# 

Inc) and Mr. David C. Mongstreet on May 28, May 30, Hay 31. July 18 and July 20 of 1978. The purpose of the survey was to evaluate the extent of the oil pollution in the groundwaters, soil, and surface waters of the Constable Hook area. A report was written detailing the results of sampling of the surface waters and soils of the area. This memo will outline the visual determinations made on the various dates.

#### May 29, 1973

AL AND SA

Between Avenue J and Avenue J paralleling New Nook Access Road sighted pools of oily water and oil soaked ground.

Along the railroad tracks paralleling the Exxon retaining wall pools of oil and oily water. A ditch in this area

Ine stork water collecting syster leading to the tidal waters had oil floating on top of the water in the ditch. On Yew nook Access Road a simple oil/water separator had been installed, but evidently it is not very effective. The water downstream of the separator is very oily, and the vegetation on the banks was oil covered. A large pool of oil was noticed near the downstream and of the ditch.

In the afternoon, a vacuum truck owned by Coastal Services (an oil recovery and oil spill clean-up contractor) was observed servicing the oil/water separator. The foreman stated that the crew had been working on Exxon property and had been requested to service the separator by Exxon.

Hay 30, 1973

The area was visited to obtain soil samples. The ground was still oil soaked. The drainare ditch alors ou hous Access Road had oil on it. The Exxon facility was inspected. During the tour of the Lxxon facility legens. Longstreet and Piontek

an a	
	1 4 4 mil
Mr. Birns	
Mr. Longstreet	
Constable Hook Area Bayonne New Jorsey	November 15, 1973
The Constable Hook aner of H	

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icok area of Hayonne was surveyed by Mr. Ken Piontek of the Interstate Sanitation Commission (ISC) and Hr. David C. Longstreet on av 23, "ay 30, May 31, July 19 and July 20 of 1973. The purpose of the survey was to evaluate the extent of the oil pollution in the groundwaters, soll, and survice waters of the Constable Sock area. A payort way witten detailing the results of paralise of the set of waters and soils of the area. This of 0 will utile of viewel determinations

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(a) Construction of Vieland States and Construction (Construction) (Constructi a serves vervicing to and l/so ter start to the there at 2.7. 20 stated that the new had tropped a the system of the and had been remember of a savie to secondates a succes

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were accompanied by Hr. John Grosso an employee of Exxon. The main interest of the tour centered in the eres of the chain link fence and pipelines paralleling the railroad. Soil samples were taken. During this time, a relief value connected to one of the pipes was open and depositing a steady flow of a liquid on the ground of Exxon's property.

#### May 31, 1973

Same general conditions of the soil and water were noted. During the taking of soil samples, especially those taken at 12 inches below grade oily liquid was present. The indications were that the oil was floating on the water table. The water table was very close to the grade level and in some cases, above grade.

July 12 and July 16

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## ADMINISTRATIVE CONSENT ORDER SITE HISTORY DELIVERABLE ITEMS EXXON COMPANY, U.S.A. BAYONNE PLANT BAYONNE, NEW JERSEY

January 1993

Prepared for

Exxon Company, U.S.A. 1400 Park Avenue Linden, New Jersey 07036

#### Compiled by

Geraghty & Miller, Inc. 125 East Bethpage Road Plainview, New York 11803 (516) 249-7600

and

Exxon Company, U.S.A. 1400 Park Avenue Linden, New Jersey 07036

TIERRA-B-000277

## ADMINISTRATIVE CONSENT ORDER APPENDIX B, SECTION IIB -SITE HISTORY DELIVERABLES

#### VOLUME I

#### **CONTENTS**

<u>Appendix</u>	<u>Item No.</u>	
Α	1	Operational History.
В	2	Raw Materials and Products.
С	3	Disposal Practices.
D	4	Historical Maps and Drawings (submitted separately as Volume II).
Е	5	Aerial Photographs.
F	6	Site Water Budget.
G	7	Area Geology and Hydrogeology - Contained in the Site History Report by Geraghty and Miller, Inc. (1993), under separate cover.
Н	8	ECRA Submissions.
Ι	9	Permits.
J	10	Summary of Civil and Criminal Enforcement Actions.
К	11	Hazardous Substance Storage.
L	12	Hazardous Substance Inventory.
М	13	Hazardous Substance Discharges.
Ν	14	Pollution Data.
0	15	Existing Environmental Data - Contained in Geraghty and Miller, Inc. (1993) Site History Report.
Р	16	Spill and Fires.

append.toc

#### ADMINISTRATIVE CONSENT ORDER SITE HISTORY DELIVERABLE ITEMS EXXON COMPANY, U.S.A BAYONNE PLANT BAYONNE, NEW JERSEY

This document is a compilation of site history information (Site History Deliverable Items) in accordance with the Administrative Consent Order (ACO), Appendix B, Section IIB, Items 1 through 16. For organizational purposes, each Site History deliverable item has been referred to as an appendix and an appropriate tab has been used. Appendix D (Item 4) is being submitted as a separate volume because of its size. Some of the information provided in this document has also been included in the Site History Report (Geraghty & Miller, Inc. 1993), and was used for planning the scope of work of the Remedial Investigation (RI) Work Plan (Geraghty & Miller, Inc. 1993). This document is being submitted concurrently with those reports.

## APPENDIX P

#### SPILLS AND FIRES

#### APPENDIX P

#### **CONTENTS**

SPILLS AND FIRES	 P-1

#### **TABLE**

P-1. Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

## **ATTACHMENTS**

P-I. Spills and Fires at Exxon (1966 - 1992) from City of Bayonne Health Department.

P-II. Fire Incidents from 1955 to 1992 from City of Bayonne Fire Department.

<u>Page</u>

#### <u>APPENDIX P</u>

#### SPILLS AND FIRES

This section provides lists of fires, spills, and discharges that may have had an adverse impact on human health or the environment at the Exxon Company Plant, Bayonne, New Jersey. The material presented was compiled in accordance with the November 27, 1991 Administrative Consent Order (ACO), Appendix B, Section IIB, Item 16.

A table of documented spills at the Exxon Company Plant, Bayonne, New Jersey was compiled from the following plant files: General Incident Reports, General Accident Reports, Spill/Mixture/Leak Reports, Spill Incident Reports, shift supervisor spill logs, telephone call logs to the "Emergency Spill Hotline", summary reports (i.e., Annual Oil Spill Reports; spill tables in Spill Prevention Control and Countermeasure Plans; and Leaks, Discharges and AIINS Incident Reports) spill-discharge reports to United States Coast Guard, and spill-discharge reports to the New Jersey Department of Environmental Protection and Energy (NJDEPE). In addition, the June 1992 New Jersey state spill database, obtained from Vista Environmental Information, Inc., was compared to the cited spills and did not yield any additional information. Spills and discharges greater than 100 gallons were chronologically organized into the 13 operational areas in Table P-1. Apparent in Table P-1 is that the Asphalt Plant Area had the most documented spills, greater than 100 gallons. However, the largest documented spill (2,400 gallons) occurred in Solvent Tank Field Area (Tank No. 1033) in 1982. Those ground spills that could be specifically located were plotted on Figure C-1.

Fires and incidences recorded by the City of Bayonne Health Department from 1966 through 1992 and fires and incidences recorded by the City of Bayonne Fire Department from 1955 through 1992 are attached. These lists record the incident number, the date of the incident, and a brief description of the incident. Some of the reportings were duplicated.

appp.doc

# Table P-1. Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
•••••		"A"-HILL TANK	FIELD	
No document	ed spills greater than 100 ga	llons.		
		LUBE OIL AR	EA	
03/28/72	1,500	Roadway in Plant	Lube Oil Additive	Exxon Company, U.S.A.: Ground Spills
04/21/73	700	Roadway in Plant	Lube Oil	Exxon Company, U.S.A.: Ground Spills
12/23/78	840-1,050	Tank No. 1	Electric Insulating Oil	General Accident Report (12/23/78)
12/24/78	6,300	Tank No. 1	Univolt 60	Letter to New Jersey Department of Environ- mental Protection (02/20/79)
03/24/87	10,000	Tank No. 6	1919 Motor Oil	Spill/Mixture/Leak Report (03/24/87)

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		LUBE OIL AREA (Con	tinued)	
08/23/89	100	Tank No. 8	Exxon Formula No. 1367	Spill/Mixture/Leak Report (08/23/89)
01/03/90	100	Pump on Tank No. 139	Slop Oil	Spill/Mixture/Leak Report (01/03/90)
07/30/90	400	Tank No. 581	Wax	Spill/Mixture/Leak Report (07/30/90)
08/14/90	300	Tank No. 94	Lube Oil	Spill/Mixture/Leak Report (08/14/90)
08/28/90	250	Tank No. 545	Slop Oil	Spill/Mixture/Leak Report (08/28/90)
09/10/90	1,114	Truck Loading Rack	Xylene	Spill/Mixture/Leak Report (09/10/90)
11/28/90	100	Truck Loading Rack	Lube Oil	Spill/Mixture/Leak Report (11/28/90)

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 Table P-1.
 Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
<u></u>		LUBE OIL AREA (Co	ntinued)	
01/15/91	2,500	Tank No. 1	Univolt 60	Spill Incident Report (1991)
07/08/91	421	Ground	Turbo Oil	Spill Incident Report (1991)
08/26/91	100	Truck Loading Rack	Wax	Spill Incident Report (1991)
02/14/92	100	Between Tank	Nuto H-46 Nos. 106 and 107	Leaks, Discharges and AIINS Incidents (1992)
02/18/92	600	Tank No. 107	Unknown	Leaks, Discharges and AIINS Incidents (1992)
07/09/92	840	Wax at Tank	Wax Nos. 558 and 586	Leaks, Discharges and AIINS Incidents (1992)

 Table P-1.
 Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		PIER NO. 1 AR	<u>EA</u>	
09/22/72	2,100	Pier 1 Kill Van Kull Waterway	Wax (MEK Feed)	Oil Spill Report Second Half (1972)
06/28/78	670	Kill Van Kull Waterway	Waste Oil	United States Coast Guard (02/06/79)
10/30/79	1,050-2,100	Kill Van Kull Waterway	Heavy Fuel Oil	Letter to HQ (11/01/79)
11/15/79	> 672	Kill Van Kull Waterway	Emulsion Flux	Letter to HQ (11/26/79)
06/04/89	840	Pier 1 Kill Van Kull Waterway	Fuel Oil	Bayonne Terminal Incidents (1989)
		<u>no. 2 tank fie</u>	CLD	
3/01/89	Unknown	Tank No. 1005	No. 2 Fuel Oil	General Incident Report (03/01/89)

Table P-1. Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
<u> </u>		ASPHALT PLANT	<u>AREA</u>	
11/19/70	300	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
11/22/70	300	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
11/25/70	100	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
12/02/70	300	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
12/15/70	150	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
12/23/70	400	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills

Table P-1.Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

# Table P-1. Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		ASPHALT PLANT AREA	(Continued)	
01/05/71	600	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
01/08/71	300	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
03/19/71	350	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
05/25/71	100	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
05/28/71	200	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
07/15/71	200	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills

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Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		ASPHALT PLANT AREA	(Continued)	
07/30/71	1,000	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
08/09/71	500	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
08/11/71	200	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
08/13/71	300	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
09/03/71	100	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
09/10/71	100	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills

# Table P-1. Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		ASPHALT PLANT ARE	(Continued)	
10/03/71	600	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
01/18/72	100	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
02/09/72	200	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
05/08/72	100	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
12/14/72	1,000	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
01/05/73	300	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills

 Table P-1.
 Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

See footnotes on last page.

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Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		ASPHALT PLANT AREA	(Continued)	
03/20/73	100	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
03/20/73	500	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
04/04/73	1,500	Roadway in Plant	Asphalt	Exxon Company, U.S.A.: Ground Spills
		AVIATION (AV)-GAS T	ANK FIELD	
01/30/88	5,000	Tank No. 1010	Toluene	Spill/Mixture/Leak Report (01/30/88)

Table P-1.Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		CHEMICAL PLANT	AREA	
01/05/87	500	OCP at Tank No. 923	Exxon Formula No. 82899	Shift Super Spill Log
01/08/87	700	ATFR R/R	Exxon Formula No. 80831	Shift Super Spill Log
01/17/87	100	Tank No. 811	Exxon Formula No. 81348	Shift Super Spill Log
02/12/87	300	"A" Reactor	Exxon Formula No. 80682	Shift Super Spill Log
02/14/87	300	Tank No. 799	Shop Oil	Shift Super Spill Log
02/15/87	300	Tank No. 793	Exxon Formula No. 81744	Shift Super Spill Log
		<u>no. 3 tank fie</u>	ELD	
01/26/88	500	Tank No. 920	F540	Spill/Mixture/Leak Report (01/26/88)

Table P-1.Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
<u></u>		GENERAL TANK	<u>K FIELD</u>	
10/14/90	300	Tank No. 1058	Oil	Spill/Mixture/Leak Report (10/14/90)
10/30/90	1,000	Tank No. 1059	Oily Sludge	General Accident Report (10/30/90)
		SOLVENT TANK	<u> FIELD</u>	
09/22/82	92,400	Tank No. 1033	Isopar L	Exxon Letter to New Jersey Department of Environ- mental Protection (11/16/82)
		LOW SULFUR TAI	NK FIELD	

 Table P-1.
 Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

No documented spills greater than 100 gallons.

# Table P-1. Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
	PIF	ERS AND EAST SIDE TREATME	ENT AREA	
08/12/71	4,200	Pier 6 Upper New York Ge Bay	ar Oil	Supervisor's Report Incident (8/12/71)
05/30/72	4,200	Pier 6 Upper New York Asj Bay	phalt	Oil Spill Report (05/30/72)
08/22/72	21,000	Pier 6 Upper New York No. Bay	. 6 Oil	Oil Spill Report Second Half (1972)
09/10/72	21,000	Pier 6 Upper New York Gas Bay	s-Oil	Oil Spill Report Second Half (1972)
09/19/73	126	Pier 6 Upper New York Un Bay	known	Oil Spill Report Second Half (1973)
10/21/73	210	Pier 7 Upper New York No. Bay	. 2 Fuel Oil	Oil Spill Report Second Half (1973)
02/11/79	168	Pier 7 Upper New York No. Bay	2 Fuel Oil	General Accident Report (02/11/79)

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
	PIERS A	ND EAST SIDE TREATMEN	T AREA (Continued)	
12/19/85	< 1,134	Pier 7 Upper New York Bay	No. 2 Fuel Oil	Spill Incident Report (1985)
11/23/87	100	Piers 6 and 7	Emulsion New York Bay	Oil Spill Summary (1987)
03/21/88	200	Upper New York Bay	Oil	Spill/Mixture/Leak Report (03/21/88)
05/01/88	200	Upper New York Bay	1941 ATF	Spill/Mixture/Leak Report (05/01/88)
10/24/89	100	Pier 7 Upper New York Bay	Diesel Fuel	Bayonne Terminal Incidents (1989)
11/03/89	100	Pier 7 Upper New York Bay	Diesel	Bayonne Terminal Incidents (1989)
05/22/91	350	Upper New York Bay	Xylene	Spill Incident Report (1991)

 Table P-1.
 Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

Table P-1.	Documented Spills at the Exxon	Company Plant, Bayonne, New Jersey.
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Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
	PIERS A	ND EAST SIDE TREATMEN	NT AREA (Continued)	<u>.</u>
06/18/91	16,000	Upper New York Bay	No. 2 Heating	Oil Spill Incident Report (1991)
08/01/91	100	Line Near New Tank No. 1097	Blend Oil	Spill Incident Report (1991)
		DOMESTIC TRADE	AREA	
No documente	ed spills greater than 100 ga	llons.		
		MISCELLANEOUS A	REAS	
11/23/76	147	Kill Van Kull Waterway or Upper New York Ba	y No. 2 Fuel Oil y	Oil Spill Data (1976)
07/13/78	168	Kill Van Kull Waterway or Upper New York Ba	Diesel y	Oil Spill Data (1978)

See footnotes on last page.

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Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		MISCELLANEOUS AREAS (	Continued)	
10/10/78	630	Kill Van Kull Waterway or Upper New York Bay	Asphalt	Oil Spill Data (1978)
12/25/78	210	Kill Van Kull Waterway or Upper New York Bay	Bunker Fuel Oil	Oil Spill Data (1978)
03/28/88	200	Ground	EXXMARX 70-5720	Bayonne Plant 1988 Reportable Spills
01/18/89	6,000	Ground	Motor Oil Dispersant	Spill/Mixture/Leak Report (01/18/89)

Table P-1. Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

# Table P-1. Documented Spills at the Exxon Company Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		MISCELLANEOUS ARE	AS (Continued)	N 8 - 9 - 9 - 9 - 9 - 9 - 9 - 9 - 9 - 9 -
01/21/92	2,500	Tank Transfer	Black Oil	Leaks, Discharges and AIINS Incidents (1992)
10/06/92	100	Tank Number	Unknown Product	Leaks, Discharges and AIINS Incidents (1992)
ATF HQ OCP	Automatic transmi Headquarters. Olefin Co-Polymer	ssion fluid.		

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## ATTACHMENT P-I

#### SPILLS AND FIRES AT EXXON (1966 - 1992) FROM THE CITY OF BAYONNE HEALTH DEPARTMENT



INCIDENT NUMBER	DATE	TYPE OF INCIDENT
1619 -	11-28-66	FIRE PUT OUT BY PERSONNEL
1380 ~	11-7-67	CHEMICAL LEAK USED JET FOAM
1483 =	11-30-67	FLASH FIRE OUT ON ARRIVAL
355 -	11-18-68	SLOP OIL
613 ~	4-23-68	MAIN CATE CAS LEAK
	7-19-68	MAIN GAIL GAS LEAR MANY
	1-27-70	IANA DUDDICU DIDD
90 +	$1 - \frac{1}{2} = 10$	RUBBISH FIRE
.978 -	6-22-70	SECOND ALARM
1009 -	6-28-70	STORAGE TANK
2493 -		OIL SPILL
3079 -	12-12-73	SURFACE FIRE
840 -	3-29-76	FIRE IN PUMP
1561 -	6-11-76	OIL FILLING BUILDING
1710 -	6-23-76	PAINT ON TANK AFIRE
3033 -	11-14-76	CHEMICAL REACTION
567 -	3-18-77	ASPHALT TANK
1039 -	5-6-77	TANK FIRE
33 -	1-5-78	NAPTHA SPILL
327 -	2-14-80	LEAK IN JET FUEL LINE
974 –	5-13-82	STRUCTURE FIRE
1334 -	7-14-84	FIRE IN REACTOR
2555 -	12-18-83	TANK FIELD 4 ALARM
102 -	1-17-84	ASPHALT TANK AFIRE
2138 -	9-4-85	INSULATOR FIRE
3024 -	12-19-85	FIRE INSULATION
1935 -	8-14-86	п и
269 -	1-25-87	11 11
193 - ·	1-24-88	11 II
354 -	2-16-88	FUEL OIL BURNING
504 -	3-4-88	FUEL OIL SPILL
1723 -	7-28-88	FUEL OIL SPILL
2329 -	10-6-88	DIESEL SPILL
2473 -	10-22-89	OIL RESIDUE FIRE
2537 -	10-30-88	OIL SPILL
2578 -	11-4-88	CHEMICAL LEAK
3069 -	12-28-88	FUEL OIL SPILL
0045 -	1-5-89	STRUCTURE FIRE
0141 -	1-18-89	OIL FIRE
0524 -	3-3-89	FUEL OIL SPILL
1079 -	5-18-89	OIL SPILL
4072 -	12-19-89	OIL SPILL
0113 -	1-15-90	TANK LEAKING
0227 -	2-1-90	OIL ADDITIVE SPILL
2864 -	8-25-89	INSULATION FIRE
3370 -	10-17-89	DIESEL OIL SPILL
3542 -	10-24-89	FUEL OIL SPILL
3545 -	10-24-89	LUBE OIL SPILL
4038 -	12-15-89	OIL SPILL
1645 -	7-29-87	INSULATION FIRE
2888 -	12-22-87	FIRE IN TANK
113 -	1-15-88	INSULATION FIRE
1921 -	8-19-88	11 12
250 -	9-25-88	DIESEL SPILL
2294 -	10-1-88	AXFLUX SPILL
1019 -	5-12-89	OIL SPILL
1079 -	5-18-89	N N N
0083	1-18-68	Elec. Pump Failure Oil on gr

#### EXXON CONTINUED

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INCIDENT NUMBER	DATE	TYPE OF INCIDENT
	·	
3643 -	11-7-89	OIL SPILL
0240 -	2-2-90	BUNKER OIL LEAK
0379 -	2-22-90	OIL SPILL
0386 -	2-23-90	NAPTHA SPILL
0425 -	2-28-90	OIL SPILL
0426 -	2-28-90	11 11
0449	3-2-90	HAZMAT INCIDENT
0662 -	4-2-90	HAZMAT LUBE SPILL
0693 -	4-6-90	FUEL OIL
0733	4-10-90	SPILL
0791 -	4-17-90	OIL SPILL
2333 -	10-27-90	012 01222 II II
2353 -	10-30-90	11 H
2357 -	10 - 31 - 90	FF 19
2501 -	11-20-90	HAZMAT INCIDENT
2500 -	11-28-90	LUBE OIL SPILL
	12-18-90	OIL SPILL
2744 -	12-28-90	INSULATION FIRE
	1-15-91	SPILI.
	1-16-91	OTL SPILL
	6-28-90	SOLVENT SPILL
1702	8-14-90	OTL SPILL
1012	8-17-90	LUBE OIL SPILL
1012 -	8-28-90	CHEMICAL SPILL
1911 -	8-28-90	WATER AND OIL SPILL
1913 -	9-12-90	FLECTRICAL FIRE
2021 -	9-12-90	DIESEL SPILL
2066 -	10-15-90	OIL AND WATER SPIT.
	1-22-01	CDI AND WATER OFFE
01/5 -	2_2_01	HAZMAT OTI. SPILI.
0250	2-0-91	OIL ADDITIVE SPILL
	2-20-91	OTL SPILL
535 -	7-22-91	SDTLL
1489 -	9-1-01	"
1562 -	0-1-71	
16/0 -	9-26-01	п
1/31 -	12.5-01	
2458 -	12-0-01	
2498 -	12-12-01	17
2519 -	1:01.00	18
0187	1 23 03	Barge Fire
0200	1 24 02	CDTII.
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## ATTACHMENT P-II

## FIRE INCIDENTS FROM 1955 TO 1992 FROM THE CITY OF BAYONNE FIRE DEPARTMENT

D Mein- Ja ¢.C. lat 274 5-1519-Ceport, Con 12 Thuc er laz TANK- 917 1955. 3 958 no l 6 -1962 80-1418 il Dis unit 1962 - Erude -1461 - 1962 - Word Staging in tent # 961 + 960 1247 - 1963 - old Inte Erun Aldy.

ESSO-HUMBLE OIL EXXON FAST 22NO. ST. 16191/2 - NOTIFIED "128 166 - PUT OUT BY PERSONNEL 1380- 11/7/67- HEXANE LEAK USED JET FEAM 1483 - 11/30/67-CHEM- PAGOUCT FLASH FIRE OOA 83- 1/18/68-FLEC fump FAILURE . GATE 3 ON GROWND 1207-8/30/68- STO . D BY FIRE ALERT 1208- 5130168. ACCUSENT ENJAY SUBSIDIARY OFHUMALE 213. 2/15/64 See CUPY 90 - 1-17-70 CAN THOP BUTBACE FIRE Second alarm. Storage tank . 1009-6/28/70 Humble Esso Dil. Refinery East 22nd St. 16191 - NOTIFIES" 28 166 - PUT OUT BY PERSONNEL 1380 - 11/2/67. CHEM LEAR USED JET X FORM 1483 . 1/30/67. FLASH FIAE CHEM. PAODUCTS O.C.A. 355 - 1968 - SLOP OIL - SOUTH OF UNION TR. CO. 613-4/23/18 MAIN GAT - GAS LEAK (HATURAC) 1003-7/19/63 TING 15- 1/4/20 Smake scare

TIERRA-B-000306

55-1/9/72 - Menior fire (Itale 3) 682 - 4/6/72 - June abut 2007.6/13/72 Fire abut 2377 11/11/72 2 - Glam IME.K. Get) 2606 - m/1/22 . Burnie Touch 405-1964 730 - 1964 - Ship oil Pit Carl of Lowestic Sales. # 1505-1964 - SLOP OIL + CIL SLUDGE. 8.3-1965-WAX PLANT. 1537 - 1965. DomESTIC JOLES TANK TRUCK 1190-1966- Impage FUELMIX-CAUSED Smalle REC'D FROM STO OIL Co. A. MR. O'CONNOP FIRE IN WAY PRESSING PUT OUT BY PERCONNEL (11/28/66) FILE + 16151/2 - Imrke Source 7/2/0/70

EXXON Composet think. 511 3 - 19 - 27 - A torre wing 57/ 3-12-17 1034 TARK STRES 5-6-77 1075 5.14 77 RIJOUN 1921 ESTE SCREES 8 8 12 1974 8-16-17 . . , ر 33 1-5-78 MERTER SFIL-10/30 /78 2505 NO CAUSE HARTERCO 2-8-79 283 BOMBSCARE PIER C BRACHE 1630 7-30-79 TRAINMENT TANK TRUCK EXXON. 4-27-75 1089 from tau femoved men 8-1-75 1827 12-17-75 -2927 3-29-76 840 6-9-76 1531 Elin Led 6-11-76 1511 and to tak fire 6.23.26-1710 Tion 7-1-76 1793. Channal reserver 11-14-76 3033 Ξ× 1358 6-9-73 2073 8-30-73 2493 3079 309/ 14-73 1095 51 8174 1292 5/28/74 2349 8-74 2359 9-20-74 :

5-13-85 1122 Fine And Querkented Tree 1132 In Fine 2-19-85 3024 neulation -19-85 3037 12 Tondel Com 1-9-He bish 1 23-86 202 1-24-86 8-1476 sc Juif 1-25-82 For EXXON 2415 12-6-92 TRAIN DERAILMENT 334 2-22-83 RAGS BURNING ON TUG 2115 10-26-83 Bomb Scare Tank Field - Yelam Frie 12-18-23 2555 folmento producto 1=1= JY \_\_\_ Lephalt Tank 7 \_\_\_ 102 1-18-24 Electrical Start 101: 343 2.27- By Trailer Fire 3-13-24 Tug Tic Guil # 2 37 4-10-8 Bond Scare XXON Æ ってだ 10-35-73 FIRE IN INSCLATION ARESING 3192 224 - 3-3-8: REPART OF BRUH FIRE 2-13-50 524 BOMB SCARE 2-14-80 LEAK IN DET FUEL LINE 3-27 . FARLEY GENERATOR ON SARGE 1009 5-30-80 6-13-80 SHOKE IN ARCA 1103 7-21-50 1420 SMOKE FROM PROFESSING FURNALS 5-55-51 1031 FROM THE BOILD FROM - EXXER PARGER 11 - 51 FIEL IN ENDINE FORTH EARINE STATE ĺ. 1116 10-13-51 BOMB SCREE 1866

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# SITE HISTORY REPORT

## BAYONNE PLANT BAYONNE, NEW JERSEY

## VOLUME 1 OF 3

NOVEMBER 1994

PREPARED FOR



EXXON COMPANY, U.S.A.



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TIERRA-B-000315

## SITE HISTORY REPORT BAYONNE PLANT BAYONNE, NEW JERSEY

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## VOLUME 1 OF 3

November 1994

Prepared for

Exxon Company, U.S.A. 1400 Park Avenue Linden, New Jersey 07036

Prepared by

Geraghty & Miller, Inc. 201 West Passaic Street Rochelle Park, New Jersey 07662 (201) 909-0700

GERAGHTY & MILLER, INC.



#### SITE HISTORY REPORT BAYONNE PLANT BAYONNE, NEW JERSEY

November 21, 1994

Geraghty & Miller, Inc. is submitting this Site History Report to Exxon Company, U.S.A. as required for a remedial investigation at the Bayonne Plant in Bayonne, New Jersey. The report was prepared in conformance with Geraghty & Miller's strict quality assurance/quality control procedures to ensure that it meets industry standards in terms of the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,

GERAGHTY & MILLER, INC.

Marie F. Welow

Marie F. McDonnell Project Scientist/Project Manager

Brian A. Blum Principal Scientist/Operations Manager

Daniel A. Nachman Vice President/Project Officer

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**SECTION 1** 

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#### SITE HISTORY REPORT BAYONNE PLANT BAYONNE, NEW JERSEY

#### 1.0 INTRODUCTION

In September 1992, Geraghty & Miller, Inc. was retained by Exxon Company, U.S.A. (Exxon) to prepare a Site History Report and a Remedial Investigation (RI) Work Plan for the Exxon Company, U.S.A. Bayonne Plant, in Bayonne, New Jersey (Figure 1-1). A draft Site History Report (Geraghty & Miller, Inc. 1993a) was submitted to the New Jersey Department of Environmental Protection (NJDEP) in January 1993, pursuant to paragraph 23 of the Administrative Consent Order (ACO), effective November 27, 1991. Since the signing of the ACO and preparation of the draft Site History Report, Exxon has sold the Bayonne Plant, with the exception of the Lube Oil Area, the contiguous Pier No. 1 Area, and the Stockpile Area, to International Matex Tank Terminals (IMTT).

Following the receipt of formal comments from the NJDEP dated August 18, 1994, meetings were held on September 15 and 20, 1994 between the NJDEP, Exxon, and Geraghty & Miller to discuss the warranted modifications to the Site History Report. The Site History Report has been revised in accordance with the NJDEP comments and the September 1994 discussions. This report represents a comprehensive gathering of information related to site environmental conditions at the Bayonne Plant. The Site History Report is part of the RI scope of work and is essential to the development of the RI Work Plan (Geraghty & Miller, Inc. 1993b), which was submitted concurrently with the draft Site History Report. The scope of the RI Work Plan has also been modified based on the NJDEP comments. These changes were incorporated into the Memorandum Modification to the RI Work Plan, which was submitted in October 1994 to the NJDEP (Geraghty & Miller, Inc. 1994a). Throughout this Site History Report, the terms Site and Plant will be used interchangeably with Bayonne Plant.

#### 1.1 PURPOSE AND SCOPE

The intent of this document is to fulfill the requests outlined in Appendix B, Section II.B, items 7 and 15, of the ACO and to provide the basis of information from which to proceed with the development of a logically organized RI field program. Additional site history information requested in Appendix B, Section II of the ACO was provided to the NJDEP under separate cover as part of the ACO deliverables (Geraghty & Miller, Inc. 1993a). A thorough analysis of existing data was required to accurately characterize site conditions and develop a conceptual model of the Bayonne Plant. The review of existing data was integral to the identification of data needs and potential areas of contamination, the selection of sampling locations, the grouping of areas to be investigated, and the sequencing of field tasks. The thorough search of existing information and data that is documented in this report will allow for a more efficient RI by focusing the investigation to fill the data needs.

The site history review included an extensive collection and evaluation of information and data found primarily in Exxon's files or in the files of their attorneys and other consultants. Additional data were collected by reviewing the files of state and local agencies such as the NJDEP, the City of Bayonne Health Department, and the Bayonne Fire Department. The site history review included the compilation of environmentally pertinent information associated with the Bayonne Plant into a manageable electronic database. This environmental database stores information in a retrievable format and has been used to help assess the current knowledge of site conditions.

#### 1.2 LOCATION AND SETTING

The Bayonne Plant (referred to as the Bayonne Terminal in the ACO) is a 288-acre (250 land and 38 riparian waterfront acres) facility located in the City of Bayonne, Hudson County, New Jersey (Figure 1-2). The Plant is located in the southwestern part of the Jersey City, New Jersey, U.S. Geological Survey (USGS) (1981) topographic quadrangle (see Figure 1-1). The property is situated in the southeastern part of the City of Bayonne, referred to as Constable

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Hook, which is an industrialized penninsula in Upper New York Bay. The following sections describe the surrounding land use and history of the Constable Hook Area.

#### 1.2.1 <u>Surrounding Land Use</u>

The Bayonne Plant is surrounded by heavy and light industry, interconnected by a transportation network of roadways, railroads, and the navigable waters of the Kill Van Kull and Upper New York Bay.

Two industries (IMTT and ICI Americas, Inc.) and Platty Kill Creek are located to the west (see Figure 1-2); numerous industries, Lower Hook Road, 22nd Street, a spur of Conrail's Lehigh Valley Rail Road, and Upper New York Bay are to the north. Several neighboring industries (Gordon Terminal Service Company, Powell Duffryn Terminals, Inc., O Blue Circle Atlantic, Inc., Amerada Hess Corporation, P. D. Q. Plastics, Interglobal Forwarding Services, Inc., G & B Packaging Company, Inc., Rafaella, Wiesen Ocean Product Corporation, Grand Corrugated, and Constable Terminal Corporation) and the Kill Van Kull Waterway are located to the south.

The closest non-industrial (commercial or residential) establishments are about 0.4 mile to the south, across the Kill Van Kull Waterway, in Staten Island, New York, and about 0.65 mile to the west, along 22nd Street in Bayonne, New Jersey. The Plant is in close proximity to the center of the largest urbanized area (New York-Northeastern New Jersey Urbanized Area) in the United States (Forstall 1992). This area is noted by the U.S. Census Bureau as being the most populated area in the United States (approximately 16,044,000 inhabitants) and one of the most populated areas in the world (Forstall 1992). The region and vicinity are also extensively industrialized and contain a vast transportation network of highways, railways, airports, and shipping.

#### 1.2.2 History of Constable Hook

The Constable Hook area has undergone many changes since it was first settled in the 1600s. Constable Hook was discovered by a Dutch navigator in the 1600s. The Council of the Netherlands rewarded Konstapel (Dutch for gunner) John Jacoben Roy with a grant of 300 acres on the "Hoeck" of land along the Kill Van Kull (Standard Oil Company 1936). In the late 1600s, all of the land in Bayonne west of Broadway and Avenue E was parcelled out in land grants by the Dutch governor to four families.

Much of the hook consists of reclaimed land that was filled beginning in the 1800s (NJDEP 1990). Residential dwellings and farming communities predominated in the area until 1812. From 1812 to 1850, the Hazard Powder Company operated a munitions factory on the southern extremity of the Hook to manufacture munitions for use in the War of 1812 (Standard Oil Company 1936). From 1862 to 1874, almost all property in the Constable Hook area was owned by Central Railroad of New Jersey (Fairchild 1994a).

Since the late 1800s, nearly all of Constable Hook has been occupied by the petrochemical industry (NJDEP 1990). The Prentice Refining Company established a small kerosene refinery in the Constable Hook area in 1875. The operation, which was primarily located in the areas currently occupied by the Lube Oil Area and portion of the "A"-Hill Tank Field (Figure 1-2), involved 20 employees producing 2,000 barrels (bbls) per day using 12 refining stills (Fairchild 1994a). In 1877, John D. Rockefeller, as Standard Oil Company (the predecessor company of Exxon), purchased the Prentice Oil Company refinery and several adjacent tracts of land totalling 176 acres (Fairchild 1994a).

From 1877 to approximately 1971, the Plant was operated as a refinery, and up to 1936, underwent significant growth and expansion. During this period, Exxon, under the name of its predecessors (Standard Oil Company [New Jersey] and Standard Oil Company of New Jersey), purchased numerous surrounding tracts of land on Constable Hook. Based on historical maps and aerial photographs, the Bayonne Plant occupied a large portion of the Hook area. At the

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peak of plant operations in 1936, Standard Oil Company owned and operated approximately 650 acres on Constable Hook (Exxon Company, U.S.A. 1988a). After 1936, economic factors and changes in the supply of crude oil caused the Bayonne Plant to downsize its refinery operations, focussing more on specialty and terminalling operations. From 1936 through 1947, Standard Oil Company sold numerous parcels of land to various industries.

Based on a review of aerial photographs dated 1940 and 1947, the Constable Hook area was extensively developed as a petrochemical area containing a network of railroad lines, roads, and piers for shipping. Hundreds of storage tanks were present at the Bayonne Plant, as well as at neighboring facilities. The northern portion of Constable Hook was undergoing extensive reclamation from Upper New York Bay. Filling was occurring by sinking boats and barges. In the 1940 aerial photograph, the areas to the south of the plant showed limited development and were being filled. By 1947, further development had occurred in the waterfront area in the northern part of Constable Hook, and additional filling had taken place north of the Plant area in Upper New York Bay. As shown in the 1947 photograph, additional railroad spurs, Lower Hook Road, and the Avenue J extension had been constructed by 1947. Aerial photographs dated 1951, 1959, and 1961 indicate that extensive filling continued into Upper New York Bay. Older storage tanks at the Plant had been replaced and larger storage tanks and additional product transfer lines had been added.

In 1963, as a result of a major modernization and dismantling program that had begun in 1955, approximately one-third of the 330-acre plant lay vacant (Humble Oil & Refining Company 1961). Under an industrial development program adopted by Humble Oil & Refining Company (the successor company created by the merger of Esso, Humble, Carter, Pate and Oklahoma Oil Companies), in cooperation with the City of Bayonne, to entice industrial firms to locate on Humble's Constable Hook property, numerous tracts of land were sold to various industries for immediate construction (Humble Oil & Refining Company 1961). The area to the north of Lower Hook Road and the Bayonne Plant was operated by the City of Bayonne from approximately 1952 through the 1960s as a municipal dump (NJDEP 1990). Aerial photographs dated 1966, 1968, and 1970, indicate that significant filling and grading activity took place in the northern portion of Constable Hook during this period. By 1968, many buildings had been constructed on previously filled-in land and many of the roads, particularly Avenue J, had been modernized to the present-day configuration. Downsizing of plant operations continued until 1971 to 1972 when all refining and manufacturing operations ceased, with the exception of operations in the Exxon Chemicals Plant Area. Aerial photographs dated 1974, 1977, and 1984 indicate that further development occurred in the area south of the Bayonne Plant. By 1984, the area north of the General Tank Field was overgrown with vegetation. By 1989, the Bayonne Plant and its environs on Constable Hook resembled its present-day configuration.

In 1991, when the ACO was executed, Exxon owned 288 acres on Constable Hook, as depicted on Figure 1-2. On April 1, 1993, Exxon sold the entire property in 1993 to IMTT, with the exception of the Lube Oil Area, Pier No. 1 Area, and Stockpile Area. Tax maps depicting the various block and lot numbers that comprise the Bayonne Plant, are provided in Appendix A. The history and operations of the 288-acre plant are discussed in greater detail in Sections 3.0 (Bayonne Plant History/Operations) and 5.0 (Operational Areas at the Bayonne Plant) of this report. Areas formerly owned and/or operated by Exxon that are not located within the 288-acre property boundaries defined by the ACO are not addressed in this Site History Report or the RI Work Plan (Geraghty & Miller, Inc. 1993b).

#### 1.3 REPORT ORGANIZATION

This report is consistent with the ACO and the site history aspects of New Jersey Administrative Code (NJAC) 7:26E, Technical Requirements for Site Remediation, which became effective on July 1, 1993. A description of the current understanding of environmental conditions at the Bayonne Plant and pertinent environmental information known about the Site have been included in this document. Specific site history items requested in the ACO, such as aerial photographs, a list of raw materials used, and a summary of the environmental penalties incurred, were previously forwarded to the NJDEP in January 1993 as part of the ACO deliverables (Geraghty & Miller, Inc. 1993c). The RI Work Plan (Geraghty & Miller, Inc. 1994a)

describe the investigation that will be necessary to collect the additional information needed to properly evaluate potential remedial measures.

Subsequent sections of this report describe the physical setting of the Bayonne Plant and the current knowledge of operations and environmental conditions. Section 2.0 describes the physical characteristics of the Site, including topography and drainage, climate, soils and vegetation, geology, and hydrogeology. Section 3.0 describes the owner/operator history, presents an overview of plant operations, and discusses environmental permits and waste disposal practices. Section 4.0 provides a summary of previous site investigations conducted at the Bayonne Plant. Section 5.0 provides a description of the historical operations, areas of potential contamination, previous investigations, and interim remedial measure (IRM) activities performed in each operational area. Section 6.0 identifies remaining data needs that will be addressed in the RI Work Plan. Section 7.0 provides a list of references. To facilitate review of this document, a glossary of refinery terms is provided after the reference section in a section entitled "Glossary." Maps, reports, and documents that were compiled as part of the site history evaluation, but are not specifically referenced in this report, are provided as bibliographies in the appendices.

Because of the extensive operational history of the Site (more than 115 years), the data collected and compiled are voluminous and, therefore, have been reduced to what is perceived to be potentially useful from the perspective of future remedial decision making. However, to comply with the specific requests of the ACO, which require "raw" information pertinent to various report sections, documents sent under separate cover to the NJDEP will be referred to in this report.

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**SECTION 2** 

#### 2.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

This section describes the regional and local physical setting at the Site. Discussed below are topography and drainage, climate, soils and vegetation, geology, and hydrogeology.

#### 2.1 TOPOGRAPHY AND DRAINAGE

The Site is located in the portion of Bayonne known as Constable Hook, which can be described as a spit or peninsula protruding into Upper New York Bay. The topography in the Constable Hook area is gentle, with elevations ranging from 0 to about 25 feet above mean sea level (msl). Most of the Site is at an elevation of 10 to 15 feet above msl, with the exception of the shoreline, which has lower elevations, and the tops of the berms surrounding the tank fields, which have higher elevations (see Appendix B).

Under natural, undisturbed conditions, direct runoff from the Site would drain directly into Upper New York Bay or the Platty Kill Creek and Kill Van Kull Waterway. However, under current conditions at the Site, precipitation in the tank field areas does not run off directly because of the spill prevention berms. The diked tank fields are designed to drain at controlled rates into sewers and subsequently to treatment facilities. Most of the Site is graded to direct runoff into the sewer system, which ultimately discharges, under New Jersey Pollutant Discharge Elimination System (NJPDES) Discharge to Surface Water (DSW) Permit No. NJ0002089, via the East Side Treatment Plant, to Upper New York Bay, at the confluence with the Kill Van Kull Waterway. Only precipitation falling at the extreme perimeter of the Site (e.g., the area immediately east of the General Tank Field), adjacent to the waterfront (riparian land), runs off directly into the adjacent waterways.

#### 2.2 CLIMATE

Although greatly modified by the Atlantic Ocean, the climate of Hudson County is humid-continental. The climate is dominated by continental influences because air masses and weather systems affecting Hudson County have their origin principally over the land areas of North America. A maritime influence is also significant. Such characteristics of the climate as an extended period of freeze-free temperatures, a reduced range in both diurnal and annual temperature, and heavy precipitation in winter relative to that in summer are a result of the county's maritime exposure.

Periods of extreme cold are, in most years, of short duration. The average annual rainfall in the area is about 42 inches, as measured at Newark International Airport (National Oceanic Atmospheric Administration [NOAA] 1991). The average annual temperature is 53.4 degrees Fahrenheit (°F). The highest average monthly temperature occurs in July (76.8°F) and the lowest average monthly temperature (31.3°F) occurs in January (NOAA 1991). The predominant wind direction on a regional scale is from the west-southwest; however, localized flow patterns (eddies) do exist.

#### 2.3 SOILS AND VEGETATION

Because of the extensive urbanization in Hudson County, no recently published information describing the soils in the area is available. A study conducted by researchers at Rutgers University (Lueder et al. 1952) describes the soil at the site as "Reclaimed" because of the extensive amount of filling that took place on Constable Hook to bring it to its present configuration. Historic aerial photographs (previously described in Section 1.2.2 [History of Constable Hook]) depict a significant portion of the Site being filled and "reclaimed" from Upper New York Bay and the Kill Van Kull Waterway. The nature of the fill varies across the Site and is described in more detail in the following sections.

The area is sparsely vegetated due to the extensive industrial setting. Vegetation is limited to grasses and low-lying shrubs (native and ornamental), with occasional ornamental hardwood trees planted near the main building. More natural vegetation exists on the Site in limited undeveloped pockets adjacent to Upper New York Bay (e.g., area to the east of the General Tank Field).

#### 2.4 GEOLOGY

This section provides a description of the regional and site-specific geology. Interpretation of the regional geology is based on information provided in regional or countywide studies conducted by the USGS or other researchers as referenced below. Local geologic information has been interpreted by reviewing hundreds of historical boring logs drilled across the site for geotechnical purposes (e.g., foundation analysis for tanks and buildings) or monitoring and recovery well installation. The majority of the historical soil borings were drilled at the Site in the 1950s and 1960s. Historical borings for which there are verifiable horizontal and vertical reference data are shown on Figure 2-1. The borings and wells depicted on Figure 2-1 have been extensively evaluated by Geraghty & Miller and the corresponding lithologic information has been put into a geographic information system (GIS) database. Information from 512 soil borings, 40 monitoring wells, and ten recovery wells was compiled and is currently in the GIS database. In addition, lithologic information from 18 soil borings and 35 monitoring wells, recently installed in 1993 as part of ongoing Non-Aqueous Phase Liquid (NAPL) IRM investigations, will be compiled and entered into the database.

#### 2.4.1 <u>Regional Geology</u>

The Site is located in the glaciated portion of the Piedmont physiographic province, which is underlain by mostly late Triassic-age rocks. The Piedmont is characterized in New Jersey by a long and narrow fault-blocked basin bordered on the west by uplifted fault-blocked mountains. The eastern border of the Piedmont lies near Bayonne and Staten Island (Schuberth 1968) and has been mapped by the Geological Survey of New York (1970) as running directly through Constable Hook. The Triassic rocks of the Piedmont include the sedimentary rocks of the Newark Basin Super Group plus intruded units of diabase and interbedded flows of basalt. The Triassic rocks comprise a sequence that attains a thickness on the order of 22,000 feet and dips generally northwestward; the sequence is locally faulted and folded. From northwest to southeast, or youngest to oldest, the sedimentary rocks include the Brunswick Formation, the Lockatong Formation, and the Stockton Formation (McGuinness 1963). More recent studies

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provide a more detailed stratigraphic sequence nomenclature within the Newark Basin Super Group. The Stockton Formation rests on the folded and extensively eroded metamorphic rock complex of the New York City Group. The sedimentary basin deposits are interlayered with extensive basaltic intrusive and extrusive rocks.

The Brunswick Formation has been reclassified as a group that is comprised of several sedimentary and volcanic formations (Olsen et al. 1989). The Passaic Formation (within the Brunswick Group) is the most abundantly exposed unit of the Newark Basin Super Group. It consists mostly of red shale but includes sandstone beds, which are thicker and more numerous in the northeast part of the Newark Basin. The Lockatong Formation consists mostly of dark shales or argillites, but may include some thin-bedded sandstone or conglomerate. The Stockton Formation is mostly an arkosic sandstone and conglomerate.

The igneous deposits consist of either extrusive lava flows of the Watchung Basalt that are interbedded with the sedimentary rocks of the Newark Super Group, or the intrusive diabase of the Palisades, which forms a ridge of massive bedrock with a dark gray, mottled appearance extending from Rockland County, New York, through Hudson County (west of the Site), and ending in Staten Island. Bordering the Triassic deposits in the vicinity of the Site to the east is either the Manhattan Formation, which is comprised principally of mica schist (Geological Survey of New York 1970) or a post-Ordovician serpentinite common to Staten Island (State of New Jersey Department of Conservation and Economic Development 1950). Geologic maps depicting bedrock for both New York and New Jersey show a geologic contact beneath the overlying unconsolidated deposits at the Site; however, the maps differ in their interpretation of the formation. Both interpretations are consistent in that part of Constable Hook is underlain by crystalline metamorphic bedrock. A review of the historical boring logs by Geraghty & Miller indicates that under the Site, glacial till deposits are underlain by the Triassic (Newark Super Group) Stockton Formation, which is comprised primarily of arkosic sandstone and conglomerate.
Unconsolidated sediments deposited by glaciers or by glacial meltwater during the Pleistocene mantle the bedrock surface in much of the vicinity of Constable Hook. These deposits consist of clay, silt, sand, gravel, and boulders. Recent age deposits, primarily marine and near marine sediments composed of silt and clay, and peat (where present), overlie the glacial sediments.

A bibliography of regional geological and hydrogeological reports is included in Appendix C.

## 2.4.2 Site-Specific Geology

The generalized geology of the Site, from the surface downward, consists of (1) a fill layer, (2) a layer of interbedded sand and clay lenses, (3) a glacial till layer, and (4) bedrock.

Previous soil investigations by various drilling or geotechnical engineering contractors provided hundreds of soil boring logs from much of the site (Table 2-1). Generalized hydrogeologic cross sections developed from these soil boring logs are illustrated on Figures 2-2, 2-3, and 2-4; the lines of cross section are shown on Figure 2-1. The borings selected for development of the generalized geologic cross sections are provided in Table 2-2, and the lithologic logs used to develop these cross sections are included in Appendix D. Appendix C includes a bibliography of previous site reports, soil borings, cross sections, grain-size analyses, well construction logs, and historical maps. Reports listed in this bibliography were used to develop a conceptual understanding of site geologic conditions. The generalized site geology described below is based on existing soil boring logs and stratigraphic cross sections.

A fill layer covers most of the site and forms the uppermost deposit. Fill material was used to modify site elevations, provide structural support for tanks and other structures, and reclaim parts of the Kill Van Kull Waterway and Upper New York Bay shoreline. The fill layer varies in thickness from 0 to approximately 30 feet and consists of a matrix of cinders and ash with construction debris, wood, gravel, sand, silt, and bricks.

Beneath the fill layer is a laterally variable sand and clay unit consisting of (1) a gray to brown clay and silt layer, which varies in thickness from 0 to approximately 10 feet; (2) peat and organic soils, which vary in thickness from 0 to approximately 7 feet; and (3) well to poorly sorted sand and silty/clayey sand layers, some with small amounts of gray gravel, which vary in thickness from 0 to approximately 15 feet. The thickest portion of the entire sand and clay sequence is approximately 15 feet. Because the laterally discontinuous clay layers may act as aquitards that can cause perched water-table conditions, they may act as barriers to vertical fluid movement in certain locations. A map of the areal extent of the clay units, as interpreted from historical boring logs, is presented on Figure 2-5.

Beneath the sand and clay layer is the glacial till layer, which is composed of a poorly sorted, stiff to very dense mixture of clay, sand, gravel, cobbles, and boulders; this layer varies in thickness from 0 to approximately 30 feet. Because the elevation of the top of bedrock is difficult to confirm from the existing boring logs in some areas of the Site, the maximum thickness of the glacial till is not known. Figure 2-6 shows the approximate thickness of unconsolidated deposits above the bedrock, where it is known.

Beneath the glacial till layer is bedrock of the Triassic Stockton Formation, which is composed of red to white arkosic sandstone and conglomerate. This is the only type of bedrock lithology that has been documented in the historical borings at the Site. The known depth to bedrock below grade ranges from approximately 20 feet in the western part of the Site to as great as 50 feet in the eastern part of the Site. Contouring of geologic data from historical borings indicates the presence of irregularities in the bedrock surface, which is depicted on Figure 2-7. These irregularities may be natural, due to varying degrees of erosion by glacial and fluvial processes, or may be partially due to the database interpretation. Historically, borings were drilled over many years by several contractors using different equipment and crews, resulting in a varied interpretation of the weathered bedrock contact with the overlying glacial till. Borings may have been terminated at "refusal," often interpreted to be bedrock. In some cases, however, "refusal" could have been created by a boulder, leading to an erroneous identification of the weathered bedrock surface. Examples of these anomalies and discrepancies

in the stratigraphy of the Site include the boring log for the deep test well installed in 1959 by William Stothoff Drilling Company in the Chemicals Plant Area, which indicated a thickness of 98 feet of unconsolidated deposits overlying bedrock. Similarly, historical soil borings on the adjacent IMTT property indicate thicknesses of unconsolidated deposits in excess of 85 feet. The discrepancies in the depth to bedrock and the thickness of unconsolidated deposits at the Site will be addressed as part of the RI by drilling a series of stratigraphic borings across the Site. The configuration of the bedrock surface, as interpreted from historical boring logs, is shown on Figure 2-7. Anomalous bedrock elevations from certain borings, although shown on Figure 2-7, were not used to generate bedrock elevation contours.

# 2.5 HYDROGEOLOGY

This section provides a description of the regional and site-specific hydrogeology.

#### 2.5.1 <u>Regional Hydrogeology</u>

Five major aquifer systems exist and are pumped for water supply in the northeast New Jersey metropolitan area. These aquifers (from youngest to oldest) are (1) till deposits, (2) stratified drift, (3) the Sayerville Sand Member, (4) the Farrington Sand Member, and (5) shales and sandstones of the Brunswick Group. Regional stratigraphy, along with geologic and hydrologic characteristics, is presented in Appendix E. The till deposits are only locally permeable; in most areas, they do not form a significant water-bearing sequence.

With the exception of the till, none of these units is at or within close proximity of the Site. The till deposits outcrop extensively. When grouped with the contemporaneous stratified drift deposits, they constitute a shallow aquifer suitable for domestic supplies. However, these types of deposits do not occur in the vicinity of the Site. Both units were deposited during the widespread glaciation that occurred throughout the area during the Pleistocene.

A computer survey of NJDEP Bureau of Water Allocation files, which document major groundwater withdrawals (greater than 100,000 gallons per day [gpd]), indicates that the closest major withdrawals are more than 4 miles from the Site (see Appendix F). As of November 1992, only two major groundwater supply sources existed within 5 miles of the Site. One of these, operated by the Spinnerin Yarn Co., Inc., is a well with a total depth of 230 feet below land surface (bls) and a capacity of 120,000 gpd. The geologic formation from which this well obtains water has not been determined. The other withdrawal consists of a surface-water pumping intake from the Passaic River and is located 4.7 miles from the Site. According to Mr. James Monkowski of the City of Bayonne Health Department, there are no industrial, domestic, or public water supply wells within a 1-mile radius of the Site (Monkowski 1994). The USGS (McGuinness 1963) has documented certain areas in New Jersey (Bayonne, Linden, Elizabeth) as having groundwater quality problems. As of November 1992, 242 Comprehensive Site List cases were located within a 5-mile radius of the Bayonne Plant. In addition, 48 known contaminated sites are listed in the City of Bayonne (NJDEP 1994). Known contaminated sites include Amerada Hess Terminal, Bayonne City Landfill, Bayonne Industries, Bayonne Terminals, Inc., ICI Americas, Inc., McGovern Trucking, Powell Duffryn, PSE&G, and White Chemical. Documented water-quality problems and potentially low specific capacities may be the reason for the lack of water supply development in the vicinity of Bayonne.

## 2.5.2 Site-Specific Hydrogeology

Limited quantitative information is available regarding the water-bearing properties of the unconsolidated deposits underlying Constable Hook. Soil boring logs suggest that hydraulic characteristics of the fill layer are variable due to its heterogeneous composition. The fill consists of loose, granular material, which is likely to have a generally high permeability if it is well sorted. The water table (usually about 5 to 10 feet below grade) may exist within the fill layer; therefore, shallow groundwater flow and potential NAPL migration will be influenced by the local character of the fill layer. Water-level elevations provided in Table 2-3 indicate that the water table ranges from 2 to 16 feet bls (Dan Raviv Associates, Inc. 1992a,b and 1993a). Floating NAPL has been observed on the groundwater in a number of areas at the Bayonne

Plant. These observations were made during the IRM investigations, which are discussed in greater detail in Section 5.0 (Operational Areas at the Bayonne Plant).

The silt and clay layer below the fill, where present, is a low permeability zone that impedes vertical groundwater flow. Where the silt and clay aquiclude is absent, the fill and sand layers are hydraulically connected. Available boring logs suggest that the till layer (located immediately above bedrock) has relatively poor water-bearing properties because it contains appreciable proportions of silt and clay, is heterogeneous, and is densely compacted.

