.60-50
142. Phenol	<20	3.0-210	---	---	---	---	290-350	93-350
145. Pyrene	31-35	---	---	---	---	---	160-190	77-190
SOAL LIST METALS								
154. Antimony	<8-7	---	---	---	---	---	---	---
155. Arsenic	4.9-8.1	0.05-10.5	<3.0	---	---	---	4-45.0	4-4.7
156. Barium	50-87	---	172-349	---	---	---	2-93.8	0.05-10.5
157. Beryllium	<0.1	0.0012-0.25	---	---	---	---	43.0-47.0	4.7-50
158. Cadmium	0.4-0.7	---	<0.75	---	---	---	0.79-0.84	0.0012-0.04
159. Chromium (total)	810-960	28-260	1.057-3.435	270-560	0.04-0.11	2.5-10.94	180.0-190.0	<0.25-0.1
160. Copper	47-58	0.05-21.3	---	---	---	---	27.0-30.0	0.04-1.435
161. Lead	330-410	2.3-1,250	1.8-450	4.0-33	0.05-13.0	6.5-73	170-180	0.05-50
162. Mercury	0.11-0.16	0.07-0.89	1-2	---	---	---	---	0.05-1.250
U.S. EPA, Amaco Onsite Engineering Report, February 1990								
							<0.05-0.76	<0.05-0.89

(a) U.S. EPA, Amoco Onsite Engineering Report, February 29, 1988 (Reference 6).

(b) Jacobs Engineering Company, Assessment of Hazardous Waste Practices, 1976 (Reference 3).

(c) Delisting petition #386 (Reference 17).

(d) Delisting petition #469 (Reference 20).

(e) Delisting petition #421 (Reference 19).

(f) Delisting petition #390 (Reference 18).

(g) U.S. EPA, Amoco Onsite Engineering Report, July 15, 1988 (Reference 8).

--- Data are not available for this constituent.

Table 2-4 (Continued)

Table 2-4 (Continued)

AVAILABLE CHARACTERIZATION DATA FOR K048

Source of Data:	Untreated waste concentration, (ppm)						Range	
	(a)	(b)	(c)	(d)	(e)	(f)	(u)	
BDAT LIST METALS (Cont.)								
163. Nickel	13-16	0.025-15	---	---	---	---	8.9-11.0	0.025-16
164. Selenium	7.8-11	0.1-4.2	4-6	---	---	---	5.2-5.7	0.1-11
165. Silver	<0.9	0.0013-2.8	<0.3	4-6	---	---	---	0.0013-6
167. Vanadium	370-480	0.05-2.15	---	<0.3	---	---	220.0-230.0	0.05-480
168. Zinc	300-450	10-1825	---	---	---	---	260.0-280.0	10-1,825
BDAT LIST INORGANICS								
169. Cyanide	40.1-1.0	0.01-1.1	---	---	---	---	40.6-7.9	0.01-7.9
170. Fluoride	---	---	---	---	---	---	5.3-22.0	5.3-22.0
171. Sulfide	130-2800	---	---	---	---	---	700-1200	130-2,800
OTHER PARAMETERS								
Filterable solids (%)	6 ⁿ						0.2-74	
Oil and grease content (%)	12 ⁿ						9.4-12.0	
Water content (%)	8 ^h						67.67-72.67	

- (a) U.S. EPA, Amoco Onsite Engineering Report, February 29, 1988 (Reference 5).
 (n) Jacobs Engineering Company, Assessment of Hazardous Waste Practices, 1978 (Reference 3).
 (c) Deltating petition #306 (Reference 17).
 (d) Deltating petition #469 (Reference 20).
 (e) Deltating petition #431 (Reference 18).
 (f) Deltating petition #308 (Reference 18).
 (g) U.S. EPA, Amoco Onsite Engineering Report, July 15, 1988 (Reference 8).
 (h) Calculations in Appendix B.
 --- Data are not available for this constituent.

Table 2-5

AVAILABLE CHARACTERIZATION DATA FOR K049

Source of Data:	Untreated waste concentration, (ppm)					Range
	(a)	(b)	(c)	(d)	(e)	
BOAT LIST ORGANICS						
Volatiles						
4. Benzene	---	95	BDL-1600	---	---	BDL-1,600
8. Carbon disulfide	---	BDL	0.15-0.96	---	---	BDL-0.96
226. Ethyl benzene	---	120	---	---	---	120
43. Toluene	---	210	240-18,000	---	---	210-18,000
215-217. Xylene (total)	---	150	---	---	---	150
Semivolatiles						
57. Anthracene	---	<40	BDL-58	---	---	BDL-58
62. Benzo(a)pyrene	0.002-0.18	<40	---	---	---	0.002-<40
70. Bis(2-ethylhexyl)phthalate	---	<40	BDL-29	---	---	BDL-29
80. Chrysene	---	40	BDL-44	---	---	BDL-44
96. 2,4-Dimethylphenol	---	<40	BDL-3.3	---	---	BDL-3.3
121. Naphthalene	---	<40	160-680	---	---	<40-680
141. Phenanthrene	---	87	BDL-390	---	---	BDL-390
142. Phenol	5.7-127	<40	BDL-8.9	---	---	BDL-127
145. Pyrene	---	<40	33-110	---	---	33-110
BOAT LIST METALS						
154. Antimony	---	<3.2	BDL-19	---	---	BDL-19
155. Arsenic	7.4	3.9	3-30	---	<2.2-9.6	<2.2-30
156. Barium	-	115	87-370	---	28-54.2	28-370
157. Beryllium	0.0025	<0.1	BDL-0.29	---	0.35	BDL-0.35
158. Cadmium	0.19	<0.4	0.7-4.4	---	28.8	0.19-28.8
159. Chromium (total)	525	134	150-1400	476	28.9-512.5	28.9-1,400

(a) Jacobs Engineering Company, Assessment of Hazardous Waste Practices, 1976 (Reference 3).

(b) U.S. EPA, Conoco Characterization Report, February 22, 1988 (Reference 13).

(c) Deregulation petition #503 (Reference 14).

(d) API, Refinery Solid Waste Survey, 1983 (Reference 2).

(e) Deregulation petitions #481, #386, #530, #264, #425, and #469 (References 21, 17, 23, 24, 25, and 20).

BDL=The compound was not detected above the detection limit; the detection limit was not reported.

--- Data are not available for this constituent.

Source of Data:	Untreated waste concentration, (ppm)					Range
	(a)	(b)	(c)	(d)	(e)	
<u>UDAT LIST METALS (Continued)</u>						
221. Chromium (hexavalent)	---	<0.05	---	---	0.02-<1.9	0.02-<1.9
160. Copper	48	65.3	---	---	79.8	48-79.8
161. Lead	28.1	31.9	28-3900	302	21.95-2146	21.95-3,900
162. Mercury	0.59	0.6	BDL-32	---	0.15	BDL-32
163. Nickel	50	9.2	20-86	---	50.62	9.2-86
164. Selenium	1.0	<5.0	BDL-4.6	---	<0.44-4.8	BDL-5.0
165. Silver	0.4	<0.6	---	---	<0.38-<4.0	0.38-0.4
167. Vanadium	25	2.5	13-60	---	5.56	2.5-60
168. Zinc	250	142	---	---	72.8	72.8-250

BDAT LIST INORGANICS

169. Cyanide	0.000012-52.5	<0.5	---	---	---	0.000012-52.5
170. Fluoride	-	1.31	---	---	---	1.31
171. Sulfide	---	34.4	---	---	---	34.4

OTHER PARAMETERS

BTU content (Btu/lb)	150 ^f
Filterable solids (%)	10 ^g
Oil and grease content (%)	39 ^g
Water content (%)	50 ^g
pH (standard units)	7.4 ^f
TOX (%)	Negligible ^f

- (a) Jacobs Engineering Company, Assessment of Hazardous Waste Practices, 1976 (Reference 3).
 (b) U.S. EPA, Conoco Characterization Report, February 22, 1988 (Reference 13).
 (c) Delisting petition #503 (Reference 14).
 (d) API, Refinery Solid Waste Survey, 1983 (Reference 2).
 (e) Delisting petitions #481, #386, #530, #264, #426, and #469 (References 21, 17, 23, 24, 25, and 20).
 (f) Environ Corporation, Characterization of Listed Waste Streams (Reference 15).
 (g) Calculations in Appendix B.
 BDL=The compound was not detected above the detection limit; the detection limit was not reported.
 --- Data are not available for this constituent.

Table 2-7

AVAILABLE CHARACTERIZATION DATA FOR K051

Source of Data: (a) (b) (c) (d) (e) (f)

Unit: mg/kg concentration (ppm)

BOAT LIST ORGANICS					
4. Benzene	---	---	---	---	---
228. Ethyl benzene	40-52	---	---	---	---
43. Toluene	33-71	---	---	---	---
215. Xylene (total)	71-83	---	---	---	---
Semi-volatiles					
52. Acenaphthene	33	---	---	---	---
57. Anthracene	---	---	---	---	---
59. Benzo(a)anthracene	23-28	---	---	---	---
62. Benzo(a)pyrene	---	0.002-4.5	---	---	---
70. Bis(2-ethylhexyl)phthalate	26-30	---	---	---	---
80. Chrysene	45-51	---	---	---	---
98. Di-n-butylphthalate	43-230	---	---	---	---
109. Fluoranthene	33-37	---	---	---	---
121. Naphthalene	150-170	---	---	---	---
141. Phenanthrene	110-120	---	---	---	---
142. Phenol	420	3.0-156.7	---	---	---
145. Pyrene	82-74	---	---	---	---
BOAT LIST METALS					
154. Antimony	8-18	---	---	---	---
155. Arsenic	5.4-8.7	0.1-32	---	---	---
156. Barium	72-120	---	---	---	---
157. Beryllium	<0.1	0.0012-0.24	---	---	---
158. Cadmium	1.3-1.7	0.024-3.0	---	---	---
159. Chromium (total)	730-1160	0.1-6780	---	---	---
221. Chromium (hexavalent)	228	---	---	---	---
160. Copper	130-170	2.5-550	---	---	---
161. Lead	640-940	0.25-1290	---	---	---
162. Mercury	0.07-0.31	0.04-8.2	---	---	---
U.S. EPA, Amoco Gasline Engineering Report, February 28, 1988 (Reference 5).					
(b) Jacobs Engineering Company, Assessment of Hazardous Waste Practices, 1976 (Reference 3).					
(c) Delisting petition #481 (Reference 21).					
(d) Delisting petition #386 (Reference 17).					
(e) Delisting petition #205 (Reference 16).					
(f) Delisting petition #468 (Reference 20).					
--- Data are not available for this constituent.					
* Colorimetric interference may have occurred in analysis of this sample.					