Figure 2-8 shows the locations of existing site monitoring wells and recovery wells. The monitoring wells previously installed at the Site are insufficient to determine site-wide groundwater flow dynamics. Because historical water-level measurements at the Site were not collected synoptically, were obtained from locations where NAPL was present without applying a correction factor, and were not collected from a sufficient areal extent, the groundwater flow direction cannot be clearly shown. Geraghty & Miller assumes that natural groundwater flow is toward the surface-water bodies surrounding the Site. The site geologic information suggests that the fill layer is in hydraulic connection with the Kill Van Kull Waterway and Upper New York Bay. The hydraulic connection of groundwater and surface water can be demonstrated by the influence of tidal fluctuations on water-table elevations in several areas of the Site.

Underlying the unconsolidated deposits at the Site is the Stockton Formation. This formation is not used as a source of groundwater on Constable Hook. Because the Site is located on a spit in Upper New York Bay (a hydraulic groundwater discharge environment) and there is no groundwater pumpage on Constable Hook to modify the local flow regime, Geraghty & Miller assumes that groundwater in the Stockton Formation ultimately discharges into Upper New York Bay.

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SECTION 3

#### 3.0 BAYONNE PLANT HISTORY/OPERATIONS

This section describes the past and present operations at the Bayonne Plant, including the owner/operator history, the types of operations, environmental permits, and past and present waste disposal practices. This section focuses on site-wide history and operations, while Section 5.0 (Operational Areas at the Bayonne Plant) describes the history and operations in the individual operational areas of the Plant. Operational areas of the Bayonne Plant are shown on Figure 3-1. Details regarding historical facilities, structures, and potential areas of contamination (e.g., transformers, loading/unloading areas, oil/water separators, and former process areas) are provided in Section 5.0 and depicted on associated figures. The information provided below describes operations conducted by Exxon prior to the sale of the majority of the plant to IMTT. Changes in operations or operational areas that occurred or will occur after the property transfer, will not be discussed in this Site History Report. Throughout this section of the report, the Site will be referred to as the Bayonne Plant, or Plant, even though it was historically known by the names, "Bayonne Works," "Bayonne Refinery," and "Bayonne Terminal."

#### 3.1 OWNER/OPERATOR HISTORY

As previously discussed in Section 1.2.2 (History of Constable Hook), the Constable Hook area, including the area on which the Bayonne Plant is currently situated, was owned and occupied by Dutch settlers in the late 1600s and early 1700s (Standard Oil Company 1936). In 1730, Peter Van Buskirk purchased the entire Constable Hook area, which then occupied approximately 500 acres, from Hartman Claasen (Fairchild 1994a). Until 1812, the Hook area was occupied by dwellings, farms, and a cemetery. In 1846, a portion of the the Van Buskirk farm was purchased by E. Montgomery Patterson (now the Lube Oil Area), Samuel Tracy (the former No. 2 and No. 3 Plant areas), and Peter C. Cornell (the lower Hook area) (Fairchild 1994a). The former No. 2 and No. 3 Plant areas at the Bayonne Plant are comprised of the following current operational areas: No. 2 Tank Field; AV-Gas Tank Field; Asphalt Plant, Exxon Chemicals Plant Area; No. 3 Tank Field; and a portion of the Main Building Area. These operational areas are shown on Figure 3-1. The Hazard Powder Company owned and

operated a munitions plant in the former Pier No. 4 area from 1812 to 1850 (Standard Oil Company 1936). During the period of 1862 to 1874, almost all of Constable Hook was owned by Central Railroad of New Jersey (Fairchild 1994a). Prior to 1862, most of the uses of the various parcels that currently comprise the Site did not present serious environmental impacts.

The Bayonne Plant has an extensive owner/operator history as a petroleum refinery and storage terminal (more than 115 years). In 1875, the Prentice Refining Company established a small kerosene refinery in the area currently occupied by the Lube Oil Area, the Pier No. 1 Area, and a portion of the "A"-Hill Tank Field (Figure 3-1). In 1877, John D. Rockefeller, as Standard Oil Company (Ohio), purchased the Prentice Refining Company property from George Chester. Adjacent parcels of land were purchased from 1877 to 1881 by Standard Oil Company (Ohio) from Thomas White (eastern portion of the Lube Oil Area), Central Railroad of New Jersey (the Main Building Area), and Peter Cornell (Low Sulfur Tank Field, Solvent Tank Field, Pier No. 5 and 6 areas) (Fairchild 1994a). The original Bayonne Plant occupied approximately 176 acres (Standard Oil Company 1936). In 1882, Standard Oil Company (Ohio) transferred all New Jersey property to a new company, Standard Oil Company of New Jersey (Fairchild 1994a). The company of New Jersey) in 1892. In 1927, all assets were transferred from Standard Oil Company (New Jersey) to Standard Oil of New Jersey, which was incorporated in Delaware as a manufacturing and marketing company (Fairchild 1994a).

During the period of 1882 to 1936, numerous surrounding tracts of land on Constable Hook were acquired to accommodate expanding refinery operations (Fairchild 1994a). Additional parcels of land purchased to comprise the current Bayonne Plant configuration include those from Warren Delano (portions of the AV-Gas Tank Field, No. 2 Tank Field, Asphalt Plant Area, Utilities Area, Exxon Chemicals Plant Area, and No. 3 Tank Field Area) Edward Clark (15 acres along Platty Kill Creek), Emmet Smith (portion of the Main Building Area), John Bowers (portion of the No. 3 Tank Field), New Jersey Storage Company (Metropolitan Distribution Center [MDC] Building Area), and John Andrus (Pier No. 7 area) (see Figure 3-1). In 1938, the Stockpile Area was acquired from the Tidewater Oil Company (Fairchild 1994a).

At the peak of refinery operations in 1936, Standard Oil Company of New Jersey owned approximately 650 acres on Constable Hook (Standard Oil Company 1936). From 1936 to 1947, Standard Oil Company of New Jersey sold numerous tracts of land. In 1948, Standard Oil Company of New Jersey became Esso Standard Oil Company. In 1959, Humble Oil & Refining Company was formed from the merger of Esso, Humble, Carter, Pate, and Oklahoma Oil Companies (Fairchild 1994a).

Beginning in 1955, the Bayonne Plant underwent a modernization program. In 1959, the present-day Domestic Trade Area was purchased from Harold Holding Company (Fairchild 1994a). By 1963, Humble Oil & Refining Company owned and operated 330 acres, of which approximately one-third was idle as a result of plant modernization and downsizing (Humble Oil & Refining Company 1961). During the 1960s, vacant parcels were sold to various neighboring industries. In 1968 and 1969, additional space was purchased from the City of Bayonne to accommodate additional tankage in the General Tank Field Area (Fairchild 1994a).

Plant operations continued to downsize until 1971. By 1971, all refining operations had been discontinued at the Bayonne Plant. Plant acreage essentially remained the same from 1971 to 1993. From 1972 to 1993, the plant was operated by Exxon (the successor company of Humble Oil & Refining Company) as a petroleum products storage terminal and specialties plant. Two Exxon divisions, Exxon Company, U.S.A. and Exxon Chemicals America, carried out operations at the Bayonne Plant. Exxon Company, U.S.A. operated a marketing terminal consisting of the storage, packaging, and distribution of petroleum products. Exxon Chemicals America operated a limited chemicals plant that manufactured lube oil additives; the Chemical Plant was partially dismantled during the period of 1991 through 1993. The entire plant area, with the exception of the Lube Oil Area and the contiguous Pier No. 1 and Stockpile Areas, was sold to IMTT in April 1993. Exxon still operates and maintains the Lube Oil Area as a lube oil and wax products storage, blending, and packaging terminal.

## 3.2 OVERVIEW OF PLANT OPERATIONS

This section describes the evolution and development of the Bayonne Plant and provides an overview of historical plant operations. Historical buildings, structures, and operations discussed in this section are described in detail in Section 5.0 (Operational Areas at the Bayonne Plant).

From 1877 to 1971, the primary activity at the Bayonne Plant was petroleum refining. When Standard Oil Company purchased the Prentice Refining Company operation in 1877, the plant consisted of 12 batch refining stills operated by 20 workers producing approximately 2,000 bbls a day (Standard Oil Company 1936). The original refining operation was concentrated in the areas currently occupied by portions of the Lube Oil Area and the "A"-Hill Tank Field, and included a few docks on the Kill Van Kull Waterway and limited steam and mechanical facilities (see Figure 3-1) (Fairchild 1994a). Crude oil was delivered to the refinery by barrel from the Pennsylvania oil fields. The crude was refined into kerosene, lubricating oils, and grease for wagon axles (Exxon Company, U.S.A. 1988a). In 1881, United Pipe Line (National Transit Company) completed the first pipeline, which was 6 inches in diameter, from the Pennsylvania oil fields to the Bayonne Refinery (Fairchild 1994a). In 1887, a compound building was added to the Lube Oil Area. During 1890 and 1891, the installation of 40 batch stills increased the distillation capacity of the refinery from 2,000 to 20,000 bbls a day. In 1891, a wooden barrel factory was built in the southern portion of the current Lube Oil Area; one year later, the wooden barrel factory was destroyed in a fire, and a new and partially mechanized factory was rebuilt in 1893 (Standard Oil Company 1936). The new barrel factory encompassed the Bottle Filling Building and eight stave sheds to the north and east with a kiln and boiler house. The barrel factory produced 10,000 to 15,000 bbls a day for shipping of lubricating oils and kerosene.

In 1893, the distribution of kerosene to consumers was simplified by the construction of a Case & Can Plant for the manufacture of 5- and 10-gallon cans, and wood cases for shipping metal containers (Standard Oil Company 1936). The Case & Can Plant was located to the west

of the current MDC Building area and produced approximately 100,000 cans a day. In 1896, the Kline saltwater pump house was erected on the Kill Van Kull Waterway in the Lube Oil Area. The pump house consisted of a two-story building housing a 500-horsepower (hp) steam pump (Fairchild 1994a). The second floor was initially used for office space and later as a laboratory in 1928. Also in 1896, portions of the current No. 2 Tank Field and AV-Gas Tank Field were purchased for expansion of operations (Fairchild 1994a). In 1897, a portion of the current No. 3 Tank Field was purchased to expand the former No. 3 Plant. The former No. 3 Plant represents the area currently occupied by the Asphalt Plant, Exxon Chemicals Plant Area, and the No. 3 Tank Field. In 1898, new and larger equipment was installed for purifying oil by treatment with copper oxide, and another 24,000 gallon per minute (gpm) saltwater pump house was constructed in the lower Hook area (Fairchild 1994a).

In the early 1900s, the petroleum industry expanded rapidly as a result of the invention of automobiles and the development of roads. Experimentation associated with the development of the automobile converted gasoline from a waste product to a major petroleum commodity. The need for better roadways led to the derivation of asphalt from certain crude oils. The uses of wax also increased, necessitating improvements in the manufacture of the product, as well as changes in the size of equipment. These changes were reflected in the rapid expansion of the Bayonne Plant during the early 1900s. In 1902, additional land, consisting of the present-day Utilities Area, Exxon Chemicals Plant Area, and portions of the Asphalt Plant Area and No. 3 Tank Field, was purchased to complete the No. 3 Plant (Fairchild 1994a). In 1907, three batteries of 12 continuous stills were placed in operation, increasing the capacity of the plant to 44,000 bbls a day. Older batch stills were converted to pitch stills to handle oxidation and steaming of asphalt (Fairchild 1994a). The Main Office Building was constructed in 1908 (Fairchild 1994a); the location of the original Main Office Building was in the southeast portion of the Lube Oil Area. In 1909, 12 modern wax sweaters and wax filters, including the wax "hot house" or "cook" building, were installed for the separation of oil from the wax and removal of sediment. From 1912 to 1916, 12 additional wax sweaters were erected in the present-day Lube Oil Area (Fairchild 1994a).

From 1910 to 1915, docking facilities were established at the Bayonne Plant. In 1910, a wharf at Pier No. 1 was built (Fairchild 1994a), and sometime between 1910 and 1912, Pier No. 3 was constructed. In 1912, the tanker Dunhold exploded and destroyed Pier No. 3 (Fairchild 1994a). Pier Nos. 1, 6, and 5 were constructed in 1913, 1914, and 1915, respectively (Fairchild 1994a). In association with the construction of a box factory, the No. 3 Plant separator and pump house were constructed in 1914. The MDC Building was also built in 1914, and in 1915, a specialty plant was erected in the Lube Oil Area for the manufacture of commercial products known as Flit, Nujol, and Mistol (Standard Oil Company 1936). These operations were later transferred to the Bayway Refinery in Linden, New Jersey.

World War I and the ensuing period created a further increase in the need for gasoline and lubricating oils. Pier No. 7 was constructed in 1916 by Lehigh Valley Railroad for unloading coal, which was then the source of energy for the boiler houses. A pump house and agitators were added to the present-day Lube Oil Area for light gas oil and heavy naphtha processes (Fairchild 1994a). In 1918, the Domestic Trade Office was constructed in the vicinity of 22nd Street, and a light oil filling building was built. The Bayonne Plant undertook an equipment expansion program that culminated in 1920 with a total of 142 crude stills producing over 77,000 bbls a day (Fairchild 1994a). In 1924, a locomotive house was constructed, the No. 9 pump house was added in the General Tank Field, and acquisition of the acreage comprising the No. 3 Plant was completed (Fairchild 1994a).

The constantly increasing demand for gasoline began to present a problem in product balance in the post-World War I era. The quantity of gasoline produced was found to be insufficient. Since gasoline was derived from the primary distillation of crude oil, the result was an excess supply of other petroleum products. Technological developments introduced the cracking coil, which allowed an increased yield of gasoline per barrel of crude oil, to the refining industry. In 1925, 12 cracking coil units were installed at the Bayonne Plant in the present-day Domestic Trade Area (Standard Oil Company 1936). Cracking operations were later transferred to the Bayway Refinery in Linden, New Jersey, due to space restrictions. From 1928 through 1934, numerous additions were made to plant operations. Five pipe stills, labeled

"A" through "F," were erected (Fairchild 1994a); boiler houses switched from coal to oil in 1930; and a two-story cooperage building was constructed in the present-day AV-Gas Tank Field Area to oxidize and package asphalt (Fairchild 1994a). Also in 1930, additional property, consisting of the present-day Piers and the East Side Treatment Plant Area, and an area east of the General Tank Field, was purchased along the Kill Van Kull Waterway. A Phenol Lube Oil Treating Plant, located in the present-day Stockpile Area, was erected in 1934 to process a higher grade of premium lubricating oil through the use of phenol to remove the low-grade constituents (Standard Oil Company 1936).

In 1932, chemical manufacturing began at the Chemical Plant with the production of "Paraflow," a lube oil additive (Standard Oil Company 1936). The chemical plant operated under the trade name Paramins and was therefore called the Paramins Plant. The plant also used an on-site laboratory for product testing and research (Dan Raviv Associates, Inc. 1992a). Products manufactured included viscosity modifiers, pour depressants, and friction modifiers.

In 1936, the Bayonne Plant had reached peak operational capability. At this time, the Bayonne Plant employed over 5,000 workers and consisted of 650 acres, 13 docks, inter-refinery pipe lines (IRPLs), ten boiler houses, and electrical operations (Standard Oil Company 1936). The Case & Can Plant and the barrel factories were still in operation (Fairchild 1994a). Processes included distilling crude oil into various fractions or component parts, such as gasoline, naphtha, heating oil, and asphalt; blending and shipping of lubricating oils; manufacturing asphalt; and producing wax (Dan Raviv Associates, Inc. 1992a).

From 1936 to 1947, changes in the supply of crude oil caused the Bayonne Plant to specialize and led to downsizing of refining operations. In 1939, the barrel factory was shut down. A central wash and locker room was constructed in 1946 and a wax tank field (series 580 tanks) was erected in the present-day Lube Oil Area (Fairchild 1994a). In 1948, a Methyl Ethyl Ketone (MEK) Dewaxing Plant was constructed in the vicinity of the present-day stockpile area. The MEK Dewaxing Plant started up in 1950. The Central Boiler House was constructed in 1951 in the present-day Utilities Area. In 1954, the No. 3 pipe still was added for wax

refining and the Greer wax molding machine began operating in the Lube Oil Area (Fairchild 1994a).

Beginning in 1955, the Bayonne Plant undertook a modernization program. Demolition progressed through 1961 to remove all old unused buildings and facilities. Numerous parcels of land were sold during this period (Humble Oil & Refining Company 1961). In 1955, the Necton Tank Field (Lube Oil Area) was modernized and the No. 2 Tank Field and AV-Gas Tank Fields were constructed (Fairchild 1994a). In 1957, three new tanks were erected in the General Tank Field, all of which were built on preloaded sites (Fairchild 1994a). Preload is defined as excess soils placed at a site for the purpose of compacting the soil below it (then removed upon tank installation) to prevent settling problems. In 1957, also, Pier No. 1 was upgraded to handle larger tankers. In 1958, the Lube Operations Building was constructed and various shops were moved to the Central Mechanical Building (Fairchild 1994a). In 1959, the No. 3 Tank Field was placed in service for the storage of crude oil, and the Marine Service Division of Esso Standard Oil (formerly Butterworth System) was transferred to the Bayonne Plant (Fairchild 1994a). Also in 1959, the present-day Domestic Trade Area was purchased, and the southwestern corner of the present-day General Tank Field was acquired from the City of Bayonne (Fairchild 1994a).

During the 1960s, modernization activities at the Bayonne Plant continued, particularly in the Lube Oil Area. A lube base stock tank field, a lube finished product tank field, and a wax tank field were erected in the area (Fairchild 1994a). In 1961, a new No. 1 Pipe Still was installed to replace the former "B" Pipe Still. The Lube Operations Building opened in 1960 and the Main Building opened in 1962. A modern Solvent Drum Filling Building (Solvent Tank Field) was constructed in 1963. Operation "Hookup" extended Avenue J to Lower Hook Road in 1964. In 1965, the MDC opened in the Butterworth/Marine Building, currently the MDC Building (Fairchild 1994a). The Domestic Trade Area commenced operation in 1966. The East Side and West Side Separators were constructed in 1963 and 1968, respectively (Fairchild 1994a). In 1968 and 1969, the acquisition of the area encompassing the General Tank Field was completed with the purchase of tracts from the City of Bayonne (Fairchild 1994a).

By 1971, all refining and wax manufacturing operations had ceased at the Bayonne Plant. Pier No. 7 was constructed in 1972 at the same time that the MEK Dewaxing Plant shut down. Since 1971, the Bayonne Plant has functioned primarily as a petroleum products storage facility, a wholesale distribution facility with various blending and packaging operations, and an oil additives manufacturing plant. In 1979 and 1980, the Pier No. 6 Foam Building and the Solvent Foam Building were constructed (Fairchild 1994a). Dismantling of the Chemical Plant began in 1991 and was completed in 1993. The main products that were handled at the Bayonne Plant were miscellaneous naphthas, aviation gasoline, aliphatic and aromatic solvents, distillate fuels, intermediate and heavy fuel oils, lube oils, process oils, waxes, asphalts, and petroleum additives (Exxon Company, U.S.A. and Exxon Chemical Americas 1990). Products were shipped in and out of the Bayonne Plant by trailer trucks (packaged products), tank trucks, railroad cars, barges, and tankers.

Products are transferred within the plant via pipelines and stored in aboveground storage tanks. A list of chemicals that are stored, blended, or transferred at the Site is provided in Appendix G. Since the purchase of the majority of the Bayonne Plant by IMTT in 1993, operations have essentially remained unchanged. Exxon retained and currently operates the Lube Oil Area for the storage, blending, and packaging of lubricating oils and specialty products.

# 3.3 ENVIRONMENTAL PERMITS

The following types of environmental permits have been issued to Exxon for the Site by the NJDEP: groundwater discharge, surface-water discharge, air discharge, and monitoring well construction.

## 3.3.1 Groundwater Discharge

Exxon was assigned a NJPDES Discharge to Groundwater (DGW) permit No. NJ0002089 for the site by the NJDEP Division of Water Resources, Bureau of Groundwater Discharge Control on June 8, 1989. Copies of the NJPDES-DGW Standard Application Forms

for the Site were included in Appendix I of the ACO Site History Deliverable (Geraghty & Miller, Inc. 1993c). However, although a DGW permit number was assigned, the permit was not issued. Instead, Exxon and the NJDEP entered into the ACO for the Site.

## 3.3.2 Surface-Water Discharge

Exxon was issued a NJPDES DSW permit for the Site by the NJDEP. This permit went into effect on August 1, 1990 and expires on July 31, 1995. The permit authorizes discharge to the confluence of Upper New York Bay and the Kill Van Kull Waterway from the East Side Treatment Plant outfall. The permit authorizes discharge of commercial surface water, Group I storm-water runoff, and thermal surface water. A copy of the NJPDES-DSW was included in Appendix I of the ACO Site History Deliverables (Geraghty & Miller, Inc. 1993c).

## 3.3.3 Air Discharge

Exxon has been assigned more than 134 stack permits listed under the NJDEP, Division of Environmental Quality Plant ID No. 10074. Permitted air releases include reactors and condensers, and a majority of the stack permits are for the numerous bulk storage tanks at the Site (NJDEP 1990). A list of air permits issued prior to October 1992 was compiled by Exxon and was included in Appendix I of the ACO Site History Deliverables (Geraghty & Miller, Inc. 1993c).

## 3.3.4 Monitoring Wells

As a result of IRM and RI investigations conducted or currently ongoing at the Bayonne Plant, Exxon has been issued numerous monitoring well permits by the NJDEP Division of Water Resources. Copies of the monitoring well permits issued prior to October 1992 were included in Appendix I of the ACO Site History Deliverables (Geraghty & Miller, Inc. 1993c).

## 3.4 WASTE DISPOSAL PRACTICES

This section discusses recent and past disposal practices at the Bayonne Plant. Information pertaining to past disposal practices, which was collected and compiled by Dan Raviv Associates, Inc. (DRAI) and included in their draft IRM Work Plan (Dan Raviv Associates, Inc. 1992a), is included in Appendix H. Figures in Appendix H include storm-water sewer and process waste lines and a schematic diagram of the West Side Treatment Plant. The figure depicting storm-water sewer and process waste lines at the plant has been superceded as a result of sewer IRM investigations.

For the discussion of waste disposal practices presented in this section, recent practices are those that were in effect at the time the ACO was executed and past waste disposal practices are those employed at the plant prior to 1991.

#### 3.4.1 <u>Recent Disposal Practices</u>

The Site generates several types of solid wastes that are collected, segregated, stored temporarily, and transported off-site for disposal by licensed contractors. Solid wastes disposed off-site are listed in Table 3-1. The garbage at the Site is collected in dumpsters stationed at various locations throughout the Site. The dumpsters are emptied routinely and their contents are transported off-site for disposal. Solid wastes (both hazardous and non-hazardous) generated by facility operations are segregated and collected in drums and roll-off containers (CH2M Hill, Inc. 1991). Roll-offs are temporarily stored on the paved area next to the MDC Building or inside the Greer Building near Pier No. 1. The other waste management activities at the Site Side and West Side Treatment Plants) (Dames & Moore 1979) and the collection of chemical process wastewater at the Chemical Waste Treatment Plant located at the Exxon Chemicals Plant Area. The chemical process wastewater was historically transported to the Bayway Refinery for off-site treatment (CH2M Hill, Inc. 1991; Exxon Company, U.S.A. and Exxon Chemical

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Americas 1990). This practice has been discontinued. Sanitary wastewater discharges to on-site septic systems or to the Bayonne City Sewer System (Exxon Company, U.S.A. 1989a).

Storm-water runoff and minor amounts of process wastewaters are transported via a sitewide plant sewer system to either the East Side Treatment Plant or the West Side Treatment Plant. Treated wastewater from the West Side Treatment Plant is transferred to the East Side Treatment Plant for further treatment. The sewer system at the Site collects rainfall runoff, drained contact water, once-through cooling water, steam condensate, pumped groundwater, and general wash water (CH2M Hill, Inc. 1991; Exxon Company, U.S.A. and Exxon Chemical Americas 1990). In addition, non-contact cooling water, boiler blow-down, equipment wastewater, and wastewater from tank bottoms are received by the sewer systems at the Site (CH2M Hill, Inc. 1991). Drainage from tank fields consists almost entirely of direct runoff, with some limited tank water drawoffs and condensate from tank heater coils. In tankage areas, flow in the Site sewer system is intercepted by valves or isolated to impound material and release it under controlled conditions to the downstream treatment facilities. Floor drains in the blending and packaging warehouse lead to a product sump, the contents of which are pumped to the recycle oil system for eventual off-site disposal (Fairchild 1993).

The following summaries have been compiled from the Best Management Practices Plan (CH2M Hill, Inc. 1991) and the Spill Control and Counter Measure Plan; the Discharge Prevention, Containment and Counter Measure Plan; and the Discharge Cleanup and Removal Plan (Exxon Company, U.S.A. and Exxon Chemical Americas 1990).

## 3.4.1.1 Chemical Process Wastewater

Within the Exxon Chemicals Plant Area, selected process wastewater from the reactor building drains into a separate, independent Chemical Plant process wastewater sewer system and on-site treatment facilities that are part of the Chemical Plant operations. The chemical waste treatment plant is located in the south-central portion of the Chemical Plant. Treated water from this treatment plant is accumulated and periodically transported to Exxon's Bayway

Refinery in Linden, New Jersey, via tankwagon, for biological treatment and discharge under Bayway's NJPDES-DSW Permit (Exxon Company, U.S.A. and Exxon Chemical Americas 1990).

# 3.4.1.2 West Side Treatment Plant

The West Side Treatment Plant is located in the Lube Oil Area near the Pier No. 1 Area. Wastewater on the west side of the plant is treated in an American Petroleum Institute (API) gravity separator and a dissolved air flotation (DAF) unit (Appendix H). This wastewater is pumped to the inlet of the API separator by means of a vertical lift screw pump. Subsequent flow through the separator and DAF unit occurs by gravity. Effluent from the West Side Treatment Plant is then pumped to the East Side Treatment Plant through a former low-pressure salt-water line for further treatment (Dan Raviv Associates, Inc. 1992a). Sludge generated during the treatment processes is stored in closed tanks prior to contracted disposal (Dames & Moore 1979).

Tank storage for storm-water diversion is also provided to collect any excess flow to the separator that may occur during rain storms. When flow to the treatment plant decreases, the accumulated water is released back to the treatment plant at a controlled rate (Exxon Company, U.S.A. and Exxon Chemical Americas 1990).

## 3.4.1.3 East Side Treatment Plant

Wastewater that enters the East Side Treatment Plant is treated by an API gravity separator, a deep-bed sand filtration unit, and an activated carbon unit. The east side wastewater flows by gravity to the API separator; effluent from the separator then flows to a sump and is pumped to the deep-bed sand filters. After filtration, the treated water is discharged at the confluence of the Kill Van Kull Waterway and the Upper New York Bay between Piers No. 6 and No. 7 (Exxon Company, U.S.A. and Exxon Chemical Americas 1990). Skimmed oil is

routed to the recycle (slop) oil system. Sludge generated during periodic cleaning is disposed off-site.

The East Side Treatment Plant receives drainage from the following areas: General Tank Field, Solvent Tank Field, Low Sulfur Tank Field, No. 2 Tank Field, Av-Gas Tank Field, No. 3 Tank Field, Asphalt Plant Area, Exxon Chemicals Plant (including steam water condensate), Plant Loading Areas, Domestic Trade Area, and MDC Building Area. Wastewaters collected by the West Side Treatment Plant also terminate in the East Side Treatment Plant (Exxon Company, U.S.A. and Exxon Chemical Americas 1990; CH2M Hill, Inc. 1991).

Storm-water diversion and storage facilities are provided upstream of the API separator for times when flow becomes excessive during heavy rain. When the water level in the API separator decreases, the accumulated water from the storage facilities is released back to the treatment plant at a controlled rate (Exxon Company, U.S.A. and Exxon Chemical Americas 1990).

## 3.4.1.4 Groundwater Collection Systems

Groundwater and NAPLs are recovered from the interceptor trench, the Avenue "J" Sump, and the recovery wells in the waterfront areas (CH2M Hill, Inc. 1991; Dan Raviv Associates, Inc. 1992c). The liquids are pumped to the plant sewer systems and treated at the wastewater treatment plants.

The location of the interceptor trench system is shown on Figure 2-8. The trench system consists of a western section and an eastern section that are pitched toward the center at Sump A. Liquids are pumped from Sump A or from Sump B (a back-up sump) directly to the main parking lot sewer system. The Avenue "J" sump, located near the northern end of the western section of the interceptor trench, independently collects liquids and discharges them to the plant sewer system in the Main Building parking lot. The sewer system in the Main Building parking lot.

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Recovery wells are located along the waterfront in the Pier No. 1 Area near the helipad area and in the Piers and East Side Treatment Plant Area near Piers No. 6 and No. 7. Eight recovery wells are located in the Pier No. 1 Area, of which two are currently active (Figure 2-8). Eighteen recovery wells are near Pier Nos. 6 and No. 7, of which four are currently being pumped. The recovery wells were installed during the 1970s and 1980s. The liquids recovered from these wells are routed to the plant sewer system and treated at the East Side Treatment Plant (Dan Raviv Associates, Inc. 1992a; CH2M Hill, Inc. 1991).

## 3.4.2 Past Disposal Practices

A large portion of the Site along the shoreline consists of land that has been reclaimed from the Kill Van Kull Waterway and Upper New York Bay. This area is characterized by variable depths of fill overlying soft marine or estuarine deposits (Dames & Moore 1979). The fill consists of primarily cinders and ash, intermingled with construction debris, wood, gravel, sand, silt, and bricks. The cinders and ash were a by-product of historical coal burning activities at the Plant. In addition to cinders and ash, construction debris was noted on several historical boring logs. The thickness of fill material is shown in the geologic cross sections A-A', B-B', C-C', and D-D' (Figures 2-2, 2-3, and 2-4, respectively). Cross Section A-A', which runs west to east across the Site, shows that fill thickness varies from approximately 9 feet in the west to approximately 30 feet near Upper New York Bay. Cross Section B-B', which runs north to south in the western part of the Site, shows fill thickness varying from 0 feet on the north (near East 22nd Street), to approximately 25 feet on the south (near Tank No. 99). Cross Section C-C' shows fill thickness varying from approximately 13 feet on the north (near Lower Hook Road) to approximately 10 feet on the south. Cross Section D-D' shows fill thickness varying from approximately 15 feet in the northern part of the General Tank Field to approximately 48 feet near the Kill Van Kull Waterway to the south.

A Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)registered, 1-acre, abandoned, open dump where lead-contaminated separator sludge was reportedly disposed has been documented by Exxon Company, U.S.A. (1980 and 1982). Waste

disposal site inventory documents dated 1980 and 1982 are provided in Appendix I. The disposal site was located in the northwestern corner of the General Tank Field, north of Tank 1072, and was active from approximately 1956 to 1965 (Exxon Company, U.S.A. 1980).

A Hydrotechnic Corporation Engineers (Hydrotechnic) report (1958) describes a previous acid-disposal practice as follows: "The acid discharge from the HCL Scrubber Unit in the Chemical Products Plant is a one percent acid solution. The flow of about 75 gallons per minute passes through a bed of limestone, which serves as a neutralizing pit, and the effluent is discharged to the Kill Van Kull Waterway after dilution with other wastes." Little historical information exists regarding this disposal system. The system reportedly consisted of a concrete-lined pit to which lime was added to neutralize the waste. The wastewater was subsequently discharged to the sewer system (Fairchild 1994b).

During the late 1950s, chromium slag was imported into the Bayonne Plant for use in preloading tank sites (Esso Standard Oil Company 1957a). Chromium slag was used as preload for one tank site in the General Tank Field; to build berms and fire banks in the No. 2 Tank Field; and as grading material in the No. 3 Tank Field (Esso Standard Oil Company 1957a). Chromium slag was also reportedly used as fill material at the site of the present-day Main Building (Fairchild 1994c). Historical chromium slag depositional areas are discussed in greater detail in Section 5.0 (Operational Areas at the Bayonne Plant).

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# SECTION 4

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# 4.0 PREVIOUS SITE INVESTIGATIONS

Hydrogeologic and environmental investigations have been conducted at the Site since The earliest study identified was a water supply investigation conducted by the 1950s. Hydrotechnic in 1958. Environmental studies have been conducted by Leggette, Brashears and Graham, Inc. (LBG), Dames & Moore, Roy F. Weston, Inc. (Weston), ICF Kaiser Engineers, Inc. (ICF Kaiser), and DRAI. In 1986, Sandaq, Inc. P.C. (Sandaq) conducted a sewer investigation, and in 1988 CH2M Hill, Inc. prepared a site water budget. Other environmental studies conducted by Exxon Company, U.S.A., the NJDEP, and Environmental Resources Management, Inc. (ERM) are also discussed in this section. IRM investigations at the Bayonne Plant are currently being conducted by DRAI, ICF Kaiser, IT Corporation, and Geraghty & Miller. A chronologic summary of previous site investigations is provided in Table 4-1, and the above reports are summarized in the following sections. In addition, Geraghty & Miller reviewed environmental reports prepared by Malcom Pirnie, Inc. (1985) and the New Jersey Public Interest Group (NJPIRG) (Terris, Edgecombe, Hecker, and Wayne 1989). These two reports offered little information and are not discussed below; however, they are included in Appendix I.

# 4.1 HYDROTECHNIC CORPORATION ENGINEERS

In 1958, Hydrotechnic conducted a hydrogeologic investigation on behalf of Esso Standard Oil Company, Exxon's predecessor. The investigation involved exploring the potential to develop freshwater resources for refinery usage and the feasibility of disposing acid wastes by injection into the ground. Hydrotechnic also investigated the practicality of using sewage as an additional, non-brackish, industrial use water supply.

The Hydrotechnic study consisted of a comprehensive description of the unconsolidated deposits and bedrock. The study concluded, based on a review of well records in the Bayonne Area (including well records at the Site), that the sediments above the glacial till were the only potential source of freshwater in the area. However, because the sediments were not very thick and were surrounded on three sides by brackish water, they were not considered to be a feasible

source of fresh groundwater supply on Constable Hook. The study also advised against acidwaste disposal by injection into the ground due to potential concerns arising from New Jersey regulations (Hydrotechnic Corporation Engineers 1958).

## 4.2 LEGGETTE, BRASHEARS AND GRAHAM, INC.

In 1974, LBG prepared three brief status reports on shallow groundwater hydrocarbon contamination at the Site (Leggette, Brashears and Graham, Inc. 1974 a,b,c). LBG installed 20 groundwater monitoring wells located north of the Lehigh Valley Railroad right-of-way in the vicinity of the present-day interceptor trench. Water levels and product thicknesses were measured in these wells; hydrocarbons were present as floating product in the monitoring wells located on the Lehigh Valley Railroad right-of-way. The direction of groundwater flow in the area of the right-of-way was to the northeast. LBG made recommendations to intercept hydrocarbon-contaminated groundwater by means of a linear sump or drain, and to pump the fluids to the treatment facility. This recommendation later resulted in the construction of the interceptor trench.

## 4.3 DAMES & MOORE

In 1979, Dames & Moore conducted a hydrogeologic investigation of the Bayonne Terminal and Chemical Plant. The study included a brief description of the facility and operations, a regional and local hydrogeologic overview, and a preliminary assessment of the permittability of the oil/water separators at the East Side and West Side Treatment Plants (Dames & Moore 1979).

The report included descriptions of the soils beneath the East Side and West Side Separators. These soil descriptions appear to have been derived from the geotechnical borings drilled in the 1950s. The overview of the local hydrogeologic conditions was very similar to Hydrotechnic's observations (Hydrotechnic Corporation Engineers 1958). Dames & Moore also reported that a 1,400-foot deep boring was drilled by the Tide Water Oil Company in 1892 in

the Kill Van Kull west of the Pier No. 1 Area. The boring did not yield significant amounts of water. This boring log is included in Appendix I.

Coefficients of permeability were estimated (in centimeters per second [cm/sec]) for "sand" as  $3.3 \times 10^{-3}$  to  $2 \times 10^{-5}$  cm/sec and for "organic silt" and "organic silty clay" as  $8.9 \times 10^{-8}$  to  $6.7 \times 10^{-8}$  cm/sec. The hydrogeologic summary presented in the Dames & Moore (1979) report generally agrees with the hydrogeologic conceptualization developed and discussed in this report.

### 4.4 ROY F. WESTON, INC.

In 1980, Weston conducted subsurface soil investigations and oil recovery programs in the Pier No. 1 Area near the helipad (referred to by Weston as the Pier No. 3 area), the Piers No. 6 and No. 7 areas, and the Low Sulfur Tank Field. Weston also monitored product thicknesses in monitoring wells in the "A"-Hill Tank Field, replaced four recovery wells and three monitoring wells, and installed two monitoring wells in the Pier No. 6 area. In addition, Weston installed a recovery well and three monitoring wells in the Low Sulfur Tank Field (Roy F. Weston, Inc. 1980).

In 1981, Weston installed four additional monitoring wells in the area of the Low Sulfur Tank Field to further delineate the presence of a "solvent-like product" floating on the water table. A product recovery system was then set up in this area. In addition, water levels and product thicknesses were measured in wells in the Pier No. 3 area and the Pier No. 7 area (Roy F. Weston, Inc. 1981a,b).

In 1985, Weston reported that their subsurface oil recovery and monitoring program in the Pier 3 area consisted of 34 usable monitoring wells out of 60 known monitoring wells. Several of the wells contained floating product; however, a nearby recovery well did not contain any floating product (Roy F. Weston, Inc. 1985). In 1986, Weston performed a well integrity overview and measured product thickness to evaluate hydrocarbon seepage from the Pier No. 7 area into New York Bay. They recommended that an additional monitoring well be installed (Roy F. Weston, Inc. 1986a,b,c).

In 1988 and 1989, Weston prepared five quarterly reports summarizing water-level elevation and product thickness measurements in the Low Sulfur Tank Field, the Pier No. 3 area, the Piers No. 6 and No. 7 areas, and the "A"-Hill Tank Field (Roy F. Weston, Inc. 1989a,b,c,d,e). The quarterly reports indicated that NAPL thickness in monitoring wells were relatively consistent, typically varying less than 1 foot.

These reports also document the effectiveness of the recovery wells and product thickness fluctuation at each of the areas where there was remedial pumping (Roy F. Weston, Inc. 1989a,b,c,d,e). These reports conclude that the periodic pumping of NAPL from wells in the Low Sulfur Tank Field, Pier No. 3 area, and Piers No. 6 and 7 areas, was effective, and recommended that further NAPL control and recovery strategies be implemented as part of an overall environmental management program.

## 4.5 SANDAQ, INC. P.C.

In 1986, Sandaq conducted a toxic substance investigation of the sewer system at the Site (Sandaq Inc. 1986). Sandaq investigated nine areas of the Site sewer system that ultimately discharge to the East Side Treatment Plant. A brief description of each location sampled was presented along with an overview of the products used or stored near that location. Samples were collected and analyzed for specific organic compounds (chlorobenzene, ethylbenzene, toluene, naphthalene, and 1,2-dichlorobenzene), pH, and total organic carbon (TOC). Sandaq reported that the sewers in the area of the Exxon Chemicals Plant Area, the No. 3 Tank Field, and southeast of what Sandaq refers to as the "Fuels" tank field (exact tank field unknown) had shown the "most significant levels" of the compounds analyzed (Sandaq Inc. 1986).

Based on their results, Sandaq recommended that efforts be made to reduce the discharge of these constituents to sewers, that the source(s) of certain constituents in the Site sewer system in the Exxon Chemicals Plant Area be located and eliminated, and that an extensive sewer system cleaning be performed on the east side of the Site. Sewer cleaning and inspection is currently in progress as part of the sewer IRM activities being conducted at the Bayonne Plant. The sewers on the west side of the Site were reported to be in good operational condition.

## 4.6 CH2M HILL, INC.

In August 1988, CH2M Hill prepared a site water budget for the Bayonne Plant. The water budget was developed to show the distribution of the water consumption at the Site as required by NJPDES permits. CH2M Hill did not conduct any flow measurements; they identified the locations of input and output wastewater streams and estimated average annual flows (CH2M Hill, Inc. 1988). A review of the performance and operation of the East Side and the West Side Treatment Plants was also conducted.

Input water streams were identified as the following: municipal water, high-pressure saltwater, stream condensate, rain water or surface runoff, tank draw-off, and pumped groundwater. The output water streams were identified as the following: off-site waste disposal, steam, evaporation/losses, city sewer, septic fields, and discharge to the Kill Van Kull Waterway. The CH2M Hill report included a discussion of the areas of the Site that received municipal water.

Oil and grease, total suspended solids, TOC, and percent dissolved organic carbon data from the discharges were reported for the period of January 1987 through March 1988. CH2M Hill was unable to sample the influent of the treatment plants, so the efficiencies of the treatment plants were not determined. The estimated quantity of pumped groundwater from product removal wells and sumps was approximately 57,600 gpd, which is equivalent to an average of 40 gpm. CH2M Hill made several recommendations on how to improve wastewater stream management in the Exxon Chemicals Plant Area and how to manage storm water.

#### 4.7 NJDEP

In January 1990, the NJDEP conducted a site inspection and collected one soil sample from 11 separate locations for analysis of total chromium. Results ranged from 90 parts per million (ppm) adjacent to Tank No. 1067 in the Low Sulfur Tank Field to 5,385 ppm from a berm opposite Tank No. 1003 in the No. 2 Tank Field. The NJDEP Site Inspection report concluded that the primary environmental concerns at the Site were the "large area of petroleum hydrocarbon contaminated soil and groundwater, and the areas of the Site containing chromium waste slag" (NJDEP 1990).

#### 4.8 EXXON COMPANY, U.S.A.

In conjunction with the NJDEP (1990) study, Exxon conducted their own soil sampling and analytical program in January 1990. Surficial grab samples of soil were collected and analyzed for total and hexavalent chromium.

Exxon collected ten soil samples from various locations within the Site. The total chromium concentrations ranged from 1,800 ppm in a sample from the No. 3 Tank Field to 7,700 ppm in a sample from the General Tank Field berm. The hexavalent chromium concentrations ranged from 2.2 ppm in a sample from the No. 2 Tank Field berm (total chromium of 6,000 ppm) to 16.9 ppm in the sample from the No. 3 Tank Field (total chromium of 1,800 ppm) (Dan Raviv Associates, Inc. 1992a).

#### 4.9 ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

On April 10, 1991, ERM collected seven soil (surficial grab) samples throughout the Site for total and hexavalent chromium analyses. The sample locations and chromium concentrations are included in Appendix J. One sample, No. 5 (east of No. 3 Tank Field), contained 10 ppm of total chromium and 0.3 ppm of hexavalent chromium. Concentrations of total chromium in the remaining samples ranged from 1,560 ppm (in sample No. 6) to 7,960 ppm (in sample

# 4.10 ICF KAISER ENGINEERS, INC.

In 1992, Pittsburgh Plate and Glass Industries, Inc. (PPG) issued a Final Investigation Work Plan, prepared by ICF Kaiser to Exxon Company, U.S.A. This investigation was conducted as part of litigation concerning the use of chromium-laden fill at the Site. The work plan was prepared for a preliminary investigation of soils in the No. 3 Tank Field (directly to the east of Tanks 921) and the General Tank Field (east of Tank 1071) for the presence of chromium (PPG Industries, Inc. 1992; ICF Kaiser Engineers, Inc. 1992). Data reported to PPG from ICF Kaiser indicate that chromium was present in the soil samples. Samples were taken at depths of up to 10 feet bls and analyzed for total and hexavalent chromium. Chromium results from 27 borings indicated a range in total chromium concentrations from less than 2.3 to 3,450 milligrams per kilogram (mg/kg). Hexavalent chromium concentrations ranged from 7.6 to 12.3 mg/kg.

In accordance with the proposed IRM Work Plan submitted by DRAI in January 1992 (Dan Raviv Associates, Inc. 1992a), ICF Kaiser conducted an IRM of chromium contamination at the Bayonne Plant (ICF Kaiser Engineers, Inc. 1993).

In November 1993, ICF Kaiser conducted a supplemental IRM investigation of the Conrail property to further characterize the extent of chromium contamination (ICF Kaiser Engineers, Inc. 1994).

## 4.11 DAN RAVIV ASSOCIATES, INC.

DRAI has been conducting NAPL IRM investigations in the Pier No. 1 Area near the helipad, in the vicinity of the Pier No. 6 and Pier No. 7 area, in the Low Sulfur and Solvent Tank Fields ("Tank 1066"), in the interceptor trench area, and in the Platty Kill Creek area.

In accordance with the IRM Work Plan submitted to the NJDEP in January 1993 (Dan Raviv Associates, Inc. 1993a), DRAI conducted an IRM investigation in the Low Sulfur and Solvent Tank Fields from May through August 1993. The field investigation included monitoring well installation, NAPL and groundwater sampling, tidal investigation, bail-down tests, recovery tests, short-term and long-term pumping tests, and emulsion tests (Dan Raviv Associates, Inc. 1993b). The results of the investigation indicated that floating NAPL was present on the groundwater in these tank fields. The NAPL consisted of gasoline components at thicknesses ranging from 0.1 to 15 feet. The report recommended that a NAPL recovery system be installed to recover floating NAPL in the area and prevent off-site migration.

In May and August 1993, DRAI conducted a well integrity survey of existing monitoring wells at the Bayonne Plant. At this time, 13 additional previously installed monitoring wells were identified in the interceptor trench area (Dan Raviv Associates, Inc. 1993c,d). Subsequently, in August 1994, DRAI installed six additional wells in the interceptor trench area (Figure 2-8). A performance evaluation of the entire system was conducted to evaluate the hydraulic gradient and flow into the trench. Twenty-four existing monitoring wells, nine manholes, and six newly installed wells were used as fluid level monitoring points during the evaluation. Cumulative and instantaneous flow of total fluids from the trench was measured with the aid of flow meters on the sewer discharge lines. IRM activities in the interceptor trench area are ongoing, and the results and findings have not yet been reported.

During February and March 1994, DRAI conducted a preliminary IRM investigation in the Pier No. 7 area (Dan Raviv Associates, Inc. 1994a). During January 1994, DRAI documented NAPL seeps in New York Bay along the Pier No. 7 bulkhead (Dan Raviv Associates, Inc. 1994a). The seeps were reported in three general areas along the bulkhead and were observed during very low spring tides. The pier construction consists of two, parallel, concrete (southern and northern) gantry walls that extend to a depth of 10 feet. A tidal investigation, short-term pumping tests, and NAPL sampling were conducted in the Pier No. 7 area. The preliminary conclusions of the investigation were that more than one type of NAPL was present in wells at the Pier No. 7 area; NAPL thicknesses ranged from 4 to 5 feet; the

southern gantry wall may be acting as a partial hydraulic barrier during high tide; and NAPL can potentially migrate beneath the gantry wall during low tides, toward the north into the bay (Dan Raviv Associates, Inc. 1994a). Since many of the existing wells were too shallow to adequately monitor NAPL thicknesses across the gantry wall, additional IRM investigations were conducted by DRAI from September through October 1994. The supplemental investigations included the installation of two deep wells and two replacement wells, NAPL and water-level measurements, step drawdown tests, and pumping tests. IRM activities in the Pier No. 7 area are ongoing, and results are not available at this time.

In August 1993, DRAI conducted an IRM investigation in the Pier No. 1 Area near the helipad. NAPL thicknesses as great as 3.65 feet have been measured in this area (Dan Raviv Associates, Inc. 1994a). Three soil borings were drilled along the southern section of the helipad area. The investigation also included an evaluation of the construction of the southern and eastern bulkheads. As the IRM investigation in the helipad area is currently in progress, results are not available at this time.

DRAI conducted an IRM investigation "at peril" in the Platty Kill Creek area during early 1994. The investigation included the installation of monitoring wells and drilling of soil borings in the area (Figure 2-8). The results of the investigation are not yet available.

## 4.12 IT CORPORATION

In November 1992, IT Corporation commenced work on the sewer IRM. In February 1992, DRAI had prepared and submitted a proposed IRM Work Plan to the NJDEP (Dan Raviv Associates, Inc. 1992a). The work plan included provisions for the mapping, field verification, inspection, cleaning and videotaping, and integrity testing of approximately 40,640 linear feet of storm-sewer line and 1,500 feet of chemical process line at the Bayonne Plant. The purpose of the sewer IRM was to identify portions of the wastewater conveyance system that may present a potential for exfiltration or migration of liquid contents outside of the sewer system. In February 1993, a Phase I Sewer IRM Work Plan was submitted to the NJDEP (IT Corporation

1993). Following approval of the Phase I Sewer IRM Work Plan in June 1993, IT Corporation proceeded with the field verification phase of work, which included cleaning and videotaping. The sewer IRM investigation is currently ongoing.

## 4.13 GERAGHTY & MILLER, INC.

Subsequent to DRAI's IRM investigation in the Low Sulfur and Solvent Tank Fields ("Tank 1066"), Geraghty & Miller performed a technology evaluation of remedial alternatives for NAPL recovery in the "Tank 1066" area (Geraghty & Miller, Inc. 1994b). The results of the evaluation indicated that a vacuum enhanced recovery (VER) system would be the preferable remedial alternative in this area. Geraghty & Miller conducted a VER pilot test at the "Tank 1066" site in June 1994 (Geraghty & Miller, Inc. 1994c). The pilot test demonstrated the ability of VER to enhance NAPL recovery in the "Tank 1066" area. A VER system is currently being designed by Geraghty & Miller for use at the "Tank 1066" site.

On October 3, 1994, Geraghty & Miller mobilized at the site and commenced IRM investigations in the General Tank Field, No. 3 Tank Field, Lube Oil Area, Exxon Chemicals Plant Area, and the "A"-Hill Tank Field. The IRM investigations collectively involve the drilling of 33 soil borings at 200-foot spacing along the boundaries of the General Tank Field, No. 3 Tank Field, Lube Oil Area, and Exxon Chemicals Plant Area. A temporary "standpipe" (2-inch diameter, flush-threaded, continuously wound, stainless-steel well screen) will be emplaced in each borehole, where potentially saturated hydrocarbons are observed to evaluate the presence of mobile NAPL. Soil borings may be converted to monitoring wells if NAPL is encountered in the groundwater, as determined from this standpipe evaluation. IRM field activities are currently in progress; therefore, results are not yet available. In addition, quarterly NAPL and groundwater measurements will be collected for a 1-year period in the "A"-Hill Tank Field to monitor NAPL.

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SECTION 5

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# 5.0 OPERATIONAL AREAS AT THE BAYONNE PLANT

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This section provides detailed descriptions of the individual operational and miscellaneous areas within the 288 acres covered by the ACO. Information for each operational area is divided into the following six categories: Description and boundaries; operations, raw materials, and products; aerial photograph interpretation; discharges, spills, and releases; areas of potential contamination; and IRM activities.

The operational areas and their boundaries are shown on Figure 3-1. These areas have been defined on the basis of the type of operation that occurred. For organizational purposes, 13 operational and four miscellaneous areas at the Site have been identified. Detailed maps of each area are shown on Figures 5-1 through 5-17. The descriptions of the operational areas and the information presented on the area-specific figures were derived from historical plant records and drawings, personal communications, and various reports. In addition, 14 aerial photographs spanning the time period from April 1940 to December 1991 were examined. The specific years of the photographs reviewed were 1940, 1947, 1951, 1959, 1961, 1963, 1966, 1968, 1970, 1974, 1977, 1984, 1989, and 1991. These photographs were previously submitted to the NJDEP under separate cover as part of the ACO deliverable items (Geraghty & Miller, Inc. 1993c).

The 13 operational areas are as follows: "A"-Hill Tank Field, Lube Oil Area, Pier No. 1 Area, No. 2 Tank Field, Asphalt Plant Area, AV-Gas Tank Field, Exxon Chemicals Plant Area (Chemical Plant Area), No. 3 Tank Field, General Tank Field, Solvent Tank Field, Low Sulfur Tank Field, Piers and East Side Treatment Plant Area, and Domestic Trade Area. Within the 13 operational areas are three active piers (Piers No. 1, No. 6, and No. 7), which are used for the loading and unloading of marine vessels at the Site.

The four miscellaneous areas consist of the Stockpile Area, the MDC Building Area, the Utilities (Power Plant) Area, and the Main Building Area.

A number of past or present facilities, structures, and operations have been identified at the Bayonne Plant as potential areas of contamination. These areas include aboveground storage

tanks (ASTs), underground storage tanks (USTs), locations where chromium slag was historically placed, oil/water separators, drum storage areas, railroad car loading/unloading areas and truck loading racks, transformers, process areas, sumps, sewers and septic systems, and other miscellaneous features. The rationale for considering each of these facilities, structures, or operations as potential areas of contamination is described below; where possible, they are shown on the area-specific figures (Figures 5-1 through 5-17).

ASTs have been present at the Bayonne Plant since the 1800s and have stored a variety of materials. The number of ASTs apparently reached an early peak in the 1930s, and generally decreased from the 1940s to the 1950s. Although modern ASTs are provided with leak detection and overfill prevention equipment, earlier ASTs may have been subject to overfilling, tank leaks, pump failures, and line leaks. These discharges, spills, and releases were not documented in Plant records prior to 1970. An inventory of ASTs within each operational area is provided in Table 5-1; an inventory of spills greater than 100 gallons that have been documented since 1970 is provided in Table 5-2.

Most of the former USTs at the Bayonne Plant have been removed. Two USTs are still in service. An inventory of known former and existing USTs is provided in Table 5-3. Review of Table 5-3 shows that releases were confirmed at two USTs (Tank 001 [G-1] and Tank 002); these USTs were removed after they failed tank integrity tests in 1989.

Chromium slag was used at the Site for fill and grading material, to construct tank berms, and as tank preload. Chromium slag was used as preload prior to the construction of one known tank located in the General Tank Field (Esso Standard Oil Company 1957a). There is evidence that the slag was used in other locations of the Plant to construct berms and as general fill material. As previously explained in Section 4.0 (Previous Site Investigations), in 1989 Exxon retained ICF Kaiser to conduct an IRM investigation to address chromium contamination.
Oil/water separators have been used at the Site since 1921. As part of the separation process, separated oil is transferred to storage tanks, and water effluent is currently discharged to plant sewers for ultimate treatment at the East Side Treatment Plant. Historically, oil/water separators varied in construction from earthen basins to concrete structures.

Drum storage areas have been located in various areas throughout the Plant's operational history. Drums have been stored on bases of either soil or concrete, with brick or concrete containment walls.

Railroad car and truck loading/unloading areas are locations where spills may have occurred as a result of routine product transfer operations. Three main tank truck loading racks and loading/unloading areas currently exist at the Bayonne Plant in the Piers and East Side Treatment Plant Area, in the Solvent Tank Field, and in the Lube Oil Area. Other historical loading/unloading areas and truck loading racks have existed and are depicted on Figures 5-1 through 5-17, where applicable.

Prior to 1979, transformers were commonly filled with oils containing polychlorinated biphenyls (PCBs) as dielectric insulators. Because of the design and age of the transformers, it was not unusual for this PCB-containing oil to leak during operation or to be released due to an explosion. Exxon implemented a program in the early 1980s to sample the contents of existing plant transformers and to dechlorinate those units found to contain PCB oils. As a result of this program, many transformers containing PCBs were removed from the Site by 1986. Table 5-4 identifies those transformers known to have contained PCBs, but there were other transformers for which historical information is unavailable. Existing and previous transformer locations are shown on the area-specific figures.

Although the Bayonne Plant is currently a bulk storage terminal that handles, blends, and packages petroleum products, it was formerly a refinery that had numerous process areas. The different process areas that existed at the Bayonne Plant included various stills (cracking, reducing, sweetening, and pipe stills), condensers, furnaces, sweaters, pre-heaters, and plants

(including the MEK Dewaxing Plant, Phenol Lube Oil Treating Plant, Asphalt Plant, and Chemical Plant).

Sumps at the Bayonne Plant are largely associated with the sewer network and the piers. The sewer network system at the Bayonne Plant varies in construction. The sewers route liquids, including storm-water, process wastewater, and spilled materials, to the on-site treatment facilities. Historical sewers are not shown on the area-specific figures, due to the limited available information. IT Corporation has been retained by Exxon to conduct IRM activities associated with the sewers. The sanitary septic systems consist of septic tanks. Some of the septic tanks are pumped out periodically while others discharge to the subsurface through associated leaching fields. Currently, 17 septic systems are located throughout the Site, as depicted on the area-specific figures.