Table 2-7 (Continued)

AVAILABLE CHARACTERIZATION DATA FOR K051

Source of Data:	Untreated waste concentration, (ppm)		
	(g)	(h)	Range
<u>FOAT LIST ORGANICS</u>			
<u>Volatiles</u>			
4. Benzene	---	74	74
226. Ethyl benzene	58	120	48-120
43. Toluene	170	450	33-450
215-			
217. Xylene (total)	290	720	71-720
<u>Semivolatiles</u>			
52. Acenaphthene	<10	---	<10-33
57. Anthracene	---	13	13
59. Benz(a)anthracene	<10	13	<10-28
62. Benz(c)pyrene	<10	7	0.002-<10
70. Bis(2-ethylhexyl)phthalate	<10	---	<10-30
80. Chrysene	14	23	14-51
98. Di-n-butylphthalate	<10	---	<10-230
109. Fluorene	11	---	11-37
121. Naphthalene	97	200	37-200
141. Phenanthrene	70	110	70-120
142. Phenol	---	<2	<2-156.7
145. Pyrene	24	27	24-74
<u>FOAT LIST METALS</u>			
154. Antimony	---	---	9-18
155. Arsenic	---	5.6	0.1-32
156. Barium	---	68	68-412
157. Beryllium	---	---	0.0012-0.24
158. Cadmium	---	<0.5	0.024-3.0
159. Chromium (total)	---	80	0.1-6,790
221. Chromium (hexavalent)	---	---	0.01-22
160. Copper	---	---	2.5-550
161. Lead	---	64	0.25-2,480
162. Mercury	---	4.4	0.04-6.2

(g) GE Systems Corporation, Company Literature, March 30, 1987 (Reference 30).

(h) The American Petroleum Institute, comments on land disposal restrictions, 1988 (Reference 26).

--- Data are not available for this constituent.

Table 2-7 (Continued)

AVAILABLE CHARACTERIZATION DATA FOR K051

Source of Data	Untreated waste concentration, (ppm)					
	(a)	(b)	(c)	(d)	(e)	(f)
<u>HEAVY METALS (Cont.)</u>						
163. Nickel	30-37	0.25-150.4	---	---	---	---
164. Selenium	0.5-1.8	0.005-7.8	---	---	2-12	---
165. Silver	1.4	0.05-3	---	---	<0.3	---
167. Vanadium	260-350	1-48.5	---	---	---	---
168. Zinc	670-420	25-6596	---	---	---	---
<u>HEAVY METALS INORGANICS</u>						
169. Cyanide	0.5-1.4	0.00006-51.4	---	---	---	---
171. Sulfide	2,800-4,800	---	---	---	---	---
<u>OTHER PARAMETERS</u>						
Filterable solids (%)	18 ¹					
Oil and grease content (%)	13 ¹					
Water content (%)	70 ¹					

- (a) U.S. EPA, Amoco Drilling Engineering Report, February 28, 1988 (Reference 6).
 (b) Jacobs Engineering Company, Assessment of Hazardous Waste Practices, 1978 (Reference 3).
 (c) Delisting petition #481 (Reference 21).
 (d) Delisting petition #386 (Reference 17).
 (e) Delisting petition #205 (Reference 16).
 (f) Delisting petition #469 (Reference 20).
 (1) Calculations in Appendix B.
 --- Data are not available for this constituent.

Table 2-7 (Continued)
AVAILABLE CHARACTERIZATION DATA FOR K051

Source of Data:	Untreated waste concentration, (ppm)		
	(g)	(h)	Range
<u>BOAT LIST METALS (Cont.)</u>			
163. Nickel	---	---	0.25-150.4
164. Selenium	<0.2	1.8	0.005-12
165. Silver	---	<0.3	0.05-3
167. Vanadium	---	---	1-350
168. Zinc	---	---	25-6,500
<u>BOAT LIST INORGANICS</u>			
169. Cyanide	<0.5	---	0.00005-51.4
171. Sulfide	120	---	120-4,800
<u>OTHER PARAMETERS</u>			
Filterable solids (%)	3.9		
Oil and grease content (%)	4.8		
Water content (%)	91.4		

(g) CF Systems Corporation, company literature, March 30, 1987 (Reference 30).

(h) The American Petroleum Institute, comments on land disposal restrictions, 1988 (Reference 26).

--- Data are not available for this constituent.

Table 2-8

AVAILABLE CHARACTERIZATION DATA FOR K052

Source of Data:		Untreated waste concentration, (ppm)				Range
		(a)	(b)	(c)	(d)	
<u>BDAT LIST ORGANICS</u>						
<u>Volatiles</u>						
4. Benzene	650					
226. Ethyl benzene	2,300					650
13. Toluene	6,400					2,300
215-						6,400
217. Xylene (total)	3,500					3,500
<u>Semivolatiles</u>						
62. Benz(o)pyrene	<1.8			0.02-0.4		0.02-<1.8
81. ortho-Cresol	13					13
82. para-Cresol	13					13
96. 2,4-Dimethylphenol	4.2					4.2
121. Naphthalene	13					13
141. Phenanthrene	1.4					1.4
142. Phenol	<1.8			2.1-250		<1.8-250
<u>BDAT LIST METALS</u>						
154. Antimony	111					111
155. Arsenic	242					242
156. Barium	8			63-525		63-525
157. Beryllium	<0.1					<0.1
158. Cadmium	0.82			0.0025		0.0025-0.82
159. Chromium (total)	48.8			4.5-8.1		4.5-8.1
160. Copper	146	1.0-504		9.0-13.7		9.0-13.7
161. Lead	99.4			110-172		110-172
		11.0-5,800		158-1,421	42-2,060	11-5,800

(a) U.S. EPA, Conoco Characterization Report, February 22, 1988 (Reference 13).

(b) API, Refinery Solid Waste Survey, 1983 (Reference 2).

(c) Jacobs Engineering Company, Assessment of Hazardous Waste Practices, 1976 (Reference 3).

(d) Delisting petition #386 (Reference 17).

--- Data are not available for this constituent.

Table 2-8 (Continued)
AVAILABLE CHARACTERIZATION DATA FOR K052

Source of Data:	Untreated waste concentration, (ppm)				Range
	(a)	(b)	(c)	(d)	
<u>BDAT LIST METALS (Cont.)</u>					
162. Mercury	2.4	---	0.19-0.94	---	0.19-2.4
163. Nickel	97.2	---	235-392	---	97.2-392
164. Selenium	<160	---	3.1-10.8	---	3.1-<100
165. Silver	<6.0	---	0.05-1.7	---	0.05-<6.0
167. Vanadium	<6.0	---	1.0-9.8	---	1.0-9.8
168. Zinc	17.1	---	1,183-17,000	---	17.1-17,000
<u>BDAT LIST INORGANICS</u>					
169. Cyanide	1.89	---	---	---	1.89
170. Fluoride	955	---	---	---	955
171. Sulfide	111	---	---	---	111
<u>OTHER PARAMETERS</u>					
Filterable solids (%)	68 ^e				
Oil and grease content (%)	13 ^e				
Water content (%)	18 ^e				

- (a) U.S. EPA, Conoco Characterization Report, February 22, 1988 (Reference 13).
 (b) API, Refinery Solid Waste Survey, 1983 (Reference 2).
 (c) Jacobs Engineering Company, Assessment of Hazardous Waste Practices, 1976 (Reference 3).
 (d) Dettling petition #386 (Reference 17).
 (e) Calculations in Appendix B.
 --- Data are not available for this constituent.

Table 2-9

AVAILABLE CHARACTERIZATION DATA FOR K048-K052 WASTE MIXTURES

Source of Data:	Untreated Waste Concentration (ppm)							
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
BDAT LIST ORGANICS								
Volatiles								
4. Benzene	86-190	---	2,100	530	9.8	600	80	60
226. Ethylbenzene	76-120	---	1,300	1,100	17	---	86	110
43. Toluene	230-470	---	6,300	1,500	68	6,600	340	360
215-217. Xylene (total)	420-570	---	5,900	4,000	106	8,860	430	690
Semivolatiles								
57. Anthracene	---	---	22	29	0.069	<46	13.3	9.4
59. Benz(a)anthracene	<20-21	---	17	18	0.14	---	3.4	20
62. Benzo(a)pyrene	<19-<21	---	9.4	11	0.071	---	1.8	9.9
63. Benzo(b)fluoranthene	---	---	6.3	8	0.041	---	1.2	6.2
70. Bis(2-ethylhexyl)phthalate	<19-<21	<3-49	4.2	<2	<0.009	---	1.1	<1
80. Chrysene	<20-33	4.7-<7	19	30	0.24	---	9.4	26
81. o-Cresol	---	---	<2	<2	0.33	<19	0.4	<1
82. p-Cresol	---	---	<2	<2	0.42	---	1.3	<1
65. Dibenz(a,h)anthracene	---	---	3.8	<2	<0.009	---	1.1	<1
87. 1,2-Dichlorobenzene	<19-<21	<3-3.3	---	---	---	---	---	---
96. 2,4-Dimethylphenol	---	<3-<7	<10	<2	<0.009	---	0.7	<1
108. Fluoranthene	<19-<21	<3-3.7	9.2	10	0.055	---	<1	5.9
109. Fluorene	---	3.4-<7	---	---	---	---	---	---
121. Naphthalene	56-140	22-30	180	490	1.1	560	82	90
141. Phenanthrene	64-140	13-17	240	210	0.53	740	109	47
142. Phenol	---	<3-<7	<2	<2	1.7	<1,900	0.9	<1
145. Pyrene	<20-36	<3-3.6	59	95	0.25	---	26	22

--- Data are not available for this constituent.

(a) K048-K052 mixture of refinery wastes: BP America, Inc. comments on land disposal restrictions, 1988 (Reference 36).

(b) Mixture of K049 and K051: Resources Conservation Company, comments on land disposal restrictions, 1988 (Reference 37).

(c) Unspecified mixture of refinery wastes: Plant C, API, comments on land disposal restriction, 1987 (Reference 26).

(d) Mixture of K048, K049, and K051: Plant D, API, comments on land disposal restrictions, 1987 (Reference 26).

(e) Mixture of K051 and K052: Plant E, API, comments on land disposal restrictions, 1987 (Reference 26).

(f) Mixture of K049 and K051: Plant F, API, comments on land disposal restrictions, 1987 (Reference 26).

(g) Unspecified mixture of refinery wastes: Plant H, API, comments on land disposal restrictions, 1987 (Reference 26).

(h) Mixture of K051 and K052: Plant H, API, comments on land disposal restrictions, 1987 (Reference 26).

Table 2-9 (Continued)

WASTE MIXTURES

Table 2-9 (continued)

AVAILABLE CHARACTERIZATION DATA FOR K048-K052 WASTE MIXTURES

Source of Data:		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
PCBs									
DOAT LIST ORGANICS									
203. Aroclor 1242	---	1.3-8.7	---	---	---	---	---	---	---
206. Aroclor 1260	---	0.55-3.5	---	---	---	---	---	---	---
DOAT LIST METALS									
155. Arsenic	---	---	0.2	1.2	0.8	2.0	1.0	142	1
156. Barium	---	---	120	21	54	115	42	1	142
158. Cadmium	---	---	<0.5	<0.5	<0.5	---	---	---	---
159. Chromium (total)	---	---	0.07-0.08	---	---	---	---	---	---
161. Lead	---	---	4.2-5.1	30	48	27	40	126	126
162. Mercury	---	---	<0.001	0.09	0.13	---	0.2	2.9	---
163. Manganese	---	---	---	---	---	---	---	---	---
167. Vanadium	---	---	---	---	---	---	---	---	---
168. Zinc	---	---	---	---	---	---	---	---	---
GENERAL CONSTITUENTS									
Oil	---	1.1-27.7	---	---	---	---	---	---	---
Solids	---	54.5-90.5	---	---	---	---	---	---	---
Water	---	1.1-8.4	---	---	---	---	---	---	---

--- Data are not available for this constituent.