Miscellaneous areas of potential contamination at the Bayonne Plant include the former acid neutralization pit, a portion of the former Bayonne Municipal Dump, the former lead contaminated sludge dump, and the former Cesium Vault.

NAPL, consisting of a variety of products, has been detected in soil and groundwater at the Plant. Product thickness measurements collected by DRAI from December 1991 through March 1993 are provided in Table 5-5. The presence of NAPLs is discussed under each operational area.

### 5.1 OPERATIONAL AREAS

A description of the history and operations of the 13 operational areas at the Bayonne Plant is provided in the following sections. Plant history and operations have been ascertained through the use of historical maps, aerial photographs, and information received from Exxon. Discharges, spills and releases, areas of potential contamination, and IRM activities in each area are also discussed.

# 5.1.1 The "A"-Hill Tank Field

A description of the "A"-Hill Tank Field and details of its history and operations are provided below.

# 5.1.1.1 Description and Boundaries

The "A"-Hill Tank Field is located in the northwestern part of the plant and comprises 16 acres bounded by East 22nd Street and ICI Americas, Inc. to the north, Avenue J and the Main Building area to the east, railroad tracks and the Lube Oil Area to the south, and additional property owned by IMTT to the west (Figure 5-1). The "A"-Hill Tank Field lot area is a parking lot, located in the extreme northwest corner of the Site, adjacent to the "A"-Hill Tank Field.

# 5.1.1.2 Operations, Raw Materials, and Products

Currently, the "A"-Hill Tank Field consists of ten ASTs in three bermed areas. These tanks range in capacity from 14,703 to 76,900 barrels (1 barrel is equal to 42 gallons), and contain recycled oil and storm-water. Two ASTs, Tanks 507 and 508, were constructed in 1923; they are both 50 feet in diameter, contain recycled oil, and have an individual capacity of 14,703 barrels. Tanks 513, 514, and 516 contain stormwater overflow; these tanks are 90 feet, 75 feet, and 100 feet, respectively, in diameter, and were built in 1928, 1940, and 1953, respectively. These stormwater tanks are drained intermittently, and their contents are discharged to the East Side Treatment Plant. The remaining five tanks (Tanks 501, 502, and 504 through 506) are out of service. The western edge of this area is used for parking trailers; there are no buildings in this area.

The "A"-Hill Tank Field has retained the same general configuration since at least 1940. In 1940, the tanks were enclosed by a greater number of fire banks and at least one sealed catch basin was located within each fire bank enclosure. The catch basin was a concrete or brick belowground catchment for storm-water. A sealed catch basin had a box, positioned over the outlet to the sewer, which prevented gas from escaping from the sewer system.

# 5.1.1.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate changes at the Site. In the 1940 aerial photograph, the "A"-Hill Tank Field contained 22 large storage tanks, including eight that currently exist. The 12 largest tanks in the "A"-Hill Tank Field were each 90 to 115 feet in diameter and 40 to 42 feet in height. The other ASTs were each 35 to 75 feet in diameter and 36 to 42 feet in height. The contents of the tanks in 1940 are unknown, but their size and location suggest that they may have been used for bulk storage of raw materials. Each large tank and each group of two or three smaller tanks were enclosed by earthen fire banks or by brick or concrete walls. Twenty smaller tanks, each 20 to 30 feet in diameter, were located between the southern edge of the tank field and the railroad tracks bordering the area to the south. The tanks in the "A"-Hill Tank Field appeared to have conical roofs at this time, except for one tank with a floating roof. The "A"-Hill Tank Field lot area was occupied by two small buildings of unknown use.

In the 1947 aerial photograph, the area had the same configuration as in 1940; the "A"-Hill Tank Field lot area contained only one small building in the northeast corner, and several cars were parked along the western edge. In the 1951 aerial photograph, the area exhibited the same configuration as in 1947.

In the 1959 aerial photograph, the tank field had the same configuration as in 1951. Fifteen tanks had been recently painted, and one tank in the southwestern corner had been removed. Three small tanks and a shed had been removed from the area south of the tank field. The "A"-Hill Tank Field lot area was vacant.

In the 1961 aerial photograph, the area exhibited the same configuration as in 1959. One large storage tank in the southeastern corner of the area had been removed, and the "A"-Hill

Tank Field lot area was vacant. By 1963, the area exhibited the same configuration as in 1961, with the exception of the removal of one small AST along the southern edge of the area. The "A"-Hill Tank Field lot area remained vacant.

In the 1966 aerial photograph, the area was modified; the six ASTs on the western side of the area had been removed. Five other tanks had been eliminated, and one tank had been added in the southeastern corner. The 16 small tanks in the southern part of this area had been eliminated. A park near the plant entrance was located in the northeastern corner of the area. The "A"-Hill Tank Field lot area was vacant, but appeared graded and leveled.

In the 1968 aerial photograph, the area exhibited the same configuration as in 1966. From 1966 through 1970, a body of standing water, approximately 100 feet in diameter, was located in the southwestern corner of the area. In 1970 and 1974, cars were parked along the western edge of the tank field. The configuration of the "A"-Hill Tank Field has not changed since 1974.

## 5.1.1.4 Discharges, Spills, and Releases

Two historical spills are reported in the "A"-Hill Tank Field (Table 5-2). The largest spill, which constituted a release of approximately 6,000 bbls (252,000 gallons) of heating oil, occurred in the vicinity of Tank No. 514. A separate spill incident in 1983 resulted in the release of approximately 1,000 bbls (42,000 gallons) of process gas oil from Tank No. 508 (Table 5-2).

# 5.1.1.5 Areas of Potential Contamination

Areas of potential contamination have been identified in the "A"-Hill Tank Field. These areas include ASTs, former chromium slag depositional areas, a former wax separator, and storm sewers (Figure 5-1).

# 5.1.1.5.1 Aboveground Storage Tanks

The "A"-Hill Tank Field currently contains ten ASTs that were built from the 1920s through the 1950s (Table 5-1). Two documented spills greater than 100 gallons occurred in the "A"-Hill Tank Field in 1978 and 1983, respectively (Table 5-2). Both spills were the result of leakage from ASTs. The five tanks in the northern part of this area contained heating oil, but are presently out of service; the two tanks in the western part of this area contain recycled oil; and the three tanks in the southern part of this area contain storm-water overflow from the West Side Treatment Plant (Figure 5-1).

# 5.1.1.5.2 Former Chromium Slag Depositional Areas

During IRM investigations and soil sampling for chromium, four areas exhibiting a low to high density of chromium slag nodules were observed in the "A"-Hill Tank Field (ICF Kaiser Engineers, Inc. 1993). A high density of chromium slag nodules was observed in the vicinity of Tank 514 and along the fire banks just west of Tank 513 (Figure 5-1). The area in the vicinity of Tank 514 was subsequently reevaluated by ICF Kaiser and found not to have visible chromium slag.

# 5.1.1.5.3 Wax Separator

Discussions with Plant personnel indicate that a wax separator existed in the "A"-Hill Tank Field (Exxon Company, U.S.A. 1978a). The construction details and dates of operation of this separator are unknown. The separator was inactive in 1978. Although the wax separator could not be conclusively identified on the aerial photographs, a rectangular structure adjacent to Tank 508 was observed in the 1950 aerial photograph; this structure appeared to coincide with the location of the wax separator. In the 1970 aerial photograph, this area is occupied by a body of standing water.

Historical maps indicate that no sewers were present in the "A"-Hill Tank Field prior to 1945 (Esso Standard Oil Company 1945) (Appendix J). The existing storm sewers in the "A"-Hill Tank Field drain to the West Side Treatment Plant and are shown on Figure 5-1. There are no known septic systems in the "A"-Hill Tank Field.

## 5.1.1.6 IRM Activities

IRM activities have been or are currently being conducted to address chromium and NAPL in the "A"-Hill Tank Field. ICF Kaiser conducted soil sampling and inspections to evaluate the extent of impact from chromium slag (ICF Kaiser Engineers, Inc. 1993). Fifteen soil samples and duplicates were collected for analysis of chromium. Of the 15 soil samples analyzed, only one had a total chromium concentration greater than 500 mg/kg. The range of total chromium concentrations in the 14 other soil samples was 13.4 to 363 mg/kg.

NAPL IRM activities are currently being conducted by Geraghty & Miller in the "A"-Hill Tank Field. NAPL IRM activities consist of the quarterly collection of NAPL and water-level measurements from existing monitoring wells. Previous rounds of NAPL and water-level measurements made by DRAI (Table 5-5) indicate that NAPL thicknesses of less than 0.2 foot were measured in Monitoring Wells EB-25 and EB-26 (Dan Raviv Associates, Inc. 1993d). Quarterly monitoring will be conducted for a period of one year as the "A"-Hill Tank Field does not currently present a potential for off-site migration of NAPL.

#### 5.1.2 Lube Oil Area

A description of the Lube Oil Area and details of its history and operations are provided below. Because the Lube Oil Area is so large and the history of activities is so extensive, the area has been depicted on two figures: the northern half is on Figure 5-2a and the southern half is on Figure 5-2b.

# 5.1.2.1 Description and Boundaries

The Lube Oil Area is located in the west-central part of the plant and comprises 54 acres. It is bounded by railroad tracks and the "A"-Hill Tank Field to the north; the Utilities Area and property owned by Gordon Terminal Service Company to the east; the Pier No. 1 Area to the south; and the Stockpile Area, the Platty Kill Creek, and additional property owned by IMTT to the west (Figures 5-2a and 5-2b).

# 5.1.2.2 Operations, Raw Materials, and Products

At present, the Lube Oil Area contains five tank fields, as follows: Finished Products, Lube Base Stock, Necton, Wax, and Former Bulk Wax Shipping Tank Fields. Approximately 236 ASTs, ranging in capacity from 60 to 45,600 barrels, are located in the Lube Oil Area (Table 5-1). Approximately 200 tanks in the 0 to 200 series, 400 series, and 500 series are in use at the northern end of the Lube Oil Area. The tanks store various petroleum products, such as transmission fluid, lubricating oils, oil additives, and waxes. The Lube Oil Area also contains ten ASTs in the 600 series; these tanks are located near Pier No. 1 and range in capacity from 3,500 to 4,223 barrels. Tanks 612 and 616 are used for 90-day hazardous waste oil storage. Tanks 611, 613, 614, and 615 are inactive. The four other ASTs in this group are associated with processes at the West Side Treatment Plant.

Surface-water runoff from the macadam and concrete that cover most of the Lube Oil Area enters a network of shallow drains and sewers that discharge to the West Side Treatment Plant. The effluent from the West Side Treatment Plant, which includes an oil/water separator and DAF unit, is pumped underground to the East Side Treatment Plant. The Hazardous Waste Drum Storage area is located within the Greer Wax Building (Figure 5-2b).

The Lube Oil tank car transfer area is located adjacent to the blending and packaging warehouse (Figure 5-2a). The transfer area consists of three railroad spurs that terminate on a completely paved concrete area covered by a metal roof. There is one major tank truck

loading/unloading area located south of the Finished Products Tank Field. The loading area is paved with concrete and is covered by a metal roof. Trucks also load and unload from numerous tanks in the Base Stock (south) and Finished Products (north) Tank Fields on a paved surface.

In 1940, the Lube Oil Area included several operational areas in a different and more dense configuration than exists today. These former areas included a refining area, a mixing and blending area, a wax production area, a bulk wax shipping tank field, the main office building, various shop buildings, a barrel factory, and refrigeration buildings. Four to five reducing stills and one pipe still were located on the western side of the Lube Oil Area, midway between the northern and southern extent of the area (Figure 5-2a). The stills were accompanied by other facilities, such as small-to-medium storage tanks, condensers, furnaces, cooler boxes, and pump houses. Distillates produced in these stills may have been used in the other process areas within the Lube Oil Area. The stills were probably constructed prior to the 1930s, and one reducing still was removed by 1940. The areas where the stills were located in 1940 are currently unoccupied.

In the south-central portion of the Lube Oil Area, several buildings and tanks were part of a barrel handling area that extended into the Pier No. 1 Area to the south. Barrels were constructed in the barrel factory located in the easternmost part of the Lube Oil Area. The barrels were then conveyed by a barrel runway to the barrel handling and shipping area. The barrel runway extended diagonally across the southeastern part of the Lube Oil Area.

In the southwestern part of the Lube Oil Area, along the Platty Kill Creek, approximately 25 sweaters comprised the Wax Production Area. Sweaters were probably heated tanks or basins used for separating oil from the wax. The former Wax Production Area is currently occupied by the Wax Tank Field; the former Wax Shipping Tank Field is currently occupied by the West Side Treatment Plant.

In the northwestern part of the Lube Oil Area were a filter press building, a chilling building, refrigerating engines and pumps, coils, a press plate building, an open cooler, and a treating pump house. It is not known how these facilities were used in the wax refining or mixing processes. A total of 13 oil/water separators may have been in use in the Lube Oil Area in 1940. A review of the historical site layout drawings indicates that many smaller structures

existed in the Lube Oil Area in 1940, including transformer buildings, truck and tank car loading racks, pump houses, and pits and trenches containing pipe lines (Appendix J).

As of 1947, the reducing stills, condensers, and pipe still were removed from the western side of the Lube Oil Area. Several smaller structures were in place, including the new "F" pipe still furnace, a slack wax (SW) and dewaxed oil (DO) heater with stack, a pump house, and the wax hydrogenation plant in the former reducing stills location. An oil/water separator was located at the western end of a row of six domed-roof agitator tanks in the northern central part of the area.

The Lube Oil Area was significantly modified between 1951 and 1959. The Base Stock Tank Field, consisting of approximately 50 tanks, was constructed in the south-central part of the area (Figure 5-2b). The boiler shop, the supply building, and several other smaller buildings were removed along the eastern side of the area, and construction of the blending and packaging building was begun. Overhead pipelines that connected the tank groups, mixing areas, and buildings, were constructed. The cooling facility buildings in the northwest corner of the area had been removed and several small sheds and trucks occupied this area.

Between 1959 and 1961, the Finished Products Tank Field was constructed in the northern part of the Lube Oil Area (Figure 5-2a). Between 1961 and 1966, many tanks were removed from the northern part of the Lube Oil Area as operations were modified. Some time between 1968 and 1970, the West Side Treatment Plant was constructed. All other operations remained generally the same.

From 1970 to about 1989, no major changes occurred in operations. The Lube Drum Building was built some time between 1984 and 1989. After 1989, the tanks from the Bulk Wax Shipping Tank Field in the southern part of the area were removed.

# 5.1.2.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate changes throughout the Lube Oil Area. As seen on the 1940 aerial photograph, the central portion of the Lube Oil Area contained a dense array of storage tanks aligned differently from the present-day configuration of tanks. The northern part contained rows of tanks and kettles. These tanks were approximately 30 to 50 feet in diameter.

In the 1940 aerial photograph, large storage tanks, each 60 to 90 feet in diameter, were located in the middle and south-central portion of the area. Agitator tanks located in this area appeared to have domed roofs, unlike the coned roofs principally found on storage tanks. Rectangular shop buildings were located along the eastern edge of the Lube Oil Area. Railroad tracks also ran along the eastern edge, providing access to the shops and piers. The main office building and the experimental laboratory were located in the southeastern corner of the area. A barrel runway, that transported barrels to and from barrel-handling facilities, was located to the east and south of the Lube Oil Area.

Also visible in the 1940 aerial photograph were light-colored rectangular structures, rectangular buildings, and cone-roofed tanks identified as sweaters. These structures comprised the Wax Production Area in the southwestern part of the Lube Oil Area. Four large storage tanks, each 90 feet in diameter, and several other smaller tanks were located to the east of the sweater structures and comprised the Bulk Wax Shipping Tank Field.

Three oil/water separators were visible in the 1940 aerial photograph. These separators included a 500- by 35-foot oil/water separator oriented north-south in the southwestern part of the area; another separator, approximately 140 by 70 feet, adjacent to the larger separator; and

a third, smaller oil/water separator in the southeastern part of this area, adjacent to a storage tank.

In the 1947 photograph, the area had the same general configuration as in the 1940 photograph, except that several structures had been removed. The barrel runway that transected the southwestern part of the area had been removed. Several storage tanks and agitator tanks in the central part of the area had also been removed, including a large storage tank that had been adjacent to an oil/water separator in the southeastern corner. The oil/water separator that was oriented northeast-southwest in the southwestern part of the area appeared to have been filled in and to be non-operational.

In the 1951 aerial photograph, one domed-roof agitator tank in the south-central part of the area had been removed, and a stack had been added to the pipe still furnace on the northeast corner of the Platty Kill Creek. An overhead pipeline led from the central western tanks in the Lube Oil Area into the Stockpile Area to the west (where a new process facility had been constructed). The Wax Hydrogenation Plant, located near this pipeline on the west side, had been expanded. Buildings in the northwest corner had been modified and were possibly being dismantled.

As shown on the 1959 aerial photographs, 91 ASTs, ranging from 15 to 60 feet in diameter, had been built in the Lube Oil Area between 1951 and 1959, and many of the older tanks had been removed. These new tanks were aligned perpendicular to the shoreline. Many previously existing tanks in the northern central part of the area had been painted, and an oil/water separator was located within the group of recently painted tanks. Many of the structures adjacent to Platty Kill Creek had been removed. The Greer Wax Building had been constructed in the southwestern corner of this area adjacent to the Platty Kill Creek, and the sweaters and stills in this area had been removed. The oil/water separator unit that had existed in the southeastern part of this area was no longer present, and the Wax Hydrogenation Plant and pipelines in this area connecting the MEK Dewaxing Plant to the Lube Oil Area were no

The northern part of the Lube Oil Area was modified in the 1961 aerial photograph. The 47 new ASTs in this tank area were in rows aligned north to south. The separation between the north (Lube Product) and south (Lube Stock) tank areas was apparent by the light-colored overhead transport lines connecting the Pier No. 1 Area to the rest of the Plant. A large warehouse (oil blending and packaging warehouse) had been constructed in the northeastern part of the Lube Oil Area. The northwestern part of the Lube Oil Area was vacant. In the 1963 aerial photograph, most of this area remained the same; however, many tanks had been removed in the northeastern part of the area.

As seen on the 1966 aerial photograph, the appearance of the Lube Oil Area had changed significantly after 1963; many structures had been removed and open areas were leveled and possibly paved. Approximately 30 tanks and two buildings had been removed from the northern part of the area; the ground was filled and leveled. All of the tanks and buildings in the southern part of the area, including the former main building and the barrel shipping areas, had been removed. A line of five tanks in the southwestern part of the area had been removed, and the area had a configuration very similar to its present one.

In the 1968 aerial photograph, the area appeared the same as in 1966. By 1970, as seen on the aerial photograph, four small tanks had been removed and replaced with two small tanks in the central western part of the area. Drums were stored adjacent to the Greer Wax Building in the southwestern corner of the area. The West Side Treatment Plant had been constructed.

In the 1974 aerial photograph, the large oil/water separator in the southwestern part of this area had been removed. The area exhibited the same configuration in 1977. By 1984, as shown on the aerial photograph, the overhead pipelines leading to the former MEK Dewaxing Plant Area had been removed.

The large warehouse called the Lube Drum Building appeared on the 1984 aerial photograph; this building had been constructed in the eastern part of the area between 1984 and 1989. In the 1991 aerial photograph, 14 small tanks (Bulk Wax Shipping Tank Field) had been removed from the southern part of the Lube Oil Area.

## 5.1.2.4 Discharges, Spills, and Releases

Eighteen spills greater than 100 gallons have been documented in the Lube Oil Area (Figure 5-2a, Figure 5-2b, and Table 5-2). The materials spilled consisted of a variety of oils, waxes, and some solvents (Table 5-2).

# 5.1.2.5 Areas of Potential Contamination

Areas of potential contamination identified in the Lube Oil Area include ASTs, USTs, former chromium slag depositional areas, oil/water separators, drum storage areas, loading/unloading areas, transformers, the West Side Treatment Plant, and sewers and septic systems (Figures 5-2a and 5-2b).

# 5.1.2.5.1 Aboveground Storage Tanks

The Lube Oil Area currently contains approximately 200 ASTs (Table 5-1). The majority of these ASTs were constructed during and after the 1950s, although several date back to the 1920s. The tanks have primarily stored lube oils and waxes. Between 1972 and 1992, 19 spills greater than 100 gallons were documented, many originating from the ASTs (Table 5-2). The Lube Oil Area was one of the original properties where the Bayonne Plant operations began. Hundreds of ASTs were built and subsequently removed as operations in this area changed over the years from wax and oil refining to blending and packaging.

Three USTs were historically located in the Lube Oil Area (Figures 5-2a and 5-2b); each of the three USTs stored gasoline. These USTs were installed sometime before 1986 and have since been removed (Table 5-3). Their integrity is undetermined.

# 5.1.2.5.3 Former Chromium Slag Depositional Areas

Based on the results of IRM soil sampling and visual inspections for chromium, several isolated patches of chromium slag have been observed in the Lube Oil Area (ICF Kaiser Engineers, Inc. 1993). A high-density area of chromium slag nodules was observed in the vicinity of the solvent drum shed and along the western boundary with Platty Kill Creek (ICF Kaiser Engineers, Inc. 1993) (Figure 5-2b).

## 5.1.2.5.4 Oil/Water Separators

Several oil/water separators have historically been located in the Lube Oil Area. These separators ranged in size from a 500-foot long separator in the southeastern corner that was present until 1959 to smaller 20-foot long separators that serviced clusters of 10 to 20 ASTs or process units such as former stills (Figures 5-2a and 5-2b). Aerial photographs indicate that the separators in the Lube Oil Area were constructed with concrete walls. By 1974, the only operating separator in this area was the one associated with the current West Side Treatment Plant.

#### 5.1.2.5.5 Drum Storage Areas

Drums or barrels have been used since production began in the Lube Oil Area in the late 1800s. Today, a major part of operations in the Lube Oil Area involves the packaging of specialty lube oils into drums or other containers for distribution. These operations are conducted in the Lube Drum Blending and Packaging Warehouse and the "1 and 5" Quart Filling

Building located in the central northeastern part of the Lube Oil Area (Figure 5-2a). Drums are stored on pallets on the concrete floors of these warehouses. A solvents drum shed is located adjacent to the warehouse.

Historical site information indicates that drum filling was a major part of operations as early as the 1940s, when several large drum-handling buildings were located in the eastern part of the area (Esso Standard Oil Company 1945). These buildings comprised the Barrel Factory and included the Lube Oil Can Filling Building, the Lube Oil Filled Can Storage Building, several small storage buildings, several shop buildings, and a boiler house. Wax products were also shipped in drums, and the Pier No. 1 Area and the southern part of the Lube Oil Area contained wax shipping and storage buildings. Numerous other sheds that may have stored drums were located throughout the Lube Oil Area in the 1940s. During the 1970s, as indicated by aerial photographs, drums were stored adjacent to the Greer Wax Building in the southwestern corner of the area. Currently, some drums are stored in and around this building.

# 5.1.2.5.6 Loading/Unloading Areas

The Lube Oil Area currently contains a railroad car transfer area and a central tank truck loading rack where various blends of lube oil are loaded into several trucks at one time. Trucks are often loaded in stages with different oil grades to create a certain blend for shipment. Trucks also load at two smaller racks adjacent to the Base Stock and Finished Products Tank Fields. At the Lube Oil warehouses, container trucks are loaded with drums using forklifts. All of the loading areas are currently paved with concrete or macadam, and the railroad car loading spurs are surrounded by concrete walls. The railroad car loading spurs enter the Lube Oil Area from the north.

Prior to the major demolition and reconstruction of this area in the 1950s, truck and railroad tank car movement throughout the area was much more extensive (Esso Standard Oil Company 1945). Railroad spurs extended along both the eastern and western edges of the area, and a spur ran from the southeastern corner near the piers into the central part of the area.

Tracks along the northern edge of the area were also present. Each of these four track areas were serviced by a railroad car loading area for as many as ten railroad cars. Two smaller railroad car loading spurs serviced wax production areas. Four truck loading racks, each one much smaller than the current central truck rack, were located in the area. The specific design of the truck and tank car loading racks is not known.

# 5.1.2.5.7 Transformers

Two transformers (Substations F-1 and G-3) containing PCB liquid were formerly located at the Lube Oil Area (Figures 5-2a and 5-2b). One transformer had approximately 425 gallons of liquid removed in December 1986 as part of Exxon's in-house dechlorination program (Table 5-4). Both transformers were removed from the area at some time after 1986. At least four other transformers are or were present in the Lube Oil Area. Their PCB content is unknown. Existing transformers are currently free of PCB oils.

# 5.1.2.5.8 West Side Treatment Plant

The West Side Treatment Plant is located in the south-central part of the Lube Oil Area. The West Side Treatment Plant is the smaller of the two on-site treatment plants; it accepts runoff from the Main Building Area, the "A"-Hill Tank Field, and the Lube Oil Area. It also receives steam condensate and spilled materials from the Lube Oil Area.

Wastewater generated on the western side of the plant is initially treated at the West Side Treatment Plant by an API gravity separator (constructed in 1958) and a DAF unit. Effluent from this facility is then pumped via a subsurface transfer line, formerly known as the Low Pressure Salt Water Line, to the East Side Treatment Plant.

Both treatment plants are capable of pumping excess water, generated following heavy rainfall events, to holding tanks for temporary storage to prevent untreated overflow. The West Side Treatment Plant diverts the overflow to tanks located in the "A"-Hill Tank Field.

Associated with the West Side Treatment Plant are three ASTs that store oil skimmed from the separator, four ASTs that store storm-water, two ASTs that store slop oil and miscellaneous liquid waste, and one small AST that stores chemicals that are injected into the separator as pre-treatment.

## 5.1.2.5.9 Sewers and Septic Systems

Historical maps indicate that sewers were present in the Lube Oil Area prior to 1945 (Esso Standard Oil Company 1945) (Appendix J). The existing storm sewers drain to the West Side Treatment Plant and are shown on Figures 5-2a and 5-2b.

Five sanitary septic systems are present at the Lube Oil Area. The septic tanks range in capacity from 900 to 5,100 gallons (Figures 5-2a and 5-2b).

## 5.1.2.6 IRM Activities

IRM investigations to address chromium, NAPL, and sewers were conducted and/or are currently being conducted in the Lube Oil Area. In 1993, ICF Kaiser collected 28 soil samples and duplicates from the Lube Oil Area to evaluate the impact from chromium slag (ICF Kaiser Engineers, Inc. 1993). Five of the 28 samples had total chromium concentrations greater than 500 mg/kg (between 615 and 1,380 mg/kg). In the other 23 soil samples, total chromium concentrations ranged between 9.6 and 479 mg/kg.

Geraghty & Miller has recently drilled seven soil borings along the southeastern perimeter of the Lube Oil Area (one of which was drilled in the Pier No. 1 Area) to evaluate whether NAPL is present and, if present, whether it has the potential to migrate off-site. One boring, which encountered floating NAPL on the groundwater, as determined using temporary standpipes, was converted into a monitoring well. Additional NAPL IRM field activities (such as bail-down tests, tidal studies, slug tests, and NAPL recovery tests) may be conducted in the Lube Oil Area, if deemed appropriate, following a review of the results from the soil boring

program. Previous rounds of NAPL thickness measurements collected between December 1991 and March 1993 by DRAI (Table 5-5) indicate NAPL thickness ranging from 0.11 to 7.58 feet (Monitoring Well EB-22).

IT Corporation is currently conducting an evaluation of the sewer system at the Bayonne Plant in accordance with NJDEP-approved work plans (Dan Raviv Associates, Inc. 1992a and IT Corporation, 1993). The sewer evaluation program involves cleaning and inspecting (via videotaping) the interior of the sewer piping. The results of this evaluation are not yet available.

#### 5.1.3 <u>Pier No. 1</u>

A description of the Pier No. 1 Area and details of its history and operations are provided below.

#### 5.1.3.1 Description and Boundaries

The Pier No. 1 Area is located in the southwestern part of the plant and comprises 4 acres of land and additional riparian acreage bounded by the Lube Oil Area to the north, land owned by Gordon Terminal Service Company to the east, the Kill Van Kull Waterway to the south, and IMTT and Platty Kill Creek to the west (Figure 5-3). The southern boundary of the Pier No. 1 Area coincides with the pier line.

# 5.1.3.2 Operations, Raw Materials, and Products

Pier No. 1 is one of three active piers utilized for the loading and unloading of the contents of marine vessels at the Plant. Several large in-facility pipes run in elevated pipe racks from the marine loading tower on Pier No. 1 to the Lube Oil Area.

In 1940, four large active piers were located in this area, as well as three operational areas including the Compounding Plant (which was also the Glue Factory at some time in the

past), the shipping warehouse, and a barrel handling area. The Compounding Plant consisted of approximately 27 small tanks and a rectangular building. Operations at the Pier No. 1 Area are unknown. Other features in this area were a small barrel storage area, a super heater, and a coal bin. The shipping warehouse was a long rectangular building that was oriented east to west along the shore, adjacent to the piers. North of the warehouse, and extending into the Lube Oil Area, was a barrel handling area, consisting of several buildings, a storage area, loading racks, and railroad tracks. Barrels were likely delivered to this area from the barrel factory located in the Lube Oil Area, via the barrel runway, which was an overhead conveyor line. Barrels were prepared by steam cleaning, drying, and painting. The barrels were probably then filled with products such as waxes or specialty lube oils manufactured in the Lube Oil Area. The barrels may have been taken away from the area via rail car and ships.

An unidentified wooden structure was present in the area of the present-day shoreline between 1940 and 1947 (Figure 5-3). The use and purpose of this structure is not known. This structure was removed some time before 1951. Between 1951 and the present day, operations remained essentially the same, except that Pier No. 1 remained active. The helipad was constructed some time around 1970. The approximate extent of the former shoreline, which existed until 1970, is shown on Figure 5-3.

#### 5.1.3.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate changes in the Pier No. 1 Area. In the 1940 aerial photograph, there were four large active piers extending from the Pier No. 1 Area into the Kill Van Kull Waterway. The shape of the shoreline of the Pier No. 1 Area varied from the present-day shoreline (Figure 5-3). On the western side was the longest pier (which is called Pier No. 1 today, but was called Pier No. 5 in 1940), where two large tanker ships were docked. On the eastern side was a large unnamed pier with railroad tracks, where two smaller ships and one rectangular barge were docked. The white-roofed launch house and the saltwater pump house (a small building constructed in 1898) were located on shore at this pier. In the center were two shorter piers, one of which was very wide, where smaller ships were docked. Inland from the two central piers was the only land area within the Pier No. 1 Area. This land area was occupied by warehouses, a group of tanks, and a railroad car and drum storage and handling area. To the west were approximately 27 small ASTs, 15 to 35 feet in diameter, and a rectangular building.

The area exhibited the same appearance on the 1947 aerial photograph as it did in 1940. An unidentified wooden structure was located at the shoreline between the two westernmost piers. The barrel storage area on shore between the buildings was densely packed with barrels and railroad cars.

In the 1951 aerial photograph, the oil/water separator seen in the 1947 photograph had been removed, and the barrel storage area on the shore was empty. In the 1959 aerial photograph, the saltwater pump house in the northeastern part of this area had been removed and its former location had been filled with light-colored material. Many trucks were parked in this part of the Pier No. 1 Area. The pier on the eastern side of the area appeared inactive. Several barges were docked at the other piers. A tall structure was present on the pier on the western side of the area (currently Pier No. 1). Several small tanks had been added to the group of tanks in the barrel handling area.

In the 1961 aerial photograph, the area exhibited the same configuration as in 1959, with the exception of additional aboveground transfer lines. By the time the 1966 aerial photograph was taken, the area had undergone significant changes. All of the buildings, warehouses, and tanks located in the Pier No. 1 Area had been eliminated and the land had been graded level.

From 1966 to 1984, the area appeared essentially the same, with the exception of the construction of the platform for the helipad, which had occurred some time between 1968 and 1970. As seen on the 1984 aerial photograph, the area had undergone significant modifications to bolster the bulkhead on the eastern side of the pier and widen the berth. Pier No. 1 was the only remaining operational pier. An old pier on the eastern side of the area was disintegrating. In the 1989 photograph, some modifications to the heliport were observed, and the landing area

was more visible from the air. The area exhibited the same features in the 1991 photograph as in 1989.

#### 5.1.3.4 Discharges, Spills, and Releases

Six spills greater than 100 gallons have been documented in the Pier No. 1 Area. The materials spilled consisted of a variety of waste oil, heavy fuel oils, and waxes (Table 5-2). Historical spills have occurred on the pier and in the Kill Van Kull Waterway. The documented volumes of material spilled range from 670 to 2,100 gallons per incident.

# 5.1.3.5 Areas of Potential Contamination

Identified areas of potential contamination at the Pier No. 1 Area include ASTs, drum storage areas, loading/unloading areas, transformers, process areas, and sewer systems.

#### 5.1.3.5.1 Aboveground Storage Tanks

There are currently no ASTs located in the Pier No. 1 Area. From 1932 to 1963, 19 to 58 small tanks were located in the western central part of this area. Two pump houses, one present from 1932 to 1963, and the other, Warehouse Pump House No. 21, present from 1921 to 1963, were also located in this area.

5.1.3.5.2 Drum Storage Areas

A drum storage area formerly occupied the north-central part of the Pier No. 1 Area and extended into the Lube Oil Area to the north. This storage area was associated with the Barrel Painting Facility and Cooperage Shop located in the east-central part of the area from 1921 to 1963.

A railroad car filling rack was located in the north-central part of the Pier No. 1 Area from 1932 to 1963. It was probably associated with the barrel handling shops located in this area.

## 5.1.3.5.4 Transformers

Two substations (Substation No. 9 and No. G-1) are located along the northern border of the Pier No.1 Area (Figure 5-3). There is no information available regarding the operational history and possible PCB content of transformers located at these substations. However, according to Plant personnel, transformers that were found to contain PCB oils at the Bayonne Plant have been removed.

## 5.1.3.5.5 Process Areas

A Compounding Plant was located in the west-central part of the Pier No. 1 Area from 1887 to 1963. It included a Glue Factory from about 1913 through 1921. Little information is available concerning the raw materials, operations, and products associated with the former Compounding Plant and former Glue Factory.

#### 5.1.3.5.6 Sewers and Septic Systems

Historical maps indicate that there were sewers in the Pier No. 1 Area prior to 1945 (Esso Standard Oil Company 1945) (Appendix J). The existing storm sewers drain to the West Side Treatment Plant and are shown on Figure 5-3. No septic systems are currently present in the Pier No. 1 Area.

#### 5.1.3.6 IRM Activities

IRM activities were conducted or are currently being conducted in the Pier No. 1 Area to address chromium, NAPL, and sewers. In 1993, ICF Kaiser collected two samples from the Pier No. 1 Area to evaluate the impact from chromium slag. The total chromium concentrations in these two samples were 1.8 and 31.2 mg/kg.

A NAPL IRM investigation was conducted in the Pier No. 1 (Helipad) area by DRAI during August and September 1994 (Dan Raviv Associates, Inc. 1994a). Eight recovery wells existed in this area prior to initiating IRM activities. Historically, Recovery Wells EBR4, EBR6, and EBR8 were pumped periodically to recover NAPL. However, since June 1993, only Recovery Well EBR8 is regularly pumped as part of on-going NAPL recovery.

The NAPL IRM investigation included the drilling of three soil borings (Soil Borings HB1 through HB3) near the helipad in the Pier No. 1 Area (Figure 2-8). Previous rounds of NAPL thickness measurements collected between December 1991 and March 1993 by DRAI (Table 5-5) indicate NAPL thicknesses ranging from 0.01 to 4.13 feet. In addition, the bulkhead construction along the Kill Van Kull is currently being evaluated by DRAI, and the several "tar-like" seeps observed in this area will be sampled. The eastern and southern bulkheads are being further evaluated to determine if the bases of the bulkheads extend below low tide. As previously described in Section 5.1.2.6, Geraghty & Miller has recently drilled seven soil borings along the southeastern boundary of the Lube Oil Area as part of the Lube Oil Area.

IT Corporation is conducting a sewer system evaluation that includes cleaning and videotaping the interior of the sewer lines. The results of the sewer IRM investigation are not yet available.

A description of the No. 2 Tank Field and details of its history and operations are provided below.

#### 5.1.4.1 Description and Boundaries

The No. 2 Tank Field is located in the northwestern part of the Plant and comprises 11 acres bounded by railroad tracks and the Main Building Area to the north, the AV-Gas Tank Field to the east, the Asphalt Plant Area and Utilities Area to the south, and Avenue J and the "A"-Hill Tank Field to the west (Figure 5-5).

#### 5.1.4.2 Operations, Raw Materials, and Products

The No. 2 Tank Field consists of eight tanks in one bermed area. Each tank has a capacity of approximately 157,400 barrels and stores No. 2 fuel oil. The dikes are intact and in good repair.

Prior to 1940, this area had sweetening stills and an oil/water separator associated with the stills. In addition, the entire northeastern perimeter of the No. 2 Tank Field Area was occupied by a line of crude stills and condensers. The raw materials and products used in this area in 1940 are not known. In 1940, there were numerous ASTs, a gas compression plant, a boiler house, a water purification plant, an oil/water separator, furnaces, and stills at the No. 2 Tank Field. The gas compression plant was previously occupied by a second line of sweetening stills.

Between 1940 and 1951, operations did not change appreciably at the No. 2 Tank Field. Between 1951 and 1959, all previous ASTs and structures were removed, and eight ASTs were added, in a configuration similar to the present. Since the installation of these tanks in the 1950s, the area has remained essentially the same.

#### 5.1.4.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate changes in activities at the No. 2 Tank Field. In the 1940 aerial photograph, railroad tracks ran through the western section of the area. To the west of the tracks were several small buildings and tanks, probably the remaining parts of a line of sweetening stills and other process units that were being dismantled. On the east side of the tracks, to the north, was a Gas Compression Plant consisting of a small square building and various tanks and lines. To the south was the boiler house, consisting of a large building with two stacks, a freshwater tank (95 feet in diameter), and another building containing a water purification plant. Two sumps had been located in this area. In the southeast corner of the area were two small buildings. In the center of the eastern part of the No. 2 Tank Field was a group of nine ASTs, each 44 feet in diameter and 10 to 12 feet in height; the contents of these tanks is unknown. To the north of these ASTs was a light-colored, rectangular building identified as the No. 37 Pump House and manifold. On the eastern side of the area was a group of ten storage tanks, each 50 to 60 feet in diameter and approximately 12 feet in height, that extended eastward into the area of the present-day AV-Gas Tank Field. These tanks were adjacent to a process area consisting of a vacuum furnace, an atmospheric furnace, two pre-heaters, a tall stack, a still (type unknown), a scrubber, and a light-colored, high-roofed, rectangular blower house. This area was the site of the former "C" and "D" pipe stills. An oil/water separator connected to this process facility was located in the northeastern corner of the No. 2 Tank Field.

In the 1947 aerial photograph, the process areas in the northern parts of the area were still in place although six of the storage tanks in the No. 2 Tank Field had been removed. In the 1951 aerial photograph, the stacks and smaller buildings at the boiler house on the south side had been removed, and four tanks in the center of the area had also been removed. The oil/water separator in the northeastern corner was partially or entirely filled and was probably being dismantled.



As seen in the 1959 aerial photograph, the No. 2 Tank Field had significantly changed since 1951. The area had its present-day configuration of eight large storage tanks, each 150 feet in diameter and 50 feet in height. The group of tanks was enclosed by one continuous berm around the perimeter. The railroad tracks that had cut through the western section of this area and all other structures were no longer present.

From 1959 through 1991, the No. 2 Tank Field had the same configuration. The only observed difference in the photographs was that several tanks had been painted (1970 aerial photograph).

## 5.1.4.4 Discharges, Spills and Releases

Only one spill of greater than 100 gallons has been documented at the No. 2 Tank Field (Figure 5-5). This spill occurred in the vicinity of Tank 1005 in 1989 and was reported to consist of No. 2 fuel oil (Table 5-2). The volume of the spill is not known.

## 5.1.4.5 Areas of Potential Contamination

Areas of potential contamination at the No. 2 Tank Field include the ASTs, former chromium slag depositional areas, oil/water separators, process areas, sumps, and sewers (Figure 5-5).

## 5.1.4.5.1 Aboveground Storage Tanks

There are currently eight large ASTs located in the No. 2 Tank Field. Each AST was constructed in 1955, has a capacity of 6.6 million gallons, and contains No. 2 fuel oil. One documented spill of an unknown quantity of No. 2 fuel oil occurred in 1989 at Tank 1005 in the southwestern corner of the area (Figure 5-5). Before its configuration as a tank field, the area contained process units and several clusters of smaller ASTs. Five to ten tanks were located in the central part of the area from 1921 to 1951; three to five tanks were located in the eastern

part of the area from 1932 to 1951; and twelve tanks were located in the western part of the area in 1940. Four former pump houses were located in the area.

# 5.1.4.5.2 Former Chromium Slag Depositional Areas

Chromium slag is reported to have been used to construct berms and as general fill in the No. 2 Tank Field (Esso Standard Oil Company 1957a). As depicted on Figure 5-5, the entire area was identified by ICF Kaiser as having a high density of chromium slag (ICF Kaiser Engineers, Inc. 1993).

#### 5.1.4.5.3 Oil/Water Separators

A 60 foot long oil/water separator was located in the northeastern corner of the No. 2 Tank Field in 1945. It was probably associated with the former process areas located in that area.

#### 5.1.4.5.4 Process Areas

Prior to construction of the large ASTs in the 1950s, the No. 2 Tank Field was occupied by several process areas and clusters of small ASTs. Before 1920, two lines of sweetening stills, that were probably constructed in 1907, extended from the south-central part of the area northward into the Main Building Area (Figure 5-5). After 1920, a boiler house occupied the south-central part of the No. 2 Tank Field until 1951. A water purification plant was located to the east of the boiler house from 1921 to 1951. A laboratory was located in the southeastern corner of the area in 1945. In the northeastern corner of the area, a line of crude stills was situated adjacent to the railroad tracks and continued into other operational areas to the east and west.



#### 5.1.4.5.5 Sumps

Two sumps were located in the south-central portion of the No. 2 Tank Field in 1945. One sump appears to have been used in conjunction with the Boiler House that was located in the south-central section of the No. 2 Tank Field in 1945. The other appears to have been used in conjunction with the Water Purification Plant that existed east of the Boiler House. It is not known when or if these sumps were decommissioned.

## 5.1.4.5.6 Sewers and Septic Systems

Historical maps indicate that there were sewers in the No. 2 Tank Field prior to 1945 (Appendix J) (Esso Standard Oil Company 1945). The existing storm sewers drain to the East Side Treatment Plant (Figure 5-5). There are no septic systems at the No. 2 Tank Field.

## 5.1.4.6 IRM Activities

IRM activities at the No. 2 Tank Field include investigations of chromium slag and of the sewer system. In 1993, ICF Kaiser collected 12 soil and sediment samples for total chromium analysis (ICF Kaiser Engineers, Inc. 1993). Seven samples had total chromium concentrations ranging from 570 to 4,590 mg/kg; five samples had concentrations of less than 500 mg/kg, ranging from 53 to 256 mg/kg.

IT Corporation is conducting a field evaluation of the sewer system, including cleaning and videotaping of sewer lines. The results of the field evaluation are not yet available.

#### 5.1.5 Asphalt Plant Area

A description of the Asphalt Plant Area and details of its history and operations are provided below.



#### 5.1.5.1 Description and Boundaries

The Asphalt Plant Area is located in the central part of the Plant and comprises 17 acres bounded by the No. 2 Tank Field and the AV-Gas Tank Field to the north, railroad tracks and the Low Sulfur Tank Field to the east, the No. 3 Tank Field and the Exxon Chemicals Plant Area to the south, and the Utilities Area to the west (Figure 5-5).

## 5.1.5.2 Operations, Raw Materials, and Products

The Asphalt Plant Area consists of approximately 41 ASTs in four concrete-curbed areas and two soil-bermed areas. The tanks range in capacity from 440 to 38,254 barrels. Most of the tanks contain cutback asphalt and other asphalt grades, which are not liquid at ambient temperatures. Three tanks in the earthen-bermed area of the Asphalt Plant contain kerosene and Varsol (a petroleum-based solvent), which are liquid at ambient temperatures. A railroad car transfer area is located in the north portion of the Asphalt Plant Area; this transfer area consists of two railroad spurs that terminate at a concrete-paved area.

In 1940, the Asphalt Plant Area processed and handled asphalt, pitch, and related products. At this time, there were six small oil/water separators, storage sheds, a pump house, and an oxidizing plant. The oxidizing plant consisted of a compressor building, a furnace, and six tanks, each 30 to 50 feet in diameter. Approximately 25 small agitators and mixing tanks, each 15 to 35 feet in diameter, were located between and among the buildings. A line of tanks, each 35 to 60 feet in diameter and 30 feet in height, was located along the southwestern edge of the Asphalt Plant Area. In the southeast corner of this area was a group of stills; near the stills were pump houses, exchangers, a vacuum tower, an evaporation tower, bottom exchanger tanks, and an oil/water separator.

Between 1940 and 1951, activities at the Asphalt Plant Area remained relatively unchanged. Some time after 1951 and before 1959, the pitch drum filling and storage shed areas (located in the central eastern part of the area) were dismantled, and three storage tanks were

added. In addition, two of the three large ASTs in the eastern portion of the area were removed, and a large diameter tank was constructed in the southeastern corner of the Asphalt Plant Area.

From 1959 to 1970, activities at the Asphalt Plant Area remained essentially unchanged, other than the addition or removal of some tanks and buildings. Between 1970 and 1974, most structures in the eastern end were being dismantled. Since 1970, minor modifications were made in the Asphalt Plant Area that culminated with the present-day configuration.

#### 5.1.5.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate changes in operations and structures at the Asphalt Plant Area. In the 1940 aerial photograph, a large, light-colored, rectangular building was located in the central eastern part of the area; this building contained the pitch drum filling and storage shed areas. To its north were railroad spurs and the pitch plant filling rack that was oriented along the length of the building. Six small oil/water separators were associated with this rack. To the west of the pitch filling and storage shed areas were several other buildings, including the Oxidizing Plant. A row of 15 to 20 small ASTs was located along the southern edge of the pitch filling area. Three large storage tanks, each 90 to 93 feet in diameter and 31 to 35 feet in height, and two small tanks, each 35 feet in diameter and 30 feet in height, were located in the northwestern corner of the Asphalt Plant Area and were enclosed by earthen fire banks. To the south of these ASTs were 11 tanks, each 25 to 35 feet in diameter and 30 to 36 feet in height. A pipeline extended from this area (between the two groups of tanks) eastward across the railroad tracks into the Low Sulfur Tank Field. Two lines of condenser stills, a pipe still, and an oil/water separator were located in the southernmost corner of the Asphalt Plant Area.

The Asphalt Plant Area exhibited the same configuration in the 1947 photographs as in the 1940 photograph; however, three tanks in the southwestern part of this area had been removed. One of the tanks had been replaced by a rectangular foundation that was the beginning

of a group of asphalt loading tanks. Trucks were parked along the eastern edge of this area along Lower Hook Road. The oil/water separator on the south side of the stills in the southeast corner had a light-colored surface. The only change seen in the 1951 aerial photograph was that one tank had been removed along the southern edge of the Asphalt Plant Area.

This area underwent significant change from 1951 to 1959. A review of the 1959 photograph shows that the large building in the central eastern portion of the area (pitch drum filling and storage shed areas) had been dismantled and in its place were three small storage tanks. In the northwestern part of the area were 30 asphalt tanks in rows. Two of the three large storage tanks in the eastern part of the area had been removed, and Tank 904 (which was 75 feet in diameter) had been constructed in the southeastern corner of the area. An air hut, which was an inflatable temporary storage building, was located in the southeastern corner of the area.

In the 1961 photograph, most of the area exhibited the same configuration as in 1959. Several small tanks had been removed from the central eastern part of the area; however, much of that area was shrouded in smoke from stacks. The building along the railroad tracks to the north had been removed. Four small tanks, including Tanks 987 and 988, which are currently situated in this location, had been constructed in the eastern part of the area.

In the 1963 photograph, several sheds and small ASTs had been removed from the northeastern part of the area. The area exhibited the same configuration from 1966 through 1970. As seen in the 1974 aerial photograph, one large and four small tanks in the eastern part of the area had been removed, leaving the eastern part of the area vacant except for two small tanks. Based on the aerial photographs, the Asphalt Plant Area has remained essentially unchanged since 1974.

#### 5.1.5.4 Discharges, Spills, and Releases

As presented in Table 5-2, 28 spills have been documented in the Asphalt Plant Area. These spills have all consisted of asphalt, except for the spill of "Exxon Formula No. 82899" at Tank 923 in 1987. The 27 asphalt spills ranged from 100 to 1,500 gallons and generally occurred in the roadway.

## 5.1.5.5 Areas of Potential Contamination

Areas of potential contamination at the Asphalt Plant Area include ASTs, former chromium slag depositional areas, oil/water separators, drum storage areas, loading/unloading areas, transformers, a Hot Oil Transfer System, process areas, sewers, and septic systems (Figure 5-4).

## 5.1.5.5.1 Aboveground Storage Tanks

There are currently 41 ASTs at the Asphalt Plant Area. A Hot Oil Transfer System and attendant tankage are located in the southwestern central part of the area. Only one documented spill has occurred at the existing ASTs; a 500-gallon spill of "Exxon Formula No. 82899," which is probably a lube oil additive, occurred in 1987 at Tank 923.

Up to 85 ASTs and agitators were located in an area encompassing the southern half of the western half of the Asphalt Plant Area from 1921 to 1959. Many ASTs were located throughout the rest of the area. Three pump houses were located in the eastern half of the area from 1932 to 1947.

### 5.1.5.5.2 Former Chromium Slag Depositional Areas

Based on historical information reviewed, there are no known reports indicating the deposition of chromium slag in the Asphalt Plant Area. However, the results of IRM soil

sampling and site inspections for chromium indicated a high density of chromium slag in large areas in the eastern portion of the Asphalt Plant (ICF Kaiser Engineers, Inc. 1993).

#### 5.1.5.5.3 Oil/Water Separators

A 120 foot long oil/water separator was located in the southern part of the Asphalt Plant Area from 1932 to 1951. Along the northern side of the area, between 1932 and 1951, a series of six small oil/water separators were located beneath the Pitch Filling Plant Rack. It is likely that the separators were filled in and abandoned in place.

#### 5.1.5.5.4 Drum Storage Areas

The Pitch Drum Filling Shed was located in the central part of the Asphalt Plant Area from 1921 to 1951. The Carton Filling and Storage Area was also located in the central part of this area from 1940 to 1951. Both drum storage areas were probably used in the packaging of asphalt for shipment and distribution.

## 5.1.5.5.5 Loading/Unloading Areas

There are currently four truck loading and unloading areas in the Asphalt Plant Area. The truck loading areas serve small groups of tanks. One railroad car loading area is located along the northern side of the area. From 1932 to 1951, this railroad car loading area was larger and encompassed the Pitch Plant Filling Rack. Another rail car loading area was located in the southeastern part of the area from 1921 to 1945. Several of the tanks in the Asphalt Plant Area serve as individual loading areas.

## 5.1.5.5.6 Transformers

Eleven transformers are or were present at the Asphalt Plant Area. Their operational history and PCB content are unknown. According to plant personnel, existing transformers at the Plant do not currently contain PCB oils.

#### 5.1.5.5.7 Hot Oil Transfer System

The Hot Oil Transfer System is located in the central southern edge of the Asphalt Plant Area. It consists of a furnace and transfer pumps that control the flow of hot oil within the adjacent AST heating coils. The intent of the system is to render the asphalt mobile and promote the flow of fluids, which are normally viscous under ambient temperatures, through the piping network in this area. No documentation is available concerning the PCB content, if any, of the hot oils in the system.

### 5.1.5.5.8 Process Areas

Prior to 1966, several process areas existed in the Asphalt Plant Area. This area was known in the early 1900s as the No. 3 Plant. Condensers and pipe stills were located in the southeastern part of the area from 1921 to 1959. The No. 2 Power Plant was located in the western part of the area from 1921 to 1957. The Pitch Plant was located in the central western part of this area from 1932 to 1951. The Oxidizing Plant was located in the central eastern part of this area from 1940 through 1966. An off-gas incinerator, oxidizer, and ferric chloride tank were formerly present along the southern boundary of the Asphalt Plant Area.

## 5.1.5.5.9 Sumps

A concrete sump (E3), which has a capacity of 6,800 gallons and is registered as a UST, is currently located in the central part of the Asphalt Plant Area and is used for collection of lube oil additives (Table 5-2). The sump is used to collect de-minimis spills of lube oil additives

from the disconnecting hose(s). From 1932 to 1945, a sump was located in the southwestern part of the area adjacent to the present Hot Oil Transfer System.

5.1.5.5.10 Sewers and Septic Systems

The sewer system in the Asphalt Plant Area, which varies in construction, is part of the sewer system that serves the entire plant and drains by gravity to the East Side Treatment Plant.

There are currently two septic systems in this area. The Furino Mechanical Shop in the southeastern part of the area utilizes a 1,000-gallon holding tank. The Asphalt Control House in the central part of the area also has a 1,000-gallon holding tank.

## 5.1.5.6 IRM Activities

IRM activities in the Asphalt Plant Area include investigations of the chromium slag and the sewer system. In 1993, ICF Kaiser collected seven surface soil samples for total chromium analysis (ICF Kaiser Engineers, Inc. 1993). Three soil samples were detected above 500 mg/kg (986 to 1,960 mg/kg); concentrations in the other four samples ranged between 57.5 and 236 mg/kg. Berms and tanks in the asphalt tank area had the highest density of chromium slag (Figure 5-4).

IT Corporation is conducting a field evaluation of the sewer system at the Bayonne Plant. The evaluation includes the cleaning and videotaping of sewer lines. The sewer IRM evaluation is ongoing, and results of the evaluation are not yet available.

#### 5.1.6 AV-Gas Tank Field

A description of the AV-Gas Tank Field and details of its history and operations are provided below.
#### 5.1.6.1 Description and Boundaries

The AV-Gas Tank Field is located in the north-central part of the Site and comprises 6 acres bounded by railroad tracks and the Domestic Trade Area to the north and east, the Asphalt Plant Area to the south, and the No. 2 Tank Field to the west (Figure 5-6).

## 5.1.6.2 Operations, Raw Materials, and Products

The AV-Gas Tank Field consists of ten tanks in two bermed areas. The tanks range in capacity from 12,592 to 96,324 barrels. The tanks contain kerosene, aviation gasoline, toluene, hexane, heptane, and cutback naphtha (Table 5-1). The catch basins and drains inside the secondary containment area route storm-water runoff to the East Side Wastewater Treatment Plant.

From 1932 through 1947, a pitch filling plant was located in the eastern portion of the AV-Gas Tank Field. Between 1940 and 1947, the AV-Gas Tank Field contained tanks and a process area that extended westward into the No. 2 Tank Field. This process area contained a vacuum furnace, an atmospheric furnace, heaters, a stack, a still, a scrubber, and a blower (see Section 5.1.4 [No. 2 Tank Field]). After 1947, the pitch filling plant was dismantled. From 1957 through 1961, a tetraethyl lead (TEL) building was located just east of the pitch filling plant. The TEL Building was occupied by equipment that placed the lead additive into the fuels. By 1959, all other structures had been removed and the AV-Gas Tank Field assumed its present-day configuration.

## 5.1.6.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate changes in operations and structures in the AV-Gas Tank Field. In the 1940 aerial photograph, the western part of the AV-Gas Tank Field contained tanks and a process area that extended westward into the No. 2 Tank Field. The southwestern corner of the area was occupied by four storage tanks, each 50 to 60 feet in diameter and 30 to 42 feet in height. The central southern portion of the area contained "Colprovia Asphalt Pans," the structure and function of which cannot be determined from the aerial photograph. The eastern corner of the area was occupied by a large building (Pitch Filling Plant). A large oil/water separator was located in the north-central part of the area, and a structure that appeared to be a small oil/water separator was located in the center of the area. Pipelines extended from the AV-Gas Tank Field Area over the railroad tracks to the Domestic Trade Area.