(a) K048-K052 mixture of refinery wastes; BP America, Inc. comments on land disposal restrictions, 1988 (Reference 26).

(b) Mixture of K048 and K051; Resource Conservation Company, comments on land disposal restrictions, 1988 (Reference 27).

(c) Unspecified mixture of refinery wastes; Plant C, API, comments on land disposal restrictions, 1987 (Reference 26).

(d) Mixture of K048, K049, and K051; Plant D, API, comments on land disposal restrictions, 1987 (Reference 26).

(e) Mixture of K051 and K052; Plant E, API, comments on land disposal restrictions, 1987 (Reference 26).

(f) Mixture of K048 and K051; Plant F, API, comments on land disposal restrictions, 1987 (Reference 26).

(g) Unspecified mixture of refinery wastes; Plant H, API, comments on land disposal restrictions, 1987 (Reference 26).

(h) Mixture of K051 and K052; Plant H, API, comments on land disposal restrictions, 1987 (Reference 26).

Table 4-2

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A-FLUIDIZED BED INCINERATION

Sample Set #1

Detected BDAT List Organic Constituents	Untreated Waste		Treated Waste
	K048 ^a Concentration mg/kg (ppm)	K051 Concentration mg/kg (ppm)	Fluidized Bed Incinerator Ash Concentration mg/kg (ppm)
VOLATILES			
1. Benzene	<14	<14	<2
21. Dichlorodifluoromethane	310	<14	<2
156. Ethyl benzene	46	48	<2
18. Methylene chloride	<70	<70	<10
43. Toluene	120	50	3
47. Trichloroethene	<14	<14	<2
115-217. Xylene (total)	120	80	<2
SEMI-VOLATILES			
52. Acenaphthene	<20	33	<0.2
59. Benz(a)anthracene	<20	29	<0.2
70. Bis(2-ethylhexyl)phthalate	<20	28	<1.0
80. Chrysene	22	46	<0.2
98. Di-n-butyl phthalate	67	150	<1.0
109. Fluorene	31	33	<0.2
121. Naphthalene	100	160	<0.2
141. Phenanthrene	85	120	<0.2
145. Pyrene	35	66	<0.2

^aK048 is a dewatered mixture of DAF float (K048) and waste biosludge.

Table 4-2 (Continued)

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A - FLUIDIZED BED INCINERATION

Sample Set #1 (Continued)

Detected BDAT List Metal and Inorganic Constituents	Untreated Waste		Treated Waste Fluidized Bed Incinerator Ash	
	K048* Concentration mg/kg (ppm)	K051 Concentration mg/kg (ppm)	Concentration mg/kg (ppm)	TCLP mg/L (ppm)
154. Antimony	<6	9	16	0.06
155. Arsenic	6.1	8.2	14	0.016
156. Barium	63	120	130	0.18
157. Beryllium	<0.1	<0.1	<0.1	<0.001
158. Cadmium	0.6	1.6	2.4	<0.003
221. Chromium (hexavalent)	<0.05	220	21	NA
159. Chromium (total)	890	730	1400	2.2
160. Copper	52	150	190	0.02
161. Lead	400	940	940	<0.05
162. Mercury	<0.02	0.19	<0.02	0.0003
163. Nickel	13	36	60	<0.02
164. Selenium	10	1.6	<0.3	0.033
165. Silver	<0.9	<0.9	<4	<0.009
167. Vanadium	430	260	690	2.8
168. Zinc	420	820	1000	0.079
INORGANICS				
169. Total cyanide	0.7	0.8	<0.1	
171. Sulfide	130	2900	<50	

NA = Not Analyzed

*K048 is a dewatered mixture of DAF float (K048) and waste biosludge.

@Colorimetric interference may have occurred in analysis of this sample.

Table 4-2 (Continued)

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A-FLUIDIZED BED INCINERATION

Sample Set #1 (Continued)

<u>Design and Operating Parameters</u>	<u>Nominal Operating Range</u>	<u>Operating Range During Sampling Episode</u>
Bed Temperature (F)*	1200-1300 (1400 max.)	1213-1240
Freeboard Temperature (F)*	1250-1350 (1450 max.)	1240-1253
API Separator Sludge Feed Rate (gpm)	0-24	22.3
Undewatered DAF Float Mixture Feed Rate (gpm)	30-90	43
Constriction Plate Pressure Differential (In. H ₂ O)*	15-20	10.7-18.7
Fluidized Bed Pressure Differential (In. H ₂ O)*	60-100	90.4-102.4
O ₂ (% Volume)	NA	8.2-16.2
CO (ppm-Volume)	35-800	50-135
CO ₂ (% Volume)	NA	2.2-9.0

*Strip charts for this parameter are included in Appendix E.

NA: Not applicable

Table 4-3
TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A - FLUIDIZED BED INCINERATION

Sample Set #2

Detected BDAT List Organic Constituents	Untreated Waste		Treated Waste
	K048* Concentration mg/kg (ppm)	K051 Concentration mg/kg (ppm)	Fluidized Bed Incinerator Ash Concentration mg/kg (ppm)
VOLATILES			
4. Benzene	<14	<14	<2
21. Dichlorodifluoromethane	260	<14	<2
226. Ethyl benzene	120	46	<2
38. Methylene chloride	<70	<70	<10
43. Toluene	22	44	<2
47. Trichloroethene	<14	<14	<2
215-217. Xylene (total)	110	71	<2
SEMIVOLATILES			
52. Acenaphthene	<20	<20	<0.2
59. Benz(a)anthracene	<20	25	<0.2
70. Bis(2-ethylhexyl)phthalate	<20	<20	<1.0
80. Chrysene	<20	47	<0.2
98. Di-n-butyl phthalate	74	73	<1.0
109. Fluorene	31	37	<0.2
121. Naphthalene	110	160	<0.2
141. Phenanthrene	79	120	<0.2
145. Pyrene	31	67	<0.2

*K048 is a dewatered mixture of DAF float (K048) and waste biosludge.

Table 4-3 (Continued)

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A - FLUIDIZED BED INCINERATION

Sample Set #2 (Continued)

Organic Constituents	Untreated Waste		Treated Waste	
	K048* Concentration mg/kg (ppm)	K051 Concentration mg/kg (ppm)	Fluidized Bed Incinerator Ash Concentration mg/kg (ppm)	TCLP mg/L (ppm)
Antimony	7	<6	13	0.06
Arsenic	5.4	6.7	19	0.008
Barium	67	73	160	0.24
Beryllium	<0.1	<0.1	<0.1	<0.001
Cadmium	0.7	1.3	3	<0.003
Chromium (hexavalent)	<0.05	<0.05	24	NA
Chromium (total)	940	860	1500	2.6
Copper	55	150	240	0.02
Lead	390	670	1100	<0.05
Mercury	0.11	0.23	<0.02	<0.0002
Nickel	14	30	74	<0.02
Selenium	9.9	1.1	<0.3	<0.02
Silver	<0.9	<0.9	<4.0	<0.009
Vanadium	450	290	730	2.5
Zinc	450	580	1100	0.086
CYANIDES				
Total cyanide	<0.1	0.5	0.4	
Sulfide	200	3600	<50	

Not analyzed

K048 is a dewatered mixture of DAF float (K048) and waste biosludge.

Table 4-3 (Continued)

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A - FLUIDIZED BED INCINERATION

Sample Set #2 (Continued)

<u>Design and Operating Parameters</u>	<u>Nominal Operating Range</u>	<u>Operating Range During Sampling Episode</u>
Bed Temperature (F)+	1200-1300 (1400 max.)	1227-1323
Freeboard Temperature (F)+	1250-1350 (1450 max.)	1253-1293
API Separator Sludge Feed Rate (gpm)	0-24	22.3
Undewatered DAF Float Mixture Feed Rate (gpm)	30-90	53
Constriction Plate Pressure Differential (In. H ₂ O)+	15-20	8.7-18.0
Fluidized Bed Pressure Differential (In. H ₂ O)+	60-100	91.2-104.0
O ₂ (% Volume)	NA	9.2-16.0
CO (ppm-Volume)	35-800	80-355
CO ₂ (% Volume)	NA	2.3-8.1

+Strip charts for this parameter are included in Appendix E.

NA=Not applicable

Table 4-4

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A - FLUIDIZED BED INCINERATION

Sample Set #3

Detected BDAT List Organic Constituents	Untreated Waste		Treated Waste
	K048* Concentration mg/kg (ppm)	K051 Concentration mg/kg (ppm)	Fluidized Bed Incinerator Ash Concentration mg/kg (ppm)
VOLATILES			
4. Benzene	<14	<14	<2
21. Dichlorodifluoromethane	<14	<14	<2
26. Ethyl benzene	33	52	<2
58. Methylene chloride	<70	<70	<10
53. Toluene	59	42	<2
47. Trichloroethene	<14	<14	<2
25-217. Xylene (total)	100	73	<2
SEMI-VOLATILES			
52. Acenaphthene	<20	<20	<0.2
59. Benz(a)anthracene	<20	22	<0.2
70. Bis(2-ethylhexyl) phthalate	<20	30	<1.0
80. Chrysene	21	45	<0.2
98. Di-n-butyl phthalate	160	200	<1.0
109. Fluorene	32	35	<0.2
121. Naphthalene	110	150	<0.2
141. Phenanthrene	84	110	<0.2
145. Pyrene	33	62	<0.2

*K048 is a dewatered mixture of DAF float (K048) and waste biosludge.

Table 4-4 (Continued)

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A - FLUIDIZED BED INCINERATION

Sample Set #3 (Continued)

Detected BDAT List Metal and Inorganic Constituents	Untreated Waste		Treated Waste	
	K048*	K051	Fluidized Bed Incinerator Ash	
	Concentration mg/kg (ppm)	Concentration mg/kg (ppm)	Concentration mg/kg (ppm)	TCLP mg/L (ppm)
METALS				
154. Antimony	<6	18	13	0.09
155. Arsenic	5.7	9.7	13	0.022
156. Barium	68	100	140	0.17
157. Beryllium	<0.1	<0.1	0.5	<0.001
158. Cadmium	0.4	1.5	2	<0.003
221. Chromium (hexavalent)	<0.05	<0.05	23	NA
159. Chromium (total)	960	900	1300	2.1
160. Copper	56	160	200	0.02
161. Lead	410	790	1100	<0.05
162. Mercury	0.12	0.28	<0.02	<0.0002
163. Nickel	16	35	51	<0.02
164. Selenium	7.5	1.2	<0.3	0.085
165. Silver	<0.9	<0.9	<4	<0.009
167. Vanadium	460	300	690	3.1
168. Zinc	450	670	1000	0.087
INORGANICS				
169. Total cyanide	<0.1	<0.1	<0.1	
171. Sulfide	2300	3200	<50	

NA = Not Analyzed

* K048 is a dewatered mixture of DAF float (K048) and waste biosludge.