The area exhibited the same configuration in the 1947 photograph as in the 1940 photograph, with a few modifications. The large oil/water separator in the north-central part of the area had been removed. The upper stories of the Pitch Filling Plant in the eastern corner of the AV-Gas Tank Field had been removed. The Asphalt Pans along the southern edge of the area were clearly visible, though their function is still unknown.

As seen on the 1951 photograph, one small tank in the southeastern corner had been removed. The Asphalt Pans may have been filled or covered. The Pitch Filling Plant in the eastern corner of the area was further dismantled.

The AV-Gas Tank Field was significantly changed between 1951 and 1959. The 1959 aerial photograph shows the AV-Gas Tank Field in its present-day configuration with ten floating-roof storage tanks. All other structures had been removed. No changes in configuration were observed in the photographs since 1959, except that geodesic domed roofs covered the floating roofs on the tanks between 1989 and 1991.

## 5.1.6.4 Discharges, Spills, and Releases

Three spills greater than 100 gallons have been documented at the AV-Gas Tank Field (Figure 5-6). A 5,000-gallon spill of toluene occurred in 1988 in the vicinity of Tank 1010 (Table 5-2). Also, approximately 100 gallons of heavy fuel oil were spilled in the AV-Gas Tank Field Area in 1992. The exact location of the heavy fuel spill was not identified. A diesel spill

of unknown volume occurred at the northern boundary of the AV-Gas Tank Field immediately west of the overhead piping rack, in 1992.

# 5.1.6.5 Areas of Potential Contamination

Areas of potential contamination at the AV-Gas Tank Field include ASTs, former chromium slag depositional areas, former asphalt pans, oil/water separators, transformers, process areas, and sewers (Figure 5-6).

# 5.1.6.5.1 Aboveground Storage Tanks

The AV-Gas Tank Field contains ten ASTs that were all constructed in 1957. They range in capacity from 12,592 to 96,324 barrels and contain kerosene, aviation gasoline, toluene, hexane, heptane, and cutback naphtha (Table 5-1). Between five and eight ASTs were located in the southwestern portion of the area from 1932 to 1951, and two tanks were located in the northeastern portion of the area from 1925 to 1940.

#### 5.1.6.5.2 Former Chromium Slag Depositional Areas

Based on historical information, chromium slag is not known to have been deposited in the AV-Gas Tank Field. However, based on the results of IRM sampling and field inspections for chromium, evidence of chromium slag deposition has been observed throughout the majority of the area (ICF Kaiser Engineers, Inc. 1993).

## 5.1.6.5.3 Former Asphalt Pans

A 1945 site map identified a series of rectangular tanks or troughs located adjacent to the Pitch Plant in the AV-Gas Tank Field as the Colprovia Asphalt Pans (Esso Standard Oil Company 1945). These pans are visible in aerial photographs from 1940 to 1951. The function of the pans in the asphalt production process is not known.

#### 5.1.6.5.4 Oil/Water Separators

A 113 foot long oil/water separator was present in 1940 in the northwestern portion of the AV-Gas Tank Field. A small separator built into the sewer lines was present in the central part of the area in 1945. These separators may have serviced the nearby ASTs and process units; the construction details and discharge areas are not known. It is likely that the separators were filled in and abandoned, similar to other historical separators at the Plant.

5.1.6.5.5 Transformers

Substation No. 2, also known as the No. 2 Tank Field substation, is located in the northwestern corner of the AV-Gas Tank Field (Figure 5-6). There is no information available regarding the operational history and possible PCB content in the transformers at this substation. However, according to Plant personnel, transformers that were found to contain PCB oils at the Bayonne Plant have been removed.

5.1.6.5.6 Process Areas

Crude stills existed from before 1920 until 1932 along the northern edge of the AV-Gas Tank Field. Crude stills were typically large heated tanks in series that distilled crude oil into lighter grades.

A Pitch Filling Plant was located in the eastern portion of the AV-Gas Tank Field from 1932 to 1947. It consisted of a large building in which asphalt-related products may have been packaged. The TEL Building was located in the eastern corner of the area from 1957 to 1961. TEL is a gasoline additive.

Historical maps indicate that there were sewers at the AV-Gas Tank Field prior to 1945 (Esso Standard Oil Company 1945). The existing storm sewers in the AV-Gas Tank Field drain to the East Side Treatment Plant. There are no septic systems in this area.

# 5.1.6.6 IRM Activities

IRM activities at the AV-Gas Tank Field include a chromium slag investigation and a sewer investigation. In 1993, ICF Kaiser collected approximately four soil samples to evaluate the impact from chromium slag (ICF Kaiser Engineers, Inc. 1993). All four soil samples had total chromium concentrations greater than 500 mg/kg (637 to 2,480 mg/kg). The majority of the AV-Gas Tank Field was identified by ICF Kaiser as having a high density of chromium slag (Figure 5-6).

IT Corporation is conducting an IRM investigation of the sewer system at the Plant. This investigation involves the cleaning and videotaping of the sewer pipelines. The results of this investigation are not yet available.

# 5.1.7 Exxon Chemicals Plant Area

A description of the Exxon Chemicals Plant Area and details of its history and operations are provided below.

## 5.1.7.1 Description and Boundaries

The Exxon Chemicals Plant Area is located in the central part of the Site and comprises 11 acres (Figure 5-7). The Asphalt Plant Area borders the Exxon Chemicals Plant Area to the north and east and the No. 3 Tank Field is located to the south. The Utilities Area is located to the west. The Exxon Chemicals Plant Area, which was dismantled prior to the sale to IMTT,

manufactured additives for lubricants, fuels, and automatic transmission fluids as a batch-type operation in small reactor vessels. In addition to making additives, the plant batch-blended additives for fuel and automatic transmission fluids.

# 5.1.7.2 Operations, Raw Materials, and Products

In 1991, the Exxon Chemicals Plant Area contained approximately 14 small tank fields, with a total of 90 tanks ranging in capacity from 57 to 3,964 barrels, a hazardous waste drum storage area, a chemical wastewater separator, and a building that housed the process reactor vessels. The chemical wastewater separator was used to store process wastewater before it was trucked to Exxon's Bayway Chemicals Plant Area wastewater treatment facility. During the period of 1991 through 1993, many structures in the Exxon Chemicals Plant Area were dismantled.

Two sewer systems serve the Exxon Chemicals Plant Area. Some of the sewers in the Exxon Chemicals Plant Area were recently separated from the wastewater treatment system at the Bayonne Plant, and their contents drain to the wastewater separator in the Exxon Chemicals Plant Area.

The Exxon Chemicals Plant Area railroad car transfer areas are located south of the tank farm areas. The larger transfer area consists of four railroad spurs that terminate on a bermed and paved concrete area. A smaller transfer area, which is next to the former Exxon Chemicals Plant Area warehouse, consists of one railroad spur that terminates on a paved area. There are 12 tank truck loading/unloading areas in the Exxon Chemicals Plant Area. These areas are all paved with concrete.

In the 1920s and 1930s, the entire Exxon Chemicals Plant Area was occupied by rows of crude stills. The crude stills were replaced by more modern pipe stills located in other parts of the Site, and by 1940, a large portion of the Exxon Chemicals Plant Area was vacant. Process operations in 1940 included lube oil additive manufacturing at the Paraflow and Parapoid

Plants. Tanks, a cooling tower, and a pump house were associated with these plants. By 1947, a series of ASTs, which may have been associated with the inert gas plant, were located in the southern part of the area. Between 1951 and 1959, a group of tanks used for blending was constructed in the southwestern part of the Exxon Chemicals Plant Area. Between 1959 and 1970, operations did not change appreciably. Before 1970 and after 1974, many of the process area structures in the eastern portion of the Exxon Chemicals Plant Area were dismantled. Operations continued throughout the remainder of the Plant's existence.

## 5.1.7.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate changes at the Exxon Chemicals Plant Area. As seen in the 1940 photograph, the northern edge of the area contained a row of storage tanks, 40 to 60 feet in diameter and 10 feet in height. The tanks were enclosed by earthen fire banks; their contents are unknown. The central part of the area was occupied by the Paraflow Plant and the Parapoid Plant. The southern part of the area was vacant, except for several railroad spurs. Light-colored rectangular patterns in the fill-like soil in this area were the remnants of rows of crude stills that operated in the 1920s and 1930s.

In the 1947 aerial photograph, four tanks in the northwestern part of the Exxon Chemicals Plant Area had been removed and replaced by two light-colored rectangular racks. South of the racks, six or twelve asphalt stills were in place. The railroad tracks and roadways in this area had been modified. Approximately 13 small ASTs, several sheds, and a mason building were located in the southern part of the area. Railroad cars were parked on the spurs in this area; one spur was called the Chlorine Car Yard. The area did not appear to have changed appreciably in the 1951 photograph.

Modifications to the Exxon Chemicals Plant Area were observed in the 1959 aerial photograph. The line of tanks along the northern edge of the area had been removed and a group of 14 small tanks had been constructed in the southwestern part of the area. In the

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northwestern end of the area, a light-colored building had been constructed. A smaller building adjacent to this large building may have been used for hazardous materials storage. Both of these buildings still exist.

A review of the 1961, 1963, 1966, 1968, and 1970 aerial photographs shows that the area exhibited the same configuration as in 1959. A rectangular, light-colored reactor building had been constructed in the northwestern part of the area (1961 photograph), and the storage building at the western end of the area had been enlarged (1968 photograph).

In the 1974 aerial photograph, the Exxon Chemicals Plant Area had been modified. The process area structures in the eastern portion of this area had been dismantled. The Exxon Chemicals Plant Area appeared unchanged in 1979 and 1984, but in 1989, the Exxon Chemicals Plant Area had undergone some modifications in the central western portion of the area. A boiler house complex, consisting of six buildings, had been constructed. The area exhibited the same features in the 1991 photograph as in the 1989 photograph. Since 1991, many of the structures in the Exxon Chemicals Plant Area have been dismantled.

## 5.1.7.4 Discharges, Spills, and Releases

Seven spills greater than 100 gallons have been documented at the Exxon Chemicals Plant Area. The materials spilled have been a variety of Exxon formulas, cyclohexane, and slop oil (Table 5-2). The volume of spills ranged from 100 to 6,000 gallons and occurred at various locations within the Exxon Chemicals Plant Area (Figure 5-7). The volume of napthalene released as a result of an explosion that occurred at Tank 727 is not known.

# 5.1.7.5 Areas of Potential Contamination

Areas of potential contamination at the Exxon Chemicals Plant Area include ASTs, USTs, former chromium slag depositional areas, drum storage areas, loading/unloading areas,

process areas, sumps, a former acid neutralization pit, a former cesium vault, and sewers and septic systems.

## 5.1.7.5.1 Aboveground Storage Tanks

Many of the ASTs in the Exxon Chemical Plant Area were dismantled between 1991 and 1993. In 1991, as many as 95 ASTs were located in this area. Most of the tanks ranged in size from 10 to 20 feet in diameter and from 20 to 30 feet in height. The tanks generally contained oils and solvents used for blending specialty products. Five spills greater than 100 gallons have been documented from tanks in this area (Table 5-2). The largest spill occurred in 1988 when 6,000 gallons of cyclohexane spilled from Tank 736. A naphthalene explosion also occurred at the former Tank 727 location. Four groups of small tanks located in this area were removed in the 1950s. One large storage tank was located in the northwestern part of the area from 1921 to 1959. Three former pump houses were located in this area. The Plant Pump House No. 31 associated with the No. 3 Plant was located in the northwestern part of this area from 1945 to 1951. From 1932 to 1951, Pump House No. 31A was located in the southern part of the area and another pump house was located in the northwestern part of the area.

## 5.1.7.5.2 Underground Storage Tanks

Two collection sumps were located at the Exxon Chemicals Plant Area (Figure 5-7). One of the sumps (E2) was approximately 4,210 gallons in capacity and was used to collect deminimis spillage of lube oil additives from disconnecting hoses. The other sump (E4) was approximately 6,824 gallons in capacity and was used to contain de-minimis spills of transmission fluid from disconnecting hoses. The sumps were registered with the NJDEP Bureau of Underground Storage Tanks (BUST) in 1992 when it was discovered that they met the regulatory definition of USTs. Their date of installation, status, and condition are not known (Table 5-3).

# 5.1.7.5.3 Former Chromium Slag Depositional Areas

Based on review of aerial photographs and discussions with site personnel, chromium slag is not known to have been deposited in the Exxon Chemicals Plant Area. Based on the results of the IRM investigations to address chromium contamination, chromium slag was observed along the eastern edge of the Exxon Chemicals Plant Area and on a small portion of the railroad tracks in the southwest corner (ICF Kaiser Engineers, Inc. 1993).

## 5.1.7.5.4 Drum Storage Areas

The Occipular Co-Polymer (OCP) Warehouse, located in the western part of the Exxon Chemicals Plant Area, is used for drum storage (Figure 5-7). A toxic materials storage area was located adjacent to this warehouse in 1959 and may have also contained drums. The Paramins Store House in the northwestern corner of the area was recently converted to truck storage but was formerly a chemical storage area.

# 5.1.7.5.5 Loading/Unloading Areas

Six past or present truck loading/unloading areas and four railroad tank car loading/unloading areas have been identified in the Exxon Chemicals Plant Area (Figure 5-7). Railroad car loading areas are located along the southern edge of the Exxon Chemicals Plant Area, and in 1989 included a chlorine tank car rack and an ATF tank car rack. A 40-car rack was also located in this area in 1945. The current truck and tank car racks in this area probably load and unload products from the Blending and Products Tanks located in the center of the Exxon Chemicals Plant. Another truck rack services the Exxon Chemical Waste Treatment Plant in the southwestern corner of the area. Two other truck racks are located along the northeastern boundary of this area.

# 5.1.7.5.6 Process Areas

Blending of specialty products is the main process conducted at the Exxon Chemicals Plant Area. In addition to several densely grouped AST areas in which most blending operations



take place, the only distinct process area is the Reactor Building, which was recently dismantled. Historically, several major process areas at the Bayonne Plant were located in the Chemical Plant Area (Figure 5-7).

In 1921, the area was occupied by crude stills that consisted of rows of heated tanks, each tank drawing lighter fractions of oil off of the previous tank. Asphalt stills were located in the central part of the area from 1945 to 1959. Several pipe stills, including the "B" Pipe Still from 1928 to 1960 and the No. 1 Pipe Still from 1960 to 1970, were located in the eastern part of the area. The Paraflow Plant from 1940 to 1961, the Parapoid Plant from 1931 to 1959, and the Paraflow Stills in 1960, were all located in the central southern part of the Chemical Plant. The No. 2 Power Plant was located in the northwestern part of the area from 1921 to 1951. A filling shed was located in the central part of the area in 1945, and an automatic transmission fluid blending shed was located in the eastern part of the area in 1989. Chlorination facilities and a hydrochloric acid (HCl) recovery unit were located in the central part of the area from 1960 to 1970. The Reactor Building in the central part of the area was recently dismantled.

## 5.1.7.5.7 Sumps

Two concrete sumps were located in the Exxon Chemicals Plant Area; as described earlier, these sumps met the regulatory definition of USTs (Figure 5-7). The sumps had individual capacities of approximately 4,210 gallons and 6,824 gallons, and were used to contain de-minimis spills of lube oil additives and transmission fluids, respectively, from disconnecting hoses. The status and condition of the sumps are not known.

5.1.7.5.8 Former Acid Neutralization Pit

An acid neutralization pit was located in the southern portion of the Exxon Chemicals Plant Area from 1945 to 1958 (Figure 5-7). The neutralization pit reportedly consisted of a concrete-lined pit to which acid effluent from the HCl scrubber unit was discharged. The wastewater was neutralized with lime and subsequently discharged to the sewer system.

#### 5.1.7.5.9 Former Cesium Vault

In the 1960s, the Exxon Chemicals Plant Area developed a process for making highly biodegradable detergent in which the petroleum feed stock used for the detergent was first exposed to gamma rays from a Cobalt 60 source. The cobalt source was stored in a lead encasement housed in a concrete-walled aboveground vault located in the central part of the area (Figure 5-7). The vault and the cobalt, which decayed to cesium, are no longer in use and have been removed from the Plant. The vault is often referred to as the cesium vault.

# 5.1.7.5.10 Sewers and Septic Systems

The only subsurface process wastewater sewer lines at the Bayonne Plant are located within the Exxon Chemical Americas Paramins Plant, which is a section of the Exxon Chemicals Plant Area. While the Exxon Chemicals Plant Area was in operation, process waste was collected via a system of catch basins and was routed to a small treatment plant in the Exxon Chemicals Plant Area. This system is entirely separate from the storm-water treatment system within the Bayonne Plant. The treatment plant consists of an oil/water separator. The effluent generated at the treatment plant was trucked to the Exxon Bayway Refinery in Linden for treatment in the Bayway Refinery's secondary wastewater treatment plant prior to being discharged to the Arthur Kill under a NJPDES-DSW Permit. Although the Exxon Chemicals Plant Area operates as a separate entity from the rest of the Bayonne Plant, the storm-water drainage system in this area is part of the site-wide storm-water system.

Three septic systems are located within the Exxon Chemicals Plant (Figure 5-2). The septic systems are associated with the Paramins Store House in the northwestern corner of the area, the No. 2 Field Office in the northwestern part of the area, and the Reactor Building (now dismantled) in the central northern part of the area.

# 5.1.7.6 IRM Activities

IRM investigations that were conducted or that are currently being conducted in the Exxon Chemicals Plant Area are associated with chromium slag, NAPL, and the sewer system. In 1993, ICF Kaiser collected four soil samples to evaluate the potential environmental impact from chromium slag (ICF Kaiser Engineers, Inc. 1993). Total chromium concentrations in these four samples were below 500 mg/kg (9.7 to 218 mg/kg).

Two existing monitoring wells are located in the Exxon Chemicals Plant Area (Table 5-5). NAPL thicknesses measured in these wells were generally less than 2 feet (Dan Raviv Associates, Inc. 1993d). Geraghty & Miller recently conducted an IRM investigation in the Exxon Chemicals Plant Area; this investigation was called the Exxon Chemical Plant IRM, although the field work was actually conducted in the adjacent Utilities Area. The investigation involved the drilling of three soil borings along the southern boundary of the area to evaluate the presence and potential for off-site migration of NAPL. One soil boring that exhibited floating NAPL was converted to a monitoring well. Additional IRM activities, such as a tidal study, bail-down tests, NAPL recovery tests, step-drawdown tests, and NAPL sampling may be conducted, if warranted, following the completion of the drilling program.

The IRM investigations of the sewer system are being completed by IT Corporation at the Bayonne Plant. The sewer system evaluation involves the cleaning and videotaping of the Plant sewer lines.

#### 5.1.8 No. 3 Tank Field

A description of the No. 3 Tank Field and details of its history and operations are presented below.

# 5.1.8.1 Description and Boundaries

The No. 3 Tank Field is located in the south-central part of the Plant and comprises 21 acres bounded by the Exxon Chemicals Plant Area and the Asphalt Plant Area to the north; Amerada Hess Corporation and Lower Hook Road to the east; Powell Duffryn Terminal, G&B Packaging Company, Inc. and Rafaella to the south; and P.D.Q. Plastic to the west (Figure 5-8).

## 5.1.8.2 Operations, Raw Materials, and Products

The No. 3 Tank Field consists of nine tanks in three bermed areas. The tanks range in capacity from 24,447 to 114,680 barrels and contain gasoline, hydrotreated light naphtha, light naphtha, asphalt, and residual fuel oil.

Since 1940, the No. 3 Tank Field has been used for storage of various liquid products. Other than the addition and removal of various tanks, operations have not changed appreciably. An oil/water separator existed in the southeastern portion of the No. 3 Tank Field prior to 1940 and was used until approximately 1970. It was removed from the area between 1970 and 1974.

#### 5.1.8.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate changes at the No. 3 Tank Field. In the 1940 aerial photograph, the No. 3 Tank Field contained ten large storage tanks, each 91 to 115 feet in diameter and 30 to 40 feet in height, enclosed by earthen fire banks. A large, concrete, multi-channel oil/water separator was located on the eastern side of the area with three adjacent small tanks. Two tanks, one 50 feet in diameter and 42 feet in height, and the other 35 feet in diameter and 4 feet in height and containing slop oil, were located in the southeastern corner of the area. A small building and small tank were located in the northeastern part of the area, which was otherwise unoccupied. A row of 13 storage tanks, each 40 to 60 feet in diameter and 11 to 42 feet in height, was located along the northwestern edge of the area. An oil/water separator was located just outside

the area, adjacent to the westernmost tank. South of this row of tanks, and north of the large storage tanks, was a storage area possibly used for trucks.

The No. 3 Tank Field exhibited the same configuration in the 1947 photograph as in the 1940 photograph. However, five of the thirteen tanks along the northwestern edge of the area had been removed, and two small tanks in this group had been replaced with one slightly larger tank. The small building and tank in the northeastern corner of the area had been removed. The storage area between the two groups of tanks was still in use and was full of materials, possibly drums.

The No. 3 Tank Field did not change appreciably in the 1951 photograph. One large floating top tank had been built; ten tanks had been painted; and one tank in the line of tanks along the northern side of the area had been removed.

A review of the 1959 photograph shows that the area had been significantly modified since 1951. The group of eight storage tanks in the southwestern part of the area had been replaced by five larger and more modern tanks, each 120 feet in diameter. At least four of these five tanks had floating roofs. Three of the smaller tanks in the northern part of this area had been removed. Tanks 901, 902, and 903, each 60 feet in diameter, had been constructed in the northeastern corner of the area.

The 1961, 1963, 1966, 1968, and 1970 aerial photographs showed essentially the same configuration as in 1959 with a few modifications. Three of the five small storage tanks along the northwestern edge of this area had been removed (1963 photograph). Some filling had occurred south of the separator (1966 photograph). The small tanks adjacent to the oil/water separator, located in the southeastern part of this area, had been removed (1970 photograph).

In the 1974 aerial photograph, two tanks in the southeastern part of the No. 3 Tank Field had been eliminated and the oil/water separator was no longer present. In 1977, preload material had been placed in the southeastern part of the tank field.

The area exhibited the same configuration in the 1984 photograph as in the 1977 photograph. The preloading in the southeastern portion of this area had subsided, but it was still in place. In the 1989 photograph, the preload area had been leveled. The area exhibited the same features in the 1991 aerial photograph as in 1989.

### 5.1.8.4 Discharges, Spills, and Releases

Two spills greater than 100 gallons has been reported at the No. 3 Tank Field (Figure 5-8). One spill occurred in 1988. This spill originated at Tank 920 and consisted of 500 gallons of "F540" powerformer feed (Table 5-2). In 1978, during an inspection of Tank 916, several holes were noted in the bottom of the tank, indicating that a release of product had occurred in this area. Currently there are no monitoring wells in this area; however, oil-saturated soil was observed in a boring in the southeastern portion of the area (ICF Kaiser Engineers, Inc. 1992).

# 5.1.8.5 Areas of Potential Contamination

Areas of potential contamination at the No. 3 Tank Field include ASTs, former chromium slag depositional areas, oil/water separators, and the sewers and septic systems.

## 5.1.8.5.1 Aboveground Storage Tanks

Nine ASTs are currently located in the No. 3 Tank Field. Six large tanks, each 120 feet in diameter, occupy the western and southern portion of the area. Three smaller tanks, each 60 feet in diameter, occupy the northeastern corner of the area called the Steam Gas and Energy Management (SGEM) Tank Field. The tanks currently contain, or have recently contained, the following materials: asphalt, powerformer feed, methyl tertiary butyl ether (MTBE), gasoline, heating oil, and water.

The one documented spill in this area occurred in 1988 when 500 gallons of "F540," powerformer feed spilled from Tank 920. Tank 920 is known to have contained MTBE in 1991

(Table 5-1). From 1921 to 1951, the former Klondike Tank Field was located in the southern portion of the No. 3 Tank Field and contained eight ASTs with unknown contents. Two other ASTs were located along the southeastern edge of the area from 1921 to 1970, and a third AST was present there from 1932 to 1968. Three lines of small ASTs were historically located within the No. 3 Tank Field. In 1921, a line of six tanks was located southwest of and adjacent to the present-day SGEM Tank Field in the northeastern part of the area. Four tanks were located next to a large oil/water separator in the central eastern part of the area from 1921 to 1968. Three to fourteen tanks were located in the northwestern part of the area from 1921 to 1961 and may have been associated with the lines of crude stills located at that time in the Exxon Chemicals Plant Area to the north. The only known pump house in this area is the IRPL pump pad located along the northern side of the area.

5.1.8.5.2 Former Chromium Slag Depositional Areas

Chromium slag was used in the No. 3 Tank Field for berms, general grading, and site preparation (Esso Standard Oil Company, 1957a). As shown on Figure 5-8, ICF Kaiser classified the entire area as having a high density of visible chromium slag (ICF Kaiser Engineers, Inc. 1993).

## 5.1.8.5.3 Oil/Water Separators

A 210 foot long oil/water separator was located in the eastern part of the No. 3 Tank Field from 1915 to 1970. It was called the No. 3 Plant Separator and was probably constructed of concrete. This separator had several small tanks for storing waste oil and discharged effluent to the Kill Van Kull Waterway to the south.

#### 5.1.8.5.4 Sewers and Septic Systems

A network of gravity-driven sewers drain storm-water from the No. 3 Tank Field collected by tank berm catch basins. The sewers vary in construction. Storm-water from this area drains to the East Side Treatment Plant.

## 5.1.8.6 IRM Activities

IRM activities that were conducted or are currently being conducted in the No. 3 Tank Field are related to the delineation of chromium slag and NAPL and to investigation of the sewer system. In 1993, ICF Kaiser collected 18 soil samples to evaluate the extent of chromium slag in the No. 3 Tank Field. Half of the soil samples had total chromium concentrations above 500 mg/kg (619 to 9,220 mg/kg) and half had concentrations below 500 mg/kg (48.2 to 469 mg/kg).

Geraghty & Miller recently conducted a NAPL IRM investigation in the No. 3 Tank Field. The investigation involved the drilling of four soil borings along the southern boundary of the area. Two soil borings that encountered floating NAPL were converted into monitoring wells. Additional studies, including a tidal study, bail-down tests, NAPL recovery tests, and step-drawdown tests, may be conducted, if warranted, based on the results of the drilling program.

IT Corporation is currently conducting a sewer IRM investigation that involves the cleaning and inspection of sewer lines at the Bayonne Plant. The results of the sewer system evaluation are not yet available.

# 5.1.9 General Tank Field

A description of the General Tank Field and details of its history and operations are provided below.

#### 5.1.9.1 Description and Boundaries

The General Tank Field is located in the northeastern part of the Site and comprises 37 acres bounded by Public Service Electric and Gas (PSE&G) to the north, the Upper New York Bay and the Piers and East Side Treatment Plant Area to the east, the railroad tracks and the Solvent Tank Field to the south, and Lower Hook Road and the Domestic Trade Area to the west (Figure 5-9).

#### 5.1.9.2 Operations, Raw Materials, and Products

The General Tank Field consists of 13 tanks in two secondary containment areas. The tanks range in capacity from 85,159 to 170,000 barrels and currently contain No. 2 heating oil and storm-water. Because the dikes between the two bermed areas have been lowered, a single containment area has effectively been formed. This area has been used as a tank field since at least 1925. In 1940, the only buildings located in this area were in the south-central part and included a utilities office store room and a general pump house. A valve pit and manifold pit, both large and rectangular, were also in this area; the function of these pits is not known. In addition, the northwestern portion of the General Tank Field was part of the Bayonne Municipal Dump from the 1940s to 1968.

#### 5.1.9.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate changes at the General Tank Field. In the 1940 aerial photograph, eight large ASTs, each 120 feet in diameter and 42 feet in height, were located in the central and western part of the General Tank Field. The tanks were constructed in 1925. Six of the tanks, Tanks 1053 through 1058, still exist today. Their contents in 1940 are unknown. Other features in the 1940 photograph included a pipeline that extended east to west across the southern part of the area. Two smaller tanks, each approximately 40 feet in diameter, were also in the General Tank Field. The eastern side of the General Tank Field was unoccupied in 1940; the soil within the tank field

was medium colored and covered with light vegetation, resembling other areas near the shore line, east of the tank field. One distinct area on the western edge of the General Tank Field was light-colored to white and may have been recently filled. The filled area is located at, and extends north of, the present-day location of Tank 1072 (Figure 5-9). A former leadcontaminated separator sludge dump is suspected to be located in this approximate area, and later aerial photographs indicated filling activity and the presence of ponded liquid in this location. It is not known what fill materials were used throughout the General Tank Field prior to the construction of the tanks present in 1940.

In the 1947 aerial photograph, the General Tank Field exhibited the same configuration as in 1940. The eight large tanks had coned roofs. Two small tanks had been removed. A parking area was in place in the southwestern corner. Roadways had been constructed around the perimeter of the General Tank Field, and a major roadway, Lower Hook Road, had been constructed along the southwestern border. This road provided access to the fill area in the northwestern part of the General Tank Field. Filling activity at this time was increased compared to 1940. The area exhibited the same configuration in the 1951 photograph as in the 1947 photograph. Filling activity continued in the northern outskirts of the area.

In the 1959 photograph, the General Tank Field was significantly modified since 1951. The eight existing tanks had been painted. Five large storage tanks, each 150 feet in diameter and 50 feet in height, had been constructed along the southern edge of the area and were in the process of being painted. Some filling activity had occurred on the eastern side of the General Tank Field. The area being filled on the western side of the operational area had a dark area that may represent ponded liquid. An overhead pipeline/rack ran along the southern edge of the area (the pipeline had existed earlier, but was less visible).

A review of aerial photographs from 1961, 1963, 1966, and 1968 showed that the General Tank Field exhibited the same configuration as in 1961. Filling activity had continued on the eastern and western boundaries of the area. Trucks and sheds occupied the southeastern

part of the area (1966 photograph). The filling area in the northwestern part of the area was somewhat graded, and filling may have ceased (1968 photograph).

The 1970 aerial photograph showed that the General Tank Field had been modified since 1968; the current boundaries of the northwestern part were visible. One large storage tank was in the process of being constructed in the northwestern part of this area, and other tank foundations were being built.

In the 1974 photograph, the General Tank Field exhibited the same configuration as in 1970; however, the tank that was being constructed in the 1970 photograph had been completed and one additional tank had been built. A large pile of soil was located near the tanks; this soil was the preload material for building another tank. In the 1977 aerial photograph, one tank in the southwestern part of the area had been removed and a large pile of soil was in its place (preload for future tank construction).

In the 1984 photograph, the large pile of preload material that had been in place in the southwestern part of the General Tank Field had subsided significantly and had been leveled off. A small area was being filled to the north of Tanks 1072 and 1073 in the northwestern corner of the area. Significant vegetation was present in the surrounding areas. Review of the 1989 and 1991 aerial photographs showed that the area did not change appreciably since 1984.

## 5.1.9.4 Discharges, Spills, and Releases

Two spills, one of oil and the other of oily sludge, in excess of 100 gallons have been documented in the General Tank Field. Both spills occurred in 1990. The spills consisted of approximately 300 gallons of oil, which was released from Tank 1058, and approximately 1,000 gallons of oily sludge spilled in the vicinity of Tank 1059 (Table 5-2).

## 5.1.9.5 Areas of Potential Contamination

Areas of potential contamination at the General Tank Field include ASTs, former chromium slag depositional areas, transformers, oil/water separators, a portion of the former Bayonne Municipal Dump, a former lead-contaminated separator sludge dump, and sewers and septic systems.

#### 5.1.9.5.1 Aboveground Storage Tanks

The General Tank Field currently contains 14 ASTs that range in capacity from 85,159 to 170,000 barrels. The tanks in the central and northeastern portion of the tank field were constructed in 1925; the tanks along the southern edge were constructed in 1958; and the tanks in the western part were constructed in 1967. The No. 9 Pump House, constructed in 1925, was located in the southern central part of the tank field until 1951. The ASTs have stored products such as diesel fuel, residual fuel oil, No. 2 heating oil, and turbo fuel A. In recent years, the tanks have stored only No. 2 fuel oil and storm-water. Two documented spills occurred in 1990 in the General Tank Field. Three hundred gallons of oil were spilled from Tank 1058, and 1,000 gallons of oily sludge were spilled from Tank 1059 (Table 5-2). Tank 1059 was removed in 1991.

### 5.1.9.5.2 Former Chromium Slag Depositional Areas

Based on aerial photograph interpretation and discussions with Plant personnel, chromium slag was used as preload for one known tank site (Tank 1060) in the General Tank Field (Esso Standard Oil Company 1957a). Based on the results of chromium IRM investigations, the highest density of chromium slag was found along the berms (ICF Kaiser Engineers, Inc. 1993). The results suggest that the slag was used to construct the berms in the General Tank Field.

## 5.1.9.5.3 Transformers

One transformer (Substation A-2) is currently in use at the General Tank Field (Figure 5-9). A second transformer (Substation No. 8) was located at the southeast end of the area. This transformer was removed in 1989. The operational history and PCB content of these transformers is unknown.

5.1.9.5.4 Former Lead-Contaminated Separator Sludge Dump and Bayonne Municipal Dump

Parcels of land in the northwestern portion of the General Tank Field were purchased in 1968 and 1969 from the City of Bayonne. The city operated a municipal dump on Constable Hook in the areas to the north and northwest of the General Tank Field from the 1940s to 1968. Aerial photographs from the 1940s and 1950s indicate that this area was being filled and that ponded liquids existed within the fill area. The lead-contaminated separator sludge dump is a CERCLA registered, 1-acre, abandoned open dump and lead-contaminated sludge residue disposal site that has been documented by Exxon Company, U.S.A. (1980 and 1982) (see Appendix I). The sludge was derived from oil/water separator bottoms contaminated with lead. The disposal site was located in the northwestern corner of the General Tank Field, north of Tank 1072, and was reportedly active from approximately 1956 to 1965 (Figure 5-9) (Exxon Company, U.S.A. 1980). A portion of the northwestern quarter of the tank field was also used at one time as a fire training field. Fire training exercises probably involved staging tank fires with burning oil.

#### 5.1.9.5.5 Sewers and Septic Systems

A review of historical information indicates that storm-water sewers were present in the General Tank Field in 1945 (Esso Standard Oil Company 1945). Existing storm sewers in the General Tank Field transmit surface-water runoff collected in catch basins within the bermed areas to the East Side Treatment Plant (Figure 5-9). There are no septic systems at the General Tank Field.

### 5.1.9.6 IRM Activities

IRM investigations were conducted or are currently being performed in the General Tank Field. The intent of the IRMs is to address chromium contamination, NAPL, and the sewer system, to prevent and mitigate off-site migration of any associated contamination. In 1993, ICF Kaiser collected 38 soil samples for evaluation of potential environmental impact from the historical deposition of chromium slag in this area. Eight samples had total chromium concentrations above 500 mg/kg (625 to 5,620 mg/kg). Concentrations of the other samples ranged from 4.4 to 197 mg/kg.

Geraghty & Miller recently conducted a NAPL IRM investigation in the General Tank Field. The investigation involved the drilling of 18 soil borings along the perimeter of the tank field. At one location where a soil boring encountered residual hydrocarbon, a monitoring well was installed. A tidal study, bail-down tests, NAPL recovery tests, step-drawdown tests, and NAPL sampling may also be conducted, if warranted, based on the results of the drilling and monitoring well installation program.

IT Corporation is currently in the process of conducting a field evaluation of the sewers at the Bayonne Plant. The sewer IRM includes cleaning, inspection, and videotaping of sewer piping. The results of the field evaluation are not yet available.

#### 5.1.10 Solvent Tank Field

A description of the Solvent Tank Field and details of its history and operations are provided below.

# 5.1.10.1 Description and Boundaries

The Solvent Tank Field (currently inactive) is located in the eastern part of the Site and comprises 14 acres bounded by railroad tracks and the General Tank Field to the north; the Piers

and East Side Treatment Plant Area to the east; the Low Sulfur Tank Field to the south; and the Domestic Trade Area, railroad tracks, and Gate F to the west (Figure 5-10).

#### 5.1.10.2 Operations, Raw Materials, and Products

The Solvent Tank Field consists of 18 tanks in two bermed areas. The tanks have capacities ranging from 170 to 33,281 barrels and contain various blends of aliphatic and aromatic solvents.

The solvent railroad car transfer area is located immediately north of the Solvent Tank Field. The transfer area consists of three railroad spurs that terminate on a gravel area. There are two railroad car loading/unloading areas on these railroad spurs, one to the east and one to the west. The western transfer area has not been active for several years. The transfer area is currently used as a railroad car storage area.

Since 1923, Solvent Tank Field operations have remained essentially unchanged. Some tanks and structures have been added or removed.

## 5.1.10.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate the history and development of the Solvent Tank Field. In the 1940 photograph, the western part of the Solvent Tank Field contained a line of four storage tanks, each 73 feet in diameter and 42 feet in height, that were built in 1923. The central and eastern part of the Solvent Tank Field contained 26 smaller tanks, each 15 to 35 feet in diameter, configured in four groups. These smaller tanks were tall, with heights greater than or equaling the diameter. The group of tanks in the southeastern corner of the Solvent Tank Field was called the Lower Hook NAP (Naphthenic) Acid Tank Field. Several pump houses and manifold pits had been located in the southern central part of the area. The area exhibited the same configuration in the 1947, 1951, and 1959 aerial photographs; however, several tanks appeared to have been recently painted. Three small tanks in the central part of the area had been removed (1947 photograph). In the 1961 aerial photograph, four small tanks were present along the northern boundary and eight small to medium tanks had been removed in the central eastern part of the area.

As observed in the 1963 aerial photograph, the tank field had been significantly modified. Nine small tanks in the central part of the area had been removed and replaced by ten tanks that still exist in 1994. Most of these new tanks were 40 feet in diameter and 48 feet in height. The truck loading rack and control house buildings had been constructed in the eastern part of the area.

In the 1966 aerial photograph, three small tanks in the western end of the tank field had been removed. In the 1968 photograph, Tank 1037 was added to the central portion and the drum building had been built in the southeastern portion of the area. Aerial photographs from 1970, 1974, 1977, 1984, 1989, and 1991 showed no appreciable changes in the Solvent Tank Field.

#### 5.1.10.4 Discharges, Spills, and Releases

Three spills greater than 100 gallons have been documented in the Solvent Tank Field Area (Table 5-2). In 1982, approximately 92,400 gallons of Isopar L, a heavy naphtha, was reported to have been released in the vicinity of Tank 1033. In 1990, a 1,114-gallon spill of xylene occurred at the trucking loading rack in the vicinity of the Control House. In 1992, a release of heavy fuel oil and diesel was reported to have occurred in an area to the north of the Low Sulfur Tank Field; however, the exact location of this spill could not be ascertained. The material was identified as Isopar L, a heavy naphtha.

### 5.1.10.5 Areas of Potential Contamination

Areas of potential contamination at the Solvent Tank Field include ASTs, USTs, former chromium slag depositional areas, drum storage areas, loading/unloading areas, transformers, former process areas, and sewers and septic systems.

#### 5.1.10.5.1 Aboveground Storage Tanks

Eighteen ASTs are located in the central and western sections of the Solvent Tank Field; all are currently inactive. These tanks contained various proprietary solvents and other volatile products. The ASTs can be divided into two groups based on size and orientation, although their use and contents were probably the same. Five tanks, 70 to 75 feet in diameter, are orientated in a row located in the western part of the area. Four of these tanks were constructed in 1923. Thirteen smaller tanks, ranging in size from 15 to 60 feet in diameter, are located in the central part of the area. All of the tanks are enclosed by a single earthen firebank. The western and central parts of the Solvent Tank Field have been occupied by ASTs since the 1920s. From 1923 to 1963, three to four small tanks were located in the western corner of the area in addition to the larger tanks that are currently located in that area. From 1921 to 1959, eight to 13 tanks, each approximately 10 to 35 feet in diameter, were located in the southern central part of the Solvent Tank Field. The Varnish Makers and Painters (VM&P) Pump House (No. 8) was located within this group of tanks in the Solvent Tank Field from 1932 to 1951, and another pump house was situated near these tanks from 1932 to 1959. Five to nine small ASTS, each approximately 35 feet in diameter, were located in the northern central part of the area from 1921 to 1961. The Lower Hook Nap Acid Tank Field, which consisted of ten small tanks, was located in the eastern part of the area from 1921 to 1992. A pump house was located within this group of tanks from 1932 to 1961. Two other pump houses were located in the southeastern part of the area, the Constable Hook Pump House (No. 7) from 1940 to 1961 and the Case & Can Pump House (No. 10) from 1893 to 1961.

#### 5.1.10.5.2 Underground Storage Tanks

One 2,000-gallon UST was known to have been located at the Solvent Filling Building. This tank was referred to as the "light oil sump" or Tank 002. The tank was installed in 1973 and collected a variety of solvents from drum filling operations (Table 5-3). Integrity testing was performed on the UST in 1989; the UST failed the test, and it was excavated in 1992. During excavation, contamination was observed. Investigation of the residual contamination associated with the former UST was deferred pending the issuance of the ACO. Residual contamination will be addressed as part of site-wide RI activities.

## 5.1.10.5.3 Former Chromium Slag Depositional Areas

Based on a review of aerial photographs and discussions with Plant personnel, chromium slag is not specifically known to have been deposited in the area of the Solvent Tank Field. Based on the results of IRM soil sampling and visual inspections, several berms in the center of the Solvent Tank Field, near Tanks 1025 and 1026, and near Tanks 1033, 1034, 1048, and 1049 indicate the presence of chromium slag (Figure 5-10) (ICF Kaiser Engineers, Inc. 1993).

# 5.1.10.5.4 Drum Storage Areas

The Solvent Drum Filling Building, constructed in 1963, is located in the southern corner of the Solvent Tank Field. This facility is used for packaging solvents for distribution.

# 5.1.10.5.5. Loading/Unloading Areas

Several loading/unloading areas have been located in the Solvent Tank Field. Between 1945 and 1981, up to three railroad car loading/unloading areas were located along the railroad spur that borders the northern perimeter of the area. A solvents truck rack was located in the southern central part of the area in 1961.

## 5.1.10.5.6 Transformers

Three substations (A-3, A-4, and A-5) are present in the Solvent Tank Field (Figure 5-10). One of the transformers located at Substation A-3 was found to contain PCB oils. The unit was dechlorinated in December 1986 and was removed at some undetermined date after 1986 (Table 5-4). Existing transformers at the Plant are not known to contain PCB oils.

#### 5.1.10.5.7 Former Process Areas

The Former Lower Hook NAP Acid Tank Field, which contained eight ASTs, each approximately 30 feet in diameter, was located in the eastern part of the Solvent Tank Field from 1921 to 1992. These tanks were used to store recovered oil and heavy naphtha.

# 5.1.10.5.8 Sewers and Septic Systems

Review of a historical sewer map shows that sewers were present at the Solvent Tank Field in 1945 (Appendix J) (Esso Standard Oil Company 1945). The existing storm sewers in the Tank Field are routed to the East Side Treatment Plant. Two septic systems are present in the northeastern corner of the Solvent Tank Field. Each system has a septic tank with a 1,500gallon capacity.

# 5.1.10.6 IRM Activities

IRM activities at the Solvent Tank Field include the evaluation of chromium slag, delineation of NAPL, and investigation of the sewers. In 1993, ICF Kaiser collected ten soil samples to assess the potential impact from chromium slag (ICF Kaiser Engineers, Inc. 1993). All samples had total chromium concentrations below 500 mg/kg (26.3 to 253 mg/kg). ICF Kaiser (1993) identified several areas (mainly berms) where there was a high density of chromium slag (Figure 5-10).

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From May through August 1993, DRAI conducted a NAPL IRM investigation of the Low Sulfur and Solvent Tank Field Areas (Tank 1066) (Dan Raviv Associates, Inc. 1993b). The investigation included the installation of 12 monitoring wells, NAPL sampling, bail-down tests, NAPL recovery tests, and pumping tests. The results of the investigation indicated that most of the Low Sulfur Tank Field and a portion of the Solvent Tank Field were underlain by a NAPL plume. Two types of NAPL were encountered in the area, gasoline components and a more viscous brown NAPL. Nineteen monitoring wells exist in the area. Apparent NAPL thicknesses measured in these monitoring wells during the period of December 1991 through March 1993 ranged from 0.01 to 17.75 feet in the area (Dan Raviv Associates, Inc. 1993b). Geraghty & Miller subsequently conducted a technology evaluation that concluded that VER is the most feasible and preferable remedial option for the Tank 1066 area (Geraghty & Miller, Inc. 1994b). A pilot test of the VER system was conducted in June 1994 (Geraghty & Miller, Inc. 1994c).

IT Corporation is currently conducting an IRM field evaluation of the Plant sewer system. The results of the field evaluation are not yet available.

## 5.1.11 Low Sulfur Tank Field

A description of the Low Sulfur Tank Field and details of its history and operations are provided below.

## 5.1.11.1 Description and Boundaries

The Low Sulfur Tank Field is located in the east-central part of the Site and comprises 11 acres bounded by the Solvent Tank Fields to the north and east; the railroad tracks, the Constable Terminal Corporation and Grand Corrugated to the south; and the Gate "F" Area, railroad tracks, and Asphalt Plant Area to the west (Figure 5-11).

#### 5.1.11.2 Operations, Raw Materials, and Products

The Low Sulfur Tank Field consists of six tanks in a single bermed area. Each tank contains residual fuel oil, has a capacity of approximately 170,000 barrels, and was constructed between 1967 and 1969. The Low Sulfur Tank Field has always been used as a tank field. More ASTs were present in 1940 than currently exist.

## 5.1.11.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate the changes in operations at the Low Sulfur Tank Field. As observed on the 1940 aerial photograph, there were many more tanks at the Low Sulfur Tank Field than there are today. There were 15 large ASTs, each 90 to 93 feet in diameter and 30 to 40 feet in height; one even larger tank, 115 feet in diameter and 40 feet in height; and 22 other tanks, each 20 to 60 feet in diameter. The tanks were enclosed in earthen fire banks and covered an area extending further to the east and to the west than the present-day tank field. Several tanks had floating roofs.

In the 1940 photograph, the group of large storage tanks in the Low Sulfur Tank Field extended westward and northward into the Solvent Tank Field. One large tank, 90 feet in diameter, and nine smaller tanks, each 15 to 25 feet in diameter, were located near the presentday Gate "F" area. A pump house and shed were located in the southern part of the Low Sulfur Tank Field. A small rectangular structure (possibly a truck rack) and an area of white fill (possibly a foundation) were located in the central part of this area. The northern half of this area was covered by railroad spurs running east to west, with several lines of parked tank cars. Pipelines connecting the Asphalt Plant Area, the Low Sulfur Tank Field, and the General Tank Field traversed the area.

The area exhibited the same configuration in the 1947 photograph as in the 1940 photograph. A 5,000-barrel Norton Spheroid had been constructed at the western end of this

tank field in the Gate "F" area. The Gate "F" area appeared to be mostly paved and was intersected by several roadways. One small tank had been removed; one medium tank had also been removed, but its foundation was visible as a light-colored circle.

In the 1951 photograph, a small storage tank with a floating roof had been removed from the southeastern portion of the Site; the area was otherwise unchanged. In the 1959 photograph, the spheroid in the Gate "F" area to the west had been removed and replaced by a rectangular building, possibly a garage.

In the 1961 photograph, the only observed change was that six large storage tanks had been removed from the northern part of the tank field. In the 1963 photograph, the Low Sulfur Tank Field exhibited the same configuration as in 1961. Fill material was being placed in areas where tanks had been removed in 1961. The building at the Gate "F" area observed in the 1959 and 1961 aerial photographs had been removed.

In the 1966 aerial photograph, the area was substantially modified. All of the tanks except one had been removed and all structures at the Gate "F" area had been removed; land area, including the Gate "F" area, had been cleared and graded. By 1968, four large storage tanks, each 150 feet in diameter and 56 feet in height, had been constructed in the tank field and the last of the older tanks had been removed.

The only observed change in the 1970 photograph was that two additional tanks had been constructed. The area appeared essentially unchanged in the 1974, 1977, and 1984 photographs. The 1984 photograph showed that all the tanks were insulated with white Thermacon panels. In both the 1989 and 1991 photographs, the area exhibited the same configuration as in 1984; many cars were parked in the Gate "F" area.

#### 5.1.11.4 Discharges, Spills, and Releases

One spill greater than 100 gallons has been documented in the Low Sulfur Tank Field (Table 5-2). The spill occurred in 1976, and consisted of approximately 142,800 gallons of No. 6 oil. The spill occurred in the vicinity of Tank 1069.

### 5.1.11.5 Areas of Potential Contamination

Areas of potential contamination include the ASTs, transformers, loading/unloading areas, and the sewers and septic systems. A description of these areas is provided below.

## 5.1.11.5.1 Aboveground Storage Tanks

Six large ASTs, each 150 feet in diameter, are located in the Low Sulfur Tank Field. These tanks were constructed between 1967 and 1969 and contain various fuel oils. From 1932 to 1966, up to 38 tanks were located in the area now occupied by the six large tanks. The Gasoline Car Rack Pump House (No. 6) was present in the area between at least 1932 through 1947. An Ethyl Mixing Pump House (No. 4) was located in the area from at least 1932 through 1959. A 5,000-gallon capacity Norton Spheroid was located in the northwestern corner of the area from at least 1947 through 1951.

# 5.1.11.5.2 Transformers

Substation C-2 is located at the south-central edge of the Low Sulfur Tank Field. One transformer (Substation No. 17) was found to contain PCBs. The transformer was dechlorinated in December 1986; approximately 110 gallons of PCB-containing oil were removed. According to information provided by Site personnel, the transformer is still in service (Table 5-4). No PCB-containing transformers are known to currently exist at the Bayonne Plant.

#### 5.1.11.5.3 Loading/Unloading Areas

In 1932, a truck loading rack was located along the southern edge of the Low Sulfur Tank Field. A second truck loading rack was located in the northwestern corner of the area from at least 1959 through 1961.

#### 5.1.11.5.4 Sewers and Septic Systems

Based on a review of historic information, sewers were present at the Low Sulfur Tank Field in 1945 (Esso Standard Oil Company 1945). Existing sewers discharge to the East Side Treatment Plant (Figure 5-11). There are no septic systems at the Low Sulfur Tank Field.

#### 5.1.11.6 IRM Activities

IRM activities in the Low Sulfur Tank Field include the evaluation of chromium slag, the delineation of NAPL, and assessment of the sewer system. In 1993, ICF Kaiser collected five shallow soil samples to delineate the potential environmental impact of chromium slag (ICF Kaiser Engineers, Inc. 1993). Total chromium concentrations in the soil samples were below 500 mg/kg (15.4 to 104 mg/kg). Chromium slag nodules were not observed in the Low Sulfur Tank Field (ICF Kaiser Engineers, Inc. 1993).

In November 1992, a small, shallow interceptor trench was installed on the southwest side of Tank 1066 to intercept NAPL along the foundations of the tank. From May through August 1993, DRAI conducted an IRM investigation in the Low Sulfur and Solvent Tank Fields (Tank 1066). As previously described in Section 5.1.10 (Solvent Tank Field), the results of the investigation indicated that a NAPL plume of predominantly gasoline components is present on the groundwater in this area (Dan Raviv Associates, Inc. 1993b). The maximum apparent NAPL thickness measured in monitoring wells in the Tank 1066 area was approximately 12.50 feet (Table 5-5). In June 1994, Geraghty & Miller conducted a VER pilot test in the Tank 1066 area (Geraghty & Miller, Inc. 1994c). Geraghty & Miller is currently designing an IRM that

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will consist of a VER remedial system to recover the floating NAPL plume in the Tank 1066 area.

IT Corporation is in the process of conducting a field evaluation of plant sewers. The IRM field evaluation includes the cleaning and inspection of sewer piping. The results of the field evaluation are not yet available.

## 5.1.12 Piers and East Side Treatment Plant Area

A description of the Piers and East Side Treatment Plant Area and details of its history and operations are provided below.

### 5.1.12.1 Description and Boundaries

The Piers and East Side Treatment Plant Area is located in the eastern part of the Site and comprises 8 acres of land and additional riparian acreage. The area is bounded by Upper New York Bay on the north, east, and south; and the Solvent Tank Field to the west. The eastern boundary of the area coincides approximately with the pier line. This area includes Piers No. 6 and No. 7 (Figure 5-12).

#### 5.1.12.2 Operations, Raw Materials, and Products

The Piers and East Side Treatment Plant Area contains eight small tanks in three bermed areas. The dates of construction of these tanks range from 1947 to 1991. Three of the tanks contain recycled oil. The East Side Treatment Plant, which receives wastewater from storm and process sewers throughout the Site, is also located in this area.

The solvent tank truck loading and unloading area consists of eight loading bays located east of the Solvent Tank Field. All loading rack activities are directed from the central control house, and products are transferred to or from the Solvent Tank Field and the AV-Gas Tank

Field via pipelines. A solvent drum filling and storage facility, which is currently idle, is also located in this area. Several large in-facility pipes run from Pier No. 6 and Pier No. 7 to various tank fields. There is a separate rack for emptying tank trucks near the railroad tracks. Operations have not changed appreciably since the 1940s. In the 1920s, a barrel operation was also present in the Pier No. 6 area.

## 5.1.12.3 Aerial Photograph Interpretation

Fourteen aerial photographs, spanning the time period from 1940 to 1991, were reviewed to evaluate changes in operations and structures at the Piers and East Side Treatment Plant Area. In the 1940 photograph, Pier No. 6 and Pier No. 7 were situated in their present locations. Pier No. 7 appeared to be a wider wooden structure. Several small ships were docked at Pier No. 7; this pier was serviced by railroad spurs. A large oil/water separator with an adjacent outfall basin was located on the northeastern point of land. Four small tanks, each 25 feet in diameter and 25 to 30 feet in height, stood in a line adjacent to the separator. Two small areas of white fill material were located adjacent to the separator and tanks. A large, light-colored barrel filling building was located partially in this area to the southwest. Although the shape of the shoreline has been slightly altered and large overhead pipelines were later added, the Piers and East Side Treatment Plant Area is similar today to its 1940 layout.

Part of this area was not shown in the 1947 photograph; however, most of this area exhibited the same configuration as in 1940. Pier No. 8, on the north side of the area, had been partially destroyed. In the 1951 photograph, the area was only slightly modified. The barrel filling building was partly dismantled and smaller. A large ship was docked at Pier No. 6.

Most of the area was not visible in the 1959 aerial photograph. Expanded overhead pipelines linked the piers in this area to the General and AV-Gas Tank Fields and the Asphalt Plant and Exxon Chemicals Plant Areas. The area had not changed appreciably in the 1961 and 1963 photographs. A large ship was docked at Pier No. 6 and a white plume, possibly steam, was visible near the shore on this pier (1963 photograph).
In the 1966 aerial photograph, the basin between the separator and Pier No. 7 had been removed and filled. A new basin or separator had been constructed to the south of the existing oil/water separator. No discharge lines from the separator and basin to the shore were visible. The pipelines leading to Pier No. 6 were covered by a light-colored roof structure. The Piers and East Side Treatment Plant were not visible in the 1968 photograph, but the area appeared unchanged in 1970.

In the 1974 aerial photograph, the area appeared to have been modified since 1970. The northernmost oil/water separator had been removed and only the oil/water separator that is presently in service was evident. Pier No. 7 had been modified and consisted of a narrow dock with block-like supports.

In the 1977 photograph, the Piers and East Side Treatment Plant were not visible. The 1984, 1989, and 1991 photographs showed that the area exhibited the same configuration as in 1974.

#### 5.1.12.4 Discharges, Spills, and Releases

Seventeen spills greater than 100 gallons have been documented at the Piers and East Side Treatment Plant Area (Table 5-2). The spills have consisted of a variety of oils, fuels, and solvents. Many of these spills have occurred in the waterway.

# 5.1.12.5 Areas of Potential Contamination

The areas of potential contamination include the ASTs, former chromium slag depositional areas, oil/water separators, drum storage areas, loading/unloading areas, transformers, sumps, the East Side Treatment Plant, and sewers and septic systems.



# 5.1.12.5.1 Aboveground Storage Tanks

Eight small ASTs, each 20 feet or less in diameter, are currently located in the Piers and East Side Treatment Plant Area (Figure 5-12). Most of the ASTs contain recycle oil. A 100-gallon spill of blend oil occurred at Tank 1097 in the northern part of this area in 1991 (Table 5-2). A slop oil pump house was located in the northern central part of the area from 1932 to 1959.

# 5.1.12.5.2 Former Chromium Slag Depositional Areas

Based on aerial photograph interpretations, review of plant records, and discussions with Site personnel, there is no record of chromium slag deposition in the Piers and East Side Treatment Plant Area (Fairchild 1994c). However, based on the results of the IRM investigation of chromium contamination (ICF Kaiser Engineers, Inc. 1993), several areas in the Piers and East Side Treatment Plant Area exhibit evidence of chromium slag deposition (Figure 5-12).

#### 5.1.12.5.3 Oil/Water Separators

A 180 foot long oil/water separator was located in the northeastern corner of the Piers and East Side Treatment Plant Area from at least 1932 through 1970. This separator was probably constructed with concrete walls. Directly to the east of the separator was the Lower Hook Separator Outfall Basin, which existed from 1931 to 1963 and consisted of an earthen basin that likely received the separator effluent and discharged into Upper New York Bay. A 100 foot long oil/water separator, located in the eastern part of the area, is operated in conjunction with the East Side Treatment Plant. The separator, which was constructed in 1963, accepts storm-water runoff directly from most of the plant, and indirectly from the entire plant because it accepts the effluent from the West Side Treatment Plant. Effluent from the East Side Treatment Plant separator undergoes further treatment by sand filtration and activated carbon filtration prior to being discharged to Upper New York Bay.

### 5.1.12.5.4 Drum Storage Areas

The Cooperage and Light-Oil Filling Building was located in the southern corner of the Piers and East Side Treatment Plant Area from at least 1918 through 1963. Sections of this building and surrounding areas were used for barrel storage and filling. A barrel staging area was located on the eastern shore adjacent to Pier No. 6 from at least 1921 through 1963. The contents of the barrels during this period are not known.

## 5.1.12.5.5 Loading/Unloading Areas

A truck loading/unloading area is currently located in the central part of the area, adjacent to the East Side Treatment Plant. Vacuum trucks unload in this area.

Pier No. 6 and Pier No. 7 are active docks located on the eastern extremity of the Piers and East Side Treatment Plant Area. Pier No. 7 is a steel finger pier that was constructed in 1972 to replace part of the original pier purchased by Standard Oil Company (New Jersey) in 1930. Part of Pier No. 7 consists of two parallel concrete (northern and southern) gantry walls that extend to a depth of 10 feet.

## 5.1.12.5.6 Transformers

Substation No. 4 is located to the south of the East Side Treatment Plant. The operational history and PCB content of transformers in this substation are unknown. According to Plant personnel, currently existing transformers at the Bayonne Plant are not known to contain PCB oils.

5.1.12.5.7 Sumps

Six sumps are located in the Piers and East Side Treatment Plant Area. Three pumped and gravity sumps are located on the northern shoreline; these sumps discharge to the East Side

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Treatment Plant's oil/water separator. A fourth pumped sump, located in the northwestern corner of the area, discharges to Tank 1097 in the central eastern part of the area. Two other pumped sumps are located on the piers. The sumps collect incidental spills that may occur during product transfer operations at the piers.

#### 5.1.12.5.8 East Side Treatment Plant

The East Side Treatment Plant receives storm-water via sewers from the No. 2 Tank Field, AV-Gas Tank Field, Asphalt Plant Area, No. 3 Tank Field, General Tank Field, Solvent Tank Field, Low Sulfur Tank Field, and the West Side Treatment Plant. Wastewater is treated at the East Side Treatment Plant with an API oil/water gravity separator, deep bed sand filtration units, and activated carbon filtration prior to being discharged into the Upper New York Bay.

The treatment plant is capable of pumping excess water, generated following heavy rainfall events, to holding tanks for temporary storage to prevent untreated overflow. The East Side Treatment Plant uses overflow tanks located in the General Tank Field.

## 5.1.12.5.9 Sewers and Septic Systems

Although one sewer system supports the operations of the entire facility, it is geographically separated into two sewer networks: the east side and the west side. All of the flow in the sewer lines is gravity driven. The primary wastewater influent is storm-water runoff; however, the system also receives tank-bottom water, steam condensate, and pumped groundwater. All wastewater is ultimately treated at the East Side Treatment Plant and discharged into the Upper New York Bay at the surface-water outfall (DSN001) under NJPDES-DSW Permit No. NJ0002089. Wastewater collected on the west side of the Bayonne Plant is pre-treated prior to being transferred to the east side sewer system. The only exception is a separate chemical process sewer system that is totally contained within the Exxon Chemicals Plant Area.

The pre-treated wastewater transfer line transports water from the West Side Treatment Plant to the East Side Treatment Plant using a former Low Pressure Salt Water Line. The line is separate from the sewer system and the process waste lines of the Exxon Chemicals Plant. A second clean water transfer line, that extends eastward from the Chemicals Plant to the East Side Treatment Plant, has been sealed and is no longer used (Dan Raviv Associates, Inc. 1992a).

A review of historical information indicates that storm sewers were present in the Piers and East Side Treatment Plant in 1945 (Esso Standard Oil Company 1945). Existing sewers are shown on Figure 5-12. Sanitary facilities located at Pier No. 6 and Pier No. 7 each have 2,000gallon holding tanks.

### 5.1.12.6 IRM Activities

IRM investigations were conducted or are currently being conducted at the Piers and East Side Treatment Plant Area to address chromium contamination, NAPL, and the Plant sewer system. In 1993, ICF Kaiser collected three soil samples to delineate surficial chromium contamination (ICF Kaiser Engineers, Inc. 1993). Two surface soil samples had total chromium concentrations below 500 mg/kg (189 and 306 mg/kg). One soil sample collected from a berm had a chromium concentration of 3,940 mg/kg. This area was identified by ICF Kaiser as a visible area of chromium slag deposition (Figure 5-12).

A preliminary NAPL IRM investigation was conducted in the Pier No. 7 area by DRAI during the period from January through March 1994 (Dan Raviv Associates, Inc. 1994a). Prior to conducting the preliminary investigation, 15 previously existing recovery wells were located on the Pier No. 6 and Pier No. 7 areas, of which four were being pumped. These wells were installed in the 1970s and 1980s (Roy F. Weston, Inc. 1980; 1981a,b; 1986a,b,c). Historical NAPL measurements taken between December 1991 and March 1993 by DRAI from existing wells indicated floating NAPL was present in this area. NAPL thickness measurements ranged from 0.01 to 3.27 feet (Table 5-5). The preliminary IRM investigation conducted by DRAI consisted of a tidal investigation, short-term pumping tests, and NAPL sampling. During

January 1994, seeps of NAPL were observed in Upper New York Bay along the bulkhead of Pier No. 7; these seeps appeared to coincide with very low spring tides.

The preliminary NAPL IRM investigation concluded that more than one type of NAPL was present in the Pier No. 7 area; NAPL thicknesses as measured in February 1994 in the Pier No. 7 area ranged from 4 to 5 feet; the southern gantry wall may be acting as a partial hydraulic barrier during high tide; and NAPL can potentially migrate beneath the gantry wall during low tides into Upper New York Bay. Since many of the existing monitoring wells were too shallow to adequately monitor NAPL thicknesses across the gantry wall, DRAI conducted a supplemental IRM investigation during September and October 1994. The supplemental IRM investigation includes the installation of two deep monitoring wells and two replacement wells, NAPL and water-level measurement, step-drawdown tests, and pumping tests. The results of the supplemental IRM investigation are not yet available. Exxon is currently planning to install a containment curtain and boom system along the Pier No. 7 bulkhead to contain NAPL and prevent it from migrating into the bay.

IT Corporation is in the process of completing the IRM evaluation of the sewer system at the Bayonne Plant. The field evaluation involves the cleaning and video inspection of the sewer lines. The results of the sewer evaluation are not yet available.

### 5.1.13 Domestic Trade Area

A description of the Domestic Trade Area and details of its history and operations are provided below.

## 5.1.13.1 Description and Boundaries

The Domestic Trade Area is located in the north-central part of the Site and comprises 6 acres bounded by the Lower Hook Road and the General Tank Field to the north and east, by railroad tracks and the AV-Gas Tank Field to the south, and by the City of Bayonne Municipal Garage to the west (Figure 5-13).

## 5.1.13.2 Operations, Raw Materials, and Products

Retail distribution of fuels occurred in the Domestic Trade Area, which contains one "miscellaneous" AST (Tank No. 1051, which is idle) and a multiple truck loading rack.

From at least 1925 through 1940, the northern part of the Domestic Trade Area was part of the refinery; a series of cracking coils were present in the area. The Domestic Trade Area has been essentially unchanged since 1966.

# 5.1.13.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate the changes in activities at the Domestic Trade Area. In the 1940 photograph, the Domestic Trade Area was less developed and its use at that time is not known. In 1940, the southern part of this area was covered by railroad tracks. The central part of the area contained several small buildings, including an auxiliary pump house and four small tanks. The northern half of the area was unoccupied, except for a series of dark trenches that may have comprised an earthen oil/water separator. Light-colored, fill-like soil covered this northern part of the Domestic Trade Area, which was called the Old Cracking Coil Area (Esso Standard Oil Company of New Jersey 1945). It is not known what fill materials were used or what historical structures existed.

The area exhibited the same configuration in the 1947 and 1951 photographs as in 1940; however, Lower Hook Road in its present-day configuration bounded the area to the north. A flare was present in this area near the four small tanks in the western corner (1947 photograph).

In the 1959 aerial photograph, the small brick buildings and small tanks had been removed and some filling had occurred in this area. Trucks were parked in this area along Lower Hook Road. The pipeline rack originating in the Piers area to the east traversed the Domestic Trade Area.

In the 1961 photograph, trucks were parked in the Domestic Trade Area and filling activity continued. No changes were observed in the 1963 photograph.

In the 1966 photograph, the area was in the process of being developed north of the pipeline rack that extended to the AV-Gas Tank Field, to the General Tank Field, and to Piers No. 6 and No. 7. Much of this area was paved. The three buildings that currently exist in this area had been constructed, including a garage and a covered truck rack. A small storage tank had been built in the southeastern corner of the area. A review of all photographs since 1966 shows that the Domestic Trade Area did not change.

### 5.1.13.4 Discharges, Spills, and Releases

As indicated in Table 5-2, no spills greater than 100 gallons have been documented at the Domestic Trade Area.

### 5.1.13.5 Areas of Potential Contamination

Areas of potential contamination at the Domestic Trade Area include the ASTs, USTs, oil/water separators, loading/unloading areas, process areas, and sewers.

#### 5.1.13.5.1 Aboveground Storage Tanks

There is currently one AST in the Domestic Trade Area; it is out of service. Four ASTs and an auxiliary pump house were located in the western corner of this area from at least 1932

through 1951; they may have been associated with former process areas to the west (Figure 5-13).

## 5.1.13.5.2 Underground Storage Tanks

Three USTs were or are currently located in the Domestic Trade Area (Figure 5-13). Two of the USTs were removed some time after 1986, and no information is available regarding their construction (Table 5-3). One UST contained waste oil and one contained diesel oil. The third UST contains heating oil and remains in service. No information is available regarding its construction.

5.1.13.5.3 Oil/Water Separators

A possible earthen separator was located in the northern part of the Domestic Trade Area in 1940. However, the existence of a separator at this location could not be verified.

5.1.13.5.4 Loading/Unloading Areas

There is currently one truck loading rack in the Domestic Trade Area. It was probably built in 1966, when this area was first used for domestic trade activities.

5.1.13.5.5 Process Areas

Historical maps indicate that the northern part of the Domestic Trade Area contained 12 cracking coil units from at least 1925 through 1940. The cracking coil units converted heavy oil fractions into gasoline.

Review of historical maps indicates that sewers were present in the Domestic Trade Area in 1945 (Esso Standard Oil Company 1945). The existing sewers in the area are routed to the East Side Treatment Plant and are shown on Figure 5-13. There are no septic systems in this area.

## 5.1.13.6 IRM Activities

IRM activities in this area include the evaluation of the chromium slag and assessment of the plant sewer system. In 1993, ICF Kaiser collected one surface soil sample in the Domestic Trade Area to evaluate the impact of historical slag deposition at the Bayonne Plant (ICF Kaiser Engineers, Inc. 1993). This sample had a total chromium concentration of 82.7 mg/kg. No visible areas of chromium slag were identified by ICF Kaiser (Figure 5-13).

The IRM investigation of the sewer system at the Bayonne Plant is currently ongoing. The investigation, which is being performed by IT Corporation, involves the cleaning and inspection of sewer lines. The results of the investigation are not yet available.

# 5.2 MISCELLANEOUS AREAS

The four miscellaneous areas at the Bayonne Plant, the Stockpile Area, the MDC Building Area, the Utilities Area, and the Main Building Area, are described below.

## 5.2.1 Stockpile Area

A description of the Stockpile Area and details of its history and operations are presented below.

#### 5.2.1.1 Description and Boundaries

The Stockpile Area (also referred to as the bone yard) is located at the westernmost boundary of the Bayonne Plant and comprises 7 acres. It is bordered to the east by the Lube Oil Area, to the south by IMTT property and Platty Kill Creek, and to the west and north by IMTT. The Stockpile Area is currently vacant (Figure 5-14).

#### 5.2.1.2 Operations, Raw Materials, and Products

Since about 1984, the Stockpile Area has been a vacant, unpaved lot used for the temporary storage of scrap metal and other construction debris from former structures and buildings.

Prior to the mid 1970s, the Stockpile Area was an active process area. It contained a Wax Plant Building, a Phenol Lube Oil Treating Plant, and a MEK Dewaxing Plant, all of which were integral parts of wax production and lube oil manufacturing.

In about 1921, the "F" pipe still, which was located primarily in the Lube Oil Area, existed in the southeastern tip of the Stockpile Area. In the 1930s, a Wax Plant building was constructed in the south-central portion of the area.

In 1934, the Phenol Lube Oil Treating Plant was constructed in the northeastern corner of the area; the Phenol Lube Oil Treating Plant was used for phenol extraction of impurities from lube oil to produce high quality lubricants. In approximately 1940, a transformer house, which was probably ancillary to the Phenol Lube Oil Treating Plant, was built in the northcentral portion of the Stockpile Area. The Phenol Lube Oil Treating Plant was shut down about 1947 and was dismantled around 1951.

In 1950, the MEK Dewaxing Plant, which was in the center of the Stockpile Area, began operation. The MEK Dewaxing Plant was built to replace the wax sweaters that existed along

the western boundary of the Lube Oil Area. MEK was used as a solvent to extract wax from petroleum distillate. Three additional filters were added to the MEK Dewaxing Plant in 1956, increasing its size. In 1972, the MEK Dewaxing Plant was shut down, concurrent with the end of wax production at the Bayonne Plant.

## 5.2.1.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate the changes in activities at the Stockpile Area. In the 1940 photograph, the Stockpile Area contained tanks and process areas on the eastern side. On the northeastern section of the area, 12 tanks, each approximately 20 to 30 feet in diameter, and several buildings and other structures comprised a process area that was probably the former Phenol Lube Oil Treating Plant. In the southeastern section of the area, approximately 30 tanks, each 20 to 50 feet in diameter, were located adjacent to condenser stills. Several pipe stills and reducing stills were located immediately to the east of these tanks in the Lube Oil Area. An octagonal-shaped building, the Wax Plant Building, was located on the south side of this area along the Platty Kill Creek. The western half of the Stockpile Area was unoccupied.

In the 1947 photograph, the still in the southeastern part of the area and the Wax Plant Building had been removed. Modifications had been made to the southern border of the area along the Platty Kill Creek.

As seen in the 1951 photograph, the MEK Dewaxing Plant had been constructed in the central part of the Stockpile Area. This process area included a flare stack, two furnaces, a high-walled square building, several small tanks, and ancillary piping. A pipeline connected this process area to the Lube Oil Area to the east. The area formerly occupied by the Wax Plant Building was unoccupied. A water discharge into the Platty Kill Creek was visible. The northwestern part of the area remained unoccupied, except for several small buildings and sheds.

In the 1959 aerial photograph, the central building in the Phenol Lube Oil Treating Plant in the northeastern part of the area had been removed. Several sheds were located in the previously unoccupied northwestern corner of the area. The MEK Dewaxing Plant in the southern part of the area was mostly unchanged, with the main building slightly expanded. The discharge into the Platty Kill Creek was still visible.

As observed in the 1961 aerial photograph, most of the sheds in the northern part of this area had been removed and only four small tanks existed where the Phenol Lube Oil Treating Plant was once located. In the southern part of the area, the MEK Dewaxing Plant appeared unchanged since 1959. The cooling water discharge into the Platty Kill Creek was visible. A review of the 1963 photograph indicated that the Stockpile Area appeared unchanged since 1961.

In the 1966 aerial photograph, four tanks on the eastern side of the MEK Dewaxing Plant had been removed, but the Plant was otherwise unchanged. The sheds and tanks north of the MEK Dewaxing Plant had been removed and this part of the Stockpile Area was vacant. The discharge from the MEK Dewaxing Plant into the Platty Kill Creek was visible.

In the 1974 aerial photograph, the MEK Dewaxing Plant had been dismantled. Four small tanks and a short pipeline remained in the area. The 1984 photograph showed that the pipelines and all the tanks, except one, had been removed.

#### 5.2.1.4 Discharges, Spills, and Releases

No spills greater than 100 gallons have been documented in the Stockpile Area (Table 5-2).

# 5.2.1.5 Areas of Potential Contamination

The areas of potential contamination in the Stockpile Area are the ASTs, former chromium slag depositional areas, oil/water separators, transformers, and process units.

#### 5.2.1.5.1 Aboveground Storage Tanks

Two to ten large ASTs were located along the eastern edge of the Stockpile Area from at least 1921 through 1963 (Figure 5-14). Ten to 12 ASTs were located in the southeastern part of the area from at least 1921 through 1947. Both of these groups of tanks may have serviced the pipe stills located in the southeastern corner of the Stockpile Area and in the Lube Oil Area. The tanks were 20 to 50 feet in diameter. The contents of the former tanks are unknown. A group of three ASTs was located in the central portion of the Stockpile Area from at least 1940 through 1977. Another group of three ASTs was located in the southwestern corner of the area from at least 1950 through 1977.

# 5.2.1.5.2 Chromium Slag Depositional Areas

Based on a review of historical aerial photographs, plant records, and discussions with Plant personnel, chromium slag was not specifically known to have been deposited in the Stockpile Area. Based on the results of the chromium IRM investigation, the southern third and western edge of the area were observed to have a high density of visible chromium slag (ICF Kaiser Engineers, Inc. 1993).

## 5.2.1.5.3 Oil/Water Separators

Two oil/water separator basins existed in the Stockpile Area. A 30 foot long separator was located in the southwestern corner of the area from at least 1932 through 1947. Two separators (in series) collectively comprising a 100 foot long basin were located in the central-southern part of the area from 1940 to 1951 (Figure 5-5). Aerial photographs indicate that these separators were constructed with concrete walls, and their location suggests that they may have discharged to Platty Kill Creek.



A transformer house was located in the northern part of the Stockpile Area from at least 1940 through 1953. The number and PCB content of the former transformers in this area are not known.

#### 5.2.1.5.5 Process Units

The Phenol Lube Oil Treating Plant was located in the northeastern portion of the Stockpile Area and was in operation from 1934 to 1951. Several ASTs associated with the Phenol Lube Oil Treating Plant were also located in this area from 1932 to 1963. The methods of transfer of raw materials and finished products to and from the Phenol Lube Oil Treating Plant and other process units in this area are not known.

Pipe stills were located in the southeastern corner of the Stockpile Area from at least 1921 through 1947. The pipe stills incorporated several towers or stacks, several high-walled buildings, and ancillary piping.

The largest process unit located in the Stockpile Area was the MEK Dewaxing Plant. This plant was reconstructed in the central portion of the area between 1947 and 1951, where it existed until it was dismantled in 1972.

## 5.2.1.6 IRM Activities

IRM activities conducted in the Stockpile Area include an evaluation of the potential impact from chromium slag and the potential for NAPL to enter Platty Kill Creek. In 1993, ICF Kaiser collected 11 soil samples at the Stockpile Area (ICF Kaiser Engineers, Inc. 1993). Two samples had total chromium concentrations above 500 mg/kg (636 and 1,690 mg/kg); concentrations in the other soil samples ranged between 38.8 and 216 mg/kg. As shown on

Figure 5-14, the southern part of the Stockpile Area was observed to have a high density of chromium slag (ICF Kaiser Engineers, Inc. 1993).

During 1994, DRAI conducted an "at peril" IRM investigation in the vicinity of Platty Kill Creek. The investigation included the drilling of approximately 14 soil borings (PKB1 through PKB14) along the western and southern boundary of the Stockpile Area and in the creek bed (Figure 2-8). Fifteen monitoring wells (Monitoring Wells PKMW1 through PKMW15) were installed in the vicinity of the Platty Kill Creek area. Other investigative activities included water-level and NAPL measurements and NAPL sampling. NAPL thickness measurements collected between December 1991 and March 1993, indicated NAPL thicknesses up to 3.9 feet in Monitoring Well EB-19. The results of the "at peril" IRM investigation in the Platty Kill Creek area are not yet available.

# 5.2.2 MDC Building Area

A description of the MDC Building Area and details of its history and operations are provided below.

#### 5.2.2.1 Description and Boundaries

The MDC Building Area is located in the southeastern part of the Site and comprises 5 acres of land and associated riparian acreage. It is bordered to the north by the Solvent and Low Sulfur Tank Fields; to the west by the Constable Terminal Corporation property, to the south by the confluence of the Kill Van Kull Waterway with Upper New York Bay, and to the east by the Piers and East Side Treatment Plant Area. The MDC Building Area is currently occupied by a large multi-story building, parking areas, and docking facilities (see Figure 5-15).

### 5.2.2.2 Operations, Raw Materials, and Products

The MDC Building Area consists of the MDC Building and a small garage (the former Butterworth Systems Building) in the southern corner. Covered rolloffs and covered soil piles were temporarily stored in the parking area in the MDC Building Area. The MDC Building Area was leased to Apple Freight Company from 1989 to 1990. A small rectangular parcel in the western portion of the MDC Building Area has been leased by Exxon to Constable Terminal Corporation since approximately 1960. This area is currently occupied by six aboveground storage tanks.

The present MDC Building was constructed in 1914 for use as a box factory. From 1918 through 1963, the cooperage and light-oil filling building in the Piers and East Side Treatment Plant Area extended into the eastern portion of the area. In 1921, a naphtha filling building existed at the location of the present garage.

In 1959, the Marine Service Division of Esso Marine was transferred to the existing MDC Building. After the MDC was established in 1965, a small building was erected in the northern corner of the area. In 1972, a fuel station was located to the northeast of the Main Building. The fuel station was used to refuel trucks that were used to distribute finished products from the MDC Building. Three USTs that contained diesel were located just south of the fuel station. The fuel station was removed in approximately 1984.

During the time that the MDC was in operation, drums were stored in the MDC Building and in the surrounding yard.

## 5.2.2.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate changes in activities at the MDC Building Area. A review of the 1940 photograph shows that several large buildings were located in this area. A garage was located partially in

the southwestern corner of the area. A large, dark-roofed rectangular building, occupied by Butterworth Systems, Inc., was also located in the southwestern part of the area. Railroad spurs and a loading platform were located on the east and west sides of this building. A light, checkered-roof building in the center of the area was a Cooperage Building; it had an associated shed and filling room. To the south of the Cooperage Building were two other buildings; these buildings are labeled as the Saltwater Pump House and the Cook House on historical plant drawings. A light-colored building in the northwest corner of the area, which had two adjacent tanks, each 20 feet in diameter, was a barrel filling building. In the northern corner of the area were several small buildings that included a pump house, manifold pits, and the Case & Can Pump House. A transformer building was also located near these buildings. Along the shore were Piers No. 4 and No. 5, which are made of concrete.

In the 1947 and 1951 photographs, the area appeared unchanged, except that the large, light-colored building in the northeastern corner of the area was partially dismantled (1951 photograph).

In the 1959 aerial photograph, the building with the checkered roof (the Cooperage Building) and the Saltwater Pump House and Cook House had been dismantled. As observed in the 1961 photograph, a car parking lot was located to the east of the MDC Building.

In the 1963 photograph, the pump house and manifold building in the northern part of this area had been removed. In the 1966 photograph, the former barrel filling building and two adjacent tanks in the northeastern part of this area had been removed.

The only observable change to the MDC Building Area in the 1974 photograph was that a small drum or other materials storage area existed in the southeastern corner of the MDC Building parking lot. The 1977, 1984, 1989, and 1991 aerial photographs show that no changes had occurred at the MDC Building Area, except that by 1984 the storage area in the southeastern corner of the parking lot was no longer present.

## 5.2.2.4 Discharges, Spills, and Releases

No spills greater than 100 gallons have been documented at the MDC Building Area.

## 5.2.2.5 Areas of Potential Contamination

Areas of potential contamination at the MDC Building Area include the USTs and the sewers and septic systems.

## 5.2.2.5.1 Underground Storage Tanks

Three USTs formerly existed at the MDC Building Area. The USTs were historically used to store diesel and were removed some time after 1986. Details of their capacity, installation and removal dates, and integrity are not known (Table 5-2).

## 5.2.2.5.2 Drum Storage Areas

During the period of operations at the MDC Building Area, two drum storage areas are known to have existed. The MDC Building and the area to the west (yard), and the area adjacent to the garage were used to store barrels and drums for distribution and shipment.

#### 5.2.2.5.3 Sewers and Septic Systems

Existing storm sewers in the MDC Building Area transmit surface-water runoff collected in catch basins to the East Side Treatment Plant. A former discharge pipe is located along the bulkhead to the southeast of the MDC Building. Storm-water was formerly discharged through this outfall to Upper New York Bay in accordance with NJPDES-DSW Permit No. NJ00289.024. One septic system, which includes a 2,000-gallon septic tank, is located to the northeast of the MDC Building.

### 5.2.2.6 IRM Activities

No IRM activities have been performed or are planned for the MDC Building Area.

#### 5.2.3 Utilities Area

A description of the Utilities Area and details of its history and operations are provided below.

# 5.2.3.1 Description and Boundaries

The Utilities Area is located in the west-central part of the Bayonne Plant and comprises 5 acres. It is bordered to the west by the Lube Oil Area, to the north by the No. 2 Tank Field, to the south by P.D.Q. Plastics and Gordon Terminal Service Company, and to the east by the Exxon Chemicals Plant and Asphalt Plant Areas. The Utilities Area currently contains buildings, structures, and a parking lot (Figure 5-16).

#### 5.2.3.2 Operations, Raw Materials, and Products

The Utilities Area is an irregular-shaped parcel occupied by the Plant's Main Substation and one AST. Several railroad spurs diagonally transect the parcel. The AST, Tank 998, is 90 feet in diameter and 48 feet in height, and contains storm-water. Two smaller ASTs, Tanks 994 and 995, were formerly located in the Utilities Area and were used to store fuel oil; these ASTs were dismantled in 1993.

Prior to the 1920s, the Utilities Area was occupied by a Barrel Factory, a stave kiln, stave sheds, and a small boiler house. In 1940, the area was occupied by several buildings, ASTs, and railroad tracks; at this time, the No. 2 Power Plant Building was located in the eastern portion of the area and warehouses occupied the southwestern corner of the area. In 1951, the Central Boiler House was constructed, and by 1959, the power plant buildings in the

northeastern part of the area had been dismantled. The Main Substation had been constructed and the Boiler House had been demolished by 1989.

# 5.2.3.3 Aerial Photograph Interpretation

Fourteen aerial photographs spanning the time period from 1940 to 1991 were reviewed to evaluate the changes in activities at the Utilities Area. In the 1940 photograph, this area was occupied by several buildings and tanks, and railroad tracks ran north to south. A large storage tank, 90 feet in diameter and 27 feet in height, was located in the north-central part of this area. In the northeast corner were two light-colored buildings. In the eastern part of the area was the No. 2 Power Plant building. To the east of the Power Plant were several other buildings and four small tanks. Two banks of transformers were located on the north side of the Power Plant, and to the south of the Power Plant was another building that was probably a pump house. In the southeast corner was a tank that was part of a group of tanks in the No. 3 Tank Field to the east. Also in the southeast was a light-colored circular area, which was likely the foundation of a future tank. In the southwest corner, two light-colored, rectangular foundation areas may represent the site of the future boiler house. To the west, was a storage and reclamation building.

In the 1947 photograph, much of the area was filled with light-colored material and a roadway had been constructed northwest to southeast across the area. The railroad tracks that crossed the area north to south had been removed. The southeastern corner of the area was unoccupied, except for the one tank that was part of the No. 3 Tank Field. Warehouses in the southwestern corner of the area had been modified and a large parking area had been built. A railroad spur extended into this area. One warehouse located in this area was labeled on historical plant drawings as the future boiler house.

In the 1951 aerial photograph, the northern part of this area appeared unchanged from 1947. In the southern part of this area, the warehouse was replaced by a high-walled building with a tall stack that was the boiler house. A large storage tank, Tank 998, 90 feet in diameter

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and 48 feet in height, was constructed in 1949 in the southeastern corner of the Main Building Area, adjacent to the boiler house. This tank was for boiler feed water and currently contains storm-water. Two small tanks, Tanks 994 and 995, each 25 feet in diameter and 40 feet in height, were also constructed in 1949 to the north of and adjacent to Tank 998. These tanks were used to store storm-water. The initial Main Substation structure was constructed in this area in 1948.

In the 1959 photograph, the Power Plant buildings in the northeastern part of the area were dismantled, and trucks, sheds, and foundation structures occupied this location. In the southern part of the area, the four large stacks at the boiler house were visible. In the 1961 photograph, construction activity continued at this site where the Power Plant buildings had been located. The boiler house in the southern part of the area appeared operational and unchanged.

In the 1963 photograph, much of the area was graded and possibly paved. Construction had been completed on a small building that is currently labeled Exxon Chemical No. 2. The Main Substation facilities were clearly visible and consisted of three electrical structures. The boiler house in the southern part of the area was operational.

As seen in the 1966 and 1974 photographs, the Utilities Area was unchanged from 1963, except that two tanks had been removed from the southeastern corner of the area (1974 photograph). These tanks were originally part of a line of tanks in the No. 3 Tank Field.

The Utilities Area appeared unchanged in the 1984 photograph. In the 1989 photograph, the Boiler House in the southern part of the Utilities Area had been dismantled and the ground had been leveled. The area was unchanged in the 1991 aerial photograph. Two smaller ASTs, Tanks 994 and 995, were dismantled in 1993.

## 5.2.3.4 Discharges, Spills, and Releases

No spills greater than 100 gallons have been documented in the Utilities Area.

## 5.2.3.5 Areas of Potential Contamination

Areas of potential contamination in the Utilities Area include ASTs, transformers, and sewers and septic systems.

## 5.2.3.5.1 Aboveground Storage Tanks

Approximately ten aboveground tanks were historically located in the Utilities Area. Five tanks were situated in the south-central portion of the area from at least 1951 through 1984. These tanks were associated with the Central Boiler House. Two tanks in the southeastern portion of the Utilities Area existed from approximately 1951 through 1992 and stored fuel oil.

# 5.2.3.5.2 Transformers

Two transformers containing PCBs were removed from Substation E-1 at the Utilities Area (Table 5-4). No information is available regarding the operational history and integrity of these transformers. According to plant personnel, no PCB-containing transformers currently exist at the site.

## 5.2.3.5.3 Sewers and Septic Systems

The existing storm sewer system in the Utilities Area collects runoff and drains to the West Side Treatment Plant. There are no septic systems in the Utilities Area.

## 5.2.3.6 IRM Activities

The "Chemical Plant Area NAPL IRM" activities, which involved the drilling of three soil borings and installation of one monitoring well by Geraghty & Miller, were actually conducted in the Utilities Area along the property boundary.

A description of the Main Building Area and details of its history and operations are provided below.

## 5.2.4.1 Description and Boundaries

The Main Building Area is located in the northwestern part of the Bayonne Plant and is comprised of 14 acres. It is bordered to the southeast by the No. 2 Tank Field, to the northeast by the Lehigh Valley Railroad, and to the west by the "A"-Hill Tank Field. The area contains the Main Building and adjacent parking lots (Figure 5-17).

#### 5.2.4.2 Operations, Raw Materials, and Products

The Main Building Area is a triangular parcel that is currently occupied by the Main Building and adjacent parking lots, the Gate A entrance to the plant, a substation, and the IRPL metering station. The Main Building consists of administrative offices currently occupied by IMTT. A guard house and weighing station are located at the Gate A entrance. The IRPL metering station remains out of service as a result of a rupture in the pipeline that occurred on January 1, 1990.

Although the Main Building Area currently serves as an administrative station and entrance to the Bayonne Plant, the area has historically been an active process area. Prior to the 1920s, the area was occupied by several buildings, process units, and ASTs. The process units included reducing stills, condensers, sweetening stills, and stirring tanks. Several ASTs were located in the northern portion of the area, and a Paraffine Boiler House and several pump stations were located in the southwestern and central portions of the area. By 1921, refining processes had been reduced. With the exception of the sweetening stills, that infringed onto the Main Building Area from the present-day No. 2 Tank Field, refining units were eliminated, and the area was primarily occupied by ASTs. By 1951, the sweetening stills and buildings in the

eastern portion of the area were dismantled. In 1959, most of the ASTs had been removed and replaced by the Main Building and parking areas. A Welfare Building was located in the southwestern portion of the area. By 1961, two remaining ASTs had been removed in the northwestern corner of the area. By 1966, Avenue J had been expanded, and the Gate A guard house and truck scale had been constructed. The Welfare Building had been removed and converted to a parking area.

#### 5.2.4.3 Aerial Photograph Interpretation

Fourteen aerial photographs, spanning the time period from 1940 to 1991, were reviewed to evaluate the changes in activities at the Main Building Area. As observed on the 1940 photograph, the northern part of the Main Building Area was occupied by several ASTs, each 60 to 115 feet in diameter, enclosed in earthen fire banks. In the southwestern corner were several buildings, including the Welfare Office and the bus station. Before 1940, this area was occupied by a Paraffine Boiler House, two reducing stills, a condenser, and a compound building. Also in 1940, a group of eight ASTs, each 40 feet in diameter and 40 feet in height, was located in the southern part of the area. In the eastern part of the area were three small tanks and several small buildings that were probably remnants of a line of pre-1940 sweetening stills. A spur of the Lehigh Valley Railroad traversed the western corner of the area, and three or four small unknown storage tanks were located in the extreme western corner.

As observed in the 1947 photograph, a parking lot had replaced a group of small tanks in the southern part of this area. In the 1951 photograph, the storage tanks and buildings in the western portion of this area remained unchanged. Light-colored fill material was placed along the northern border of the tank berms adjacent to the Lehigh Valley Railroad. The buildings and process area in the eastern part of the Main Building Area had been dismantled.

In the 1959 photograph, two large ASTs remained in the northwestern corner of this area. All other tanks (four large, two medium, and eight small) had been removed and replaced by the Main Building and adjacent parking lots in the central part of the area. The northern part

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of the area had been covered with a light-colored, graded material. The northeastern section of the area was being used for storage, possibly for drums.

The 1961 aerial photograph shows that two ASTs had been removed from the northwestern corner of this area. Light-colored fill material was still visible to the northeast of the Main Building. The two small buildings adjacent to the Welfare Building in the southern part of the area had been removed.

Filling activity was observed in the northwestern corner of the Main Building Area in the 1963 photograph. A light-colored building or garage had been constructed to the east of the Main Building. The northeastern part of the area was used for parking trucks. In 1966, Avenue J had been expanded and the gate entrance and truck scale had been constructed. The Welfare Building in the southern part of the area had been removed and the area had been converted to parking. The Main Building Area appeared unchanged in the 1970 and 1974 aerial photographs.

In the 1984 photograph, the area north of the main building had new vegetation. A small building, possibly a pump house, was located east of the Main Building, and storage activity had ceased. The area appeared unchanged in the 1989 and 1991 aerial photographs.

## 5.2.4.4 Discharges, Spills, and Releases

No known spills above 100 gallons have been documented in the Main Building Area.

## 5.2.4.5 Areas of Potential Contamination

The areas of potential contamination at the Main Building Area include the ASTs, USTs, former chromium slag depositional areas, oil/water separators, transformers, process areas, sumps, and the sewers and septic systems.

#### 5.2.4.5.1 Aboveground Storage Tanks

The northern half of the Main Building Area contained 15 large ASTs in 1940; they had all been removed by 1959 when the Main Building was constructed. A cluster of smaller tanks in the southern part of the area and a line of small tanks in the eastern part of the area were associated with the pre-1920 Paraffine Boiler House and sweetening stills, respectively. All ASTs had been removed by 1961, and there were no documented spills from tanks in this area. A pump house was located in the eastern part of this area until 1945, and another pump house, called the Former Avenue J Pump House, was located in the western part of this area for an unknown time period. In addition, the IRPL metering station was located in the eastern corner of this area until the IRPL connecting Bayonne to Bayway was shut down in 1990.

# 5.2.4.5.2 Underground Storage Tanks

One 2,000-gallon UST containing unleaded gasoline was known to have existed in the Main Building Area (Table 5-3). The UST was installed in 1979. Leak testing was performed in 1982 and 1989. The UST passed the first leak test, but failed the test performed in 1989. A notification of the release was provided to the NJDEP in August 1989 and the UST was subsequently removed. A 2,000-gallon replacement UST was installed in 1989 for the storage of unleaded gasoline. This UST is currently in service and is located to the south of the Main Building.

# 5.2.4.5.3 Former Chromium Slag Depositional Areas

Based on historical information, chromium slag was used as fill material beneath the Main Building (Fairchild 1994c). However, as seen on Figure 5-17, chromium slag is generally not present in other parts of the Main Building Area, except for a very small section in the eastern corner, which was identified as having a high density of chromium slag nodules (ICF Kaiser Engineers, Inc. 1993).

#### 5.2.4.5.4 Oil/Water Separators

Two oil/water separators were located along the northeastern edge of the Main Building Area and were probably associated with former process areas. One of the separators was present in 1940; the other was present in 1945. The exact dates of operation and construction of these separators are not known.

#### 5.2.4.5.5 Transformers

One transformer at Substation F-2 was known to have contained PCB oils (Table 5-2). This transformer was reportedly removed some time after 1986. According to Plant personnel, there are currently no known transformers that contain PCB oils at the Bayonne Plant.

# 5.4.2.5.6 Process Areas

The Main Building Area was primarily a process area in the early 1900s through the 1940s. The Compound Building and stirring tanks were erected in the southern corner of the Main Building Area. Kerosene was the main product, possibly as early as 1887. In 1915, two reducing stills and a boiler house, which was referred to as the Paraffine Plant, were constructed in the southern-central part of this area. The process areas described above had been removed by the early 1920s. A line of sweetening stills was located in the eastern part of this area prior to the 1920s until at least 1945.

The Main Building, in the central part of the Main Building Area, was constructed in the early 1950s and operations were expanded from shops and store houses to "all service" facilities in the early 1960s. The Office Lab was relocated to this building.

# 5.2.4.5.7 Sumps

Four sumps are located in the Main Building Area. One sump (Gate A) is associated with the storm sewer system and is located in the parking lot area adjacent to Gate A in the southeastern part of the area. The other three sumps (Avenue J, Sump A, and Sump B) are associated within a groundwater and NAPL recovery system known as the interceptor trench. Details on the location and operations of the interceptor trench system are provided in Section 5.2.4.6 (IRM Activities).

5.2.4.5.8 Sewers and Septic Systems

Historical maps indicate that there were sewers at the Main Building Area prior to 1945 (Esso Standard Oil Company 1945). The existing storm sewers drain to the West Side Treatment Plant. There are no septic systems in this area. Present buildings connect to the City of Bayonne sanitary sewer system on Lower Hook Road.

## 5.2.4.6 IRM Activities

IRM activities in the Main Building Area are related to chromium and NAPL. In 1993, ICF Kaiser collected three soil samples at the Main Building Area to evaluate the extent of chromium slag (ICF Kaiser Engineers, Inc. 1993). Two soil samples had total chromium concentration below 500 mg/kg (58.4 and 107 mg/kg), and one soil sample had a total chromium concentration of 4,610 mg/kg. As shown on Figure 5-17, the area underneath the Main Building Area was reported to have been filled with chromium slag (Fairchild 1994c).

DRAI has been conducting an IRM in the Main Building Area. The NAPL IRM focuses on the interceptor trench. NAPL sampling events conducted between December 1991 and March 1993 indicate NAPL thicknesses of generally less than 0.6 foot. The interceptor trench is located adjacent to the central portion of the northern property line. The 2,038 foot long interceptor trench was installed to prevent off-site NAPL migration across the property line.

The trench has been in operation since the early part of 1977. The source of the NAPL in the area is not known but, based on anecdotal communications, appears to have been related to historical spills.

Two sumps (Sump A and Sump B) are associated with the 2,038 foot long interceptor trench. Sump A, which is a pumped sump, is located along the northeastern side of the Main Building Area. Sump A collects effluent from the interceptor trench, and discharges to the West Side Treatment System. Sump B, which is located near Sump A, serves as a backup in case Sump A fails. A 200 foot long interceptor trench is located within the adjacent ICI Americas, Inc. property to the west of the 2,038 foot long trench. A separate pumped sump (the Avenue J Sump) is located within 30 feet north of the northwestern end of the 2,038 foot long interceptor. The effluent from the 200 foot long trench may discharge to the Avenue J Sump. Liquids collected in the Avenue J Sump are pumped to the West Side Treatment Plant.

Prior to the initiation of IRM activities by DRAI in the area of the interceptor trench, a network of 11 monitoring wells existed in the area adjacent to the interceptor trench. Additional monitoring wells were found in this area as a result of DRAI's well integrity survey conducted in August 1993 (Dan Raviv Associates, Inc. 1993d). In August 1994, DRAI installed six additional wells in the interceptor trench area. A performance evaluation of the entire system was conducted to evaluate the hydraulic gradient and flow to the trench. IRM activities in the Interceptor Trench Area are ongoing and the results and findings have not yet been reported.

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#### 6.0 DATA NEEDS

Geraghty & Miller's review of site history information has resulted in the identification of the following data needs related to the evaluation of the potential environmental impacts of past or present Plant activities. Due to the extensive operational history (more than 115 years) and limited plant historical records for the period of the early 1900s, it is difficult to identify all potential sources of contamination that existed at the Bayonne Plant. However, the data needs identified as a result of the site history review are being adequately addressed in Phase IA of the RI.

- 1. Discrepancies and anomalies exist in the available stratigraphic data for the Site. The stratigraphic units, distribution and thickness of unconsolidated deposits, and depth to bedrock across the entire site area require further delineation. This data need is being addressed as part of the Phase IA RI.
- 2. There are insufficient sample collection points (groundwater monitoring wells) in many areas of the Site. Existing monitoring wells will provide groundwater flow data for the Lube Oil Area, "A"-Hill Tank Field, Pier No. 1, Low Sulfur and Solvent Tank Fields, Interceptor Trench Area, and Piers No. 6 and 7. Data needs exist within the central area of the Plant and within the areal coverage of the existing well network in the previously mentioned operational areas. Consequently, insufficient site-wide data exist to develop a groundwater flow model that can identify (1) the interaction of groundwater flow between the unconsolidated zone and the surface-water bodies bordering the Site, (2) the flow direction of floating NAPL and of dissolved-phase groundwater contaminants, (3) the tidal effects exerted by Upper New York Bay and the Kill Van Kull Waterway on the groundwater, and (4) the vertical flow gradients between the various hydrogeologic units at the Site.
- 3. Quantitative hydrogeologic data currently exist only for areas of the Site in which IRM investigations have been conducted (i.e., the Low Sulfur and Solvent Tank

Fields, the Pier No. 7 area, and the Pier No. 1 area [helipad area]). Insufficient quantitative hydrogeologic data (i.e., hydraulic conductivity, transmissivity, storativity, and vertical gradients) are available on a site-wide basis for the various hydrogeologic units underlying the Bayonne Plant.

- 4. Groundwater quality data for the Site are limited to physical measurements of NAPL thickness in existing monitoring wells and recovery wells. Groundwater quality data do not currently exist for potential dissolved hydrocarbon, chemical, and refinery-related contaminants that may potentially be present under the Bayonne Plant as a result of historical operations. Insufficient groundwater quality data exist for total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/PCBs, and metals.
- 5. Soil quality data at the Bayonne Plant are limited to the results of the surficial sampling (0 to 2 feet) for total and hexavalent chromium and of selected TPH sampling associated with previous excavation and construction activities (e.g., the construction of a containment system in the Lube Oil Area). Insufficient soil quality data exist to characterize the surficial and subsurface soil quality at the Bayonne Plant.

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SECTION 7

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GLOSSARY

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## GLOSSARY OF REFINERY TERMS RELATING TO THE OIL REFINING PROCESS AND THE RESULTING PRODUCTS AT THE BAYONNE PLANT, BAYONNE, NEW JERSEY

Aboveground Storage Tank (AST)	Vessel used to contain liquids. Typically cylindrical and constructed of carbon steel and occasionally of fiberglass-reinforced plastic. Built on foundations. Some have multiple internal compartments. Roof design is related to the volatility of the liquid being stored and includes fixed, fixed cone, floating, and internal floating types. All are filled by pipeline with pumps and valves; all have some type of secondary containment system such as concrete walls or earthen berms or fire banks that use a drainage system for storm water runoff and potential spillage that incorporates an oil/water separator.
Acto .	Sodium sulfonate soap produced in the specialties section of the Exxon Chemicals Plant.
API Separator	An American Petroleum Institute (API) separator is an oil/water separator that is constructed and operated according to API protocols and typically consists of a concrete-walled basin.
Asphalt Oxidation Unit	A process unit that injects air into a base grade asphalt to alter its physical properties.
Asphalt	Black to brown bituminous material obtained as a residue of petroleum refining; consists chiefly of hydrocarbons.
Colprovia Asphalt Pans	Small tanks that stored processed crude from refining stills. Colprovia probably refers to the type or origin of the crude oil.
Atmospheric Unit	A process unit attached to a pipe still to produce liquid hydrocarbons. The atmospheric unit drew off fractions of product. This is also a unit of measurement.
AV-Gas	Aviation gasoline.

Boiler House	Coal-fired (pre-1930) and oil-fired steam- generating plants.
Bulk Wax Gravity Tank	An elevated shipping tank for filling tank trucks by gravity.
Cesium Vault	A concrete-walled building in the Exxon Chemicals Plant Area that housed a lead cylinder containing a bar of Cobalt 60. Because Cobalt 60 decays to cesium, the vault is called the cesium vault.
Chromium Slag	Pellets, pebbles, and nodules of chromium and chromium oxide generated by chromium smelting operations, probably from the scum that floats on top of molten chromium. Chromium slag was used at the Bayonne Plant and other industrial facilities as an inexpensive fill material, especially for preloading the ground surface before construction of large tanks and buildings.
Cinder	Fragments of ash, or partially burned coal, and other miscellaneous materials that may have been placed in an incinerator. Used as a fill material.
Clay Filter Burners	Used to regenerate the clay or bauxite utilized for filtering wax products. Burners removed impurities from the clay.
Condenser	A process unit that cooled distilled vapor phase hydrocarbons to the liquid phase.
Cooperage Building	A structure within which asphalt was oxidized and packaged.
Cracking Coil Units	Process units that convert heavy fractions to gasoline.

Crude Still	The earliest mechanism used for petroleum distillation. Crude stills (also termed batch stills) consisted of furnaces and a row of heated tanks that contained progressively lighter distillates drawn from preceding tanks. They were capable of refining crude oil into kerosene. Crude stills were a type of continuous still: horizontal drums heated from below by coal or oil into which crude or other petroleum products were continuously fed.
Cutback	Any end product from a process unit that is fed back into the unit for reprocessing. Also used to describe a substandard product that may be in storage awaiting reprocessing, disposal or blending. Cutback asphalt was asphalt that was thinned using kerosene or other rapid cure solvents. The process was used to make different grades of asphalt.
Diesel	A blend of petroleum hydrocarbons used as motor fuel.
Fire Bank	An earthen, brick, or concrete wall surrounding tanks used to contain spills, fires, or explosions.
Fire Fighting Training Field	An open area that existed in the northwestern
	corner of the General Tank Field from 1981 to 1982.
Flit	corner of the General Tank Field from 1981 to 1982. The brand name of a white oil insecticide produced in the specialties section of the Lube Oil Area. Flit is an acronym for fleas, lice, insects, and ticks.
Flit Foam Building	corner of the General Tank Field from 1981 to 1982. The brand name of a white oil insecticide produced in the specialties section of the Lube Oil Area. Flit is an acronym for fleas, lice, insects, and ticks. A fire control pump house capable of producing foam from a protein-based concentrate that were used to fight oil fires.
Flit Foam Building Gasoline	<ul><li>corner of the General Tank Field from 1981 to 1982.</li><li>The brand name of a white oil insecticide produced in the specialties section of the Lube Oil Area. Flit is an acronym for fleas, lice, insects, and ticks.</li><li>A fire control pump house capable of producing foam from a protein-based concentrate that were used to fight oil fires.</li><li>A fuel used in internal-combustion engines, consisting of a blend of several products of natural gas and petroleum.</li></ul>

Heating Oil	A distillate fuel generally used for residential heating.
Hivisfuel Furnace	A furnace moved in 1958 from the Central Boiler House, where it heated high viscosity fuel, stored the Asphalt Plant Area. Associated with the furnace was a closed loop piping system that circulated oil. The hivisfuel furnace is integrated with the current Asphalt Plant hot oil transfer system and is referred to as the Hot Oil Furnace.
Hydraulic Oil	An oil used in hydraulic cylinders and lines; high quality lubrication oil capable of withstanding high heat and pressure.
Inter-Refinery Pipeline (IRPL)	One 12-inch and two 8-inch pipelines that connected the Bayway Refinery to the Bayonne Plant from the 1930s (estimated) until January 1990 when a rupture occurred near the Bayway pier. The IRPL carried powerformer feed, jet fuel, kerosene, heating oil, diesel, and low sulfur fuel oil.
Kerosene	A fuel, solvent, and thinner, very similar to heating oil.
Kerosene Lube Oil	A fuel, solvent, and thinner, very similar to heating oil. A lubrication or lubricating oil.
Kerosene Lube Oil Methyl Ethyl Ketone (MEK)	<ul><li>A fuel, solvent, and thinner, very similar to heating oil.</li><li>A lubrication or lubricating oil.</li><li>A substance used as a solvent to filter wax; the MEK Plant replaced the sweaters.</li></ul>
Kerosene Lube Oil Methyl Ethyl Ketone (MEK) Mistol	<ul><li>A fuel, solvent, and thinner, very similar to heating oil.</li><li>A lubrication or lubricating oil.</li><li>A substance used as a solvent to filter wax; the MEK Plant replaced the sweaters.</li><li>The brand name of medicated nose drops made from products manufactured in the specialties section of the Lube Oil Area.</li></ul>
Kerosene Lube Oil Methyl Ethyl Ketone (MEK) Mistol	<ul> <li>A fuel, solvent, and thinner, very similar to heating oil.</li> <li>A lubrication or lubricating oil.</li> <li>A substance used as a solvent to filter wax; the MEK Plant replaced the sweaters.</li> <li>The brand name of medicated nose drops made from products manufactured in the specialties section of the Lube Oil Area.</li> <li>Constructed in 1921; tanks contained napthenic (NAP) acid used in the Case &amp; Can Plant.</li> </ul>
Kerosene Lube Oil Methyl Ethyl Ketone (MEK) Mistol NAP Acid Tank Field	<ul> <li>A fuel, solvent, and thinner, very similar to heating oil.</li> <li>A lubrication or lubricating oil.</li> <li>A substance used as a solvent to filter wax; the MEK Plant replaced the sweaters.</li> <li>The brand name of medicated nose drops made from products manufactured in the specialties section of the Lube Oil Area.</li> <li>Constructed in 1921; tanks contained napthenic (NAP) acid used in the Case &amp; Can Plant.</li> <li>A base grade of lubricating oil.</li> </ul>
Kerosene Lube Oil Methyl Ethyl Ketone (MEK) Mistol NAP Acid Tank Field Necton No. 2 Plant	<ul> <li>A fuel, solvent, and thinner, very similar to heating oil.</li> <li>A lubrication or lubricating oil.</li> <li>A substance used as a solvent to filter wax; the MEK Plant replaced the sweaters.</li> <li>The brand name of medicated nose drops made from products manufactured in the specialties section of the Lube Oil Area.</li> <li>Constructed in 1921; tanks contained napthenic (NAP) acid used in the Case &amp; Can Plant.</li> <li>A base grade of lubricating oil.</li> <li>A general name given to the former process areas located north of the railroad tracks that divide the Bayonne Plant.</li> </ul>

No. 3 Plant	A general name given to the former process areas located south of the railroad tracks that divide the Bayonne Plant.
Nujol	A mineral oil laxative produced in the specialties section of the Lube Oil Area.
Occipular Co-Polymer (OCP) Warehouse	Formerly located in the Exxon Chemicals Plant, the building housed operations related to viscosity improvement additives.
Paraffine	A waxy, crystalline, flammable substance obtained from distillates of petroleum that is a complex mixture of hydrocarbons and is used chiefly in coating and sealing, in candles, in rubber compounding, and in pharmaceuticals and cosmetics; any of various mixtures of similar hydrocarbons including mixtures that are semi- solid or oily; alkane; kerosene.
Paraflow Plant	A process area that manufactured a "pour depressant" lube oil additive.
Paramins	Referred to as the trade name of Exxon Chemical Company.
Parapoid Plant	A process area that manufactured a "viscosity improver" lube oil additive.
Phenol Plant	A process area that processed ordinary grades of lube oil to a high-grade premium product by removing undesirable low-grade constituents using phenol as a medium.
Pipe Still	A fractionating tower, furnace pumps, and control equipment used to produce petroleum products.
Pitch Still	A process unit that reduced crude oil to an asphalt component.
Pitch	Similar to asphalt; a black or dark viscous substance obtained as a residue in the distillation of organic materials and especially tars.
Porocel Plant	A trade name for a plant that filtered wax through bauxite.

**Powerformer Feed** 

Preload

**Pump House** 

**Recycled Oil** 

**Reducing Still** 

Refined Wax

Separator Outfall

Separator Bottoms

The powerforming process was a proprietary name for the petroleum reforming process in which catalytically promoted chemical reactions converted low octane feed components into high octane products called reformate. Powerformer feed is liquid naphtha, a light grade oil generated in the atmospheric pipe stills. Powerformer feed for operations at the Bayway Refinery was stored in several ASTs at Bayonne. No powerformer operations were conducted at the Bayonne Plant.

Any type of fill material placed in bulk at the site of a large storage tank or building prior to foundation construction in order to prepare the ground for the weight of the tank by compressing organic or miscellaneous fill on the site. The use of preload material that contained chromium slag was documented for one tank foundation at the Bayonne Plant and was also used for grading and for tank berm construction.

Process Gas Oil (PGO) The fraction of crude oil that is heavier than middle distillates and lighter than asphalt/pitch. The process gas oil is sent from the pipe stills to the catalytic cracking unit for further refining. "Bayway PGO" has been stored in several ASTs at Bayonne.

A building or structure that housed process pumps handling various liquids.

A waste oil generated from various petroleum storage and blending operations.

An old 1900 process unit that further reduced fractions of hydrocarbons to lighter components.

A pure and highest grade of wax used for food products, crayons, etc.