Table 4-4 (Continued)

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A - FLUIDIZED BED INCINERATION

Sample Set #3 (Continued)

<u>Design and Operating Parameters</u>	<u>Nominal Operating Range</u>	<u>Operating Range During Sampling Episode</u>
Bed Temperature (F)+	1200-1300 (1400 max.)	1227-1287
Freeboard Temperature (F)+	1250-1350 (1450 max.)	1253-1287
API Separator Sludge Feed Rate (gpm)	0-24	22.3-22.4
Dewatered DAF Float Mixture Feed Rate (gpm)	30-90	50
Constriction Plate Pressure Differential (In. H ₂ O)+	15-20	9.3-18.7
Fluidized Bed Pressure Differential (In. H ₂ O)+	60-100	91.2-104.0
O ₂ (% Volume)	NA	9.5-16.8
CO (ppm-Volume)	35-800	45-140
CO ₂ (% Volume)	NA	2.2-8.6

+Strip charts for this parameter are included in Appendix E.

NA: Not analyzed

Table 4-5

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A-FLUIDIZED BED INCINERATION

Sample Set #4

Detected SDAT List Organic Constituents	Untreated Waste		Treated Waste
	K048*	K051	Fluidized Bed Incinerator Ash
	Concentration	Concentration	Concentration
	mg/kg	mg/kg	mg/kg
	(ppm)	(ppm)	(ppm)
VOLATILES			
4. Benzene	<14	<14	<2
21. Dichlorodifluoromethane	<14	<14	<2
226. Ethyl benzene	<14	50	<2
38. Methylene chloride	<70	<70	<10
43. Toluene	28	33	<2
47. Trichloroethene	<14	<14	<2
215-217. Xylene (total)	79	72	5.8
SEMIVOLATILES			
52. Acenaphthene	<20	<20	<0.2
59. Benz(a)anthracene	<20	23	<0.2
70. Bis(2-ethylhexyl)phthalate	59	26	<1.0
80. Chrysene	<20	48	<0.2
98. Di-n-butyl phthalate	190	170	<1.0
109. Fluorene	31	35	<0.2
121. Naphthalene	93	150	<0.2
141. Phenanthrene	77	120	<0.2
145. Pyrene	31	74	<0.2

*K048 is a dewatered mixture of DAF float (K048) and waste biosludge.

Table 4-5 (Continued)

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A - FLUIDIZED BED INCINERATION

Sample Set #4 (Continued)

Selected BDAT List Metal and Inorganic Constituents	Untreated Waste		Treated Waste Fluidized Bed Incinerator Ash	
	K048 ^a Concentration mg/kg (ppm)	K051 Concentration mg/kg (ppm)	Concentration mg/kg (ppm)	TCLP mg/L (ppm)
Metals				
34. Antimony	<6	15	17	0.06
35. Arsenic	4.9	7.5	14	0.015
36. Barium	61	92	180	0.25
37. Beryllium	<0.1	<0.1	0.7	<0.001
38. Cadmium	<0.3	1.4	2	<0.003
39. Chromium (hexavalent)	<0.05	<0.05	24	NA
39. Chromium (total)	840	960	1600	2.3
40. Copper	49	140	240	0.02
41. Lead	340	590	1200	<0.05
42. Mercury	0.13	0.07	<0.02	0.0003
43. Nickel	14	37	80	<0.02
44. Selenium	8.7	0.9	<0.3	0.11
45. Silver	<0.9	<0.9	<4	<0.009
47. Vanadium	390	320	790	2.7
48. Zinc	400	650	1100	0.086
ORGANICS				
49. Total cyanide	1	1.4	0.5	
50. Sulfide	2500	4800	<50	

NA: Not Analyzed

^a (DAF) is a dewatered mixture of DAF float (K048) and waste biosludge.

Table 4-5 (Continued)

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048 AND K051
PLANT A - FLUIDIZED BED INCINERATION

Sample Set #4 (Continued)

<u>Design and Operating Parameters</u>	<u>Nominal Operating Range</u>	<u>Operating Range During Sampling Episode</u>
Bed Temperature (F)+	1200-1300 (1400 max.)	1200-1260
Freeboard Temperature (F)+	1250-1350 (1450 max.)	1253-1273
API Separator Sludge Feed Rate (gpm)	0-24	22.3-22.4
Undewatered DAF Float Mixture Feed Rate (gpm)	30-90	61
Constriction Plate Pressure Differential (In. H ₂ O)+	15-20	8.7-18.3
Fluidized Bed Pressure Differential (In. H ₂ O)+	60-100	91.2-105.6
O ₂ (% Volume)	NA	10.5-17.0
CO (ppm-Volume)	35-800	40-340
CO ₂ (% Volume)	NA	2.8-7.9

+Strip charts for this parameter are included in Appendix E.

NA=Not applicable

Table 4-8

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048
PLANT A - FLUIDIZED BED INCINERATOR SCRUBBER WATER

Sample Set #1

Detected BDAT List Organic Constituents	Untreated K048*	Scrubber Water
	Concentration mg/kg (ppm)	Concentration mg/L (ppm)
VOLATILES		
4. Benzene	14	<0.0041
226. Ethylbenzene	46	<0.0040
43. Toluene	130	<0.0040
215- 217. Xylene (total)	170	<0.0040
SEMIVOLATILES		
80. Chrysene	46	<0.010
109. Fluorene	<0.66	<0.010
121. Naphthalene	321	<0.010
141. Phenanthrene	166	<0.010
145. Pyrene	79	<0.010
Detected BDAT List Metal Constituents		
154. Antimony	5.0	<0.034
155. Arsenic	3.9	0.32
156. Barium	47.0	1.6
157. Beryllium	0.84	0.004
158. Cadmium	<0.4	0.009
159. Chromium (total)	190.0	5.9
221. Chromium (hexavalent)	---	1.3
160. Copper	30.0	1.3
161. Lead	180	9.4
162. Mercury	<0.05	0.0034
163. Nickel	11.0	0.29
164. Selenium	5.5	0.9
167. Vanadium	230.0	7.7
168. Zinc	280.0	9.0

---Hexavalent chromium could not be analyzed due to colorimetric interferences.

*K048 is a dewatered mixture of DAF float (K048) and waste biosludge.

Table 4-8 (Continued)

TREATMENT PERFORMANCE DATA COLLECTED BY EPA FOR K048
PLANT A - FLUIDIZED BED INCINERATOR SCRUBBER WATER

Sample Set #1

<u>Detected BDAT List</u> <u>Inorganic Constituents</u>	<u>Untreated</u> <u>K048*</u>	<u>Scrubber</u> <u>Water</u>
	<u>Concentration</u> mg/kg (ppm)	<u>Concentration</u> mg/L (ppm)
169. Cyanide	<0.6	---
170. Fluoride	5.3	0.32
171. Sulfide	860	2.0
<u>Physical Parameters</u>		
Total Solids	120,000	7,700

---Data were not available for this constituent.

*K048 is a dewatered mixture of DAF float (K048) and waste biosludge.

Table 4-16

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT G - SOLVENT EXTRACTION

Detected BDAT List Organic Constituents	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/L (ppm)
VOLATILES			
222. Acetone	NA	2.5 3.8	
4. Benzene	NA	0.28 0.49	
226. Ethylbenzene	NA	5.0 6.0	
43. Toluene	NA	9.0 9.2	
47. Trichloroethene	NA	0.32 <2.4	
215- Xylene (total)	NA	35	
217.		35	
SEMIVOLATILES			
70. Bis(2-ethylhexyl)- phthalate	<3 49 <4 <7	6.6 5.2 5.5	
80. Chrysene	4.7 4.5 5.6 <7	<19 <17 <20	

*Unspecified mixture of refinery wastes.

NA = Not analyzed.

Table 4-16 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT C - SOLVENT EXTRACTION

<u>Detected BDAT List Organic Constituents</u>	<u>Untreated Waste</u>	<u>Treated Waste</u>	
	<u>K048-K052*</u> <u>Concentration</u> <u>mg/kg (ppm)</u>	<u>Solids Concentration</u> <u>mg/kg (ppm)</u>	<u>TCLP</u> <u>mg/L (ppm)</u>
VOLATILES (Cont.)			
87. o-Dichlorobenzene	3.3	<19	
	<3	<17	
	<3	<20	
	<3		
108. Fluoranthene	3.7	<19	
	<3	<17	
	<3	<20	
	<3		
109. Fluorene	3.4	<19	
	4.2	<17	
	<4	20	
	<7		
121. Naphthalene	22	2.3	
	28	<17	
	30	<20	
	22		
141. Phenanthrene	13	2.5	
	13	2.1	
	16	2.3	
	17		
142. Phenol	4.5	<19	
	<3	<17	
	<4	<20	
	<7		

*Unspecified mixture of refinery wastes.

NA = Not analyzed.

Table 4-16 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT C - SOLVENT EXTRACTION

<u>Detected BDAT List Organic Constituents</u>	<u>Untreated Waste</u>	<u>Treated Waste</u>	
	<u>K048-K052*</u> <u>Concentration</u> <u>mg/kg (ppm)</u>	<u>Solids Concentration</u> <u>mg/kg (ppm)</u>	<u>TCLP</u> <u>mg/L (ppm)</u>
VOLATILES (Cont.)			
145. Pyrene	<3	<19	
	<3	<17	
	3.6	<20	
	<3		
<u>Detected BDAT List Metal Constituents</u>			
156. Barium	210	554	<0.03
	190	585	<0.03
	250	516	<0.05
	260	549	<0.05
	320	105	<0.05
	160	140	<0.05
	270	321	<0.05
	370	190	<0.05
	310	578	<0.05
	220	416	
	360	583	
	200		
	180		
	200		
	160		
	230		
	180		

*Unspecified mixture of refinery wastes.

NA = Not analyzed.

Table 4-16 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT C - SOLVENT EXTRACTION

Detected BDAT List Metal Constituents (Cont.)	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/L (ppm)
158. Cadmium	0.7 <0.5	NA	NA
159. Chromium (total)	6.2	19	<0.05
	5	19	<0.05
	6	19	<0.1
	6	18	<0.1
	7	20	<0.1
	5	18	<0.1
	7	21	<0.1
	7	22	<0.1
	7	23	<0.1
	5	24	
	7	26	
	7		
	6		
	7		
	6		
	6		
	5		
160. Copper	23	103	<0.03
	23	101	<0.03
	24	112	<0.06
	24	105	<0.06
	24	115	<0.06
	21	100	<0.06
	25	134	<0.06
	30	114	<0.06
	27	112	<0.06
	21	136	
	27	37	
	29		
	26		
	24		
	24		
	23		
	24		

*Unspecified mixture of refinery wastes.

NA = Not analyzed.