A pipe or open flume into which the water effluent from an oil/water separator drains; historically many separator outfalls discharged directly to water bodies or settling basins.

A sludge residue that sinks to the bottom of oil/water separators.

GERAGHTY & MILLER, INC.

SGEM Tank Field	Steam generation energy management (SGEM) complex that included a city water tank and two fuel storage tanks; associated with the new boiler house complex.
Shell Stills	Same as crude stills.
Solvent Drum Filling Building	A building housing filling and conveyor equipment to fill 55-gallon steel drums.
Stave Still	Possibly a stave kiln.
Substation	A subsidiary station in which electric current is transformed; contains one or more transformers.
Sump	A pit at the lowest point in a drainage system that often has a fixed pump used to remove collected liquids.
Superflo	A highly refined lubricating oil containing various additives and used as a premium motor oil.
Sweater or Wax Sweater	A process unit that separates oil from wax by heating and cooling the material in trays containing coils.
Sweetening Still	Sweetening is the process in which desulfurization occurs; desulfurization removes unwanted sulfurs that normally exist in crude oils.
Tank Bottoms	The material that accumulates in the bottom of storage tanks, consisting of oil, water, and the solids that settle out of petroleum products.
Teresstic	A blended grade of lubricating oils.
Tetra Ethyl Lead	The additive used to make leaded gasoline; also called organic lead.
Transformer	A unit that converts high voltage electricity into lower voltage electricity.
Truck Loading Rack	An area where tank trucks are filled, usually from an overhead pipeline.

Twenty-Five Cycle Power	An old former electrical generator in use before 60-cycle power came into use.
Underground Storage Tank (UST)	A carbon steel or fiberglass vessel buried below ground surface used for storing liquids such as waste oils, heating oils, or gasoline.
Vacuum Still	A process unit that reran pressed oil; pressed oil has been squeezed from wax.
Varsol	A petroleum-based naphtha solvent.
Wax	A solid substance of mineral origin consisting of higher hydrocarbons.
Wax Hot House and Cook Building	A building used to heat wax for processing with steam.
Wax Hydrogenation	A process to further refine wax with hydrogen to further remove impurities.
Wax Filter	A unit that separates oil from wax.
Wax Separator/Paraffine Separator	A compartmented concrete separator in which floating hydrocarbons that were skimmed off as liquids flowed from one compartment to the next for further treatment.
White Oil	A mineral oil produced by treating base oil feedstock with sulfuric acid and caustic soda to remove sulfides.

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Table 2-1.	Soil Boring	Identification 3	Numbers,	Exxon	Company	Plant,	Bayonne,	New Jersey.	
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New	Original	East	North
Boring Number	Boring Number	Coordinate	Coordinate
B001	B-1	9,783	10,700
B002	B-2	9,878	10,700
B003	B-3	9,971	10,700
B004	B-4	9,972	10.809
B005	B-4A	9,972	10.811
B006	B-5	10,005	10,936
B007	B-6A	10,013	11,096
B008	B-7	9,880	10,860
B009	B-8	9,816	11,086
B010	B-9C	9,777	10,937
B011	B-10A	9,880	10.973
B012	B-A	12,221	11.390
B013	3	9,220	9,940
B014	B-B	12.221	11.223
B015	B-1	10,872	11.073
B016	B-2	10,956	11.088
B017	B-3	11.048	11.082
B018	B-4	11.147	11.082
B019	B-5	11.249	11.091
B020	B-6	10.857	10 952
B021	B-7	10.963	10,944
B022	B-8	11,017	10 984
B023	B-9	11 147	10,957
B024	B-10J	11.234	10,986
B025	B-11	10.854	10,900
B026	B-12	10 964	10,883
B027	B-13	11.058	10,883
B028	B-14	11,050	10,883
B029	B-15C	11 255	10,888
B030	B-4	12,263	11 886
B031	B-5	12,705	11,000
B032	B-6	13 398	11,002
B033	B-7	13,320	11,910
B034	B-8	13 345	11,991
B035	B-9	12 593	11,910
B036	B-1	12,555	11,902
B037	B-2	12,510	11,902
B038	B-3	12,307	11,027
B030		0.152	11,910
B040	2	9,132	10,426
B053	1	9,132	10,420
B054	· 2	9,404	7,820 0,820
B055	- 4	2,340 0 3 <i>1</i> 0	7,820 0.040
R056	5	2,340 0.220	9,940 10.000
B057	6	9,220	10,060
B058	7	7,340 0.720	10,060
B059	8	9,220	10,180
B060	0	7,340 0 140	10,180
	7	7,400	10,180

Table 2-1. Soil Boring Identification Numbers, Exxon Company Plant, Bayonne, New Jersey.

New	Original	East	North
Boring Number	Boring Number	Coordinate	Coordinate
B061	10	9,220	10,300
B062	11	9,332	10,300
B063	12F	9,488	10,247
B064	13	9,232	10,420
B065	14	9,340	10,420
B066	15	9,460	10,420
B067	16	9,340	10,540
B068	17	9,460	10,540
B069	18	9,340	10,660
B070	19	9,316	10,790
B071	20	9,340	10,900
B072	21	9,460	10,900
B073	22H	9,092	11,040
B074	23	9,220	11,020
B075	24	9,100	11,140
B076	25	9,220	11,140
B077	27	9,340	11,260
B078	CB-3	9,027	9,835
B079	CB-4	9,011	9,835
B080	CB-5	9,028	9,975
B081	CB-6	9,012	9,975
B082	CB-7	9,039	10.113
B083	CB-8	9.014	10.113
B084	CB-9	9.047	10,165
B085	CB-10	9,100	10,177
B086	CB-11	9.047	10,230
B087	CB-12	9,100	10 243
B088	CB-13	9.047	10 293
B089	CB-14	9 100	10 293
B090	CBA	9.069	10,250
B091	CBB	9.073	10,255
B092	CBC	9.075	10,203
B092	CB-1	9,579	11 090
B004	CB-2	0.554	11,070
B005	CB-15	9,554	10,320
B095	CB-15	9,705	10,520
B090	CB-37	0.438	0 807
B097	CB-33	0 530	0.080
B000	CB-34	9,530	7,700
D033	CD-34 CD-35	9,515	7,003
B101	CB-35	7,JJ7 0.607	7,717
B101	CB-37	9,047	7,710 0 952
D102	CB-39	9,01U 0.540	7,023
	CD-J0	9,00	У, /ठठ 0,040
D104	D•1 D 0	y,408	y,84y
COLG	B-2	9,468	9,791
B106	B-3	9,429	9,762
B107	B-4	9,499	9,697
B108	B-5	9,517	9,787

Table 2-1. Soil Boring Identification Numbers, Exxon Company Plant, Bayonne, New Jersey.

New	Original	East	North
Boring Number	Boring Number	Coordinate	Coordinate
B109	B-6	9.550	9.840
B110	B-7	9,600	9 732
B111	B-8	9 634	9 767
B112	B-9	9 674	9 830
B113	B-1	9,767	11 335
B114	B-2	9.449	11 255
B115	B-3	9.502	11 213
B116	B-4	9,460	11.145
B117	B-5	9,803	10.768
B118	B-6A	9,500	10 792
B119	B-7	9,762	10.641
B120	B-8	9,486	10.648
B121	B-9	9,517	10.430
B122	B-10	9,971	10.278
B123	B-11	9.844	10.238
B124	B-12	9.664	10.203
B125	B-13	9.552	10.252
B126	B-15A	9,546	9.387
B127	B-16A	9,347	9.616
B128	B-17	9,196	9.648
B129	B-18	9,448	11.277
B130	B-19	9,476	10.992
B131	CB-37 (g)	9.684	10 655
B132	CB-38 (g)	9,729	10 632
B133	CB-39 (g)	9.626	10 573
B134	CB-40 (g)	9.607	10.524
B135	1	9,669	9,523
B136	2	9,627	9.540
B137	3	9,633	9.446
B138	4	9,555	9,444
B150	1	14,868	11.649
B151	2	15,024	11.599
B152	3	15,200	11.541
B153	4	15,390	11.479
B154	5	15,490	11.447
B155	6	15,665	11.390
B156	B-1	13,731	12.370
B157	B-2	13,684	12.415
B158	B-3	13,760	12.220
B159	B-4	13,674	12.220
B160	B-5	13,760	12,043
B161	B-6	13,671	12,036
B162	B-7	13,811	11,899
B163	B-8	13,813	11,813
B164	B-9	13,628	11,900
B165	B-10	13,634	11,817
B166	B-11	12 464	11 012
2100	<i>P</i>	13,404	11,912

Table 2-1. Soil Boring Identification Numbers, Exxon Company Plant, Bayonne, New Jersey.

New	Original	East	North
Boring Number	Boring Number	Coordinate	Coordinate
<u> </u>	· · · · · · · · · · · · · · · · · · ·		· · · ·
B168	B-13	13,274	11,913
B169	B-14	13,274	11,822
B170	B-15	13,094	11,912
B171	B-16	13,094	11,823
B172	B-17	12,779	12,274
B173	B-18	12,725	12,245
B174	B-19	12,859	11,756
B175	B-20	12,874	11,828
B176	B-21	12,797	11,825
B177	H-1	13,575	11,193
B178	H-2	13,649	11,120
B179	H-3	13,626	11,069
B180	H-4	13,524	11,069
B181	H-5	13,502	11,122
B182	H-6	13,576	11,121
B183	H-7	13,354	11,231
B184	H-8	13,428	11.151
B185	H-9	13,354	11.079
B186	H-10	13,354	11.151
B187	H-11	13.131	11 256
B188	H-12	13,205	11 183
B189	H-13	13 131	11,105
B190	H-13A	13 130	11,003
B191	H-13B	13,095	11,005
B192	H-13C	13,095	11,102
B193	H-14	13,152	11,117
B194	H-15	13,057	11,104
B105	H-16	13,131	11,185
B196	H-17	13,260	11,443
B107	L-19	13,333	11,371
B108	U_10	13,200	11,298
D193	U 20	13,204	11,371
D177	H-20	13,280	11,371
D200	п-21 Ц 22	13,013	11,445
B201 D202	H-22	13,086	11,369
B202	H-23	13,013	11,298
B203	H-24	12,937	11,369
B204	H-25	12,844	11,186
B205	A	12,357	12,795
B206	В	13,500	12,795
B207	Α	11,583	10,981
B208	В	11,670	10,966
B209	С	11,648	11,023
B210	B-8	10,985	9,427
B211	B-9	11,005	9,595
B212	B-10	11,003	9,700
B213	B-11	10,998	9,815
B214	B-12	10,998	9,940
B215	B-13	11,000	10.043
			,

Table 2-1. Soil Boring Identification Numbers, Exxon Company Plant, Bayonne, New Jersey.

New	Original	East	North
Boring Number	Boring Number	Coordinate	Coordinate
			······
B216	B-14	11,086	9,370
B217	B-15	11,077	9,797
B218	B-16	11,097	9,931
B219	B-17	11,090	10,043
B220	B-18	11,143	9,616
B221	B-19	11,216	9,530
B222	B-20	11,236	9,638
B223	B-21	11,211	9,769
B224	B-22	11,183	9,930
B225	B-23	11,192	10,043
B226	1	11,000	12,388
B227	6	11,125	13,000
B228	B-2	9,745	10,790
B229	B-3	9,719	10,903
B230	101	13,275	10,450
B231	102	13,580	10,350
B232	103	13,740	10,350
B233	104	13,410	10,365
B234	B-4	11,406	11,102
B235	B-5	11,447	11,102
B236	68-1	9,396	10,155
B237	68-2	9,397	10,225
B238	1A	8,868	11,138
B239	2A	8,800	11,006
B240	3A	8,906	10,903
B241	4A	8,842	10,771
B242	5A	8,942	10,696
B243	6A	8,860	10.611
B244	W-1	13,576	11.039
B245	W-2	12,884	11.290
B246	W-3	12,920	11.228
B247	W-4	12,844	11,164
B248	W-6	12.726	11.345
B249	W-7	12,576	11.345
B250	W-8	12,546	12.080
B251	W-9	12.506	12,148
B252	W-10	12,482	12,216
B253	W-11	12.662	12,380
B254	W-12	12.658	12 450
B255	W-13	12.772	12,480
B256	W-14	12.728	12,420
B257	W-15	12.724	12,576
B258	W-16	12,776	12,570
B259	W-17	12,430	12,150
B260	W-18	12,532	12 714
B261	B-6	14 479	11,217
B262	B-7	14 393	11 481
B263	B-10	14 341	11,701
	-1v	17,371	11,008

Table 2-1. Soil Boring Identification Numbers, Exxon Company Plant, Bayonne, New Jersey.

New	Original	East	North
Boring Number	Boring Number	Coordinate	Coordinate
B264	B-8	14,250	11,520
B265	B-9	14,281	11.638
B266	B-11	14,144	11.666
B267	B-12	14.047	11.713
B268	B-1	14,479	11.341
B269	B-2	14,497	11.429
B270	B-3	14,440	11.395
B271	B-1	11.925	10.477
B272	B-2	12,098	10.444
B273	B-3	12,020	10.467
B274	B-4	12,086	10.521
B275	B-5	11,951	10.417
B276	B-6	12,141	10.636
B277	B-7	12,138	10.533
B278	B-8	12,301	10.575
B279	B-9	12,265	10.684
B280	B-10	12.230	10.593
B281	W-21	12.654	12.206
B282	W-22	12,760	12.211
B283	W-23	12,762	12.098
B284	W-32	12.659	12 163
B285	BAY 74-1	14.426	11 607
B286	BAY 74-2	14.375	11 407
B287	BAY 74-3	14 347	11 407
B288	T1	12 497	12 426
B289	T2	12,502	12 346
B290	Т3	12.437	12 455
B291	T4	12,500	12,100
B292	T5	12.302	12,120
B293	T6	12,353	12,205
B294	T7	12,353	12,540
B295	T8	12,335	12,235
B296	T9	12,250	12,235
B297	B-I	9 986	9 4 1 9
B298	B-2	9 996	9 398
B299	B-3	9 984	9 4 57
B300	B-4	9 975	9 469
B301	B-5	9 959	9 504
B302	22	12 435	12 077
B303	23	12,135	12,077
B304	24	12,505	12,170
B305	25	12.550	12,702
B306	26	12,834	12,307
B307	27	12,663	12,390
B308	28	12,451	11 792
B309	29	12.532	11 927
B310	30	12.677	11 827
B311	31	12 732	11 895
	~ -	A 44, 1 - 2 44	11,075

Table 2-1.	Soil Boring	Identification	Numbers,	Exxon	Company	Plant,	Bayonne,	New Jerse	ey.
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New	Original	East	North		
Boring Number	Boring Number	Coordinate	Coordinate		
			·		
B312	32	12,852	11,909		
B313	33	13,009	11,846		
B314	34	13,178	11,915		
B315	35	12,674	12,510		
B316	36	12,678	11,975		
B317	37	12,769	11,979		
B318	38	12,902	11,982		
B319	39	13,009	11,981		
B320	CB-62	11,798	11,641		
B321	CB-63	11,765	11,515		
B322	CB-64	11,860	11,512		
B323	CB-65	11,970	11,513		
B324	CB-66	11,940	11,602		
B325	CB-67	11,615	11,556		
B326	CB-68	11,521	11,554		
B327	CB-69	11,436	11,560		
B328	CB-70	11,298	11.574		
B329	CB-71	11,215	11.580		
B330	CB-72	11.223	11.655		
B331	B-1	11.689	11,000		
B332	B-2	11,002	11,657		
B333	 B-3	11 984	11,007		
B334	B-4	11,204	11,725		
B335	B-5	11,451	11,723		
B336	No 1	11.168	11,727		
B337	No. 2	11,100	11,585		
B338	No 3	11,172	11,045		
B330	No. 4	11,175	11,740		
B340	No. 6	11,204	11,652		
D340 P241	No. 8	11,171	11,957		
D341 D242	No. 0	10,800	12,007		
D342 D242	No. 9	10,010	12,024		
D343	NO. 10	10,558	12,050		
B344	NO. 11	10,502	12,076		
B345	No. 12	10,436	11,963		
B346	No. 13	10,850	11,780		
B347	No. 14	10,844	11,724		
B348	No. 15	10,951	11,796		
B349	No. 16	10,946	11,719		
B350	CB-40	10,562	12,175		
B351	CB-41	10,706	12,200		
B352	CB-42	10,575	12,015		
B353	CB-43	10,725	12,055		
B354	CB-44	10,871	12,087		
B355	CB-45	10,740	11,905		
B356	CB-46	10,906	11,940		
B357	CB-47	11,058	11,957		
B358	CB-48	10,908	11,760		
B359	CB-49	11,060	11,843		
			-		

 Table 2-1.
 Soil Boring Identification Numbers, Exxon Company Plant, Bayonne, New Jersey.

New	Original	East	North
Boring Number	Boring Number	Coordinate	Coordinate
			· ·
B360	CB-50	11,215	11,885
B361	CB-51	11,116	11,708
B362	CB-52	11,245	11,774
B363	CB-53	11,383	11,791
B364	CB-54	11,300	11,689
B365	CB-55	11,410	11,666
B366	CB-56	11,531	11,713
B367	CB-57	11,593	11,615
B368	CB-58	11,730	11,649
B369	CB-59	10,643	11,730
B370 🛉	CB-60	10,743	11,760
B371	CB-61	10,987	11,656
B372	B-40	12,455	11,919
B373	B-6	9,500	10,804
B374	B-15	9,564	9,387
B375	B-16	9,347	9,654
B376	CB-A	11,758	10,704
B377	CB-1	11,753	10.765
B378	CB-2	11.714	10,657
B379	CB-3	11.814	10 677
B380	CB-4	11.965	10 803
B381	CB-5	11 943	10,690
B382	CB-6	12,039	10,729
B383	CB-7	12,055	10,725
B384	CB-8	12,175	10,000
B385	CB-0	12,105	10,720
2362	CB-10	12,237	10,760
D300 D207		12,308	10,855
D30/		12,400	10,755
D388	CB-12 CD-11	12,478	10,833
B389 D200	CB-21	11,198	10,426
B390	CB-22	11,292	10,362
B391	CB-23	11,393	10,469
B392	CB-24	11,488	10,402
B393	CB-25	11,582	10,501
B394	CB-26	11,676	10,435
B395 🦼	CB-27	11,766	10,532
B396	CB-28	11,859	10,466
<b>B397</b>	CB-29	11,247	10,154
B398	CB-30	11,312	10,252
B399	CB-31	11,440	10,190
B400	CB-32	11,506	10,286
B401	CB-33	11,627	10,225
B402	CB-34	11,692	10,319
B403	CB-35	11,812	10,254
B404	CB-36	11,878	10,351
B405	74-1	15,131	11,012
B406	B-I	11,904	10,480
B407	B-2	11.876	10.432

Table 2-1. Soil Boring Identification Numbers, Exxon Company Plant, Bayonne, New Jersey.

New	Original	East	North			
Boring Number	Boring Number	Coordinate	Coordinate			
		14 660	11 400			
B409	B-1 B-2	14,009	11,409			
B410	B-1	15,025	11,301			
B411	B-4	15,002	11,333			
B412	B-4A	15,203	11,522			
B413	B-14	15,203	11,309			
B414	B-6	14 905	11,270			
B415	B-1	10,512	11,508			
B416	B-2	10,512	11,100			
B417	B-3	10,000	11,082			
B418	B-3 B-4	10,802	11,007			
B419	B-5	10,020	11,600			
B420	B-5 B-6	10,770	11,500			
B420 B421	B-7	11,110	11,518			
B421 B422	B-7 B-74	11,119	11,495			
B423	B-8	11,119	11,495			
B423 B474	B-0	10.050	11,365			
B425	B-10	10,900	11,396			
B425	B-10 B-11	11,050	11,199			
B420 B427	D-11 D-11	11,011	11,444			
B427 B428	D-12 B-13	10,776	11,427			
D420 D410	D-13	10,014	11,478			
D429 D420	D-14 D-15	10,580	11,376			
D430 D421		10,782	11,296			
D431 D421	D-IJA D-IZ	10,742	11,292			
D4J2 D432	D-10 D-10	10,903	11,289			
D433 D424	D-29 D 17	10,320	11,695			
D434 D425	D-1/ D 19	11,005	11,089			
D433 D424	D-10	10,877	11,137			
D430	D-19	10,702	11,190			
D437	B-20 D 21	10,562	11,259			
D430 D420	D-21	10,584	11,170			
D439	B-22	10,659	11,296			
B440	B-23	10,902	11,476			
B441	B-24	10,722	11,508			
B442	B-25	10,767	11,541			
B443	B-26	10,842	11,517			
B444	B-27	10,635	11,139			
B445	B-28	10,602	11,307			
B446	CB-41	9,325	10,976			
B447	CB-42	9,326	11,010			
15448 15448	CB-43	9,326	11,040			
B449	CB-I7	9,712	11,681			
B450	CB-18	9,673	11,676			
B451	CB-19	9,638	11,672			
B452	CB-20	9,582	11,628			
B453	CB-21	9,469	11,657			
B454	CB-22	9,362	11,593			
B455	CB-23	9,241	11,680			

Table 2-1.	Soil Boring Identi	fication Numbers	Exxon Con	эралу Plant, E	ayonne, New Jersey.
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New	Original	East	North
Boring Number	Boring Number	Coordinate	Coordinate
<u> </u>			
B456	CB-24	9,211	11,685
B457	CB-25	9,241	11,660
B458	CB-26	9,211	11,655
B459	CB-27	9,241	11,630
B460	CB-28	9,211	11,625
B461	CB-29	9,241	11,593
B462	CB-30	9,211	11,594
B463	CB-31	9,241	11,567
B464	CB-44	9,703	11,438
B465	CB-45	9,704	11,487
B466	CB-46	9,681	11,540
B467	CB-47	9,659	11.490
B468	CB-48	9,612	11.541
B469	CB-49	9,612	11.492
B470	CB-50	9.612	11 442
B471	CB-51	9,568	11 492
B472	CB-52	9,525	11 544
B473	CB-53	9.525	11 492
B474	CB-54	9 525	11,42
B475	B-101	14 570	11 125
B476	B-102	14 875	11,125
B477	B-103	14,025	11,075
B478	B-103 A	14,540	11,008
D470	B.104	14,904	11,004
D473	D-104 D-105	15,104	10,964
D400 D401	D-103 D-104	14,082	11,034
D401 D401	D-100 D-107	14,431	11,098
D402	D-107	14,351	11,110
D483	D-1	11,895	11,009
B484	B-2	11,890	11,058
B485	B-3	11,804	11,058
B486	B-4	11,625	11,213
B487	B-5	11,498	11,213
B488	B-6	11,347	11,212
B489	B-7	11,270	11,215
B490	B-8	11,617	11,294
B491	B-9	11,548	11,302
B492	B-10	11,500	11,300
B493	B-11	11,425	11,290
B494	B-12	F1,311	11,284
B495	B-13	11,174	11,214
B496	B-14	11,094	11,238
B497	B-15	11,013	11,202
B498	B-16	10,972	11,235
B499	B-17	10,978	11,300
B500	B-18	11,043	11,416
B501	B-19	10,928	11,354
B502	B-20	10,856	11.357
B503	B-21	10.793	11.353
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Table 2-1. Soil Boring Identification Numbers, Exxon Company Plant, Bayonne, New Jersey.

New	Original	East	North		
Boring Number	Boring Number	Coordinate	Coordinate		
B504	CB-1	8,958	12,952		
B202	CB-2	9,113	13,162		
B506	CB-4	9,226	13,009		
B307	CB-5	9,280	12,952		
B208		9,225	12,775		
B209	CB-7	9,333	12,560		
8510	CB-9	9,386	13,065		
BSII	CB-10	9,484	12,842		
B512	CB-II	9,384	12,705		
B513	CB-12	9,489	12,505		
B514	CB-13	9,580	13,010		
B515	CB-14	9,567	12,842		
B216	CB-15	9,680	12,680		
B517	CB-16	9,577	12,525		
B518	CB-17	9,855	12,825		
B519	CB-18	10,020	12,775		
B520	CB-19	9,810	12,645		
B521	CB-20	10,156	12,625		
B522	CB-21	10,005	12,329		
B523	CB-22	10,343	12,484		
B524	CB-23	10,000	12,162		
B525	CB-24	10,343	12,144		
B526	CB-25	10,402	12,395		
B527	CB-26	10,402	12,282		
B528	B-1	14,465	11,667		
B529	B-1	13,665	11,694		
B530	B-2	13,497	11,672		
B531	B-1	9,676	10,110		
B532	B-2	9,763	10,211		
B533	B-3	9,955	10,376		
B534	B-4	9,678	10,162		
B535	B-5	9,763	10,162		
B536	B-1	14.227	11.615		
B537	B-2	13.885	11.417		
B538	B-3	14.260	11 605		
B539	B-I	10.253	10 646		
B540	B-2	10.401	10.661		
B541	B-3	10.327	10 646		
MW01	MWI	10.862	10.967		
MW02	MW2	10,863	10,988		
EB1	L-27	9.818	9 364		
EB2	L-49	9.901	9 364		
EB3	L-50	9 917	9 385		
EB4	L-51	9 920	9,505 9 <u>4</u> 05		
EBS	L-52	9 978	9,405		
EB6	L-53	9,926	0 449		
FB7	L-54	2,230 Q QA7	2,770 0 /70		
FB8		7,742 0.085	7,4/V 0 /77		
-100	D-00	7,702	7,477		

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Table 2-1. Soil Boring Identification Numbers, Exxon Company Plant, Bayonne, New Jersey.

New	Original	Fast	North		
Boring Number	Boring Number	Coordinate	Coordinate		
EB9	L-55	9,943	9,496		
EB10	L-22	9,801	9,506		
EB11	L-25	9,852	9,681		
EB12	L-24	9,758	9,770		
EB13	L-20	9,537	9,481		
EB14	L-30	9,285	9,770		
EB15	L <b>-7</b>	9,038	9,775		
EB16	L-46	9,276	10,228		
EB17	L-40	9,869	10,363		
EB19	L-1A	8,925	10,496		
EB21		9,348	11,464		
EB22	L-43	9,712	11,451		
EB23	L-45	9,554	11,546		
EB24	L-44	9,801	11.555		
EB25	AH-1	9,768	11,707		
EB26	AH-5	9,761	11.742		
EB27	AH-3	9.507	11.824		
EB28	AH-4	9.796	12.045		
EB29	OW-23	9.546	12,409		
EB30	OW-22	9,777	12,412		
EB31	AH-7	10.183	12.014		
EB33	T2	10.022	12,782		
EB34	 T1	10,006	12,778		
EB35	т3	10,000	12,799		
FB36	T4	10,020	12,775		
EB30	T9	10,055	12,010		
FB41	T10	10,075	12,742		
FB42	TII	10,220	12,070		
FB44	T13	10,384	12,015		
FB45	T14	10,384	12,425		
EB46	OW-AAW	11 314	11 851		
ED40 FB47	D7_7_87	13 870	11,051		
EB48	P7_3_87	13,027	11,750		
ED48	P7-4-87	13,917	11,552		
ED49	D7.5.97	13,975	11,800		
EDSI	D7 6 97	12,744	11,000		
ED51 ED51	17-0-07	13,047	11,798		
EDJ2 ED52	F /=/+0/	13,919	11,793		
EDJJ	F7-15	13,709	11,700		
7954 7956	, (C	13,747	11,529		
EDJU EB57	D7_0 97	12,000	11,043		
۲D < 6	r /-7-0/ D7-9-97	12,767	11,008		
EDJO	F/-0-0/ D7 10 97	14,013	11,725		
СДЈУ Брсор	r/-1V-8/	14,140	11,701		
EBOUK	r/-12-8/	14,204	11,701		
EB01	r/-14-8/	14,345	11,704		
EB02	r/-10-8/	14,476	11,704		
EB63	P/-18-87	14,592	11,704		
£B64	<b>P7-17</b>	14,010	11,700		

Table 2-1. Soil Boring Identification Numbers, Exxon Company Plant, Bayonne, New Jersey.

New	Original	East North		
Boring Number	Boring Number	Coordinate	Coordinate	
		·	· · · · · · · · · · · · · · · · · · ·	
EB65	P7-11-87	14,150	11,690	
EB66R	P7-13-87	14,268	11,691	
EB67	P7-15-87	14,350	11,685	
EB68	P7-17-87	14,474	11,686	
EB69	P7-19-87	14,550	11,686	
EB71	P6-21-87	14,238	11,282	
EB72	P6-23-87	14,257	11,130	
EB73	P6-24-87	14,203	11,006	
EB74	P6-22-87	14,340	11,127	
EB75	LS-13	13,663	11,056	
EB76	LS-9	13,668	11,185	
ÉB77	LS-7	13,254	11,249	
EB78	LS-11	13,331	11,295	
EB79	LS-10	13,415	11,322	
EB80	LS-1	13,335	11,454	
EB81	LS-2	13,302	11,446	
EB82	6	14,198	11,566	
EB83	Not known.	10,040	12,779	
EB84	Not known.	13,858	11.725	
EB85	Not known.	14.279	11.419	
EB86	Not known.	14,369	11,188	
EB87	Not known.	11.623	11 892	
EB88	Not known.	11,591	11 818	
EB89	Not known.	11 495	11 848	
EB90	Not known.	17 565	21 234	
EB91	Not known	11 336	11 916	
EB92	Not known	11 221	11,977	
EB93	Not known	11 128	12,008	
EB94	Not known	10 772	12,000	
FB95	Not known	10,772	12,100	
EB96	Not known	10,705	12,245	
FB07	Not known	10,557	12,510	
FROS	Not known	10,453	12,373	
EB00	Not known	11 400	12,434	
ED77	DW-7	0.622	11,695	
EDAI		9,023	9,290	
EDRZ EDR2	RW-2 DW 10	9,002	9,342	
EDRU		9,883	9,424	
EBR4		9,917	9,506	
EBRO EDD(	KW-9	9,903	9,515	
EBRO	RW-0	9,539	9,463	
EDK/		9,728	9,704	
EDKO	KW-3	9,007	9,528	
EBRY EDD10	11-W	13,961	11,854	
EBRIU	9-W	13,966	11,805	
EBRII	8-W	13,969	11,729	
EBR12	1-W	14,398	11,344	
EBR13	2-W	14,378	11,318	
EBR14	3-W	14,373	11,271	

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Table 2-1.	Soil Boring	Identification	Numbers,	Exxon	Company	Plant,	Bayonne,	New Je	rsey.
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Boring Number         Boring Number         Coordinate         Coordinate           EBR15         4-W         14,343         11,221           EBR16         5-W         14,335         11,136           EBR17         6-W         14,335         11,136           EBR18         13-W         14,323         11,126           EBR19         12-W         14,301         11,007           EBR20         10-W         14,244         10,956           EBR21         7-W         14,116         11,072           EBR23         Not known.         14,179         10,980           HB1*         HB1         9,590         9,387           HB2*         HB2         9,713         9,302           HB3*         HB3         9,851         9,381           PKB2*         B2         8,900         10,556           PKB2*         B3         8,960         10,639           PKB2*         B3         8,960         10,648           PKB5*         B5         8,788         10,936           PKB5*         B7         8,788         10,938           PKB5*         B10         8,944         10,409           PKB1* <th>New</th> <th>Original</th> <th>East</th> <th>North</th>	New	Original	East	North
EBR15         4-W         14,343         11,221           EBR16         5-W         14,384         11,190           EBR17         6-W         14,335         11,136           EBR18         13-W         14,323         11,126           EBR19         12-W         14,201         11,007           EBR20         10-W         14,244         10,956           EBR21         7-W         14,116         11,072           EBR22         RW-8         9,116         10,358           EBR23         Not known.         14,179         10,980           HB1*         HB1         9,590         9,387           HB2*         HB2         9,713         9,302           HB3*         HB3         9,851         9,381           PKB1*         B1         8,991         10,554           PKB2*         B2         8,900         10,566           PKB4*         B4         8,760         10,848           PKB5*         B5         8,785         10,680           PKB4*         B4         8,760         10,317           PKB7*         B7         8,788         10,336           PKB6*         B6	Boring Number	Boring Number	Coordinate	Coordinate
EBR10         +-W         14,343         11,221           EBR16         5-W         14,335         11,136           EBR17         6-W         14,335         11,136           EBR19         12-W         14,301         11,007           EBR20         10-W         14,244         10,956           EBR21         7-W         14,116         11,072           EBR23         Not known.         14,179         10,980           HB1*         HB1         9,590         9,387           HB2*         HB2         9,713         9,302           HB3*         HB3         9,851         9,381           PKB2*         B2         8,900         10,556           PKB2*         B2         8,900         10,566           PKB3*         B3         8,960         10,639           PKB4*         B4         8,760         10,448           PKB5*         B5         8,788         10,936           PKB4*         B1         9,002         10,333           PKB6*         B6         9,036         10,411           PKB7*         B7         8,788         10,506           PKB1*         B10         <	EDD16	A 117	14 242	11.001
LBR/10         J-W         H, J34         H, J30           EBR17         6-W         H, J335         H, J36           EBR18         13-W         H, J335         H, J16           EBR19         12-W         H, J01         H, 077           EBR20         10-W         H, 244         10, 956           EBR21         7-W         H, 116         H, 077           EBR23         Not known.         H, 179         10, 980           HB1*         HB1         9, 590         9, 381           PKB2*         HB2         9, 713         9, 302           HB3*         HB3         9, 851         9, 381           PKB2*         B2         8, 900         10, 554           PKB3*         B3         8, 960         10, 639           PKB4*         B4         8, 760         10, 848           PKB5*         B5         8, 785         10, 680           PKB6*         B6         9, 036         10, 411           PKB7*         B7         8, 758         10, 356           PKB4*         B4         8, 760         10, 348           PKB7*         B7         8, 758         10, 502           PKB6*	EBRID	4-W 5-W	14,343	11,221
EBR1         14,33         11,136           EBR18         13-W         14,323         11,136           EBR19         12-W         14,301         11,007           EBR20         10-W         14,244         10,956           EBR21         7-W         14,116         11,072           EBR22         RW-8         9,116         10,358           EBR23         Not known.         14,179         10,980           HB1*         HB1         9,590         9,387           HB2*         HB2         9,713         9,302           HB3*         HB3         9,851         9,381           PKB4*         B1         8,991         10,554           PKB4*         B2         8,900         10,566           PKB4*         B4         8,760         10,488           PKB5*         B5         8,785         10,680           PKB6*         B6         9,036         10,411           PKB7*         B7         8,758         10,338           PKB7*         B7         8,758         10,338           PKB7*         B1         9,002         10,383           PKB1*         B10         8,954	EDKIO	J-W KW	14,384	11,190
EBR19         12-W         14,323         11,126           EBR19         12-W         14,301         11,007           EBR20         10-W         14,244         10,956           EBR21         7-W         14,116         11,072           EBR22         RW-8         9,116         10,358           EBR23         Not known.         14,179         10,980           HB1*         HB1         9,590         9,387           HB2*         HB2         9,713         9,302           HB3*         HB3         9,851         9,381           PKB2*         B2         8,900         10,556           PKB2*         B2         8,900         10,566           PKB5*         B5         8,785         10,680           PKB6*         B6         9,036         10,411           PKB5*         B7         8,758         10,383           PKB5*         B7         8,758         10,383           PKB5*         B10         8,944         10,409           PKB1*         B11         9,002         10,383           PKB1*         B13         8,698         10,502           PKB1*         B13	EDRI/	0-W	14,333	11,136
EBR19         12-W         14,201         11,007           EBR20         10-W         14,244         10,956           EBR21         7-W         14,116         11,072           EBR23         Not known.         14,179         10,980           HB1*         HB1         9,590         9,387           HB2*         HB2         9,713         9,302           HB3*         HB3         9,851         9,381           PKB1*         B1         8,991         10,554           PKB2*         B2         8,900         10,566           PKB3*         B3         8,960         10,639           PKB4*         B4         8,760         10,848           PKB5*         B5         8,785         10,680           PKB6*         B6         9,036         10,411           PKB7*         B7         8,758         10,680           PKB6*         B6         9,002         10,383           PKB1*         B10         8,944         10,409           PKB1*         B11         9,002         10,383           PKB1*         B13         8,698         10,502           PKB1*         B13	EDKIO	13-W	14,323	11,126
EBR20         10-W         14,244         10,356           EBR21         7-W         14,116         11,072           EBR22         RW-8         9,116         10,358           EBR23         Not known.         14,179         10,980           HB1*         HB1         9,590         9,387           HB2*         HB2         9,713         9,302           HB3*         HB3         9,851         9,381           PKB2*         B2         8,900         10,566           PKB2*         B2         8,900         10,566           PKB3*         B3         8,960         10,639           PKB4*         B4         8,760         10,848           PKB5*         B5         8,785         10,566           PKB5*         B6         9,036         10,411           PKB7*         B7         8,758         10,338           PKB8*         B8         8,788         10,333           PKB8*         B9         8,925         10,446           PKB1*         B11         9,002         10,383           PKB1*         B12         8,777         10,537           PKB1*         B14         8,	EDRIA	12-W	14,301	11,007
EBR21         I-W         IA, ID         I1/02           EBR22         RW-8         9, 116         10,358           EBR23         Not known.         14,179         10,980           HB1*         HB1         9,590         9,387           HB2*         HB2         9,713         9,302           HB3*         HB3         9,851         9,381           PKB2*         B2         8,900         10,556           PKB3*         B3         8,960         10,639           PKB4*         B4         8,760         10,848           PKB5*         B5         8,785         10,680           PKB6*         B6         9,036         10,411           PKB7*         B7         8,758         10,936           PKB6*         B6         9,036         10,411           PKB7*         B7         8,758         10,936           PKB10*         B10         8,944         10,409           PKB1*         B11         9,002         10,383           PKB1*         B13         8,698         10,502           PKB1*         B13         8,698         10,502           PKMW-1*         PKMV-1         <	EBR20	10-W	14,244	10,956
EBR22         RW-8         9,116         10,38           EBR23         Not known.         14,179         10,980           HB1*         HB1         9,590         9,387           HB2*         HB2         9,713         9,302           HB3*         HB3         9,851         9,381           PKB1*         B1         8,991         10,554           PKB2*         B2         8,900         10,566           PKB3*         B3         8,960         10,639           PKB4*         B4         8,760         10,848           PKB5*         B5         8,785         10,680           PKB7*         B7         8,758         10,936           PKB7*         B7         8,758         10,502           PKB1*         B10         8,944         10,409           PKB1*         B13         8,698         10,502           PKB1*         B14         8,700 <td>EBK21</td> <td>/-₩</td> <td>14,110</td> <td>11,072</td>	EBK21	/-₩	14,110	11,072
EBR23         Not Rown.         14,179         10,380           HB1*         HB1         9,590         9,387           HB2*         HB2         9,713         9,302           HB3*         HB3         9,851         9,381           PKB1*         B1         8,991         10,554           PKB2*         B2         8,900         10,566           PKB3*         B3         8,960         10,639           PKB4*         B4         8,760         10,848           PKB5*         B5         8,785         10,680           PKB6*         B6         9,036         10,411           PKB7*         B7         8,758         10,936           PKB9*         B9         8,925         10,446           PKB10*         B10         8,944         10,409           PKB11*         B11         9,002         10,383           PKB12*         B12         8,776         10,508           PKB13*         B13         8,698         10,502           PKB14*         B14         8,700         10,537           PKMW-1*         PKMV-2         8,785         10,555           PKMW-3*         PKMW-4	EBK22	KW-8	9,116	10,358
HB1*       HB1       9,390       9,387         HB2*       HB2       9,713       9,302         HB3*       HB3       9,851       9,381         PKB1*       B1       8,991       10,554         PKB2*       B2       8,900       10,566         PKB3*       B3       8,960       10,639         PKB4*       B4       8,760       10,848         PKB5*       B5       8,785       10,680         PKB7*       B7       8,758       10,936         PKB7*       B7       8,758       10,936         PKB7*       B7       8,758       10,936         PKB7*       B7       8,758       10,936         PKB1*       B1       9,002       10,383         PKB10*       B10       8,944       10,409         PKB11*       B11       9,002       10,383         PKB12*       B12       8,776       10,508         PKB13*       B13       8,698       10,502         PKMW-1*       PKMW-1       8,936       10,504         PKMW-2*       PKMW-3       8,955       10,555         PKMW-3*       PKMW-4       9,030       10,402	EBR23	NOT KNOWN.	14,179	10,980
HB2*       HB2       9,713       9,302         HB3*       HB3       9,851       9,381         PKB1*       B1       8,991       10,554         PKB2*       B2       8,900       10,566         PKB3*       B3       8,960       10,639         PKB4*       B4       8,760       10,848         PKB5*       B5       8,785       10,680         PKB4*       B6       9,036       10,411         PKB7*       B7       8,758       10,338         PKB8*       B8       8,788       10,338         PKB9*       B9       8,925       10,446         PKB1*       B10       8,944       10,409         PKB1*       B11       9,002       10,333         PKB1*       B13       8,698       10,502         PKB1*       B13       8,698       10,502         PKMV-1*       PKMW-1       8,936       10,504         PKMW-2*       PKMW-1       8,935       10,565         PKMW-3*       PKMW-4       9,030       10,440         PKMW-4*       PKMW-5       9,033       10,144         PKMW-5*       PKMW-6       9,033       10,6	HB1*	HBI	9,590	9,387
HB3*       HB3       9,851       9,381         PKB1*       B1       8,991       10,554         PKB2*       B2       8,900       10,566         PKB3*       B3       8,960       10,639         PKB4*       B4       8,760       10,848         PKB5*       B5       8,785       10,680         PKB6*       B6       9,036       10,411         PKB7*       B7       8,758       10,936         PKB8*       B8       8,788       10,338         PKB9*       B9       8,925       10,446         PKB1*       B10       8,944       10,409         PKB1*       B11       9,002       10,383         PKB1*       B13       8,698       10,502         PKB1*       B13       8,698       10,502         PKB1*       B15       8,737       10,537         PKMV-1*       PKMV-1       8,936       10,504         PKMW-2*       PKMW-3       8,955       10,555         PKMW-3*       PKMW-3       8,955       10,555         PKMW-4*       PKMW-5       9,033       10,144         PKMW-5*       PKMW-6       9,039       10	HB2*	HB2	9,713	9,302
PKB1*     B1     8,991     10,554       PKB2*     B2     8,900     10,656       PKB3*     B3     8,960     10,639       PKB4*     B4     8,760     10,848       PKB5*     B5     8,785     10,680       PKB7*     B7     8,758     10,936       PKB8*     B8     8,788     10,338       PKB9*     B9     8,925     10,446       PKB1*     B10     8,944     10,409       PKB1*     B11     9,002     10,383       PKB1*     B12     8,776     10,508       PKB1*     B13     8,698     10,502       PKB1*     B14     8,700     10,537       PKMV-1*     B15     8,737     10,537       PKMV-2*     PKMW-1     8,936     10,504       PKMW-3*     BKM*-3     8,955     10,555       PKMW-4*     PKMW-4     9,030     10,402       PKMW-5*     PKMW-5     9,033     10,144       PKMW-5*     PKMW-6     9,039     10,016       PKMW-9*     8,932     10,560       PKMW-8*     PKMW-1     8,913     10,662       PKMW-9*     9,033     10,662       PKMW-10*     8,933     10,662	HB3*	HB3	9,851	9,381
PKB2*     B2     8,900     10,566       PKB3*     B3     8,960     10,639       PKB4*     B4     8,760     10,848       PKB5*     B5     8,785     10,680       PKB6*     B6     9,036     10,411       PKB7*     B7     8,758     10,936       PKB8*     B8     8,788     10,838       PKB9*     B9     8,925     10,446       PKB10*     B10     8,944     10,409       PKB12*     B12     8,776     10,508       PKB13*     B13     8,698     10,502       PKB14*     B14     8,700     10,537       PKMV-1*     PKMW-1     8,936     10,504       PKMV-2*     PKMW-1     8,936     10,504       PKMV-2*     PKMW-2     8,785     10,565       PKMV-3*     PKMW-2     8,785     10,565       PKMW-4*     PKMW-3     8,955     10,555       PKMW-5*     PKMW-6     9,039     10,016       PKMW-7*     PKMW-7     9,070     9,880       PKMW-8*     PKMW-1     8,932     10,662       PKMW-9*     8,932     10,662       PKMW-1*     PKMW-13     9,061     10,879       PKMW-10*     8	PKB1*	BI	8,991	10,554
PKB3*       B3       8,960       10,639         PKB4*       B4       8,760       10,848         PKB5*       B5       8,785       10,680         PKB6*       B6       9,036       10,411         PKB7*       B7       8,758       10,630         PKB8*       B8       8,788       10,338         PKB9*       B9       8,925       10,446         PKB10*       B10       8,944       10,409         PKB12*       B12       8,776       10,508         PKB13*       B13       8,698       10,502         PKB14*       B14       8,700       10,537         PKMW-1*       PKMW-1       8,936       10,504         PKMW-2*       PKMW-1       8,936       10,505         PKMW-3*       PKMW-3       8,955       10,555         PKMW-4*       PKMW-5       9,033       10,144         PKMW-5*       PKMW-5       9,033       10,402         PKMW-7*       PKMW-7       9,070       9,880         PKMW-8*       PKMW-7       9,033       10,662         PKMW-9*       8,932       10,660         PKMW-10*       PKMW-10       8,933	PKB2*	B2	8,900	10,566
PKB4*       B4       8,760       10,848         PKB5*       B5       8,785       10,680         PKB6*       B6       9,036       10,411         PKB7*       B7       8,758       10,936         PKB8*       B7       8,758       10,936         PKB8*       B9       8,925       10,446         PKB10*       B10       8,944       10,409         PKB11*       B11       9,002       10,383         PKB12*       B12       8,776       10,508         PKB13*       B13       8,698       10,502         PKB14*       B14       8,700       10,537         PKMW-1*       PKMW-1       8,936       10,504         PKMW-2*       PKMW-1       8,936       10,505         PKMV-3*       PKMW-3       8,955       10,555         PKMW-4*       PKMW-5       9,033       10,144         PKMW-5*       9,033       10,144       9         PKMW-7*       PKMW-7       9,070       9,880         PKMW-8*       PKMW-10       8,933       10,662         PKMW-9*       PKMW-13       9,026       10,440         PKMW-14*       9,023       <	PKB3*	B3	8,960	10,639
PKB5*       B5       8,785       10,680         PKB6*       B6       9,036       10,411         PKB7*       B7       8,758       10,936         PKB8*       B8       8,788       10,838         PKB9*       B9       8,925       10,446         PKB10*       B10       8,944       10,409         PKB12*       B12       8,776       10,508         PKB13*       B13       8,698       10,502         PKB14*       B14       8,700       10,537         PKB15*       B15       8,737       10,537         PKMW-1*       PKMW-1       8,936       10,504         PKMW-2*       PKMW-2       8,785       10,565         PKMW-3*       PKMW-3       8,955       10,555         PKMW-4*       PKMW-4       9,030       10,402         PKMW-5*       PKMW-5       9,033       10,144         PKMW-6*       PKMW-7       9,070       9,880         PKMW-7*       PKMW-8       8,760       10,840         PKMW-9*       PKMW-9       8,932       10,662         PKMW-10*       8,933       10,662       PKMW-11         PKMW-11       9,002 <td>PKB4*</td> <td>B4</td> <td>8,760</td> <td>10,848</td>	PKB4*	B4	8,760	10,848
PKB6*         B6         9,036         10,411           PKB7*         B7         8,758         10,936           PKB8*         B8         8,788         10,838           PKB9*         B9         8,925         10,446           PKB10*         B10         8,944         10,409           PKB11*         B11         9,002         10,383           PKB12*         B12         8,776         10,508           PKB13*         B13         8,698         10,502           PKB14*         B14         8,700         10,537           PKB15*         B15         8,737         10,537           PKMW-1*         PKMW-1         8,936         10,504           PKMW-2*         PKMW-2         8,785         10,565           PKMW-3*         PKMW-3         8,955         10,555           PKMW-4*         PKMW-4         9,030         10,412           PKMW-5*         PKMW-5         9,033         10,114           PKMW-6*         PKMW-7         9,070         9,880           PKMW-7*         PKMW-8         8,760         10,840           PKMW-10*         R,933         10,662           PKMW-11	PKB5*	B5	8,785	10,680
PKB7*         B7         8,758         10,936           PKB8*         B8         8,788         10,838           PKB9*         B9         8,925         10,446           PKB10*         B10         8,944         10,409           PKB11*         B11         9,002         10,383           PKB12*         B12         8,776         10,508           PKB13*         B13         8,698         10,502           PKB14*         B14         8,700         10,537           PKB15*         B15         8,737         10,537           PKMV-1*         PKMW-1         8,936         10,504           PKMW-2*         PKMW-2         8,785         10,565           PKMV-3*         PKMW-3         8,955         10,555           PKMW-4*         PKMW-4         9,030         10,402           PKMW-5*         PKMW-5         9,033         10,114           PKMW-6*         PKMW-7         9,070         9,880           PKMW-7*         PKMW-8         8,760         10,840           PKMW-10*         8,933         10,662         10,413           PKMW-11*         9,002         10,546           PKMW-113	PKB6*	B6	9,036	10,411
PKB8*         B8         8,788         10,838           PKB9*         B9         8,925         10,446           PKB10*         B10         8,944         10,409           PKB11*         B11         9,002         10,383           PKB12*         B12         8,776         10,508           PKB13*         B13         8,698         10,502           PKB14*         B14         8,700         10,537           PKB15*         B15         8,737         10,537           PKMW-1*         PKMW-1         8,936         10,504           PKMW-2*         PKMW-2         8,785         10,555           PKMW-3*         PKMW-3         8,955         10,555           PKMW-4*         PKMW-4         9,030         10,402           PKMW-5*         PKMW-5         9,033         10,144           PKMW-6*         PKMW-7         9,070         9,880           PKMW-8*         PKMW-8         8,760         10,840           PKMW-9*         PKMW-10         8,933         10,662           PKMW-10*         PKMW-11         9,002         10,546           PKMW-12*         PKMW-13         9,026         10,413 <t< td=""><td>PKB7*</td><td>B7</td><td>8,758</td><td>10,936</td></t<>	PKB7*	B7	8,758	10,936
PKB9*         B9         8,925         10,446           PKB10*         B10         8,944         10,409           PKB11*         B11         9,002         10,383           PKB12*         B12         8,776         10,508           PKB13*         B13         8,698         10,502           PKB14*         B14         8,700         10,537           PKB15*         B15         8,737         10,537           PKMW-1*         PKMW-1         8,936         10,504           PKMW-2*         PKMW-2         8,785         10,555           PKMW-3*         PKMW-4         9,030         10,402           PKMW-5*         PKMW-5         9,033         10,144           PKMW-6*         PKMW-7         9,070         9,880           PKMW-7*         PKMW-8         8,760         10,840           PKMW-10*         8,933         10,662         2           PKMW-10*         8,933         10,662         2           PKMW-10*         8,933         10,662         2           PKMW-10*         8,933         10,662         2           PKMW-11*         9,002         10,546         2           PKMW	PKB8*	B8	8,788	10,838
PKB10*         B10         8,944         10,409           PKB11*         B11         9,002         10,383           PKB12*         B12         8,776         10,508           PKB13*         B13         8,698         10,502           PKB14*         B14         8,700         10,537           PKB15*         B15         8,737         10,537           PKMV-1*         PKMW-1         8,936         10,504           PKMV-2*         PKMW-2         8,785         10,565           PKMV-3*         PKMW-3         8,955         10,555           PKMV-4*         PKMW-4         9,030         10,402           PKMW-5*         PKMW-5         9,033         10,144           PKMW-6*         PKMW-7         9,070         9,880           PKMW-7*         PKMW-8         8,760         10,840           PKMW-9*         PKMW-9         8,932         10,660           PKMW-10*         RS933         10,662         PKMW-11           PKMW-12*         PKMW-13         9,026         10,413           PKMW-13*         PKMW-15         9,061         10,879           PKMW-15*         9,061         10,879         11 </td <td>PKB9*</td> <td>B9</td> <td>8,925</td> <td>10,446</td>	PKB9*	B9	8,925	10,446
PKB11*         B11         9,002         10,383           PKB12*         B12         8,776         10,508           PKB13*         B13         8,698         10,502           PKB14*         B14         8,700         10,537           PKB15*         B15         8,737         10,537           PKMV-1*         PKMW-1         8,936         10,504           PKMW-2*         PKMW-2         8,785         10,565           PKMW-3*         PKMW-2         8,785         10,555           PKMW-3*         PKMW-4         9,030         10,402           PKMW-5*         PKMW-5         9,033         10,144           PKMW-6*         PKMW-7         9,070         9,880           PKMW-7*         PKMW-8         8,760         10,840           PKMW-9*         PKMW-10         8,933         10,662           PKMW-10*         PKMW-11         9,002         10,546           PKMW-11*         PKMW-12         8,929         10,560           PKMW-13*         9,026         10,413         PKMW-13           PKMW-14*         9,203         10,712         PKMW-14           PKMW-15*         9,061         10,879         1174 <td>PKB10*</td> <td>B10</td> <td>8,944</td> <td>10,409</td>	PKB10*	B10	8,944	10,409
PKB12*         B12         8,776         10,508           PKB13*         B13         8,698         10,502           PKB14*         B14         8,700         10,537           PKB15*         B15         8,737         10,537           PKMV-1*         PKMW-1         8,936         10,504           PKMW-2*         PKMW-2         8,785         10,555           PKMW-3*         PKMW-3         8,955         10,555           PKMW-4*         PKMW-4         9,030         10,402           PKMW-5*         PKMW-5         9,033         10,144           PKMW-6*         PKMW-7         9,070         9,880           PKMW-7*         PKMW-8         8,760         10,840           PKMW-9*         PKMW-9         8,932         10,662           PKMW-10*         PKMW-11         9,002         10,546           PKMW-11*         PKMW-11         9,026         10,413           PKMW-13*         9,026         10,413           PKMW-14*         9,031         10,712           PKMW-15*         9,061         10,879           ITMW-1*         ITMW-1         1,734         11,700           ITMW-2*         ITMW-3 <td>PKB11*</td> <td>B11</td> <td>9,002</td> <td>10,383</td>	PKB11*	B11	9,002	10,383
PKB13*B138,69810,502PKB14*B148,70010,537PKB15*B158,73710,537PKMW-1*PKMW-18,93610,504PKMW-2*PKMW-28,78510,565PKMW-3*PKMW-38,95510,555PKMW-4*PKMW-49,03010,402PKMW-5*PKMW-59,03310,144PKMW-6*PKMW-79,0709,880PKMW-7*PKMW-79,0709,880PKMW-8*PKMW-98,93210,662PKMW-9*PKMW-108,93310,662PKMW-10*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-149,20310,712PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-1*ITMW-310,86812,045ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	PKB12*	B12	8,776	10,508
PKB14*B148,70010,537PKB15*B158,73710,537PKMW-1*PKMW-18,93610,504PKMW-2*PKMW-28,78510,565PKMW-3*PKMW-38,95510,555PKMW-4*PKMW-49,03010,402PKMW-5*PKMW-59,03310,144PKMW-6*PKMW-69,03910,016PKMW-7*PKMW-79,0709,880PKMW-8*PKMW-88,76010,840PKMW-9*PKMW-98,93210,680PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-310,86812,045ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-310,12312,647ITMW-5*ITMW-510,16712,714ITMW-5*ITMW-610,00012,793	PKB13*	B13	8,698	10,502
PKB15*B158,73710,537PKMW-1*PKMW-18,93610,504PKMW-2*PKMW-28,78510,565PKMW-3*PKMW-38,95510,555PKMW-4*PKMW-49,03010,402PKMW-5*PKMW-59,03310,144PKMW-6*PKMW-69,03910,016PKMW-7*PKMW-79,0709,880PKMW-8*PKMW-88,76010,840PKMW-9*PKMW-98,93210,680PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-310,16712,714ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	PKB14*	B14	8,700	10.537
PKMW-1*PKMW-18,93610,504PKMW-2*PKMW-28,78510,565PKMW-3*PKMW-38,95510,555PKMW-4*PKMW-49,03010,402PKMW-5*PKMW-59,03310,144PKMW-6*PKMW-69,03910,016PKMW-7*PKMW-79,0709,880PKMW-8*PKMW-88,76010,840PKMW-9*PKMW-98,93210,680PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-139,02610,413PKMW-13*PKMW-139,02610,413PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-310,16712,714ITMW-5*ITMW-610,00012,793	PKB15*	B15	8.737	10.537
PKMW-2*PKMW-28,78510,565PKMW-3*PKMW-38,95510,555PKMW-4*PKMW-49,03010,402PKMW-5*PKMW-59,03310,144PKMW-6*PKMW-69,03910,016PKMW-7*PKMW-79,0709,880PKMW-8*PKMW-88,76010,840PKMW-9*PKMW-98,93210,662PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-6*10,00012,793	PKMW-1*	PKMW-1	8.936	10.504
PKMW-3*PKMW-38,95510,555PKMW-4*PKMW-49,03010,402PKMW-5*PKMW-59,03310,144PKMW-6*PKMW-69,03910,016PKMW-7*PKMW-79,0709,880PKMW-7*PKMW-79,0709,880PKMW-8*PKMW-88,76010,840PKMW-9*PKMW-98,93210,680PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	PKMW-2*	PKMW-2	8.785	10.565
PKMW-4*PKMW-49,03010,402PKMW-5*PKMW-59,03310,144PKMW-6*PKMW-69,03910,016PKMW-7*PKMW-79,0709,880PKMW-8*PKMW-79,0709,880PKMW-8*PKMW-88,76010,840PKMW-9*PKMW-98,93210,680PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-610,00012,793	PKMW-3*	PKMW-3	8,955	10 555
PKMW-5*PKMW-59,03310,144PKMW-6*PKMW-69,03910,016PKMW-7*PKMW-79,0709,880PKMW-8*PKMW-79,0709,880PKMW-8*PKMW-98,93210,680PKMW-9*PKMW-98,93310,662PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-6*I0,00012,793	PKMW-4*	PKMW-4	9 030	10 402
PKMW-6*PKMW-69,03910,016PKMW-7*PKMW-79,0709,880PKMW-7*PKMW-79,0709,880PKMW-8*PKMW-88,76010,840PKMW-9*PKMW-98,93210,680PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	PKMW-5*	PKMW-5	9.033	10 144
PKMW-7*PKMW-79,0709,880PKMW-7*PKMW-79,0709,880PKMW-8*PKMW-88,76010,840PKMW-9*PKMW-98,93210,680PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,86812,045ITMW-3*ITMW-310,86812,045ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	PKMW-6*	PKMW-6	9,039	10,144
PKMW-7PKMW-7P,070P,080PKMW-8*PKMW-79,07010,840PKMW-9*PKMW-98,93210,680PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	PKMW_7*	PKMW-7	9,037	0.880
FKMW-9FKMW-98,76010,840PKMW-9*PKMW-98,93210,680PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	DK.V.M.8*	PKWW-8	9,070 8.760	3,880
PKMW-10*PKMW-108,93210,680PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	LUIMAN'O+	DK MW-0	0,700	10,640
PKMW-10*PKMW-108,93310,662PKMW-11*PKMW-119,00210,546PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	FRIVIW-9	PKNW 10	0,932	10,680
PKMW-11*PKMW-119,00210,346PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	PRIVIW-10	PKINW-IU DVMW 11	0,000	10,662
PKMW-12*PKMW-128,92910,560PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	PKIMW-11*	PKIVIW-11	9,002	10,546
PKMW-13*PKMW-139,02610,413PKMW-14*PKMW-149,20310,712PKMW-15*PKMW-159,06110,879ITMW-1*ITMW-111,73411,700ITMW-2*ITMW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	PKMW-12*	PKMW-12 DVD 0V 12	8,929	10,560
PKMW-14*       PKMW-14       9,203       10,712         PKMW-15*       PKMW-15       9,061       10,879         ITMW-1*       ITMW-1       11,734       11,700         ITMW-2*       ITMW-2       10,874       12,066         ITMW-3*       ITMW-3       10,868       12,045         ITMW-4*       ITMW-4       10,123       12,647         ITMW-5*       ITMW-5       10,167       12,714         ITMW-6*       ITMW-6       10,000       12,793	PKMW-13*	PKMW-13	9,026	10,413
PKMW-15*     PKMW-15     9,061     10,879       ITMW-1*     ITMW-1     11,734     11,700       ITMW-2*     ITMW-2     10,874     12,066       ITMW-3*     ITMW-3     10,868     12,045       ITMW-4*     ITMW-4     10,123     12,647       ITMW-5*     ITMW-5     10,167     12,714       ITMW-6*     ITMW-6     10,000     12,793	rkmw-14*	PKNW-14	9,203	10,/12
IIMW-I*       IIMW-I       II,734       II,700         ITMW-2*       ITMW-2       10,874       12,066         ITMW-3*       ITMW-3       10,868       12,045         ITMW-4*       ITMW-4       10,123       12,647         ITMW-5*       ITMW-5       10,167       12,714         ITMW-6*       ITMW-6       10,000       12,793	rkmw-10*	rkmw-15	9,001	10,879
11 MW-2*11 MW-210,87412,066ITMW-3*ITMW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	IIMW-I*	IIMW-I	11,734	11,700
I1MW-3*I1MW-310,86812,045ITMW-4*ITMW-410,12312,647ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	11MW-2*	IIMW-2	10,874	12,066
ITMW-4*     ITMW-4     10,123     12,647       ITMW-5*     ITMW-5     10,167     12,714       ITMW-6*     ITMW-6     10,000     12,793	11MW-3*	11MW-3	10,868	12,045
ITMW-5*ITMW-510,16712,714ITMW-6*ITMW-610,00012,793	ITMW-4*	ITMW-4	10,123	12,647
ITMW-6* ITMW-6 10,000 12,793	TTMW-5*	ITMW-5	10,167	12,714
	ITMW-6*	ITMW-6	10,000	12,793

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 Table 2-1.
 Soil Boring Identification Numbers, Exxon Company Plant, Bayonne, New Jersey.