Table 4-16 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT G - SOLVENT EXTRACTION

Detected BDAT List Metal Constituents (Cont.)	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/L (ppm)
161. Lead	2,700	18,800	5.9
	2,700	18,800	5.2
	4,000	21,300	11.0
	3,100	20,000	4.2
	3,600	24,700	4.0
	2,200	21,300	4.0
	3,400	15,100	4.9
	4,300	23,200	12.0
	3,700	31,100	
	2,800	27,300	
	4,100	29,300	
	3,300		
	3,200		
	2,900		
	2,700		
	2,900		
	3,200		
162. Mercury	<0.05	<0.001	0.007
			0.002
			<0.001
164. Selenium	<4	<0.004 <8	0.008
			0.020
			<0.04
			<0.008
			<0.04
			<0.04
			<0.04
			<0.04

*Unspecified mixture of refinery wastes.

NA : Not analyzed.

Table 4-16 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR 1048-K052 MIXTURE
PLANT G - SOLVENT EXTRACTION

Detected BDAT List Metal Constituents (Cont.)	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/L (ppm)
167. Vanadium	2 <1	NA	NA
168. Zinc	310	990	22
	280	862	21
	300	902	22
	300	839	22
	320	1,030	25
	270	930	25
	310	1,210	26
	330	972	30
	310	1,040	33
	280	1,240	
	350	1,260	
	330		
	320		
	310		
	300		
	280		
	300		

*Unspecified mixture of refinery wastes.

NA = Not analyzed.

Table 4-16 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT G - SOLVENT EXTRACTION

Detected BDAT List Constituents (Cont.)	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/L (ppm)
PCBs:			
203. Aroclor 1242	5.1	0.37	
	2.7	<0.00086	
	4.8	<0.00083	
	2.1		
	4.1		
	3.9		
	1.8		
	3.2		
	3.7		
	1.3		
	4.6		
	4.9		
	3.8		
	3.4		
	3.4		
	8.7		
	8.4		
206. Aroclor 1260	3.5	<0.04	
	1.9	<0.005	
	2.9	<0.0017	
	1.4		
	1.9		
	1.8		
	1.5		
	1.8		
	1.8		
	0.55		
	2.3		
	2.3		
	2.0		
	1.4		
	2.2		
	2.6		
	3.0		

*Unspecified mixture of refinery wastes.

Table 4-18

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT M - SOLVENT EXTRACTION (Three-Cycle Process)

<u>Detected BDAT List Organic Constituents</u>	<u>Untreated Waste</u>	<u>Treated Waste</u>	
	<u>K048-K052*</u> <u>Concentration</u> <u>mg/kg (ppm)</u>	<u>Solids Concentration</u> <u>mg/kg (ppm)</u>	<u>TCLP</u> <u>mg/L (ppm)</u>
VOLATILES			
4. Benzene	130	<2	
	120	<2	
	86	<2	
	150	<5	
	190	<2	
	180	<6	
226. Ethylbenzene	100	<10	
	97	6.2	
	76	<5.0	
	100	<25	
	120	<5.0	
	110	<30	
43. Toluene	310	<2	
	280	<2	
	230	<2	
	360	<5	
	470	<2	
	400	<6	
215- Xylene (total)	500	246	
217.	490	223	
	420	237	
	540	30	
	570	118.8	
	550	607	

*Unspecified mixture of refinery wastes.

Table 4-18 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT M - SOLVENT EXTRACTION (Three-Cycle Process)

Treated BDAT List Organic Constituents	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCAP mg/L (ppm)
SEMI-VOLATILES			
H. Anthracene	<21	<2.0	
	<20	<2.0	
	<20	<5.0	
	<20	<2.0	
	<19	<2.0	
	<20	<2.0	
		<2.0	
H. Benz(a)anthracene	<21	1.20	
	<20	0.700	
	<20	0.71	
	<20	<0.70	
	21	<0.70	
	<20	1.1	
		0.92	
H. Benz(a)pyrene		0.89	
	<21	0.750	
	<20	<0.60	
	<20	<0.60	
	<20	<0.60	
	<19	<0.60	
	<20	0.75	
		0.66	
		0.71	

Unspecified mixture of refinery wastes.

Table 4-18 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT M - SOLVENT EXTRACTION (Three-Cycle Process)

Detected BDAT List Organic Constituents	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/L (ppm)
SEMIVOLATILES (Cont.)			
70. Bis(2-ethylhexyl)- phthalate	<21	<0.80	
	<20	4.90	
	<20	<0.8	
	<20	<0.8	
	<19	<0.8	
	<20	<0.8	
		<0.8	
		30	
80. Chrysene	23	1.70	
	24	1.00	
	21	1.1	
	<20	0.9	
	33	<0.8	
	<20	1.5	
		1.3	
		1.4	
83. Dibenz(a,h)anthracene	<21	<0.60	
	<20	<0.60	
	<20	<0.60	
	<20	<0.60	
	<19	<0.60	
	<20	<0.60	
		0.75	
		0.65	

*Unspecified mixture of refinery wastes.

Table 4-18 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT M - SOLVENT EXTRACTION (Three-Cycle Process)

Detected BOAT List Organic Constituents	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/L (ppm)
SEMIVOLATILES (Cont.)			
18. Di-n-butyl phthalate	<21	<0.80	
	<20	<0.80	
	<20	<0.8	
	<20	<0.8	
	<19	<0.8	
	<20	<0.8	
21. Naphthalene	120	280.0	
	110	18.0	
	98	200	
	56	60	
	140	110	
	57	200	
41. Phenanthrene		100	
		280	
	140	4.70	
	140	3.10	
	120	2.6	
	64	1.3	
	140	1.4	
	64	3.0	
		3.4	
		3.7	

*Unspecified mixture of refinery wastes.

Table 4-18 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT M - SOLVENT EXTRACTION (Three-Cycle Process)

Detected BDAT List Organic Constituents	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/L (ppm)
SEMIVOLATILES (Cont.)			
145. Pyrene	34	1.50	
	28	0.90	
	33	0.9	
	<20	<0.8	
	36	0.8	
	<20	1.3	
		1.5	
		0.9	
81. o-Cresol	<10	<0.80	
	<10	<0.80	
	<10	<0.8	
	<10	<0.8	
	<10	<0.8	
	<10	<0.8	
		<0.8	
		<0.8	
82. o-Cresol	<10	<0.80	
	<10	<0.80	
	<10	<0.8	
	<10	0.9	
	<10	<0.8	
	<10	<0.8	
		<0.8	
		<0.8	
142. Phenol	<10	<2.0	
	<10	<2.0	
	<10	<0.8	
	<10	<0.8	
	<10	<0.8	
	<10	<0.8	
		<0.8	
		<0.8	

*Unspecified mixture of refinery wastes.

Table 4-18 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT M - SOLVENT EXTRACTION (Three-Cycle Process)

Detected BOAT List Metals Constituents	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/L (ppm)
54. Antimony	<0.1	10	---
	<0.1	12	---
	<0.1	6	---
	<0.1	5	---
	<0.1	<10	---
	<0.1	8	---
55. Arsenic	<0.2	4.1	0.005
	<0.2	13	<0.003
	<0.2	12	<0.003
	<0.2	10	<0.003
	<0.2	12	0.012
	<0.2	11	0.010
56. Barium	1.7	710	---
	2.3	790	---
	1.9	730	---
	2.3	720	---
	2.4	760	---
	2.3	800	---
57. Beryllium	<0.002	0.3	---
	<0.002	0.2	---
	<0.002	0.2	---
	<0.002	0.2	---
	<0.002	0.3	---
	<0.002	0.3	---

*Unspecified mixture of refinery wastes.

---Data were not available for this constituent.

Table 4-18 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT M - SOLVENT EXTRACTION (Three-Cycle Process)

Detected BDAT List Metals Constituents (Cont.)	Untreated Waste K048-K052*	Treated Waste	
	Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/L (ppm)
158. Cadmium	<0.001	1.1	---
	<0.001	1.0	
	<0.001	1.1	
	<0.001	1.1	
	<0.001	1	
	<0.001	1.1	
159. Chromium-(total)	<0.02	370	<0.05
	<0.02	450	<0.05
	<0.02	480	0.14
	<0.02	510	0.33
	<0.02	570	0.76
	<0.02	540	0.59
			<0.05
			<0.1
161. Lead	<0.1	16	<0.3
	<0.1	37	<0.3
	<0.1	32	<0.3
	<0.1	35	<0.3
	<0.1	40	<0.3
	<0.1	36	<0.3
			<0.3
			<0.5
162. Mercury	<1	0.92	---
	<1	0.86	
	<1	0.93	
	<1	1.10	
	<1	860	
	<1	1.10	

*Unspecified mixture of refinery wastes.

---Data were not available for this constituent.

Table 4-18 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT M - SOLVENT EXTRACTION (Three-Cycle Process)

Detected SDAT List Metal Constituents (Cont.)	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/L (ppm)
163. Nickel	0.9	39	0.4
	0.9	43	0.2
	0.10	37	0.3
	0.10	34	0.3
	0.11	33	0.3
	0.11	37	0.3
			<0.2
164. Selenium			<0.4
	<0.04	<0.4	<0.02
	<0.02	3	<0.02
	<0.02	3	<0.04
	<0.02	2	<0.04
	<0.02	2	<0.04
	<0.02	<2	<0.04
167. Vanadium			<0.04
	<0.02	22	<0.05
	<0.02	25	<0.05
	<0.02	23	<0.05
	<0.02	22	<0.05
	<0.02	22	<0.05
	<0.02	22	<0.05
168. Zinc			<0.05
	---	---	<0.1
			15
			0.39
			11
			10
			9.4
			8.6
			1.2
			2.1

*Unspecified mixture of refinery wastes.

---Data were not available for this constituent.

Table 4-18 (Continued)

TREATMENT PERFORMANCE DATA SUBMITTED BY INDUSTRY FOR K048-K052 MIXTURE
PLANT M - SOLVENT EXTRACTION (Three-Cycle Process)

Detected BDAT List Inorganic Constituents	Untreated Waste	Treated Waste	
	K048-K052* Concentration mg/kg (ppm)	Solids Concentration mg/kg (ppm)	TCLP mg/kg (ppm)
169. Cyanide	---	30	
		44	
		32	
		28	
		28	
		22	

*Unspecified mixture of refinery wastes.

---Data were not available for this constituent.

Table 6-1

SUMMARY OF AVAILABLE CHARACTERIZATION DATA FOR BDAT LIST CONSTITUENTS
FOR UNTREATED K048-K052

	K048 Detection Status (mg/kg)	K049 Detection Status (mg/kg)	K050 Detection Status (mg/kg)	K051 Detection Status (mg/kg)	K052 Detection Status (mg/kg)
<u>Volatiles</u>					
222. Acetone	NA	NA	NA	NA	NA
1. Acetonitrile	ND	ND	ND	ND	ND
2. Acrolein	ND	ND	ND	ND	ND
3. Acrylonitrile	ND	ND	ND	74	650
4. Benzene	13-16	ND-1,600	ND	ND	ND
5. Bromodichloromethane	ND	ND	ND	NA	ND
6. Bromomethane	NA	NA	NA	ND	ND
223. n-Butyl alcohol	ND	ND	ND	A	ND
7. Carbon tetrachloride	A	ND-0.96	ND	ND	ND
8. Carbon disulfide	ND	ND	ND	ND	ND
9. Chlorobenzene	ND	ND	ND	ND	ND
10. 2-Chloro-1,3-butadiene	ND	ND	ND	ND	ND
11. Chlorodibromomethane	ND	ND	ND	A	ND
12. Chloroethane	A	ND	ND	ND	ND
13. 2-Chloroethyl vinyl ether	ND	ND	ND	ND	ND
14. Chloroform	ND	ND	ND	ND	ND
15. Chloromethane	ND	ND	ND	ND	ND
16. 3-Chloropropene	ND	ND	ND	ND	ND
17. 1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND
18. 1,2-Dibromoethane	ND	ND	ND	ND	ND
19. Dibromomethane	ND	ND	ND	ND	ND
20. trans-1,4-Dichloro-2-butene	ND-310	ND	ND	ND	ND
21. Dichlorodifluoromethane	ND	ND	ND	ND	ND
22. 1,1-Dichloroethane	ND	ND	ND	ND	ND
23. 1,2-Dichloroethane	ND	ND	ND	ND	ND

A = Constituent was analyzed but a detection limit or analytical result was not obtained due to analytical problems.

NA = Not analyzed.

ND = Not detected.

Table 6-1 (Continued)

SUMMARY OF AVAILABLE CHARACTERIZATION DATA FOR DDAT LIST CONSTITUENTS
FOR UNTREATED K048-K052

Volatiles (Conc.)	K048	K049	K050	K051	K052
	Detection Status (mg/kg)	Detection Status (mg/kg)	Detection Status (mg/kg)	Detection Status (mg/kg)	Detection Status (mg/kg)
24. 1,1-Dichloroethylene	ND	ND	ND	ND	ND
25. trans-1,2-Dichloroethene	ND	ND	ND	ND	ND
26. 1,2-Dichloropropane	ND	ND	ND	ND	ND
27. trans-1,3-Dichloropropene	ND	ND	ND	ND	ND
28. cis-1,3-Dichloropropene	ND	ND	ND	ND	ND
29. 1,4-Dioxane	A	ND	ND	A	ND
224. 2-Ethoxyethanol	NA	NA	NA	NA	NA
225. Ethyl acetate	NA	NA	NA	NA	NA
226. Ethyl benzene	ND-120	120	NA	46-120	2,300
30. Ethyl cyanide	ND	ND	ND	ND	ND
227. Ethyl ether	NA	NA	NA	NA	NA
31. Ethyl methacrylate	ND	ND	ND	ND	ND
214. Ethylene oxide	NA	NA	NA	NA	NA
32. Iodomethane	ND	ND	ND	ND	ND
33. Isobutyl alcohol	ND	ND	ND	ND	ND
228. Methanol	NA	NA	NA	NA	NA
34. Methyl ethyl ketone	ND	ND	ND	ND	ND
229. Methyl isobutyl ketone	NA	NA	NA	NA	NA
35. Methyl methacrylate	ND	ND	ND	ND	ND
37. Methacrylonitrile	ND	ND	ND	ND	ND
38. Methylene chloride	ND	ND	ND	ND	ND
230. 2-Nitropropane	NA	NA	NA	NA	NA
39. Pyridine	ND	ND	ND	ND	ND
40. 1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND

A = Constituent was analyzed but a detection limit or analytical result was not obtained due to analytical problems.

NA = Not analyzed.

ND = Not detected.

Table 6-1 (Continued)

SUMMARY OF AVAILABLE CHARACTERIZATION DATA FOR BOAT LIST CONSTITUENTS
FOR UNTREATED K048-K052

	K048	K049	K050	K051	K052
	Detection	Detection	Detection	Detection	Detection
	Status	Status	Status	Status	Status
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
<u>Volatiles (Cont.)</u>					
41. 1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND
42. Tetrachloroethene	ND	ND	ND	ND	ND
43. Toluene	22-150	210-18,000	ND	33-450	6,400
44. Tribromomethane	ND	ND	ND	ND	ND
45. 1,1,1-Trichloroethane	ND	ND	ND	ND	ND
46. 1,1,2-Trichloroethane	ND	ND	ND	ND	ND
47. Trichloroethene	ND	ND	ND	ND	ND
48. Trichloromonofluoromethane	ND	ND	ND	ND	ND
49. 1,2,3-Trichloropropane	ND	ND	ND	ND	ND
231. 1,1,2-Trichloro-1,2,2-tri- fluoroethane	NA	NA	NA	NA	NA
50. Vinyl chloride	ND	ND	ND	ND	ND
215.-					
217. Xylene	ND-170	150	ND	71-720	3,500
<u>Semivolatiles</u>					
51. Acenaphthalene	ND	ND	ND	ND	ND
52. Acenaphthene	ND	ND	ND	ND-33	ND
53. Acetophenone	ND	ND	ND	ND	ND
54. 2'-Acetylaminofluorene	A	ND	ND	A	ND
55. 4-Aminobiphenyl	ND	ND	ND	ND	ND
56. Aniline	ND	ND	ND	ND	ND
57. Anthracene	ND	ND-58	ND	13	ND
58. Aramite	A	A	ND	A	A
59. Benz(a)anthracene	ND	ND	ND	ND-29	ND

A : Constituent was analyzed but a detection limit or analytical result was not obtained due to analytical problems.

NA : Not analyzed.

ND : Not detected.

Table 6-1 (Continued)

SUMMARY OF AVAILABLE CHARACTERIZATION DATA FOR BDAT LIST CONSTITUENTS
FOR UNTREATED K048-K052

		K048	K049	K050	K051	K052
		Detection	Detection	Detection	Detection	Detection
		Status	Status	Status	Status	Status
		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Semivolatiles (Cont.)						
218.	Benzal chloride	NA	NA	NA	NA	NA
60.	Benzenethiol	A	A	ND	A	A
62.	Benzo(a)pyrene	0.004-1.75	0.002-<40	0.7-3.6	0.002-45	0.02-<1.8
63.	Benzo(b)fluoranthene	A	ND	ND	ND	ND
64.	Benzo(ghi)perylene	ND	ND	ND	ND	ND
65.	Benzo(k)fluoranthene	ND	ND	ND	ND	ND
66.	p-Benzoquinone	A	A	ND	A	A
67.	Bis(2-chloroethoxy)ethane	ND	ND	ND	ND	ND
68.	Bis(2-chloroethyl)ether	ND	ND	ND	ND	ND
69.	Bis(2-chloroisopropyl)ether	ND	ND	ND	ND	ND
70.	Bis(2-ethylhexyl)phthalate	ND-59	ND-29	ND	ND-30	ND
71.	4-Bromophenyl phenyl ether	ND	ND	ND	ND	ND
72.	Butyl benzyl phthalate	ND	ND	ND	ND	ND
73.	2-sec-Butyl-4,6-dinitro-phenol	A	ND	ND	A	ND
74.	p-Chloroaniline	ND	ND	ND	ND	ND
75.	Chlorobenzilate	A	A	ND	A	A
76.	p-Chloro-m-cresol	ND	ND	ND	ND	ND
77.	2-Chloronaphthalene	ND	ND	ND	ND	ND
78.	2-Chlorophenol	ND	ND	ND	ND	ND
79.	3-Chloropropionitrile	A	A	ND	A	A
80.	Chrysene	ND-59	ND-44	ND	14-51	ND
81.	ortho-Cresol	ND	ND	ND	ND	13
82.	para-Cresol	ND	ND	ND	ND	13

A = Constituent was analyzed but a detection limit or analytical result was not obtained due to analytical problems.

NA = Not analyzed.

ND = Not detected.

Table 6-1 (Continued)

SUMMARY OF AVAILABLE CHARACTERIZATION DATA FOR BDAT LIST CONSTITUENTS
FOR UNREFINED K048-K052

Semi-volatiles (Cont.)	K048	K049	K050	K051	K052
	Detection Status (mg/kg)	Detection Status (mg/kg)	Detection Status (mg/kg)	Detection Status (mg/kg)	Detection Status (mg/kg)
232. Cyclohexanone	NA	NA	NA	NA	NA
83. Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND
84. Dibenzo(a,e)pyrene	A	A	ND	A	A
85. Dibenzo(a,i)pyrene	A	A	ND	A	A
86. m-Dichlorobenzene	ND	ND	ND	ND	ND
87. o-Dichlorobenzene	ND	ND	ND	ND	ND
88. p-Dichlorobenzene	ND	ND	ND	ND	ND
89. 3,3'-Dichlorobenzidine	ND	ND	ND	ND	ND
90. 2,4-Dichlorophenol	ND	ND	ND	ND	ND
91. 2,6-Dichlorophenol	ND	A	ND	ND	A
92. Diethyl phthalate	ND	ND	ND	ND	ND
93. 3,3'-Dimethoxybenzidine	ND	ND	ND	ND	ND
94. p-Dimethylaminoazobenzene	ND	ND	ND	ND	ND
95. 3,3'-Dimethylbenzidine	A	A	ND	A	A
96. 2,4-Dimethylphenol	ND	ND-3.3	ND	ND	4.2
97. Dimethyl phthalate	ND	ND	ND	ND	ND
98. Di-n-butyl phthalate	67-190	ND	ND	ND-230	ND
99. 1,4-Dinitrobenzene	ND	ND	ND	ND	ND
100. 4,6-Dinitro-o-cresol	ND	ND	ND	ND	ND
101. 2,4-Dinitrophenol	ND	ND	ND	ND	ND
102. 2,4-Dinitrotoluene	ND	ND	ND	ND	ND
103. 2,6-Dinitrotoluene	ND	ND	ND	ND	ND
104. Di-n-octyl phthalate	ND	ND	ND	ND	ND
105. Di-n-propylnitrosamine	ND	ND	ND	ND	ND

A = Constituent was analyzed but a detection limit or analytical result was not obtained due to analytical problems.

NA = Not analyzed.

ND = Not detected.

Table 6-1 (Continued)

SUMMARY OF AVAILABLE CHARACTERIZATION DATA FOR BOAT LIST CONSTITUENTS
FOR UNTREATED K048-K052

	<u>K048</u> <u>Detection</u> <u>Status</u> <u>(mg/kg)</u>	<u>K049</u> <u>Detection</u> <u>Status</u> <u>(mg/kg)</u>	<u>K050</u> <u>Detection</u> <u>Status</u> <u>(mg/kg)</u>	<u>K051</u> <u>Detection</u> <u>Status</u> <u>(mg/kg)</u>	<u>K052</u> <u>Detection</u> <u>Status</u> <u>(mg/kg)</u>
<u>Semivolatiles (Cont.)</u>					
106. Diphenylamine	ND	ND	ND	ND	ND
219. Diphenylnitrosamine	NA	NA	NA	NA	NA
107. 1,2-Diphenylhydrazine	ND	ND	ND	ND	ND
108. Fluoranthene	ND	ND	ND	ND	ND
109. Fluorene	ND-58	ND	ND	11-37	ND
110. Hexachlorobenzene	ND	ND	ND	ND	ND
111. Hexachlorobutadiene	ND	ND	ND	ND	ND
112. Hexachlorocyclopentadiene	ND	ND	ND	ND	ND
113. Hexachloroethane	ND	ND	ND	ND	ND
114. Hexachlorophene	A	A	ND	A	A
115. Hexachloropropene	ND	A	ND	ND	A
116. Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND
117. Isosafrole	A	ND	ND	A	ND
118. Methapyrilene	A	A	ND	A	A
119. 3-Methylcholanthrene	A	ND	ND	A	ND
120. 4,4'-Methylenebis (2-chloroaniline)	A	ND	ND	A	ND
36. Methyl methanesulfonate	ND	A	ND	ND	A
121. Naphthalene	93-350	<40-680	ND	97-200	13
122. 1,4-Naphthoquinone	ND	A	ND	ND	A
123. 1-Naphthylamine	ND	ND	ND	ND	ND
124. 2-Naphthylamine	ND	ND	ND	ND	ND
125. p-Nitroaniline	ND	ND	ND	ND	ND
126. Nitrobenzene	ND	ND	ND	ND	ND

A = Constituent was analyzed but a detection limit or analytical result was not obtained due to analytical problems.