New	Original	East	North	
Boring Number	Boring Number	Coordinate	Coordinate	
MW-3*	MW-3	13,476	11,102	
MW-4*	MW-4	13,095	11,022	
MW-5*	MW-5	13,358	11,031	
MW-6*	MW-6	13,509	10,973	
MW-7*	MW-7	12,891	11,598	
MW-8*	MW-8	13,495	11,449	
MW-9*	MW-9	12,852	11,034	
MW-10*	MW-10	13,324	11,697	
MW-11*	MW-11	13,543	11,656	
MW-12*	MW-12	13,175	11,372	
MW-13*	MW-13	13,262	11,174	
MW-14*	MW-14	13,346	11,306	
P7MW-1*	P7MW-1	14,319	11,703	
P7MW-2*	P7MW-2	14,196	11,687	
SHERI-1	SHERI-1	14,282	11,288	
SHERI-2	SHERI-2	14,298	11,146	
SHERI-3	SHERI-3	13,903	11,796	

Non-Aqueous Phase Liquid (NAPL) Interim Remedial Measure (IRM) soil boring or monitoring well recently installed by Dan Raviv Associates, Inc. (1994b). Lithologic information from these borings has not yet been compiled and entered into the database and was not utilized in the development of Figures 2-2 through 2-7. Table 2-2.Summary of Borings Selected for Development of Generalized Hydrogeologic<br/>Cross Sections, Bayonne Plant, Bayonne, New Jersey.

Boring	Report	Date
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Cross Section A-A'

B242	Raymond Concrete Pile Company	1948
B070	Warren George, Inc.	March 19, 1957
B373	Greer Engineering Associates, Inc.	February 8, 1956
B228	Leonard Yie Associates, Inc.	September 5, 1980
B005	Warren George, Inc.	June 21, 1958
B020	Warren George, Inc.	April 30, 1957
B021	Warren George, Inc.	April 30, 1957
B023	Warren George, Inc.	April 30, 1957
B024	Warren George, Inc.	April 30, 1957
B485	Greer & McClelland	September 27, 1954
B014	Burmister, Donald M.	December 27, 1957
B247	Woodward-Clyde Consultants	July 12, 1968
B246	Woodward-Clyde Consultants	July 12, 1968
B187	Warren George, Inc.	March 22, 1967
B197	Warren George, Inc.	March 22, 1967
B183	Warren George, Inc.	March 22, 1967
B357	Greer & McClelland	July 15, 1953
B287	Woodward-Moorhouse & Associates, Inc.	July 2, 1974
B286	Woodward-Moorhouse & Associates, Inc.	July 2, 1974
B269	Woodward-Clyde Consultants	September 25, 1969
B152	Warren George, Inc.	April 28, 1971

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Boring	Report	Date
Cross Section B-B'		, ,
B510	Greer & McClelland	August 10, 1953
B512	Greer & McClelland	August 10, 1953
B509	Greer & McClelland	August 10, 1953
B453	Greer & McClelland	July 15, 1953
B468	Greer & McClelland	April 17, 1953
B129	Greer Engineering Associates, Inc.	February 8, 1956
B114	Greer Engineering Associates, Inc.	February 8, 1956
B116	Greer Engineering Associates, Inc.	February 8, 1956
B130	Greer Engineering Associates, Inc.	February 8, 1956
B072	Warren George, Inc.	March 19, 1957
B373	Greer Engineering Associates, Inc.	February 8, 1956
B120	Greer Engineering Associates, Inc.	February 8, 1956
B068	Warren George, Inc.	March 19, 1957
B121	Greer Engineering Associates, Inc.	February 8, 1956
B063	Warren George, Inc.	March 19, 1957
В098	Greer & McClelland	July 15, 1953
B100	Greer & McClelland	July 15, 1953
B099	Greer & McClelland	July 15, 1953
B109	Greer Engineering Associates, Inc.	February 10, 1956
B103	Greer & McClelland	July 15, 1953
B107	Greer Engineering Associates, Inc.	February 10, 1956
B138	Greer & McClelland	September 9, 1954
B374	Greer Engineering Associates, Inc.	February 8, 1956

Table 2-2.Summary of Borings Selected for Development of Generalized Hydrogeologic<br/>Cross Sections, Exxon Company Plant, Bayonne, New Jersey.

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GERAGHTY & MILLER, INC.

Boring	Report	Date	
Cross Section C-C	<u></u>		
B227	Goodkind & O'Dea	1965	
B226	Goodkind & O'Dea	1965	
B340	Greer & McClelland	February 1, 1955	
B356	Greer & McClelland	July 15, 1953	
B338	Greer & McClelland	February 1, 1955	
B337	Greer & McClelland	February 1, 1955	
B336	Greer & McClelland	February 1, 1955	
B500	Greer & McClelland	September 27, 1954	
B495	Greer & McClelland	September 27, 1954	
B018	Warren George, Inc.	April 30, 1957	
B023	Warren George, Inc.	April 30, 1957	
B028	Warren George, Inc.	April 30, 1957	
B389	Greer & McClelland	April 17, 1953	
B225	Dames & Moore	April 15, 1970	
B224	Dames & Moore	April 15, 1970	
B223	Dames & Moore	April 15, 1970	
B222	Dames & Moore	April 15, 1970	
B221	Dames & Moore	April 15, 1970	

Table 2-2.Summary of Borings Selected for Development of Generalized Hydrogeologic<br/>Cross Sections, Exxon Company Plant, Bayonne, New Jersey.

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GERAGHTY & MILLER, INC.

Boring	Report	Date	
Cross Section D-D'	· · · · · · · · · · · · · · · · · · ·		
B258	Woodward-Clyde Consultants	July 12, 1968	
B315	Greer Engineering Associates, Inc.	February 28, 1956	
B254	Woodward-Clyde Consultants	July 12, 1968	
B256	Woodward-Clyde Consultants	July 12, 1968	
B172	Greer & McClelland	July 29, 1954	
B282	Woodward-Moorhouse & Associates, Inc.	August 20, 1973	
B283	Woodward-Moorhouse & Associates, Inc.	August 20, 1973	
B318	Greer Engineering Associates, Inc.	February 28, 1956	
B175	Greer Engineering Associates, Inc	January 29, 1954	
B200	Warren George, Inc.	March 22, 1967	
B201	Warren George, Inc.	March 22, 1967	
B187	Warren George, Inc.	March 22, 1967	
B194	Warren George, Inc.	March 22, 1967	
B192	Warren George, Inc.	March 22, 1967	
B233	Warren George, Inc.	December 26, 1973	
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Table 2-2.Summary of Borings Selected for Development of Generalized Hydrogeologic<br/>Cross Sections, Exxon Company Plant, Bayonne, New Jersey.

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Ball         8.92         5.36         ND         3.56         NA         NA           EB-2         8.91         7.47         7.14         1.46         1.79         0.33           EB-3         8.96         7.90         7.20         1.06         1.76         0.70           EB-4         9.01         7.22         7.05         1.79         1.36         0.17           EB-5         9.09         7.35         7.24         1.74         1.81         0.11           EB-6         9.20         7.52         7.51         1.63         1.69         0.01           EB-7         8.87         7.38         7.40         1.29         1.47         0.18           EB-8         8.12         5.90         ND         2.22         NA         NA           EB-10         8.78         6.04         4.92         2.74         3.86         1.12           EB-11         9.30         5.22         4.61         4.08         4.69         0.61           EB-12         9.33         2.01         0.64         7.52         8.89         1.37           EB-13         10.04         8.25         4.60         1.79         5.44	Well Designation	Measuring Point Elevation (feet above mean sea leve!)	Depth to Water (feet below measuring point)	Depth to Product (feet below measuring point)	Water-Level Elevation (feet relative to mean sea level)	Product-Level Elevation (feet relative to mean sea level)	Product Thickness (fect)
EB-2 $1.93$ $1.47$ $7.14$ $1.46$ $1.79$ $0.33$ EB-3 $1.96$ $7.90$ $7.20$ $1.66$ $1.76$ $0.70$ EB-4 $9.01$ $7.22$ $7.05$ $1.79$ $1.36$ $0.17$ EB-5 $0.09$ $7.35$ $7.24$ $1.74$ $1.45$ $0.11$ EB-4 $9.20$ $7.52$ $7.51$ $1.68$ $1.69$ $0.01$ EB-7 $4.87$ $7.58$ $7.40$ $1.29$ $1.47$ $0.18$ EB-8 $4.812$ $3.90$ ND $2.22$ NANAEB-9 $8.81$ $8.14$ $7.23$ $0.67$ $1.58$ $0.91$ EB-10 $3.78$ $6.04$ $4.92$ $2.74$ $3.86$ $1.12$ EB-11 $3.30$ $5.22$ $4.61$ $4.08$ $4.69$ $0.61$ EB-12 $9.53$ $2.01$ $0.64$ $7.52$ $8.99$ $1.37$ EB-13 $10.04$ $8.25$ $4.60$ $1.79$ $5.44$ $3.65$ EB-14 $1.01$ $8.67$ $8.67$ $2.34$ $2.34$ $4.01$ EB-15 $9.74$ $6.51$ $1.09$ $-0.07$ $1.47$ $1.54$ EB-14 $1.01$ $8.67$ $8.67$ $2.35$ $NA$ NAEB-15 $9.74$ $6.53$ $1.09$ $0.07$ $1.47$ $1.54$ EB-16 $12.66$ $12.66$ $1.06$ $9.93$ $0.33$ EB-17 $12.36$ $1.07$ $1.07$ $0.73$ $0.17$ EB-18 $10.09$ $6.24$	EB-1	8.92	5.36	ND	3.56	NA	NA
EB-3         8.96         7.90         7.20         1.66         1.76         0.70           EB-4         9.01         7.22         7.05         1.79         1.96         0.11           EB-4         9.02         7.33         7.24         1.74         1.85         0.11           EB-7         8.87         7.52         7.51         1.68         1.69         0.01           EB-7         8.87         7.58         7.01         1.29         1.47         0.18           EB-8         8.12         5.90         ND         2.22         NA         NA           EB-10         8.78         6.04         4.92         2.74         3.86         1.12           EB-11         9.30         5.22         4.60         1.79         5.44         3.65           EB-13         10.04         8.25         4.60         1.79         5.44         3.65           EB-14         10.10         8.67         8.67         2.34         9.60         9.3         0.33           EB-15         9.76         2.43         9.60         9.93         0.33         0.67           EB-14         10.09         6.24         ND         3.85	EB-2	8.93	7.47	7.14	1.46	1.79	0.33
B4         901         7.22         7.05         1.79         1.96         0.17           B3-5         9.09         7.33         7.24         1.74         1.85         0.01           B3-6         9.20         7.52         7.51         1.68         1.69         0.01           B2-7         8.87         7.58         7.40         1.29         1.47         0.18           B2-8         8.12         5.90         ND         2.22         NA         NA           B2-9         8.81         8.14         7.23         0.67         1.58         0.91           B2-10         8.78         6.04         4.92         2.74         3.86         1.12           B3-11         9.33         2.01         0.64         7.52         8.89         1.61           B2-12         9.33         2.01         0.64         7.52         8.89         1.37           B2-13         1.04         8.67         8.67         2.34         2.34         4.00           B2-14         1.01         8.67         8.67         2.83         NA         NA           B2-15         9.74         6.91         ND         3.85         NA <td< td=""><td>EB-3</td><td>8.96</td><td>7.90</td><td>7.20</td><td>1.06</td><td>1.76</td><td>0.70</td></td<>	EB-3	8.96	7.90	7.20	1.06	1.76	0.70
B-5         909         7.35         7.24         1.74         1.85         0.11           B24         9.20         7.32         7.51         1.68         1.69         0.01           B24         9.20         7.32         7.51         1.68         1.69         0.01           B24         8.12         5.90         ND         2.22         NA         NA           B29-         8.81         8.14         7.23         0.67         1.58         0.91           B21         9.30         5.22         4.61         4.92         2.74         3.86         1.12           B21         9.33         2.01         0.64         7.52         8.89         1.37           B214         11.01         8.67         8.67         2.34         2.34         -0.01           B214         12.16         12.63         1.09         -0.07         1.47         1.54           B214         12.16         1.76         2.43         9.00         9.33         0.33           B216         10.73         2.74         ND         3.85         NA         NA           B214         10.55         1.06         1.06         -0.07 <t< td=""><td>EB-4</td><td>9.01</td><td>7.22</td><td>7.05</td><td>1.79</td><td>1.96</td><td>0.17</td></t<>	EB-4	9.01	7.22	7.05	1.79	1.96	0.17
B44         9.20         7.32         7.51         1.68         1.69         0.01           B57         8.87         7.38         7.40         1.19         1.47         0.18           B58         8.12         5.50         ND         2.22         NA         NA           B59         8.81         8.14         7.23         0.67         1.58         0.91           B51         9.30         5.22         4.61         4.08         4.69         0.61           B513         10.04         8.23         4.60         1.79         5.44         3.65           B513         10.04         8.67         2.34         2.34         <0.01	EB-5	9.09	7.35	7.24	1.74	1.85	0.11
BB7         8.87         7.58         7.40         1.29         1.47         0.18           BB4         8.12         3.90         ND         2.22         NA         NA           BB9         8.81         8.14         7.23         0.67         1.58         0.91           BD1         8.78         6.04         4.92         2.74         3.86         1.12           BD1         9.30         5.22         4.61         4.08         4.69         0.61           BD1         9.04         8.25         4.60         1.79         5.44         3.65           BD14         11.01         8.67         8.67         2.34         2.34         <0.01	EB-6	9.20	7.52	7.51	1.68	1.69	0.01
Bas         Bas <td>EB-7</td> <td>8.87</td> <td>7.58</td> <td>7.40</td> <td>1.29</td> <td>1.47</td> <td>0.18</td>	EB-7	8.87	7.58	7.40	1.29	1.47	0.18
BB-9         8.81         8.14         7.23         0.67         1.58         091           BB-10         8.78         6.04         4.92         2.74         3.86         1.12           BB-11         9.33         5.22         4.61         4.08         4.69         0.61           BB-12         9.53         2.01         0.64         7.52         8.89         1.37           BB-13         10.04         8.25         4.60         1.79         5.44         3.65           BB-14         11.01         8.67         8.67         2.34         2.34         <0.01	EB-8	8.12	5.90	ND	2.22	NA	NA
BEB-10         8.78         6.04         4.92         2.74         3.86         1.12           BE11         9.30         5.22         4.61         4.08         4.69         0.61           BE12         9.53         2.01         0.64         7.52         8.89         1.37           BE14         10.04         8.25         4.60         1.79         5.44         3.65           BE14         11.01         8.67         8.67         2.34         2.34         <0.01	EB-9	8.81	8.14	7.23	0.67	1.58	0.91
BB-11         9.30         5.22         4.61         4.08         4.69         0.61           EB-12         9.53         2.01         0.64         7.52         8.89         1.37           EB-13         10.04         8.25         4.60         1.79         5.44         3.65           EB-14         11.01         8.67         8.67         2.34         2.34         <0.01	EB-10	8.78	6.04	4.92	2.74	3.86	1.12
BB-12         9.53         2.01         0.64         7.52         8.89         1.37           BB-13         10.04         8.25         4.60         1.79         5.44         3.65           BB-14         11.01         8.67         8.67         2.34         2.34         <0.01	EB-11	9.30	5.22	4.61	4.08	4.69	0.61
EB-13         10.04         8.25         4.60         1.79         5.44         3.65           EB-14         11.01         8.67         8.67         2.34         2.34         <0.01	EB-12	9.53	2.01	0.64	7.52	8.89	1.37
EB-14         11.01         8.67         8.67         2.34         2.34         <0.1           EB-15         9.74         6.91         ND         2.83         NA         NA           EB-16         12.56         12.63         11.09         -0.07         1.47         1.54           EB-16         12.35         2.76         2.43         9.60         9.93         0.33           EB-18         10.09         6.24         ND         3.85         NA         NA           EB-19         9.67         5.73         5.04         3.94         4.63         0.69           EB-20         10.73         2.47         ND         8.26         NA         NA           EB-21         12.71         1.65         1.65         11.06         11.06         <0.01	EB-13	10.04	8.25	4.60	1.79	5.44	3.65
B2-15         9,74         6,91         ND         2.83         NA         NA           B2B-16         12,56         12,63         11.09         -0.07         1.47         1.54           B2B-17         12,36         2.76         2.43         9,60         9.93         0.33           BE-18         10.09         6.24         ND         3.85         NA         NA           BE-19         9,67         5.73         5.04         3.94         4.63         0.69           BE-20         10.73         2.47         ND         8.26         NA         NA           BE-21         12.71         1.65         1.65         11.06         11.06         <0.01	EB-14	11.01	8.67	8.67	2.34	2.34	<0.01
EB-16         12.56         12.63         11.09         -0.07         1.47         1.54           EB-17         12.36         2.76         2.43         9.60         9.93         0.33           EB-18         10.09         6.24         ND         3.85         NA         NA           EB-19         9.67         5.73         5.04         3.94         4.63         0.69           EB-20         10.73         2.47         ND         8.26         NA         NA           EB-21         12.71         1.65         1.65         11.06         11.06         <0.01	EB-15	9.74	6.91	ND	2.83	NA	NA
EB-17         12.36         2.76         2.43         9.60         9.93         0.33           EB-18         10.09         6.24         ND         3.85         NA         NA           EB-19         9.67         5.73         5.04         3.94         4.63         0.69           EB-20         10.73         2.47         ND         8.26         NA         NA           EB-21         12.71         1.65         1.65         11.06         11.06         <0.01	EB-16	12.56	12.63	11.09	-0.07	1.47	1.54
EB-18         10.09         6.24         ND         3.85         NA         NA           EB-19         9.67         5.73         5.04         3.94         4.63         0.69           EB-20         10.73         2.47         ND         8.26         NA         NA           EB-21         1.71         1.65         1.65         11.06         11.06         <0.1	EB-17	12.36	2.76	2.43	9.60	9,93	0.33
Bel9         9.67         5.73         5.04         3.94         4.63         0.69           EB-20         10.73         2.47         ND         8.26         NA         NA           BB-21         12.71         1.65         1.65         11.06         11.06         <0.01	EB-18	10.09	6.24	ND	3.85	NA	NA
BB-20         10,73         2.47         ND         8.26         NA         NA           EB-21         12,71         1.65         1.65         11.06         11.06         <0.01	EB-19	9.67	5.73	5.04	3.94	4.63	0.69
EB-21         12.71         1.65         1.65         11.06         11.06         <0.01           EB-22         13.31         11.79         4.21         1.52         9.10         7.58           EB-23         14.73         4.16         3.98         10.57         10.75         0.18           EB-24         15.82         6.49         6.16         9.33         9.66         0.33           EB-25         13.76         4.42         4.27         9.34         9.49         0.15           EB-26         15.99         6.53         6.53         9.46         9.46         <0.01	EB-20	10.73	2.47	ND	8.26	NA	NA
BB-22       13.31       11.79       4.21       1.52       9.10       7.58         BB-23       14.73       4.16       3.98       10.57       10.75       0.18         BB-24       15.82       6.49       6.16       9.33       9.66       0.33         BB-25       13.76       4.42       4.27       9.34       9.49       0.15         BB-26       15.99       6.53       653       9.46       9.46       <0.01	EB-21	12.71	1.65	1.65	11.06	11.06	<0.01
BB-23       14.73       4.16       3.98       10.57       10.75       0.18         BB-24       15.82       6.49       6.16       9.33       9.66       0.33         BB-25       13.76       4.42       4.27       9.34       9.49       0.15         BB-26       15.99       6.53       6.53       9.46       9.46       <0.01	EB-22	13.31	11.79	4.21	1.52	9.10	7.58
BB-24         15.82         6.49         6.16         9.33         9.66         0.33           BB-25         13.76         4.42         4.27         9.34         9.49         0.15           BB-26         15.99         6.53         6.53         9.46         9.46         <0.01	EB-23	14.73	4.16	3.98	10.57	10.75	0.18
EB-25       13.76       4.42       4.27       9.34       9.49       0.15         EB-26       15.99       6.53       6.53       9.46       9.46       <0.01	EB-24	15.82	6.49	6.16	9.33	9.66	0.33
EB-26       15.99       6.53       6.53       9.46       9.46       <0.01	EB-25	13.76	4.42	4.27	9.34	9,49	0.15
EB-2716.235.47ND10.76NANAEB-2816.065.06ND11.00NANAEB-2917.742.68ND15.06NANAEB-3013.052.75ND10.30NANAEB-3116.767.38ND9.38NANAEB-328.919.137.33-0.221.581.80EB-3412.849.238.653.614.190.58EB-3510.626.56ND4.06NANAEB-368.093.303.294.794.800.01	EB-26	15.99	6.53	6.53	9.46	9.46	<0.01
EB-28       16.06       5.06       ND       11.00       NA       NA         EB-29       17.74       2.68       ND       15.06       NA       NA         EB-30       13.05       2.75       ND       10.30       NA       NA         EB-31       16.76       7.38       ND       9.38       NA       NA         EB-32       8.91       9.13       7.33       -0.22       1.58       1.80         EB-33       11.05       7.76       ND       3.29       NA       NA         EB-34       12.84       9.23       8.65       3.61       4.19       0.58         EB-35       10.62       6.56       ND       4.06       NA       NA         EB-36       8.09       3.30       3.29       4.79       4.80       0.01	EB-27	16.23	5.47	ND	10.76	NA	NA
EB-2917.742.68ND15.06NANAEB-3013.052.75ND10.30NANAEB-3116.767.38ND9.38NANAEB-328.919.137.33-0.221.581.80EB-3311.057.76ND3.29NANAEB-3412.849.238.653.614.190.58EB-3510.626.56ND4.06NANAEB-368.093.303.294.794.800.01	EB-28	16.06	5.06	ND	11.00	NA	NA
EB-3013.052.75ND10.30NANAEB-3116.767.38ND9.38NANAEB-328.919.137.33-0.221.581.80EB-3311.057.76ND3.29NANAEB-3412.849.238.653.614.190.58EB-3510.626.56ND4.06NANAEB-368.093.303.294.794.800.01	E <b>B-29</b>	17.74	2.68	ND	15.06	NA	NA
EB-31       16.76       7.38       ND       9.38       NA       NA         EB-32       8.91       9.13       7.33       -0.22       1.58       1.80         EB-33       11.05       7.76       ND       3.29       NA       NA         EB-34       12.84       9.23       8.65       3.61       4.19       0.58         EB-35       10.62       6.56       ND       4.06       NA       NA         EB-36       8.09       3.30       3.29       4.79       4.80       0.01	EB-30	13.05	2.75	ND	10.30	NA	NA
EB-32       8.91       9.13       7.33       -0.22       1.58       1.80         EB-33       11.05       7.76       ND       3.29       NA       NA         EB-34       12.84       9.23       8.65       3.61       4.19       0.58         EB-35       10.62       6.56       ND       4.06       NA       NA         EB-36       8.09       3.30       3.29       4.79       4.80       0.01	EB-31	16.76	7.38	ND	9.38	NA	NA
EB-33       11.05       7.76       ND       3.29       NA       NA         EB-34       12.84       9.23       8.65       3.61       4.19       0.58         EB-35       10.62       6.56       ND       4.06       NA       NA         EB-36       8.09       3.30       3.29       4.79       4.80       0.01	EB-32	8.91	9.13	7.33	-0.22	1.58	1.80
EB-34         12.84         9.23         8.65         3.61         4.19         0.58           EB-35         10.62         6.56         ND         4.06         NA         NA           EB-36         8.09         3.30         3.29         4.79         4.80         0.01	EB-33	11.05	7.76	ND	3.29	NA	NA
EB-35 10.62 6.56 ND 4.06 NA NA EB-36 8.09 3.30 3.29 4.79 4.80 0.01	EB-34	12.84	9.23	8.65	3.61	4.19	0.58
EB-36 8.09 3.30 3.29 4.79 4.80 0.01	EB-35	10.62	6.56	ND	4.06	NA	NA
	EB-36	8.09	3.30	3.29	4.79	4.80	0.01

Table 2-3. Water-Level and Product Thickness Measurements Taken by Dan Raviv Associates, Inc., December 1991 Through January 1992 at the Bayonne Plant, Bayonne, New Jersey.

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See footnotes on last page.

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GERAGHTY & MILLER, INC.
Table 2-3.	Water-Level and Product Thickness Measurements	Taken by Dan Raviv Associates, Inc.,	December 1991 Through Janua	ary 1992 at the Bayonne Plant, Bayonne, New Jersey.	
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Well Designation	Measuring Point Elevation (feet above mean sea leve!)	Depth to Water (feet below measuring point)	Depth to Product (feet below measuring point)	Water-Level Elevation (fect relative to mean sea level)	Product-Level Elevation (feet relative to mean sea level)	Product Thickness (feet)
EB-37	9.19	7.84	7.83	1.35	1.36	0.01
EB-38	8.89	7.30	ND	1.59	NA	NA
EB-39	8.70	7.30	ND	1.40	NA	NA
EB-40	11.41	8.16	8.16	3.25	3.25	<0.01
EB-41	9.96	7.12	7.10	2.84	2.86	0.02
EB-42	12.01	9.78	9.68	2.23	2.33	0.10
EB-43	11.04	-	-	-	-	_
EB-44	11.18	8.63	8.62	2.55	2.56	0.01
EB-45	14.33	10.49	ND	3.84	NA	NA
EB-46	17.82	5.98	5.98	11.84	11.84	<0.01
EB-47	9.83	6.37	ND	3.46	NA	NA
EB-48	9.06	6.50	ND	2.56	NA	NA
EB-49	10.67	8.71	ND	1.96	NA	NA
EB-50	10.91	7.21	ND	3.70	NA	NA
EB-51	10.21	5.83	ND	4.38	NA	NA
EB-52	10.53	8.11	8.10	2.42	2.43	0.01
EB-53	8.73	3.57	3.56	5.16	5.17	0.01
EB-54	8.48	2.70	ND	5.78	NA	NA
EB-55	-	-	<b>⊷</b> ,		-	-
EB-56	9.16	4.90	4.88	4.26	4.28	0.02
EB-57	11.28	7.11	ND	4.17	NA	NA
EB-58	8.94	6.76	6.76	2.18	2.18	<0.01
EB-59	10.82	8.92	8.82	1.90	2.00	0.10
EB-60	11.30	8.90	8.90	2.40	2.40	<0.01
EB-61	10.48	9.03	9.02	1.45	1.46	0.01
EB-62	10.78	8.02	8.01	2.76	2.77	0.01
EB-63	9.68	7.13	ND	2.55	NA	NA
EB-64	9.25	8.59	7.86	0.66	1.39	0.73
EB-65	11.03	8.61	8.61	2.42	2.42	<0.01
EB-66	11.60	11.05	11.03	0.55	0.57	0.02
EB-67	10.54	9.02	8.22	1.52	2.32	0.80
EB-68	11.48	8.94	ND	2.54	NA	NA
EB-69	11.47	8.81	8.80	2.66	2.67	0.01
EB-70	-	-	++	_	-	-
EB-71	12.15	10.28	ND	1.87	NA	NA
EB-72	12.27	10.51	10.51	1.76	1.76	<0.01

See footnotes on last page.

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Table 2-3.	Water-Level and Product Thickness Measurements	Taken by Dan Raviv Associates, In	ic., December 1991 Through Ja	anuary 1992 at the Bayonne Plant	, Bayonne, New Jersey.
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Well Designation	Measuring Point Elevation (feet above mean sea level)	Depth to Water (feet below measuring point)	Depth to Product (feet below measuring point)	Water-Level Elevation (feet relative to mean sea level)	Product-Level Elevation (fect relative to mean sea level)	Product Thickness (feet)
EB-73	11.51	9.60	9.60	1.91	1.91	<0.01
EB-74	12.01	11.01	11.01	1.00	1.00	<0.01
EB-75	13.47	8.06	8.06	5.41	5.41	<0.01
EB-76	11.88	8.42	7.82	3.46	4.06	0.60
EB-77	10.94	16.22	8.20	-5.28	2.74	8.02
EB-78	11.50	13.40	8.25	-1.90	3.25	5.15
EB-79	12.34	15.16	9.13	-2.82	3.21	6.03
EB-80	13.21	16.94	9.81	-3.73	3.40	7.13
EB-81	13.04	3.83	3.09	9.21	9.95	0.74
EB-82	10.70	8.41	ND	2.29	NA	NA
EBR-1	12.83	12.51	12.50	0.32	0.33	0.01
EBR-2	8.93	7,44	7.33	1.49	1.60	0.11
EBR-3	8.73	7.25	7.25	1.48	1.48	<0.01
EBR-4	8.58	7.98	6.99	0.60	1.59	0.99
EBR-5	8.60	8.38	6.88	0.22	1.72	1.50
EBR-6	10.38	5,24	5.08	5.14	5.30	0.16
EBR-7	9.64	3.55	ND	6.09	NA	NA
EBR-8	9.46	5.79	5.04	3.67	4.42	0.75
EBR-9	8.69	6.48	ND	2.21	NA	NA
EBR-10	9.30	6.94	ND	2 36	NA	NA
EBR-11	9.24	7.80	7.59	1.44	1.65	0.21
EBR-12	10.04	8.13	8.12	191	1 97	0.01
EBR-13	10.06	8.25	ND	1.81	NA	NA
EBR-14	10.05	8.19	ND	1.86	NA	NA
EBR-15	9.52	7.83	ND	1.69	NA	NA
EBR-16	10.29	897	897	1.37	1 37	<0.01
EBR-17	9.68	7 50	7 50	2.18	7 19	<0.01
EBR-18	11 44	10.55	10.55	0.80	0.90	<0.01
EBR-19	9.54	6.65	ND	2.89	0.67 NA	NA
EBR-20	9.50	-	-	2.07		176
EBR-21	10.12	-	-	-	-	-
EBR-22	10.10		_ ND		- NA	 N1 A
MW-I	15.10	J.03 7 70	6 70	4.4/	NA 0 07	NA
MW-2	15.65	7.85	6.65	7.80	9.00	1.00

ND Not detected.

NA Not applicable.

- Not measured.

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Table 3-1.Wastes Recently Generated at the Exxon Company Plant and Disposed Off-Site,<br/>Bayonne Plant, Bayonne, New Jersey.

Contaminated soils and residues and/or absorbents from spills Filtration cartridges from fuel filtering Materials used to clean up marine oil spills Sludges from tank bottoms Process waste materials (e.g., oily wastes) Cleaning solvents for parts Sandblast abrasives from paint removal operations Skimmed oils from oil-water separators Stabilized sludges from wastewater treatment plant Phase separation and carbon adsorbtion materials from wastewater treatment plants PCB wastes from transformers

Compiled from Exxon Company, U.S.A. (1992a).

PCB Polychlorinated biphenyl.

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Date	Investigative Event
1958	Hydrogeologic investigation conducted by Hydrotechnic Corporation Engineers to develop fresh water resources for refinery usage and examine the feasibility of disposing of acid wastes by underground injection (Hydrotechnic Corporation Engineers 1958).
1974	Leggette, Brashears and Graham (LBG) investigated shallow groundwater hydrocarbon contamination in the area of the interceptor trench and Conrail (formerly Lehigh Valley Railroad) Right-of-Way (Legette, Brashears and Graham, Inc. 1974a,b,c).
1979	Dames & Moore conducted a hydrogeologic investigation of the Bayonne Plant (Dames & Moore 1979).
1980	Weston conducted subsurface soil investigations and oil recovery programs in the Pier No. 1 (helipad area), Pier No. 6, and Pier No. 7 Areas, and in the Low Sulfur Tank Field. Weston monitored product in the "A"-Hill Tank Field and installed recovery wells in the Pier areas and Low Sulfur Tank Field (Roy F. Weston, Inc. 1980).
1981	Weston installed additional wells in the Low Sulfur Tank Field to delineate NAPL. A product recovery system was installed. Water-level and NAPL measurements were made in monitoring wells in the helipad area and Pier No. 7 Area (Roy F. Weston, Inc. 1981a,b).
1985	A Potential Hazardous Waste Site Preliminary Assessment was conducted by USEPA subcontractor, Malcolm Pirnie, Inc. (Malcolm Pirnie, Inc. 1985).
	Weston evaluated well conditions in the helipad area and reported that 34 of the 60 known wells were useable. Several wells contained NAPL (Roy F. Weston, Inc. 1985).
1986	Sandaq conducted a toxic subsurface investigation of the Bayonne Plant sewer system (Sandaq, Inc. 1986).
	Weston conducted a well integrity evaluation and measured NAPL thickness in monitoring wells (Roy F. Weston, Inc. 1986a,b,c).
1988	CH2M Hill, Inc. prepared a site water budget for the Bayonne Plant (CH2M Hill, Inc. 1988).
	Weston prepared quarterly reports summarizing water-level and NAPL measurements in the Low Sulfur Tank Field, the helipad area, the Pier No. 6 and No. 7 Areas, and the "A"-Hill Tank Field (Roy F. Weston, Inc. 1989a,b, c,d,e).

 
 Table 4-1.
 Chronological Summary of Previous Site Investigations Conducted at the Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

Date	Investigative Event
1989	Weston prepared additional quarterly monitoring reports for the above areas (Roy F. Weston, Inc. 1989a,b,c,d,e).
1990	Exxon conducted a soil sampling program for chromium (Dan Raviv Associates, Inc. 1992a).
	The NJDEP completed a site inspection of the Bayonne Plant (NJDEP 1990).
1991	The ACO was signed and executed. The ACO required Exxon to conduct an RI and implement IRMs to address chromium, NAPL, and sewers at the Bayonne Plant.
	Environmental Resource Management collected soil samples throughout the plant for chromium analyses on April 10, 1991 (Dan Raviv Associates, Inc. 1992a).
1992	ICF Kaiser conducted a chromium investigation, as part of litigation activity concerning the use of chromium-laden fill at the Site. Soil sampling was conducted on behalf of PPG Industries, Inc. in the No. 3 Tank Field and the General Tank Field (PPG Industries, Inc. 1992; ICF Kaiser Engineers, Inc. 1992).
	Dan Raviv Associates, Inc. (DRAI) conducted a NAPL IRM investigation in the Low Sulfur and Solvent Tank Fields ("Tank 1066") from May through August 1993. A final report was issued in November 1993 (Dan Raviv Associates, Inc. 1993b).
	IT Corporation commenced the sewer IRM in November 1992 in accordance with the proposed IRM Work Plan (Dan Raviv Associates, Inc. 1992a).
1993	Geraghty & Miller prepared a draft Site History Report and RI Work Plan for the Bayonne Plant (Geraghty & Miller, Inc. 1993a,b). The reports were submitted in January 1993.
	DRAI prepared an IRM Work Plan that was submitted to the NJDEP in January 1993 (Dan Raviv Associates, Inc. 1993a). The work plan addressed chromium slag, NAPL, and sewer IRMs.
	IT Corporation prepared a Phase I IRM Work Plan for the proposed sewer system evaluation. The work plan was submitted to the NJDEP in February 1993 (IT Corporation 1993).
	ICF Kaiser conducted the chromium IRM investigation in March, April, and June 1993. The report was submitted to the NJDEP in July 1993 (ICF Kaiser Engineers, Inc. 1993).

# Table 4-1.Chronological Summary of Previous Site Investigations Conducted at the Bayonne Plant,<br/>Bayonne, New Jersey.

See last page for footnotes.

Date	Investigative Event
1993 (Cont'd)	DRAI prepared well integrity evaluation reports in May 1993 and August 1993 (Dan Raviv Associates, Inc. 1993c,d).
	DRAI conducted the NAPL IRM investigation in the interceptor trench area during August 1994. Investigations are ongoing.
	ICF Kaiser conducted a supplemental Field Sampling and Analysis Plan in November 1993 as part of the chromium IRM. The report was submitted to the NJDEP in February 1994 (ICF Kaiser Engineers, Inc. 1994).
1994	DRAI conducted the NAPL IRM investigations in the Pier No. 7 Area, helipad area, and Platty Kill Creek during the period of February and March 1994 (Dan Raviv Associates, Inc. 1994a).
	DRAI prepared and submitted a NAPL IRM work plan addendum to the NJDEP in June 1994 (Dan Raviv Associates, Inc. 1994a).
	DRAI completed IRM investigations in the Platty Kill Creek, interceptor trench area, helipad area, and Pier No. 7 Area from August through October 1994. Investigations are ongoing in the Pier No. 7 Area.
	Geraghty & Miller conducted a field evaluation of the removal of petroleum hydrocarbon from the subsurface by means of conventional pumping from recovery wells versus vacuum-enhanced recovery, in the vicinity of Tank 1066 (Geraghty & Miller, Inc. 1994b). A vacuum-enhanced pilot test was conducted in June 1994 (Geraghty & Miller, Inc. 1994c).
NJDEP ACO	New Jersey Department of Environmental Protection. Administrative consent order.
RI IRM NAPL	Remedial investigation. Interim remedial measure. Non-aqueous phase liquid.
USEPA	U.S. Environmental Protection Agency.

Table 4-1.Chronological Summary of Previous Site Investigations Conducted at the Bayonne Plant,<br/>Bayonne, New Jersey.

			Tank Dimensions	Appro	ximate		· · · · ·
Tank	Tank	Year	(Diameter x height	Cap	acity	Tank Content	CAS Number
Number	Туре	Built	in feet)	(Barrels)	(Gallons)		
				· · · · ·	·····		
"A" - HILL TA	NK FIELD						
501	Carbon steel AST	1924	115x42	76980	3233160	Out of service	68476-30-2
502	Carbon steel AST	1920	115x42	73895	3103590	Out of service	68476-30-2
504	Carbon steel AST	1927	90x42	47263	1985046	Out of service	68476-30-2
505	Carbon steel AST	1929	90x42	47263	1985046	Out of service	68476-30-2
506	Carbon steel AST	1951	100x48	67184	2821728	Out of service	68476-30-2
507	Carbon steel AST	1923	50x42	14753	619626	Recycled oil	
508	Carbon steel AST	1923	50x42	14703	617526	Recycled oil	
513	Carbon steel AST	1928	90x42	47472	1993824	Storm water	
514	Carbon steel AST	1940	75x42	33284	1397928	Storm water	
516	Carbon steel AST	1953	100x48	67438	2832396	Storm water	
LUBE OIL ARE	<u>CA</u>						
1	Carbon steel AST	1959	30x48	6079	255318	Univolt 60	
2	Carbon steel AST	1959	30x48	6079	255318	Out of service	
3	Carbon steel AST	1959	30x48	6079	255318	M.O. Disp.	
4	Carbon steel AST	1959	30x48	6079	255318	Coray 150/750 Coastal	
5	Carbon steel AST	1959	30x48	6079	255318	ATF	
6	Carbon steel AST	1959	25x42	3696	155232	150 Vis. Solv Neutral	
7	Carbon steel AST	1958	25x42	3695	155190	Motor oil 15W-40	
8	Carbon steel AST	1958	25x42	3696	155232	1364	
9	Carbon steel AST	1958	25x42	3697	155274	200 SOL Ext. Coast Pal	
10	Carbon steel AST	1959	25x42	3694	155148	Out of service	
11	Carbon steel AST	1959	25x42	3694	155148	Canthus 1000	
12-1	Multi-compartment AST	1959	15x9*	322	13524	\$380	
12-2	Multi-compartment AST	1959	15x9**	322	13524	5382	
12-3	Multi-compartment AST	1959	1.5x9+++	322	13524	5386	
13	Carbon steel AST	1957	30x48	6080	255360	1391 Base Oil	
14	Carbon steel AST	1957	30x48	6078	255276	Coray 46/225 Coastal	
15	Carbon steel AST	1959	30x48	6080	255360	CA SW30	
16	Carbon steel AST	1959	30x48	6082	255444	Univolt 60	
17	Carbon steel AST	1968	25x42	3600	151200	75 Solvent Neutral	
18	Carbon steel AST	1968	25x42	3600	151200	1960	
19	Carbon steel AST	1958	25x42	3600	151200	GM ATF	
20	Carbon steel AST	1958	25x42	3695	155190	Telura 619D	
21	Carbon steel AST	1958	25x42	3695	155190	Out of service	
22	Carbon steel AST	1958	25x42	3695	155190	Diol 2213	
23	Carbon steel AST	1958	25x42	3695	155190	200 Naphthenic STK	
24-1	Multi-compartment AST	1959	15x9*	322	13524	\$383	
24-2	Multi-compartment AST	1959	15x9**	322	13524	5385	
24-3	Multi-compartment AST	1959	15,9***	322	13524	5386	
25	Carbon steel AST	1981	30x48	5800	243600	Hydraulic Oil Base	
26	Carbon steel AST	1981	30x48	5800	243600	Univolt N-61	
27	Carbon steel AST	1958	40x48	10823	454566	75 Solv, Ext. Coast Pl.	
28	Carbon steel AST	1959	40x48	10823	454566	Telura 619	
29	Carbon steel AST	1958	40x48	10827	454734	Low V.I. 150 Neutral	
30	Carbon steel AST	1959	40x48	10824	454608	Necton 78/900 Coastal	

See footnotes on last page.

e			Tank Dimensions	Approximate			
Tank	Tank Type	Year	(Diameter x height in feet)	Cap	acity	Tank Content	CAS Number
Number		Built		(Barrels)	(Gallons)		
				•			
LUBE OIL AR	(EA (CONT.)						
31	Carbon steel AST	1959	40x48	10828	454776	Coray 220	
32	Carbon steel AST	1967	30x48	6000	252000	M.O. Disp.	
33	Carbon steel AST	1958	30x48	6022	252924	Diol 2213	
35	Carbon steel AST	1981	30x48	5800	243600	1364	
36	Carbon steel AST	1981	30x48	5800	243600	600 Neutral	
37	Carbon steel AST	1959	40x48	10824	454608	370 Solvent Neutral	
38	Carbon steel AST	1959	40x48	10825	454650	150 LP Solvent Neutral	
39	Carbon steel AST	1959	40x48	10825	454650	150 S.E. Bright Stock	
40	Carbon steel AST	1959	40x48	10824	454608	150 S.E. Bright Stock	
41	Carbon steel AST	1959	40x42	9500	399000	325 Neutral	
43	Carbon steel AST	1959	60x48	24409	1025178	130 Solvent Neutral	
44	Carbon steel AST	1956	60x48	24265	1019130	L.P. 100 Neutral	
45	Carbon steel AST	1956	60x48	24306	1020852	100 Pale Paraffin	
46	Carbon steel AST	1956	60x48	24282	1019844	330 Solvent Neutral	
47	Carbon steel AST	1959	20x42	2363	99246	ECA 13112 Slurry-P.C. 382549	64742650
48	Carbon steel AST	1959	20x42	2363	99246	150 Solvent Neutral	
49	Carbon steel AST	1959	20x42	2363	99246	0049	
50	Carbon steel AST	1959	20x42	2363	99246	Castrol DOCP	NCN
51	Carbon steel AST	1959	20x42	2363	99246	Out of service	
52	Carbon steel AST	1959	20x42	2363	99246	Slurry-TLA 347A	
53	Carbon steel AST	1959	20x42	2363	99246	Examar X70	
54	Carbon steel AST	1959	20x42	2363	99246	Out of service	
55	Carbon steel AST	1959	20x42	2363	99246	3147 Hydraulic Oil Base	
56	Carbon steel AST	1959	20x42	2363	99246	Paratone 856 Slurry P.C. 382656	
57	Carbon steel AST	1958	60x48	24373	1023666	L.P. 150 Neutral	
58	Carbon steel AST	1951	55x48	20321	853482	600 Neutral	
59	Carbon steel AST	1959	50x48	16931	711102	105 Coastal Pale	
60	Carbon steel AST	1959	50x48	16933	711186	ATF 1975	
61	Carbon steel AST	1981	30x48	5800	243600	Out of service	
63-1	Multi-compartment AST	1959	15x15*	288	12096	Idle	
63-2	Multi-compartment AST	195 <del>9</del>	15x15**	288	12096	Idle	
64-1	Multi-compartment AST	195 <del>9</del>	15x15***	288	12096	Idle	
64-2	Multi-compartment AST	1959	15x15*	288	12096	Idle	
65-1	Multi-compartment AST	1959	15x15**	288	12096	ECA 11785-P.C.225384	NCN
65-2	Multi-compartment AST	1959	15x15***	288	12096	ECA 13610	64741884
66-1	Multi-compartment AST	1960	12x11'3*	244	10248	ECA-12823-P.C.225118	64741884
66-2	Multi-compartment AST	1960	12x11'3**	244	10248	Paraflow 385-50/50 Slurry	
66-3	Multi-compartment AST	1960	12x11'3***	244	10248	ECA 9349-P.C.225273	64741884
70	Carbon steel AST	1959	15x30	953	40026	ECA 15400	NCN
71	Carbon steel AST	1959	15x30	953	40026	Unvis J-13	
72-1	Multi-compartment AST	1960	I2x11'4*	244	10248	Unvis J-13	
72-2	Multi-compartment AST	1960	12x11'4**	244	10248	Unvis J-13	
72-3	Multi-compartment AST	1960	12x11'4***	244	10248	Acryloid HF833 50/50-P.C.382672	
79	Multi-compartment AST	1955	12x12'1***	247	10374	1774	
80	Multi-compartment AST	1955	12x12'1**	247	10374	Exmar 12TP40	
81	Multi-compartment AST	1955	12x12'1*	247	10374	Exmar 30TP30	
82	Multi-compartment AST	1955	12x12'1***	247	10374	Flexon 767	

See footnotes on last page.

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		· · ·	Tank Dimensions	Appro	ximate	· · · · · · · · · · · · · · · · · · ·	
Tank	Tank	Year	(Diameter x height	Cap	acity	Tank Content	CAS Number
Number	Туре	Built	in feet)	(Barrels)	(Gallons)		
LUBE OIL A	REA (CONT.)	· · · · · · · · · · · · · · · · · · ·					
92	Multi commente AST	1055	10.101144	0.47	10071		•
83	Multi-compartment AS I	1955	12x12.1++	247	10374	Canthus 680	
84	Multi-compariment AS I	1955	12x121*	247	10374	Emmist EP460	
6) 9/	Multi-compartment AS1	1955	12x121**	247	10374	5803	
80	Multi-compartment ASI	1955	12x12'1**	247	10374	Gear Oil GX 80W-90	
8/	Multi-compariment AST	1922	12x12.1*	247	10374	Examar X60	
88 90	Multi-compartment AST	1955	12x12'1**	247	10374	100 LP Slovent Neutral	
89	Multi-compartment AS I	1955	12x121**	247	10374	1358	
90	Multi-compartment AST	1955	12x12'1*	247	10374	Zerice 68	
91	Multi-compartment AST	1955	12x12'I**	247	10374	Univis N32	
91	Multi-compartment AST	1955	12x12'1**	247	· 10374	1774	
93	Multi-compartment AST	1955	12×12'1*	247	10374	Teresstic 77	
94	Multi-compartment AST	1955	12x12'1**	247	10374	1446	
20	Multi-compartment AS1	1955	12x12'1**	247	10374	Instrument Oil	
96	Multi-compartment AS I	1955	12x12'1*	247	10374	Teresstic N-150	
97	Carbon steel AS I	1953	25x40	3500	147000	150 SN-LS	
98	Carbon steel AS I	1953	25x40	3511	147462	Idle	
<b>99</b>	Carbon steel AS I	1941	30x42	5312	223104	Idle	
101	Carbon steel AS I	1960	20x30	1689	70938	Tromar TEP	
102	Carbon steel AS 1	1960	20x30	1689	70938	Nuto H-68	
103	Carbon steel AST	1960	20x30	1689	70938	Nuto H-32	
104	Carbon steel AST	1960	20x30	1688	70896	Torque Fluid 56	
105	Carbon steel AS I	1960	20x30	1688	70896	Examar X70	
106	Carbon steel AS I	1960	20x30	1688	70896	Superflo 5W30	
107	Carbon steel AS I	1960	20x30	1688	70896	Nuto H-46	
108	Carbon steel AST	1949	30x42	5289	222138	Superflo 10W40	
109	Carbon steel AST	1949	30x42	5287	222054	Superflo S/P 10W30	
110	Carbon steel AST	1925+	30x42	5316	223272	ATF 1941	
111	Carbon steel AS1	1925+	30x42	5323	223566	ATF 1973	
112	Carbon steel AS I	1925+	30x42	5351	224742	Superflo 10W-30	
113	. Carbon steel AST	1960	25x48	4222	177324	Superflo ATF	
116	Carbon steel AST	1960	20x30	1689	70938	Out of service	
117	Carbon steel AST	1960	20x30	1689	70938	ATF 1938	
118	Carbon steel AST	1960	20x30	1689	70938	100 Sol. Ext. Cos. PL. NCN	
119	Carbon steel AST	1960	20x30	1689	70938	300 Sol. Ext. Cos. PL. NCN	
120	Carbon steel AST	1960	20x30	1689	70938	Exmar XP	
121	Carbon steel AST	1960	20x30	1689	70938	Teresstic 32	
122	. Carbon steel AST	1960	20x30	1689	70938	Diol 2212	
123	Carbon steel AST	1960	25x30	2649	111258	1767 Motor Oil 15W-40	
124	Carbon steel AST	1960	25x30	2643	111006	XD-3 15W40	
125	Carbon steel AST	1960	25x30	2643	111006	CA 5W30	
126	Carbon steel AST	1960	25x30	2643	111006	Superflo Supreme Perform 10W-40	
127	Carbon steel AST	1960	25x48	4224	177408	CA 5W30	
128	Carbon steel AST	1960	25x48	4223	177366	Diol 2211	
131-1	Multi-compartment AST	1961	12x10'11*	244	10248	Teresstic 77	
131-2	Multi-compartment AST	1961	12x10'3**	244	10248	Teresstic 150	
131-3	Multi-compartment AST	1961	12x10'3***	244	10248	5806	

See footnotes on last page.