NA = Not analyzed.

ND = Not detected.

Table 6-1 (Continued)

SUMMARY OF AVAILABLE CHARACTERIZATION DATA FOR BOAT : 1ST CONSTITUENTS
FOR UNTREATED K048-K052

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Semivolatiles (Cont.)	K048 Detection Status (mg/kg)	K049 Detection Status (mg/kg)	K050 Detection Status (mg/kg)	K051 Detection Status (mg/kg)	K052 Detection Status (mg/kg)
127. 4-Nitrophenol	ND	ND	ND	ND	ND
128. N-Nitrosodi-n-butylamine	ND	A	ND	ND	A
129. N-Nitrosodiethylamine	ND	A	ND	ND	A
130. N-Nitrosodimethylamine	ND	ND	ND	ND	ND
131. N-Nitrosomethylethylamine	A	ND	ND	A	ND
132. N-Nitrosomorpholine	ND	ND	ND	ND	ND
133. N-Nitrosopiperidine	ND	ND	ND	ND	ND
134. N-Nitrosopyrrolidine	ND	ND	ND	ND	ND
135. 5-Nitro-o-toluidine	A	ND	ND	A	ND
136. Pentachlorobenzene	ND	A	ND	ND	A
137. Pentachloroethane	ND	A	ND	ND	A
138. Pentachloronitrobenzene	ND	ND	ND	ND	ND
139. Pentachlorophenol	ND	ND	ND	ND	ND
140. Phenacetin	ND	ND	ND	ND	ND
141. Phenanthrene	77-190	ND-390	ND	70-120	1-4
142. Phenol	3.0-210	ND-127	8-18.5	ND-156.7	1.8-250
220. Phthalic anhydride	NA	NA	NA	NA	NA
143. 2-Picoline	ND	ND	ND	ND	ND
144. Pronamide	ND	A	ND	ND	A
145. Pyrene	31-93	33-110	ND	24-74	ND
146. Resorcinol	ND	A	ND	ND	A
147. Saffrole	A	ND	ND	A	ND
148. 1,2,4,5-Tetrachlorobenzene	ND	ND	ND	ND	ND
149. 2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND
150. 1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND

A : Constituent was analyzed but a detection limit or analytical result was not obtained due to analytical problems.

NA : Not analyzed.

ND : Not detected.

Table 6-1 (Continued)

Table 6-1 (Continued)

SUMMARY OF AVAILABLE CHARACTERIZATION DATA FOR BOAT LIST CONSTITUENTS
FOR UNTREATED K048-K052

		K048	K049	K050	K051	K052
		Detection	Detection	Detection	Detection	Detection
		Status	Status	Status	Status	Status
		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
<u>Semivolatiles (Cont.)</u>						
151.	2,4,5-Trichlorophenol	ND	ND	ND	ND	ND
152.	2,4,6-Trichlorophenol	ND	ND	ND	ND	ND
153.	Tris(2,3-dibromopropyl) phosphate	ND	ND	ND	ND	ND
<u>Metals</u>						
154.	Antimony	4.4-7	ND-19	ND	9-18	111
155.	Arsenic	0.05-10.5	<2.2-30	10.2-11	0.1-32	63-525
156.	Barium	43.0-59	28-370	ND	68-412	8
157.	Beryllium	0.0012-0.84	ND-0.35	0.05-0.34	0.0012-0.24	0.0025-<0.1
158.	Cadmium	ND-0.7	0.19-28.8	1.0-1.5	0.024-3.0	0.82-8.1
159.	Chromium (total)	0.04-3,435	28.9-1,400	11-1,600	0.1-6,790	1.0-504
221.	Chromium (hexavalent)	ND	0.02-<1.9	0.01-<1.0	0.01-22	NA
160.	Copper	0.05-56	48-79.8	67-75	2.5-550	110-172
161.	Lead	0.05-1,250	21.95-3,900	0.5-1,100	0.25-2,480	11-5,800
162.	Mercury	ND-0.89	ND-32	0.14-3.6	0.04-6.2	0.19-2.4
163.	Nickel	0.025-16	9.2-86	61-170	0.25-150.4	97.2-392
164.	Selenium	0.1-11	ND-5.0	2.4-52	0.005-12	3.1-<100
165.	Silver	0.0013-6	<0.38-0.4	0.0007-0.01	0.05-3	0.05-<6.0
166.	Thallium	ND	ND	ND	ND	ND
167.	Vanadium	0.05-460	2.5-60	0.7-50	1-350	1.0-9.8
168.	Zinc	10-1,825	72.8-250	91-297	25-6,596	17.1-17,000

NA = Not analyzed.

ND = Not detected.

Table 6-1 (Continued)

SUMMARY OF AVAILABLE CHARACTERIZATION DATA FOR BOAT LIST CONSTITUENTS
FOR UNTREATED K048-K052

	K048	K049	K050	K051	K052
	Detection	Detection	Detection	Detection	Detection
	Status	Status	Status	Status	Status
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
<u>Inorganics</u>					
169. Cyanide	0.01-7.9	0.000012-52.5	0.0004-3.3	0.00006-51.4	1.89
170. Fluoride	5.3-22.0	1.31	ND	ND	955
171. Sulfide	130-2,800	34.4	ND	120-4,800	111
<u>Organochlorine Pesticides</u>					
172. Aldrin	NA	NA	NA	NA	NA
173. alpha-BHC	NA	NA	NA	NA	NA
174. beta-BHC	NA	NA	NA	NA	NA
175. delta-BHC	NA	NA	NA	NA	NA
176. gamma-BHC	NA	NA	NA	NA	NA
177. Chlordane	NA	NA	NA	NA	NA
178. DDD	NA	NA	NA	NA	NA
179. DDE	NA	NA	NA	NA	NA
180. DDT	NA	NA	NA	NA	NA
181. Dieldrin	NA	NA	NA	NA	NA
182. Endosulfan I	NA	NA	NA	NA	NA
183. Endosulfan II	NA	NA	NA	NA	NA
184. Endrin	NA	NA	NA	NA	NA
185. Endrin aldehyde	NA	NA	NA	NA	NA
186. Heptachlor	NA	NA	NA	NA	NA
187. Heptachlor epoxide	NA	NA	NA	NA	NA
188. Isodrin	NA	NA	NA	NA	NA

NA = Not analyzed.

ND = Not detected.

Table 6-1 (Continued)

SUMMARY OF AVAILABLE CHARACTERIZATION DATA FOR BDAT LIST CONSTITUENTS
FOR UNTREATED K048-K052

	K048 Detection Status (mg/kg)	K049 Detection Status (mg/kg)	K050 Detection Status (mg/kg)	K051 Detection Status (mg/kg)	K052 Detection Status (mg/kg)
<u>Organochlorine Pesticides (Cont.)</u>					
189. Kepone	NA	NA	NA	NA	NA
190. Methoxychlor	NA	NA	NA	NA	NA
191. Toxaphene	NA	NA	NA	NA	NA
<u>Phenoxyacetic Acid Herbicides</u>					
192. 2,4-Dichlorophenoxyacetic acid	NA	NA	NA	NA	NA
193. Silvex	NA	NA	NA	NA	NA
194. 2,4,5-T	NA	NA	NA	NA	NA
<u>Organophosphorus Insecticides</u>					
195. Disulfoton	NA	NA	NA	NA	NA
196. Fomphur	NA	NA	NA	NA	NA
197. Methyl parathion	NA	NA	NA	NA	NA
198. Parathion	NA	NA	NA	NA	NA
199. Phorate	NA	NA	NA	NA	NA
<u>PCBs</u>					
200. Aroclor 1016	NA	NA	NA	NA	NA
201. Aroclor 1221	NA	NA	NA	NA	NA
202. Aroclor 1232	NA	NA	NA	NA	NA
203. Aroclor 1242	NA	NA	NA	NA	NA

NA = Not analyzed.

Table 6-1 (Continued)

SUMMARY OF AVAILABLE CHARACTERIZATION DATA FOR BDAT LIST CONSTITUENTS
FOR UNTREATED K048-K052

	K048	K049	K050	K051	K052
	Detection	Detection	Detection	Detection	Detection
	Status	Status	Status	Status	Status
	(mg/kg)	(ng/kg)	(mg/kg)	(mg/kg)	(ng/kg)
<u>PCBs (Cont.)</u>					
204. Aroclor 1248	NA	NA	NA	NA	NA
205. Aroclor 1254	NA	NA	NA	NA	NA
206. Aroclor 1260	NA	NA	NA	NA	NA
<u>Dioxins and Furans</u>					
207. Hexachlorodibenzo-p-dioxins	NA	NA	NA	NA	NA
208. Hexachlorodibenzofuran	NA	NA	NA	NA	NA
209. Pentachlorodibenzo-p-dioxins	NA	NA	NA	NA	NA
210. Pentachlorodibenzofuran	NA	NA	NA	NA	NA
211. Tetrachlorodibenzo-p-dioxins	NA	NA	NA	NA	NA
212. Tetrachlorodibenzofuran	NA	NA	NA	NA	NA
213. 2,3,7,8-Tetrachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA

NA = Not analyzed.

Table 7-5

CALCULATION OF NONWASTEWATER TREATMENT STANDARDS
FOR ORGANIC CONSTITUENTS IN K049

<u>Regulated Constituent</u>	<u>Untreated K048-K052 at Plant M (ppm)</u>	<u>Arithmetic Average of Treatment Values (ppm)</u>	<u>Variability Factor (VF)</u>	<u>Treatment* Standard (Average x VF) (ppm)</u>
<u>Organics</u>				
<u>(Total Composition)</u>				
Anthracene	<19- ^c 21	2.38	2.01	6.2
Benzene	86-190	3.17	2.99	9.5
Benzo(a)pyrene	<19- ^c 21	0.66	1.27	0.84
Bis(2-ethylhexyl)phthalate	<19- ^c 21	4.96	7.36	37
Chrysene	<20-33	1.21	1.79	2.2
Ethylbenzene	76-120	13.53	4.93	67
Naphthalene	56-140	156.00	6.62	1,000 ^b
Phenanthrene	64-140	2.90	2.67	7.7
Phenol	<10	1.10	2.46	2.7
Pyrene	<20-36	1.08	1.82	2.0
Toluene	230-470	3.17	2.99	9.5
Xylene (total)	420-570	243.63	7.48	1,800 ^b

*The values shown on this table for treatment standards have been rounded to show significant figures only.

^bThe table shows the calculated treatment standards for naphthalene and xylenes; however, the Agency is not promulgating standards at these levels and is instead reserving standards for these constituents.

Table 7-9

CALCULATION OF NONWASTEWATER TREATMENT STANDARDS FOR ORGANIC CONSTITUENTS IN K051

<u>Regulated Constituent</u>	<u>Untreated K048-K052 at Plant M (ppm)</u>	<u>Arithmetic Average of Treatment Values (ppm)</u>	<u>Variability Factor (VF)</u>	<u>Treatment* Standard (Average x VF) (ppm)</u>
<u>Organics</u>				
<u>Total Composition</u>				
Benz(a)anthracene	<20-21	0.87	1.63	1.4
Benzene	86-190	3.17	2.99	9.5
Benzo(a)pyrene	<19-<21	0.66	1.27	0.84
Bis(2-ethylhexyl)phthalate	<19-<21	4.96	7.36	37
Chrysene	<20-33	1.21	1.79	2.2
Ethylbenzene	76-120	13.53	4.93	67
Naphthalene	56-140	156.00	6.62	1,000*
Phenanthrene	64-140	2.90	2.67	7.7
Phenol	<10	1.10	2.46	2.7
Pyrene	<20-36	1.08	1.82	2.0
Toluene	230-470	3.17	2.99	9.5
Xylene (total)	420-570	243.63	7.48	1,800*

*The values shown on this table for treatment standards have been rounded to show significant figures only.

*The table shows the calculated treatment standards for naphthalene and xylenes; however, the Agency is not promulgating standards at these levels and is instead reserving standards for these constituents.

Table 7-11

CALCULATION OF NONWASTEWATER TREATMENT STANDARDS
FOR ORGANIC CONSTITUENTS IN K052

<u>Regulated Constituent</u>	<u>Untreated K048-K052 at Plant M (ppm)</u>	<u>Arithmetic Average of Treatment Values (ppm)</u>	<u>Variability Factor (VF)</u>	<u>Treatment* Standard (Average x VF) (ppm)</u>
<u>Organics</u>				
<u>(Total Composition)</u>				
Benzene	86-190	3.17	2.99	9.5
Benzo(a)pyrene	<19-<21	0.66	1.27	0.84
o-Cresol	<10	0.80	2.80	2.2
p-Cresol	<10	0.81	1.10	0.90
Ethylbenzene	76-120	13.53	4.93	67
Naphthalene	56-140	156.00	6.62	1,000*
Phenanthrene	64-140	2.90	2.67	7.7
Phenol	<10	1.10	2.46	2.7
Toluene	230-470	3.17	2.99	9.5
Xylene (total)	420-570	243.63	7.48	1,800*

*The values shown on this table for treatment standards have been rounded to show significant figures only.

*The table shows the calculated treatment standards for naphthalene and xylenes; however, the Agency is not promulgating standards at these levels and is instead reserving standards for these constituents.

Table 7-13

CALCULATION OF WASTEWATER TREATMENT STANDARDS FOR K048

<u>Regulated Constituent</u>	<u>Constituent from which Treatment Data were Transferred*</u>	<u>Untreated K048 at Plant A (ppm)</u>	<u>Arithmetic Average of Corrected Treatment Values (ppm)</u>	<u>Variability Factor (VF)</u>	<u>Treatment Standard** (Average x VF) (ppm)</u>
<u>Organics</u>					
<u>(Total Composition)</u>					
Benzene	NA	13-16	0.004	2.80	0.011
Benzo(a)pyrene	NA	0.004-1.75**	0.017	2.80	0.047
Bis(2-ethylhexyl)phthalate	NA	<20-59	0.015	2.80	0.043
Chrysene	NA	<0.66-59	0.015	2.80	0.043
Di-n-butyl phthalate	NA	67-190	0.021	2.80	0.060
Ethylbenzene	NA	<14-120	0.004	2.80	0.011
Fluorene	NA	<0.66-58	0.018	2.80	0.050
Naphthalene	NA	93-350	0.012	2.80	0.033
Phenanthrene	NA	77-190	0.014	2.80	0.039
Phenol	NA	3.0-210	0.017	2.80	0.047
Pyrene	NA	31-93	0.016	2.80	0.045
Toluene	NA	22-150	0.004	2.80	0.011
Xylene (total)	NA	<14-170	0.004	2.80	0.011
<u>Metals</u>					
<u>(Total Composition)</u>					
Chromium (total)	Chromium (total)	393-2,581*	0.19	1.09	0.20
Lead	Lead	0.02-210*	0.013	2.8	0.037

*This is the untreated concentration of each constituent in the waste from which treatment data were transferred.

**Metals were transferred from the Envirite Report (Reference 27).

***The values shown on this table for treatment standards have been rounded to show significant figures only.

****Untreated concentration in K048 as reported in Jacobs Engineering Company Report (Reference 3).

NA = Not applicable.

Table 7-14

CALCULATION OF WASTEWATER TREATMENT STANDARDS FOR K049

<u>Regulated Constituent</u>	<u>Constituent from which Treatment Data were Transferred*</u>	<u>Untreated Concentration[†] (ppm)</u>	<u>Arithmetic Average of Corrected Treatment Values (ppm)</u>	<u>Variability Factor (VF)</u>	<u>Treatment Standard** (Average x VF) (ppm)</u>
<u>Organics</u>					
<u>(Total Composition)</u>					
Anthracene	Phenanthrene	77-190	0.014	2.80	0.039
Benzene	Benzene	13-16	0.004	2.80	0.011
Benzo(a)pyrene	Benzo(a)pyrene	0.004-1.75	0.017	2.80	0.047
Bis(2-ethylhexyl)phthalate	Bis(2-ethylhexyl)phthalate	<20-59	0.015	2.80	0.043
Carbon disulfide	Benzene	13-16	0.004	2.80	0.011
Chrysene	Chrysene	<0.66-59	0.015	2.80	0.043
2,4-Dimethylphenol	Naphthalene	93-350	0.012	2.80	0.033
Ethylbenzene	Ethylbenzene	<14-120	0.004	2.80	0.011
Naphthalene	Naphthalene	93-350	0.012	2.80	0.033
Phenanthrene	Phenanthrene	77-190	0.014	2.80	0.039
Phenol	Phenol	3.0-210	0.017	2.80	0.047
Pyrene	Pyrene	31-93	0.016	2.80	0.045
Toluene	Toluene	22-150	0.004	2.80	0.011
Xylene (total)	Xylene (total)	<14-170	0.004	2.80	0.011
<u>Metals</u>					
<u>(Total Composition)</u>					
Chromium (total)	Chromium (total)	393-2,581	0.19	1.09	0.20
Lead	Lead	0.02-210	0.013	2.8	0.037

*This is the untreated concentration of each constituent in the waste from which treatment data were transferred.

†Metals were transferred from the Envirite Report (Reference 27).

**The values shown on this table for treatment standards have been rounded to show significant figures only.

NA : Not applicable.

Table 7-16

CALCULATION OF WASTEWATER TREATMENT STANDARDS FOR K051

<u>Regulated Constituent</u>	<u>Constituent from which Treatment Data were Transferred*</u>	<u>Untreated Concentration^a (ppm)</u>	<u>Arithmetic Average of Corrected Treatment Values (ppm)</u>	<u>Variability Factor (VF)</u>	<u>Treatment Standard** (Average x VF)(ppm)</u>
<u>Organics</u>					
<u>(Total Composition)</u>					
Acenaphthene	Fluorene	<0.66-58	0.018	2.80	0.050
Anthracene	Phenanthrene	77-190	0.014	2.80	0.039
Benz(a)anthracene	Chrysene	<0.66-59	0.015	2.80	0.043
Benzene	Benzene	13-16	0.004	2.80	0.011
Benzo(a)pyrene	Benzo(a)pyrene	0.004-1.75	0.017	2.80	0.047
Bis(2-ethylhexyl)phthalate	Bis(2-ethylhexyl)phthalate	<20-59	0.015	2.80	0.043
Chrysene	Chrysene	<0.66-59	0.015	2.80	0.043
Di-n-butyl phthalate	Di-n-butyl phthalate	67-190	0.021	2.80	0.060
Ethylbenzene	Ethylbenzene	<14-120	0.004	2.80	0.011
Fluorene	Fluorene	<0.66-58	0.018	2.80	0.050
Naphthalene	Naphthalene	93-350	0.012	2.80	0.033
Phenanthrene	Phenanthrene	77-190	0.014	2.80	0.039
Phenol	Phenol	3.0-210	0.017	2.80	0.047
Pyrene	Pyrene	31-93	0.016	2.80	0.045
Toluene	Toluene	22-150	0.004	2.80	0.011
Xylene (total)	Xylene (total)	<14-170	0.004	2.80	0.011
<u>Metals</u>					
<u>(Total Composition)</u>					
Chromium (total)	Chromium (total)	393-2,581	0.19	1.09	0.20
Lead	Lead	0.02-210	0.013	2.8	0.037

*This is the untreated concentration of each constituent in the waste from which treatment data were transferred.

**Metals were transferred from the Ekvirite Report (Reference 27).

**The values shown on this table for treatment standards have been rounded to show significant figures only.

Table 7-17

CALCULATION OF WASTEWATER TREATMENT STANDARDS FOR K052

<u>Regulated Constituent</u>	<u>Constituent from which Treatment Data were Transferred*</u>	<u>Untreated Concentration^a (ppm)</u>	<u>Arithmetic Average of Corrected Treatment Values (ppm)</u>	<u>Variability Factor (VF)</u>	<u>Treatment Standard** (Average x VF)(ppm)</u>
<u>Organics</u>					
<u>(Total Composition)</u>					
Benzene	Benzene	13-16	0.004	2.80	0.011
Benzo(a)pyrene	Benzo(a)pyrene	0.004-1.75	0.017	2.80	0.047
ortho-Cresol	Ethylbenzene	<14-20	0.004	2.80	0.011
para-Cresol	Ethylbenzene	<14-20	0.004	2.80	0.011
2,4-Dimethylphenol	Naphthalene	93-350	0.012	2.80	0.033
Ethylbenzene	Ethylbenzene	<14-120	0.004	2.80	0.011
Naphthalene	Naphthalene	93-350	0.012	2.80	0.033
Phenanthrene	Phenanthrene	77-190	0.014	2.80	0.039
Phenol	Phenol	3.0-210	0.017	2.80	0.047
Toluene	Toluene	22-150	0.004	2.80	0.011
Xylene (total)	Xylene (total)	<14-170	0.004	2.80	0.011
<u>Metals</u>					
<u>(Total Composition)</u>					
Chromium (total)	Chromium (total)	393-2,581	0.19	1.09	0.20
Lead	Lead	0.02-210	0.013	2.8	0.037

*This is the untreated concentration of each constituent in the waste from which treatment data were transferred.

^aMetals were transferred from the Enviro Report (Reference 27).

**The values shown on this table for treatment standards have been rounded to show significant figures only.