			Tank Dimensions	Аррго	ximate	· · · · · · · · · · · · · · · · · · ·	
Tank	Tank	Year	(Diameter x height	Cap	acity	Tank Content	CAS Number
Number	Туре	Built	in feet)	(Barrels)	(Gallons)		
LUBE OU AD	EA (CONT.)						· ····
LUDE OIL AN	EA (CONT.)						
132-1	Multi-compartment AST	1961	12x10'11*	260	10920	3099 Process Oil	
132-2	Multi-compartment AST	1961	12x10'3**	237	9914	Terestic 220	
132-3	Multi-compartment AST	1961	12×10'3***	237	9954	1005	
133-1	Multi-compartment AST	1961	12x10'11*	260	10920	Idle	
133-2	Multi-compartment AST	1961	12×10'3**	237	9954	Idie	
133-3	Multi-compartment AST	1961	12×10'3***	237	9954	Idle	
134-1	Multi-compartment AST	1961	15x12'8*	434	18778	Exmar 12TP30	
134-2	Multi-compartment AST	1961	15x12'7***	434	18228	Exmar 74TP30	
135-1	Multi-compartment AST	1961	15x12'8*	434	18228	Aviation Oil 100 NCN	
135-2	Multi-compartment AST	1961	15x11'8***	434	18228	Caloria HT43	
136-1	Multi-compartment AST	1961	15x12'8*	434	18228	1748 Heavy Duty Eng. Oil 30	
136-2	Multi-compartment AST	1961	15x12'8***	434	18228	Fymar XA	
137	Carbon steel AST	1961	15x30	949	39858	150 Coastal	
138	Carbon steel AST	1961	15x30	949	39858	Teresstic 33	
139	Carbon steel AST	1961	15x30	949	39858	Teresstic 68	
140	Carbon steel AST	1961	15x30	949	39858	Superflo 20W50	
141	Carbon steel AST	1961	15x30	949	39858	1643/1718 Motor Oil 30	
142	Carbon steel AST	1961	15x30	949	39858	2576 Cylesstic 1500	
143	Carbon steel AST	1961	15x30	949	39858	XD 3-30	
144	Carbon steel AST	1961	15x30	949	39858	XD-3 Extra 15W40	
145	Carbon steel AST	1968	15x18	550	23100	1938 ATF	
146-1	Multi-compartment AST	1961	12x10'11*	260	10920	PX-52 P.C. 225046	
146-2	Multi-compartment AST	1961	12x10'3**	237	9954	Cylesstic TK460	
146-3	Multi-compartment AST	1961	12x10'3***	237	9954	Q.Q. GX85W140	
147-1	Multi-compartment AST	1961	12x10'11*	260	10920	XD-3 Extra 30	
147-2	Multi-compartment AST	1961	12x10'3**	238	9996	Canthus 680	
147-3	Multi-compartment AST	1961	12x10'3***	238	9996	5830 Cycle Oil 22	
148-1	Multi-compartment AST	1961	12x10'11*	260	10920	Ethyl Flow 74	
148-2	Multi-compartment AST	1961	12x10'3**	238	9996	Ethyl Flow 74	
148-3	Multi-compartment AST	1961	12x10'3***	238	9996	5806	
149-1	Multi-compartment AST	1961	12x10'3*	359	15078	XD-3 Extra 40	
149-2	Multi-compartment AST	1961	15x12'7***	509	21378	5805	
150-1	Multi-compartment AST	1961	15x12'8*	434	18228	Unvis J26	
150-2	Multi-compartment AST	1961	15x12'7***	434	18228	240 Pale Paraffin	
151-1	Multi-compartment AST	1961	15x12'7*	434	18228	500 Coastal Pale NCN	
151-2	Multi-compartment AST	1961	15x12'8***	434	18228	Examar 24TP40	
153	Multi-compartment AST	1961	15x30'	949	39858	Busgard HD 30	
154	Carbon steel AST	1961	15x30'	949	39858	Busgard HD 40	
155	Carbon steel AST	1961	15x30'	949	39858	XD3-10W	
156	Carbon steel AST	1961	15x30'	949	39858	Teresstic N220	
157	Carbon steel AST	1961	15x30'	949	39858	Examar 30TP40	
158	Carbon steel AST	1961	15x30'	949	39858	2329	
159	Carbon steel AST	1961	15x30'	949	39858	Teresstic 100	
160	Carbon steel AST	1968	15x18	560	23520	Process Oil	
161	Carbon steel AST	1968	15x18	560	23520	Humble Hydraulic H-68	
170	Carbon steel AST	1968	15x18	560	23520	1915	
171	Carbon steel AST	1968	15x18	560	23520	Necton 60	

See footnotes on last page.

			Tank Dimensions	Арргоз	ximate		
Tank	Tank	Year	(Diameter x height	Capa	acity	Tank Content	CAS Number
Number	Туре	Built	in feet)	(Barrels)	(Gallons)		
	·····			<u> </u>			
LUBE OIL AREA	<u>(CONT.)</u>						
237	Carbon steel AST	1935	40x42	9306	390852	Disp. STK	
238	Carbon steel AST	1908	40x30	6669	280098	Skimmed Oil/West Side Separator	
402	Carbon steel AST	1899	32x22	3192	134064	Out of service	
403	Carbon steel AST	1899	30x20'	2535	106470	Out of service	
404	Carbon steel AST	1899	45x25	7156	300552	Out of service	
405	Carbon steel AST	1918	25x30	2601	109242	Out of service	
406	Carbon steel AST	1908	30x23	2982	125244	Out of service	
407	Carbon steel AST	1922	25x25	2206	92652	Out of service	
408	Carbon steel AST	1920	25x25	2160	90720	Out of service	
410	Carbon steel AST	1920	25x25	2177	91434	Out of service	
411	Carbon steel AST	1908	50x35	12034	505428	Out of service	
412	Carbon steel AST	1899	40x30	6764	284088	Hydraulic oil	
413	Carbon steel AST	1899	40x30	6734	282828	Out of service	
414	Carbon steel AST	1908	45x25	7030	295260	Out of service	
415	Carbon steel AST	1920	25x25	2147	90174	Out of service	
416	Carbon steel AST	1953	25x42	3685	154770	Out of service	
417	Carbon steel AST	1953	25x42	3665	153930	Out of service	
448	Carbon steel AST	1953	25x42	3676	154392	Out of service	
541	Carbon steel AST	1962	40x48	10811	454062	Storm water	
543	Carbon steel AST	1913	25x30	2643	111006	Out of service	
545	Carbon steel AST	1960	60x48	24365	1023330	Storm water	
547	Carbon steel AST	1920	35x36	5973	250866	Out of service	
548	Carbon steel AST	1930	35x42	7216	303072	Storm water	
549	Carbon steel AST	1930	50x42	14758	619836	Storm water	
550	Carbon steel AST	1930	50x42	14757	619794	Storm water	
552	Carbon steel AST	1930	50x42	14921	626682	Out of service	
553	Carbon steel AST	1930	50x42	14871	624582	Out of service	
554	Carbon steel AST	1935	50x42	14729	618618	Out of service	
556	Carbon steel AST	1922	35x40	6935	291270	Out of service	
557	Carbon steel AST	1922	35x40	6935	291270	Out of service	
565	Carbon steel AST	1939	50x42	14757	619794	Out of service	
569	Carbon steel AST	1945	60x42	21284	893928	130 VIS. LPSN	
571	Carbon steel AST	1951	20x30	1672	70224	Out of service	
572	Carbon steel AST	1951	20x30	1672	70224	Out of service	
573	Carbon steel AST	1951	20x30	1672	70224	Idle	
576	Carbon steel AST	1969	30x32	4000	168000	West Side Separator	
577	Carbon steel AST	1969	80x50	45600	1915200	West Side Separator	
578	Carbon steel AST	1957	(4)	60	2520	West Side Sep. Chem. Inj.	
580	Carbon steel AST	1950	20x42	2332	97944	Out of service	
581	Carbon steel AST	1950	25x42	3670	154140	Refined Wax	
582	Carbon steel AST	1950	25x42	3670	154140	Refined Wax	
583	Carbon steel AST	1945	40x42	9425	395850	Refined Wax	
584	Carbon steel AST	1945	24x42	3704	155568	Refined Wax	
585	Carbon steel AST	1945	40x42	9425	395850	Out of service	
586	Carbon steel AST	1945	25x42	3704	155568	Out of service	
588	Carbon steel AST	1945	25x42	3704	155568	Refined Wax	
591	Carbon steel AST	1963	40x48	10800	453600	Refined Wax	

See footnotes on last page.

GERAGHTY & MILLER, INC.

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	· · · ·			Tank Dimensions Approximate			
Tank	Tank	Year	(Diameter x height	Cap	acity	Tank Content	CAS Number
Number	Туре	Built	in feet)	(Barrels)	(Gallons)		
LUBE OIL AREA	(CONT.)						
592	Carbon steel AST	1963	30x48	6100	256200	Refined Wax	
593	Carbon steel AST	1963	40x48	10800	453600	Refined Wax	
594	Carbon steel AST	1963	30x48	6100	256200	Refined Wax	
595	Carbon steel AST	1961	25x48	4199	176358	Out of service	
596	Carbon steel AST	1961	25x48	4205	176610	Out of service	
597	Carbon steel AST	1961	25x48	4200	176400	Out of service	
598	Carbon steel AST	1961	25x42	4197	176274	Out of service	
599	Carbon steel AST	1961	25x48	4198	176316	Out of service	
611	Carbon steel AST	1961	25x48	4219	177198	Out of service	
612	Carbon steel AST	1961	25x48	4217	177114	Slop Oil and Miscellaneous Liquid Waste	
613	Carbon steel AST	1961	25x48	4223	177366	Out of service	
614	Carbon steel AST	1961	25x48	4217	177114	Out of service	
615	Carbon steel AST	1961	25x48	4221	177282	Out of service	
616	Carbon steel AST	1961	25x48	4220	177240	Slop Oil and Miscellaneous Liquid Waste	
617	Carbon steel AST	1951	25x48	4220	177240	Out of service	
PIER NO. 1 AREA	L						
No tanks.							
<u>NO. 2 TANK FIEI</u>	<u>.D</u>						
1001	Carbon steel AST	1955	150x50	157449	6612858	#2 Fuel	68476-30-2
1002	Carbon steel AST	1955	150x50	157449	6612858	#2 Fuel	68476-30-2
1003	Carbon steel AST	1955	150x50	157441	6612522	#2 Fuel	68476-30-2
1004	Carbon steel AST	1955	150x50	157437	6612354	#2 Fuel	68476-30-2
1005	Carbon steel AST	1955	150x50	157447	6612774	#2 Fuel	68476-30-2
1006	Carbon steel AST	1955	150×50	157455	6613110	Out of service	68476-30-2
1007	Carbon steel AST	1955	150x50	157410	6611220	#2 Fuel	68476-30-2
1008	Carbon steel AST	1955	150x50	157397	6610674	#2 Fuel	68476-30-2
ASPHALT PLAN	TAREA						
904	Carbon stee! AST	1957	75x48	38254	1606668	AC-20	8052-42-4
927	Carbon steel AST	1957	20x40	2251	94542	MC-30	8052-42-4
928	Carbon steel AST	1957	25x40	3517	147714	MC-250	8052-42-4
929	Carbon steel AST	1957	20x40	2251	94542	MC-70	8052-42-4
930	Carbon steel AST	1957	20x40	2251	94542	7052 QD Asphalt	64742-93-4
931	Carbon steel AST	1957	25x40	3517	147714	RC-250	8052-42-4
932	Carbon steel AST	1957	25x40	3517	147714	7057 QD Asphalt	64742-93-4
933	Carbon steel AST	1957	20x40	2251	94542	7037 QD Asphalt	64742-93-4
934	Carbon steel AST	1957	25x40	3517	147714	RC-70	8052-42-4
935	Carbon steel AST	1957	10x32	440	18480	7060	
936	Carbon steel AST	1957	10x32	440	18480	7060	
937	Carbon steel AST	1957	10x32	440	18480	7060	
938	Carbon steel AST	1957	10x32	440	18480	MC-30	8052-42-4
941	Carbon steel AST	1957	25x40	3517	147714	7057 QD Asphalt	8052-42-4

See footnotes on last page.

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			Tank Dimensions	Аррго	oximate		
Tank	Tank	Year	(Diameter x height	Car	pacity	Tank Content	CAS Number
Number	Туре	Built	in feet)	(Barrels)	(Gallons)		
CHEMICAL PL	ANT AREA (CONT.)						
734	Certion steel AST	1959	10x74	329	13818	Out of service	
/37 726	Carbon steel AST	1050	10/24	329	13818	Aromatic 150	
735	Carbon steel AST	1959	10x24	329	13818	Oil Flush	
750	Carbon steel AST	1050	10x24	329	13818	Out of service	
737	Carbon steel AST	1050	10×24	329	13818	Vinvl Acetate	
730	Carbon steel AST	1961	10x24	379	13818	Out of service	
737	Multi-compartment AST	1955	12x12*	238	9996	FRX Rundown	
740	Multi compartment AST	1955	12×12	238	9996	FRX Rundown	
740	Multi compartment AST	1955	12414	238	9996	FRX Rundown	
740	Carbon steel AST	1955	10.74	329	13818	ODSA (82759)	
741	Carbon steel AST	1933	10×27	418	18396	83555	
742	Carbon steel AS I	1907	15,22	000	41580	PIRSA	
743	Carbon steel AS I	1907	13,52	112	14000	(1)	
744	Fiberglass Reinforced Flashe	(1)	12×10	177	14000	(*)	
/45	Fibergiass Reinforced Flastic	(a)	12×10	333	14000	(•)	
840		(8)	12×10	470	20118	(*) Out of service	
7485	Carbon steel AS I	1900	10-20	440	18480	Out of service	
/49	Carbon steel AS I	1901	15-20	907	37984	81418	
750	Carbon steel AS I	1902	15,50	902	38909	ATEVI	
/51	Carbon steel AS I	1962	15×30	924	38808		
754	Carbon steel AST	1962	15×30	974	38808	ATE VI	
755	Carbon steel AST	1704	10,00	471	10787	ATE	
760	Carbon steel AS I	1947	10-26	391	16002	4TF	
701	Carbon steel AS I	1040	15-10	\$79	24318	80831	
701	Carbon steel AST	1747	13417	471	10782	ATE	
/04		1945	12824	391	15007	ATF	
705	Carbon steel AST	1747	15-10	581 <b>(7</b> 0	24319	ATE	
/00	Carbon steel AS I	1747	13819	70	2310	Cleaning Fluid	
/08	Carbon steel AS I	1940	7x12	70	2219	Cleaning Fluid	
709	Carbon steel AS I	1940	10-24	17	11607	Out of remine	
770	Carbon steel AS I	1903	10:24	320	13072	Out of service	
//1	Carbon steel AS I	1963	10224	1562	13010	ECA4360	
113	Carbon steel AS I	1949	10-24	1302	15019	Nacton	
776	Carbon steel AS I	1949	10824	379	(0216	Mercon Destroit	
///	Carbon steel AS 1	1900	20x30	947	16414	Finished CuO	
778	Carbon steel AS I	1940	20815	100	12006	ATE	
779	Carbon steel AS I	1922	10224	400	12070	N27 Flueber	
781	Carbon steel AS I	1940	20215	809	30498	NJ / FILSHES	
783	Multi-compartment AS I	1966	l DX(a)*	221	9282	Mark 3072	
783	Multi-compartment AST	1966	15X(A)**	224	9408	OT DA 260D	
783	Multi-compartment AST	1966	15X( <b>a</b> )***	441	9282 14010	ULUA 209K	
784	Carbon steel AST	1947	12x18	300	14910	FILEC EOI I	
785	Carbon steel AST	1949	12x18	337	14994	IN COLON	
786	Carbon steel AST	1938	12x24	474	19908	AIT	
787	Carbon steel AST	1959	12x18	336	14112	A17 DHP(01730)	
/88	Carbon steel AS I	1928	13824	/8.) 7/1	34000	Sion Oil	

See footnotes on last page.

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		Tank Dimensions Approximate			ximate		
Tank	Tank	Year	(Diameter x height	Сар	acity	Tank Content	CAS Number
Number	Туре	Built	in feet)	(Barrels)	(Gallons)		
CHEMICAL P	LANT AREA (CONT.)						
705	Eihanglage Dainformed Blastic	1075	9.43	107	4512	Step Oil	
775	ribergiass Rehiloreed riastic	(975	6X12	(-)	4312	Stop On	
770	(a) Carbon steel AST	(4)	(4)	160	23500	Effluent	
709	Carbon steel AST	1955	15-42	1322	\$5520	Effluent	
799	Carbon steel AST	1955	15x42	1322	55520	Effluent	
800	Carbon steel AST	1959	12x36	719	30198	LOFI	
801	Carbon steel AST	1959	12x36	719	30198	LOFI	
802	Carbon steel AST	1959	12x36	719	30198	LOFI	
803	Carbon steel AST	1959	12x36	719	30198	DWA Work-Off	
804	Carbon steel AST	1959	10x24	331	13902	Out of service	
805	Carbon steel AST	1959	10x24	331	13902	Out of service	
806	Carbon steel AST	1959	10x24	331	13902	Necton	
807	Carbon steel AST	1959	10x24	331	13902	HFFI (83623)	
809	Carbon steel AST	1959	10x24	331	13902	HFFI (83612)	
810	Carbon steel AST	1966	10x18	245	10290	Heating Oil	
811	Carbon steel AST	1959	24x30	2329	97818	Out of service	
812	Carbon steel AST	1958	20x30	1662	69804	150 Solvent Neutral	
813	Carbon steel AST	1958	20x30	1662	69804	Dewaxing Aid	
814	Carbon steel AST	1959	20x30	1662	69804	Dewaxing Aid	
815	Carbon steel AST	1959	20x30	1662	69804	LOFI (80136)	
816	Carbon steel AST	1969	20x30	1662	69804	ECA 9587 LOFI	
840	Carbon steel AST	1968	24x24	1879	78918	Mercon Dextron	
841	Carbon steel AST	1968	24x24	1879	78918	Mercon Dextron	
842	Carbon steel AST	1968	15x24	736	30912	ATF	
843	Carbon steel AST	1968	15x24	736	30912	Mercon Dextron	
844	Carbon steel AST	1974	25x32	2536	106512	Mercon Dextron	
845	Carbon steel AST	1974	25x32	2536	106512	Mercon Dextron	
850	Carbon steel AST	1968	18x24	1057	44394	Necton	
851	Carbon steel AST	1968	15x24	738	30996	ATF	
852	Carbon steel AST	1968	10x24	324	13608	ATF	
853	Carbon steel AST	1968	10x24	324	13608	Necton	
854	Carbon steel AST	1968	10x24	324	13608	ATF	
855	Carbon steel AST	1971	12x18	340	14280	Amoco 6811	
856	(a)	(a)	(a)	290	12180	ATF	
861	Carbon steel AST	1974	12x24	476	19992	ECA 8864/DHP	
862	Carbon steel AST	1951	10x24	333	13986	Tomah Amine	
863	Carbon steel AST	1950	5x15	57	2394	Plexol 305	
870	Carbon steel AST	1968	10x18	238	9996	Van Lube/FN31664	
871	Carbon steel AST	1964	8x18	157	6594	E4814	
872	Stainless Steel AST	1964	8x18	157	6594	Out of service	
873	Carbon steel AST	1964	8x18	157	6594	ECA 9324/4999	
874	Carbon steel AST	1964	8x18	157	6594	ECA 4493	
875	Carbon steel AST	1968	8x18	157	6594	ECA 5087	
876	Carbon steel AST	1964	10x24	329	13818	PX 15	
880	Carbon steel AST	1969	30x32	3964	166488	ECA 5025	

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Tank	Tank	Year	(Diameter x height	Сар	acity	Tank Content	CAS Number
Number	Туре	Built	in feet)	(Barrels)	(Gallons)		
NO. 3 TANK FIE	LD				· · · · · ·		
901	Carbon steel AST	1958	60x30	25418	1067556	Water	
902	Carbon steel AST	1957	60x48	24447	1026774	LSFO	68476-33-5
903	Carbon steel AST	1957	60x48	24490	1028580	LSFO	68476-33-5
916	Carbon steel AST	1951	120x47	97080	4077360	PFF	
917	Carbon steel AST	1955	120x48	98109	4120578	AC-5	
918	Carbon steel AST	1957	120x56	114619	4813998	PFF	
919	Carbon steel AST	1957	120x56	114680	4816360	Out of service	
920	Carbon steel AST	1957	120x56	114626	4814292	MTBE	
921	Carbon steel AST	1957	120x56	114604	4813368	Out of service	
GENERAL TANK	<u>(FIELD</u>						
1053	Carbon steel AST	1925	120x42	85159	3576678	Storm water	
1054	Carbon steel AST	1925	120x42	85254	3580668	Out of service	
1055	Carbon steel AST	1925	120x42	85297	3582474	Bayway PGO	064810-00-4
1056	Carbon steel AST	1925	120x42	85281	3581802	Bayway PGO	064810-00-4
1057	Carbon steel AST	1925	120x42	85242	3580164	Out of service	
1058	Carbon steel AST	1925	120x42	85219	3579198	Out of service	
1060	Carbon steel AST	1958	150x50	160826	6754692	TURBO	64742-47-8
1061	Carbon steel AST	1958	150x50	160826	6754692	TURBO	64742-47-8
1062	Carbon steel AST	1958	150x50	160836	6755112	Cattar/HAFO	64741-62-4
1063	Carbon steel AST	1958	150x50	160732	6750744	Cattar/HAFO	64741-62-4
1064	Carbon steel AST	1958	150x50	160740	6751080	260 Diesel	68476-34-6
1071	Carbon steel AST	1969	150x56	170000	7140000	Water	64742-47-8
1072	Carbon steel AST	1969	150x56	170000	7140000	Bayway PGO	068410-00-4
1073	Carbon steel AST	1969	150x56	170000	7140000	Bayway PGO	068410-00-4
SOLVENT TANK	FIELD						
1024	Carbon steel AST	1966	10x12	170	7140	Idle	
1025	Carbon steel AST	1967	70x48	33000	1386000	Xylene	1330-20-7
1026	Carbon steel AST	1923	75x42	33256	1396752	Varsol 1	8052-41-3
1027	Carbon steel AST	1923	75x42	33256	1396752	Idle	
1028	Carbon steel AST	1923	75x42	33281	1397802	Aromatic 100	64742-95-6
1029	Carbon steel AST	1923	40x42	33281	1397802	Varsol 18	8052-41-3
1030	Carbon steel AST	1959	40x48	10768	452256	L.O.P.S.	64742-47-8
1031	Carbon steel AST	1959	40x48	10770	452340	EXXPRINT 588D	64742-47-8
1032	Carbon steel AST	1962	40x48	10767	452214	Norpar 15	64771-72-8
1033	Carbon steel AST	1962	40x48	10725	450450	Isopar L	64742-49-9
1034	Carbon steel AST	1961	40x48	10766	452172	2429 Naptha	64742-89-8
1035	Carbon steel AST	1961	40x48	10767	452214	Norpar 12	64771-72-8
1036	Carbon steel AST	1961	40x48	10725	450450	EXXSOL D110	64742-47-8
1037	Carbon steel AST	1968	50x48	10700	449400	Aromatic 150	64742-94-5
1046	Carbon steel AST	1951	15x24	760	31920	Aromatic 200	64742-94-5
1047	Carbon steel AST	1928	60x42	21307	894894	Isopar G	64742-48-9
1048	Carbon steel AST	1962	40x48	10727	450534	HAN	64742-06-9
1049	Carbon steel AST	1961	50x48	16752	703584	Isopar H	64742-48-9

See footnotes on last page.

	· · · · · · · · · · · · · · · · · · ·		Tank Dimensions	Аррго	ximate		
Tank	Tank	Year	(Diameter x height	Cap	acity	Tank Content	CAS Number
Number	Туре	Built	in feet)	(Barrels)	(Gallons)		
LOW SULFUR	TANK FIELD						
1065	Carbon steel AST	1967	150x56	170000	7140000	RSFO	
1066	Carbon steel AST	1967	150x56	170000	7140000	Out of service	
1067	Carbon steel AST	1967	150x56	170000	7140000	Cattar/HAFO	64741-62-4
1068	Carbon steel AST	1968	150x56	170000	7140000	RSFO	
1069	Carbon steel AST	1969	150x56	170000	7140000	Bayway PGO	068410-00-4
1070	Carbon steel AST	1969	150x56	170000	7140000	Bayway PGO	068410-00-4
PIERS AND EA	AST SIDE TREATMENT AREA						
659	Carbon steel AST	(a)	(a)	(a)	(a)	Idie	
996	Fiberglass Reinforced Plastic	1980	14x12	330	13860	Out of service (APH)	
997	Fiberglass Reinforced Plastic	1980	14x12	330	13860	Calgon	
1097	Carbon steel AST	1991	13x24	567	23830	Recycle Oil	
1098	Carbon steel AST	1964	20x24	2562	1076047	Recycle Oil	
1099	Carbon steel AST	1964	20x24	2562	107604?	Recycle Oil	
1100	Carbon steel AST	1947	15x18	576	24192	DEMAR	
1101	Carbon steel AST	1956	12x12	244	10248	XD-3XTRA-40	
DOMESTIC TH	RADE AREA						
1051	Carbon steel AST	1966	40x50	11200	470400	Idle (Domestic Trade)	
MISCELLANE	<u>OUS AREAS</u>						
994	Carbon steel AST	1949	25x40	3494	146748	Out of service (CBH)	
995	Carbon steel AST	1949	25x40	3494	146748	Out of service (CBH)	
998	Carbon steel AST	1949	90x48	45320	1903440	CBH Storm water	

All tanks that are out of service or idle are empty.

Top compartment.
 Middle compartment.
 Bottom compartment.
 Unknown.
 Unknown.
 AST Aboveground storage tank.
 ECA Exxon Chemical Americas.

ATF Asphalt tank field.

AV-GAS Aviation gasoline.

CAS Chemical abstract system.

Source: Aboveground storage tank information ws obtained from R. Scerbo (1992).

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		<u>"A"-HILL TAN</u>	IK FIELD	
10/78	252,000	Tank No. 514	Heating Oil	Oil Spill Report (1978)
2/15/83	42,000	Tank No. 508	Process Gas Oil	Fuels Operations Supervisor Accident Report
		LUBE OIL	AREA	
03/28/72	1,500	Roadway in plant (exact location not known)	Lube oil additive	Exxon Company, U.S.A.: Ground Spills
04/21/73	700	Roadway in plant (exact location not known)	Lube oil	Exxon Company, U.S.A.: Ground Spills
12/23/78	840-1,050	Tank No. 1	Electric insulating oil	General Accident Report (12/23/78)
12/24/78	6,300	Tank No. 1	Univolt 60	Letter to NJDEP (02/20/79)
03/24/87	10,000	Tank No. 6	1919 Motor oil	Spill/Mixture/Leak Report (03/24/87)
08/10/89	500	243,000-Gallon Tank (vicinity of Tank Nos. 25, 26, 35, and 36)	Lube base oil	NJDEP Notification Report

## Table 5-2.Documented Spills Over 100 Gallons at the Bayonne Plant, Bayonne, New Jersey.

See footnotes on last page.

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Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		LUBE OIL ARE	<u>A (Continued)</u>	
08/23/89	100	Tank No. 8	Exxon Formula No. 1367	Spill/Mixture/Leak Report (08/23/89)
01/03/90	100	Pump on Tank No. 139	Slop oil	Spill/Mixture/Leak Report (01/03/90)
07/30/90	400	Tank No. 581	Wax	Spill/Mixture/Leak Report (07/30/90)
08/14/90	300	Tank No. 94	Lube oil	Spill/Mixture/Leak Report (08/14/90)
08/28/90	250	Tank No. 545	Slop oil	Spill/Mixture/Leak Report (08/28/90)
11/28/90	100	Tank No. 23	Raw lube oil (CORAY 220)	Spill/Mixture/Leak Report (11/28/90)
01/15/91	2,500	Tank No. 1	Univolt 60	Spill Incident Report (1991)
07/08/91	421	Ground (exact location not known)	Turbo oil	Spill Incident Report (1991)
08/26/91	100	Truck loading rack	Wax	Spill Incident Report (1991)

See footnotes on last page.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		LUBE OIL AR	EA (Continued)	
02/14/92	100	Between Tank Nos. 106 and 107	Nuto H-46	Leaks, Discharges, and AIINS Incidents (1992)
02/18/92	600	Tank No. 107	Unknown	Leaks, Discharges, and AIINS Incidents (1992)
07/09/92	840	Wax at Tank Nos. 585 and 586	Wax	Leaks, Discharges, and AIINS Incidents (1992)
		PIER NC	). 1 AREA	
09/22/72	2,100	Pier 1 Kill Van Kull Waterway	Wax (MEK Feed)	Oil Spill Report Second Half (1972)
06/28/78	670	Kill Van Kull Waterway	Waste oil	United States Coast Guard (02/06/79)
10/30/79	1,050-2,100	Kill Van Kull Waterway	Heavy fuel oil	Letter to HQ (11/01/79)
11/15/79	> 672	Kill Van Kull Waterway	Emulsion flux	Letter to HQ (11/26/79)
06/04/89	840	Pier 1 Kill Van Kull Waterway	Fuel oil	Bayonne Terminal Incidents (1989)

See footnotes on last page.

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Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		<u>NO. 2 TANK</u>	FIELD	
3/01/89	Unknown	Tank No. 1005	No. 2 Fuel Oil	General Incident Report (03/01/89)
		ASPHALT PLA	NT AREA	
11/19/70	300	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
11/22/70	300	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
11/25/70	100	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
12/02/70	300	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
12/15/70	150	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
12/23/70	400	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
01/05/71	600	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills

## Table 5-2.Documented Spills Over 100 Gallons at the Bayonne Plant, Bayonne, New Jersey.

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Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		ASPHALT PLANT A	REA (Continued)	
01/08/71	300	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
03/19/71	350	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
05/25/71	100	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
05/28/71	200	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
07/15/71	200	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
07/30/71	1,000	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
08/09/71	500	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
08/11/71	200	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills

## Table 5-2.Documented Spills Over 100 Gallons at the Bayonne Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		ASPHALT PLANT A	REA (Continued)	
08/13/71	300	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
09/03/71	100	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
09/10/71	100	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
10/03/71	600	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
01/18/72	100	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
02/09/72	200	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
05/08/72	100	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
12/14/72	1,000	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		ASPHALT PLANT A	REA (Continued)	
01/05/73	300	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
03/20/73	100	Roadway in plant Asphalt (exact location not known)		Exxon Company, U.S.A.: Ground Spills
03/20/73	500	Roadway in plant (exact location not known)	oadway in plant Asphalt exact location not known)	
04/04/73	1,500	Roadway in plant (exact location not known)	Asphalt	Exxon Company, U.S.A.: Ground Spills
01/05/87	500	OCP at Tank No. 923	Exxon Formula No. 82899	Shift Super Spill Log
		AV-GAS TAN	K FIELD	
01/30/88	5,000	Tank No. 1010	Toluene	Spill/Mixture/Leak Report (01/30/88)
01/08/92	100	AV-Gas Tank Field (exact location not known)	Heavy fuel oil Exxon Letter to	

Table 5-2.Documented Spills Over 100 Gallons at the Bayonne Plant, Bayonne, New Jersey.

See footnotes on last page.

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Reported Spill Date Volume (Gallons)		Approximate Location	Material Spilled	Spill Documentation
-		AV-GAS TANK FIEI	D (Continued)	
1992	Unknown	North of Tank No. 1015 at northern boundary to the west of the overhead piping rack.	Diesel	Personal communication with R. Scerbo (11/8/94)
		EXXON CHEMICALS	S PLANT AREA	
01/08/87	700	ATF R/R (exact location not known)	Exxon Formula No. 80831	Shift Super Spill Log
01/17/87	100	Tank No. 811	Exxon Formula No. 81348	Shift Super Spill Log
02/12/87	300 "A" Reactor (exact location not known)		Exxon Formula No. 80682	Shift Super Spill Log
02/14/87	300	Tank No. 799	Slop oil	Shift Super Spill Log
02/15/87	300	Tank No. 793 (exact location not known)	Exxon Formula Shift Super Spill No. 81744	
11/04/88	6,000	Tank No. 736	Cyclohexane	Emergency Response Field Report

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Table 5-2.Documented Spills Over 100 Gallons at the Bayonne Plant, Bayonne, New Jersey.

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		EXXON CHEMICALS PLA	NT AREA (Continued)	
Unknown	Unknown	Tank No. 727 (explosion)	Napthalene	Personal Communication With Chemical Plant Personnel (11/8/94)
		<u>NO, 3 TANI</u>	<u> FIELD</u>	
01/26/88	500	Tank No. 920	F540	Spill/Mixture/Leak Report (01/26/88)
8/3/78	Unknown	Tank No. 916 (evidence of tank leakage)	Unknown	Report by Bayway Inspections
				(8/3/78)
		<u>GENERAL TA</u>	NK FIELD	
10/14/90	300	Tank No. 1058	Oil	Spill/Mixture/Leak Report (10/14/90)
10/30/90	1,000	Tank No. 1059	Oily sludge	General Accident Report (10/30/90)
		SOLVENT TA	NK FIELD	
09/22/82	92,400	Tank No. 1033	Isopar L	Exxon Letter to NJDEP (11/16/82)

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Reported Spill Date Volume (Gallons)		Approximate Location	Material Spilled	Spill Documentation	
		SOLVENT TANK FI	ELD (Continued)		
02/18/92	2,400	North of Low Sulfur Tank Field (exact location not known)	Heavy oil and diesel	Exxon Letter to NJDEP	
09/10/90	1,114	Truck loading rack	Xylene	Spill/Mixture/Leak Report (09/10/90)	
		LOW SULFUR T	ANK FIELD		
02/21/76	142,800	Tank No. 1069	F-942 No. 6 Oil	Report of Committee Investigating Spill	
		PIERS AND EAST SIDE T	REATMENT PLANT		
08/12/71	4,200	Pier 6 Upper New York Bay	Gear oil	Supervisor's Report Incident (8/12/71)	
05/30/72	4,200	Pier 6 Upper New York Bay	Asphalt Oil Spill Re		
08/22/72	21,000	Pier 6 Upper New York Bay	No. 6 oil	Oil Spill Report Second Half (1972)	

Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		PIERS AND EAST SIDE TREA	TMENT PLANT (Continued	<u>1)</u>
09/10/72	21,000	Pier 6 Upper New York Bay	Gas-oil	Oil Spill Report Second Half (1972)
09/19/73	126	Pier 6 Upper New York Bay	Unknown	Oil Spill Report Second Half (1973)
10/21/73	210	Pier 7 Upper New York Bay	No. 2 fuel oil	Oil Spill Report Second Half (1973)
02/11/79	168	Pier 7 Upper New York Bay	No. 2 fuel oil	General Accident Report (02/11/79)
12/19/85	< 1,134	Pier 7 Upper New York Bay	No. 2 fuel oil	Spill Incident Report (1985)
11/23/87	100	Piers 6 and 7	Emulsion New York Bay	Oil Spill Summary (1987)
03/21/88	200	Upper New York Bay	Oil	Spill/Mixture/Leak Report (03/21/88)
05/01/88	200	Upper New York Bay	1941 ATF	Spill/Mixture/Leak Report (05/01/88)

Table 5-2. Documented Spills Over 100 Gallons at the Bayonne Plant, Bayonne, New Jersey.

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Date	Reported Spill Volume (Gallons)	Approximate Location	Material Spilled	Spill Documentation
		PIERS AND EAST SIDE TREA	TMENT PLANT (Continued)	
10/24/89	100	Pier 7 Upper New York Bay	Diesel fuel	Bayonne Terminal Incidents (1989)
11/03/89	9 100 Pier 7 Upper New York Bay		Diesel fuel	Bayonne Terminal Incidents (1989)
02/09/90	20,000	Pier 7, Kill Van Kull	No. 2 fuel oil	NJDEP Incident Notification Report
05/22/91	350	Upper New York Bay	Xylene	- Spill Incident Report (1991)
06/18/91	16,000	Upper New York Bay No. 2 heating oil		Oil Spill Incident Report (1991)
08/01/91	100	Line near new Tank No. 1097	Blend oil	Spill Incident Report (1991)

 Table 5-2.
 Documented Spills Over 100 Gallons at the Bayonne Plant, Bayonne, New Jersey.

## Page 12 of 14

## DOMESTIC TRADE AREA

No documented spills greater than 100 gallons.

## **STOCKPILE AREA**

No documented spills greater than 100 gallons.

See footnotes on last page.

Date	Reported Spill	Approximate	Material	Spill
	Volume (Gallons)	Location	Spilled	Documentation

## MDC BUILDING AREA

No documented spills greater than 100 gallons.

## **UTILITIES AREA**

No documented spills greater than 100 gallons.

## MAIN BUILDING AREA

No documented spills greater than 100 gallons.

## **MISCELLANEOUS SPILLS**

11/23/76	147	Kill Van Kull Waterway or Upper New York Bay	No. 2 fuel oil	Oil Spill Data (1976)
07/13/78	168	Kill Van Kull Waterway or Upper New York Bay	Diesel	Oil Spill Data (1978)
10/10/78	630	Kill Van Kull Waterway or Upper New York Bay	Asphalt	Oil Spill Data (1978)
12/25/78	210	Kill Van Kull Waterway or Upper New York Bay	Bunker fuel oil	Oil Spill Data (1978)
03/28/88	200	Ground	EXXMARX 70-5720	Bayonne Plant 1988

See footnotes on last page.

Date	Reported Spill Volume (Gallons)	ApproximateMaterialLocationSpilled		Spill Documentation
		MISCELLAN	EOUS SPILLS	
12/28/88	110	Barge overflow into New York Bay	No. 2 fuel oil	NJDEP Incident Notification Report
12/28/88	130	Hose transfer at pier	Fuel oil	Emergency Response Field Report
01/18/89	6,000	Ground	Motor oil dispersant	Spill/Mixture/Leak Report
02/28/90	715	Off barge E-25	No. 6 oil blend	
01/21/92	2,500	Transfer from barge to Tank No. 1065	Black oil	Leaks, Discharges, and AIINS Incidents (1992)
10/06/92	100	Tank	Unknown product	Leaks, Discharges, and AIINS Incidents (1992)

ATF Automatic transmission fluid.

HQ Headquarters.

NJDEP New Jersey Department of Environmental Protection.

AV-GAS Aviation gas.

MDC Metropolitan distribution center.

Source: Spill documentation was obtained from the Bayonne Health Department and Bayonne Fire Department (1992), from Exxon Company, U.S.A. files on spill reports (1992b), and through personal communications with R. Scerbo (1992, 1994a), and Exxon Chemicals Plant personnel (1994).

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Table 5-3. Inventory of Past and Present Underground Storage Tanks at the Bayonne Plant, Bayonne, New Jersey.

Tank ID	Location	Capacity (gallons)	Contents	Date Installed	Integrity Testing	Status *
Unknown	Wax Building, Lube Oil Area	Unknown	Gasoline	Pre-1986	Unknown	Removed post-1986.
Unknown	1- and 5-Quart Filling Building, Lube Oil Area	Unknown	Gasoline	Pre-1986	Unknown	Removed post-1986.
Unknown	Blending and Packaging Warehouse, Lube Oil Area	Unknown	Gasoline	Pre-1986	Unknown	Removed prior to 1986. Perhaps April 1985.
E2 (concrete sump)	Exxon Chemicals Plant Area	4,210 (containment when disconnecting hoses)	Collection sump for lube oil additives	Unknown	Unknown	Unknown.
E3 (concrete sump)	Asphalt Plant Area	6,800	Collection sump for lube oil additives	Unknown	Unknown	Unknown.
E4 (concrete sump)	Exxon Chemicals Plant Area	6,824	Collection sump for transmission fluid	Unknown	Unknown	Unknown.
002 (also referred to as "light oil sump")	Filling Building, Solvent Tank Field	2,000	Solvents (Varsol, Isopar X, toluene, xylene, aromatics)	1973	Tested April 29, 1989 - failed. Hydrocarbon contamination noted on April 30, 1992 during excavation (Case No. 92-430-1202-30).	Removed April 1992. Residual contamination to be addressed by ACO.
Unknown	Domestic Trade Area	Unknown	Diesel	Pre-1986	Unknown	Removed post-1986.

See Page 2 for footnotes.

GERAGHTY & MILLER, INC.

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Table 5-3. Inventory of Past and Present Underground Storage Tanks at the Bayonne Plant, Bayonne, New Jersey.

Tank ID	Location	Capacity (gallons)	Contents	Date Installed	Integrity Testing	Status *
				D . 1000	<b>T</b> 1 1	D
Unknown	Domestic Trade Area	Unknown	Waste (slop) oil	Pre-1980	Unknown	Removed post-1980.
Unknown	Domestic Trade Area	Unknown	Heating oil	Unknown	Unknown	Remains in service.
Unknown	MDC Building	Unknown	Diesel	Pre-1986	Unknown	Removed post-1986.
Unknown	MDC Building	Unknown	Diesel	Pre-1986	Unknown	Removed post-1986.
Unknown	MDC Building	Unknown	Diesel	Pre-1986	Unknown	Removed post-1986.
001 (also referred to as G-1)	Main Building	2,000	Unleaded gasoline	<b>1979</b>	Tested September 1982 - passed. Tested August 1989 - failed. Release reported to NJDEP on August 11, 1989 (Case No. 89-08-11-1107). Confirmation of release reported on August 15, 1989 (Case No. 89-08-15-1520).	Removed August 17, 1989. DICAR investigation to be conducted in conjunction with NJPDES-DGW permit.
003	Main Building	2,000	Unleaded gasoline	1989	Unknown	Currently in service. Replacement tank for 001.

MDC Metropolitan Distribution Center.

NJDEP New Jersey Department of Environmental Protection.

DICAR Discharge Investigation and Corrective Action Report.

NJPDES New Jersey Pollutant Discharge Elimination System.

DGW Discharge to Groundwater.

ACO Administrative Consent Order.

\* Underground storage tank (UST) status on October 13, 1984 as related by Ron E. Scerbo, Exxon Company, U.S.A.

Sources: Exxon Company, U.S.A. 1988b. Exxon Company, U.S.A. 1989a. Exxon Company, U.S.A. 1990.

Location	Transformer	Location	Serial No.	PCB Content (ppm)	Weight (kg)	Dechlorination Date	Transformer Status *
Station F-1	GE 500 kva 4,160-480 V 280 Gal.	Lube Oil Area	G638543	PCB liquid	1,590	NA	Removed
Station G-3 Sub No. G-3	GE 750 kva 4,160-480 V 425 Gal.	Lube Oil Area	8641561	PCB liquid	2,145	12/17/86 425 Gal. Removed	Removed
Station A-3 Sub No. 15	GE 500 kva 4,160-480 V 140 Gal.	Solvent Tank Field	NA	13,720	795	12/17/86 140 Gal. Removed	Removed
Station C-2 Sub No. 17	GE 500 kva 160-480 V 110 Gal.	Low Sulfur Tank Field	F92760	2,093	625	12/17/86 110 Gal. Removed	In service
Station E-1	Wagner 300 kva 4,160-480 V 170 Gal.	Utilities Area	K9G1037	PCB liquid	966	NA	Removed
Station E-1	Wagner 200 kva 4,160-480 V 124 Gal.	Utilities Area	G9C1594	PCB liquid	705	NA	Removed
Station F-2	Standard 500 kva 4,160-480 V 247 Gal.	Main Building Area	130889	21,862	1,403	NA	Removed
PCB ppm	Polychlorinated b Parts per million.	iphenyls.					
kg	Kilograms.						
GE	General Electric.						
kva	Kilovolt ampere.						
v Gal	voit. Gallon						
NA	Information not a	vailable.					
*	Transformer statu	is as of October 13	, 1994 (Scerbo	1994b).			
Sources:							

Table 5-4. Summary of Transformers Known to Have Contained Polychlorinated Biphenyl Dielectric Fluids, Bayonne Plant, Bayonne, New Jersey.

Exxon Company, U.S.A. (1986) Exxon Company, U.S.A. (1994)

		Product Thickness in Feet					
WELL ID	IRM AREA <sup>(a)</sup>	Dec. 91-Jan 92	Sep-92	Dec-92	6-Jan-93	11-Jan-93	31-Mar-93
OPERATIONAL AREAS						·	
"A" - Hill Tank Field							
EB-25	"A"-Hill Tank Field	0.15	NM	0.16	NM	NM	0.17
EB-26	"A"-Hill Tank Field	<0.01	NM	0.03	NM	NM	0.01
EB-27	"A"-Hill Tank Field	ND	NM	ND	NM	NM	ND
EB-28	"A"-Hill Tank Field	ND	NM	ND	NM	NM	ND
EB-29	"A"-Hill Tank Field	ND	NM	ND	NM	NM	ND
EB-30	"A"-Hill Tank Field	ND	NM	ND	NM	NM	ND
Lube Oil Area							
EB-16	Lube Area	1.54	NM	1.34	NM	NM	1.01
EB-17	Lube Area	>1.87	NM	>1.28	NM	NM	0.25
EB-21	Lube Area	<0.01	NM	ND	NM	NM	ND
EB-22	Lube Area	7.58	NM	0.16	NM	NM	0.11
EB-23	Lube Area	0.18	NM	0.11	NM	NM	0.11
EB-24	Lube Area	0.33	NM	0.34	NM	NM	0.33
PKMW-5	Platty Kill Creek Area						
PKMW-6	Platty Kill Creek Area						
PKMW-7	Platty Kill Creek Area						
PKMW-14	Platty Kill Creek Area						
Pier No. 1 Area							
EB-1	Helipad Area	ND	NM	ND	NM	NM	ND
EB-2	Helipad Area	0.33	NM	0.17	NM	NM	0.22
EB-3	Helipad Area	0.7	NM	0.01	NM	NM	0.42
EB-4	Helipad Area	0.17	NM	0.06	NM	NM	0.04
EB-5	Helipad Area	0.11	NM	0.02	NM	NM	0.15
EB-6	Helipad Area	0.01	NM	ND	NM	NM	ND
EB-7	Helipad Area	0.18	NM	<0.01	NM	NM	0.16

Table 5-5. Product Thickness Measurements Conducted by Dan Raviv Associates, Inc. at the Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

		Product Thickness in Feet					
WELL ID	IRM AREA <sup>(a)</sup>	Dec. 91-Jan 92	Sep-92	Dec-92	6-Jan-93	11-Jan-93	31-Mar-93
Pier No. 1 Area (Continued)							
EB-8	Helipad Area	ND	NM	ND	NM	NM	ND
EB-9	Helipad Area	0.91	NM	1.81	NM	NM	0.75
EB-10	Helipad Area	1.12	NM	0.14	NM	NM	1.5
EB-11	Helipad Area	0.61	NM	0.09	NM	NM	0.21
EB-12	Helipad Area	1.37	NM	3.53	NM	NM	3.11
EB-13	Helipad Area	3.65	NM	0.85	NM	NM	1.79
EB-14	Helipad Area	< 0.01	NM	ND	NM	NM	ND
EB-15	Platty Kill Creek Area	ND	NM	ND	NM	NM	ND
EBR-1	Helipad Area	0.01	NM	0.02	NM	NM	0.01
EBR-2	Helipad Area	0.11	NM	0.01	NM	NM	ND
EBR-3	Helipad Area	<0.01	NM	0.26	NM	NM	0.07
EBR-4	Helipad Area	0.99	NM	0,32	NM	NM	0.16
EBR-5	Helipad Area	1.5	NM	2,73	NM	NM	4.13
EBR-6	Helipad Area	0.16	NM	0.01	NM	NM	0.01
EBR-7	Helipad Area	ND	NM	ND	NM	NM	ND
EBR-8	Helipad Area	0.75	' NM	1.17	NM	NM	1,58
EBR-22	Platty Kill Creek Area	ND	NM	ND	NM	NM	ND
No. 2 Tank Field							
EB-92 *	Interceptor Trench Area						
EB-93 *	Interceptor Trench Area						
Asphalt Plant Area							
No monitoring wells currently ex	ist in the Asphalt Plant Area.						
AV-Gas Tank Field							
EB-46	Interceptor Trench Area	<0.01	NM	ND	NM	NM	ND
EB-87 *	Interceptor Trench Area	NM	NM	NM	NM	NM	NM
EB-88 *	Interceptor Trench Area	NM	NM	NM	NM	NM	NM

Table 5-5. Product Thickness Measurements Conducted by Dan Raviv Associates, Inc. at the Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

Product Thickness in Feet IRM AREA (a) WELL ID Dec. 91-Jan 92 Sep-92 Dec-92 6-Jan-93 11-Jan-93 31-Mar-93 AV-Gas Tank Field (Continued) EB-89 \* Interceptor Trench Area NM NM NM NM NM NM EB-91 \* Interceptor Trench Area NM NM NM NM NM NM EB-99 \* Interceptor Trench Area NM NM NM NM NM NM IT-MW1 Interceptor Trench Area --------------------Exxon Chemicals Plant Area MW-1 Exxon Chemicals Plant Area 1.00 NM 1.00 NM NM 1.97 MW-2 Exxon Chemicals Plant Area 1.20 NM 0.35 NM NM 0.29 No. 3 Tank Field No monitoring wells currently exist in the No. 3 Tank Field. General Tank Field **EB-47** Pier 7 Area ND NM ND NM NM ND **EB-48** Pier 7 Area ND NM ND NM NM ND EB-50 Pier 7 Area ND NM ND NM NM ND EB-51 Pier 7 Area ND NM ND NM NM ND EB-52 Pier 7 Area 0.01 NM 1.34 NM NM 1.00 SHERI 3 Pier 7 Area NM NM NM NM NM NM Solvent Tank Field EB-53 LSSTF < 0.01 NM ND ND ND ND EB-54 LSSTF ND NM ND ND ND ND EB-56 Pier 7 Area 0.02 NM 0.65 NM NM 0.58 EB-57 Pier 7 Area ND NM ND NM NM < 0.01 EB-79 LSSTF 6.03 NM 8,79 7.52 8.50 7.30 **EB-84** Pier 7 Area NM NM NM NM NM 3.20

Table 5-5. Product Thickness Measurements Conducted by Dan Raviv Associates, Inc. at the Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.
	Produc	t Thickness	in Feet			
Dec. 91-Jan 92	Sep-92	Dec-92	6-Jan-93	11 <b>-</b> Jan-93	31-Mar-93	
· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·		• • • •		
			1.78	2.83	10.00	
			11.85	9.40	17.75	
			ND	ND	ND	
			ND	ND	ND	
<0.01	NM	ND	ND	ND	ND	
0.40	NM	0.01	0.20	0.20	0.10	
8.02	NM	10.29	10.46	11.85	8.90	
5.15	NM	6.05	5.95	7.36	7.05	
7,13	NM	5.56	3.03	3.66	3.20	
0.74	NM	ND	<0.01	0.01	ND	
			8.26	8.33	7.20	
			ND	ND	0.07	
			ND	ND	ND	
			ND	ND	ND	
			ND	ND	ND	
			7.82	8.46	9.20	
			11.95	12.44	10.20	
			1.63	1.52	1.55	
ND	NM	ND	NM	NM	ND	
<0.01	NM	1,90	NM	NM	0.71	
0.10	NM	ND	NM	NM	3.27	
<0.01	NM	ND	NM	NM	0.17	
0.01	NM	1.11	NM	NM	0.16	
0.01	NM	0.77	NM	NM	3.01	
ND	NM	0.09	NM	NM	<0.01	
	Dec. 91-Jan 92	Dec. 91-Jan 92         Sep-92   -	Dec. 91-Jan 92         Sep-92         Dec-92   5.15         NM         6.05            7.13         NM         5.56         0.74         NM         ND	Dec. 91-Jan 92         Sep-92         Dec-92         6-Jan-93              11.85              ND             ND <t< td=""><td>Dec. 91-Jan 92         Sep-92         Dec-92         6-Jan-93         11-Jan-93              11.85         9.40              ND         ND              ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         N</td><td>Dec. 91-Jan 92         Sep-92         Dec-92         6-Jan-93         11-Jan-93         31-Mar-93           -         -         -         11.85         9.40         17.75           -         -         -         ND         ND         ND           -         -         -         ND         ND         0.07           -         -         -         ND         ND         ND           -         -         -         ND         ND         ND           -         -         -         ND</td></t<>	Dec. 91-Jan 92         Sep-92         Dec-92         6-Jan-93         11-Jan-93              11.85         9.40              ND         ND              ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         ND             ND         ND         N	Dec. 91-Jan 92         Sep-92         Dec-92         6-Jan-93         11-Jan-93         31-Mar-93           -         -         -         11.85         9.40         17.75           -         -         -         ND         ND         ND           -         -         -         ND         ND         0.07           -         -         -         ND         ND         ND           -         -         -         ND         ND         ND           -         -         -         ND

See last page for footnotes.

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GERAGHTY & MILLER, INC.

			Produc	t Thickness	in Feet			
WELL ID	IRM AREA (*)	Dec. 91-Jan 92	Sep-92	Dec-92	6-Jan-93	11-Jan-93	31-Mar-93	
Piers and East Side					- · · · <u></u>			
Treatment Plant Area	(Continued)							
EB-64	Pier 7 Area	0.73	NM	0.28	NM	NM	0.34	
EB-65	Pier 7 Area	< 0.01	NM	1.15	NM	NM	0.13	
EB-66R	Pier 7 Area	0.02	NM	0.58	NM	NM	1.42	
EB-67	Pier 7 Area	0.80	NM	0.36	NM	NM	0.21	
EB-68	Pier 7 Area	ND	NM	ND	NM	NM	0.05	
EB-69	Pier 7 Area	0.01	NM	0.73	NM	NM	1.75	
EB-70	Pier 6 Area	NM	NM	NM	NM	NM	NM	
EB-71	Pier 6 Area	ND	<0.01	0,02	NM	NM	ND	
EB-72	Pier 6 Area	< 0.01	0.67	0.60	NM	NM	0.43	
EB-73	Pier 6 Area	< 0.01	0.05	0.19	NM	NM	0.12	
EB-74	Pier 6 Area	<0.01	0.04	0.09	NM	NM	<0.01	
EB-82	Pier 7 Area	ND	NM	ND	NM	NM	ND	
EB-85	Pier 6 Area	NM	NM	NM	NM	NM	NM	
EB-86	Pier 6 Area	NM	NM	NM	NM	NM	NM	
EBR-9	Pier 7 Area	ND	NM	ND	NM	NM	<0.01	
EBR-10	Pier 7 Area	ND	NM	ND	NM	NM	0.01	
EBR-11	Pier 7 Area	0.21	NM	<0.01	NM	NM	0.16	
EBR-12	Pier 6 Area	0.01	· 0.63	0.42	NM	NM	0.50	
EBR-13	Pier 6 Area	ND	<0.01	ND	NM	NM	ND	
EBR-14	Pier 6 Area	ND	<0.01	ND	NM	NM	ND	
EBR-15	Pier 6 Area	ND	ND	ND	NM	NM	ND	
EBR-16	Pier 6 Area	< 0.01	ND	ND	NM	NM	ND	
EBR-17	Pier 6 Area	< 0.01	ND	ND	NM	NM	ND	
EBR-18	Pier 6 Area	<0.01	1.09	1.31	NM	NM	1.30	
EBR-19	Pier 6 Area	ND	ND	ND	NM	NM	ND	
EBR-20	Pier 6 Area	NM	ND	ND	NM	NM	ND	
EBR-21	Pier 6 Area	NM	0.52	ND	NM	NM	ND	
EBR-23	Pier 6 Area	NM	ND	ND	NM	NM	ND	
P7MW-1	Pier 7 Area					**		
P7MW-2	Pier 7 Area	-						

See last page for footnotes.

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GERAGHTY & MILLER, INC.

			Produc	t Thickness	in Feet		
WELL ID	IRM AREA (*)	Dec. 91-Jan 92	Sep-92	Dec-92	6-Jan-93	11-Jan-93	31-Mar-93
Piers and East Side <u>Treatment Plant Area</u> (Continued	d)					<u> </u>	
SHERI 1 SHERI 2	Pier 6 Area Pier 6 Area	NM NM	NM NM	NM NM	NM NM	NM NM	ND ND
Domestic Trade Area							
No monitoring wells currently ex	cist in the Domestic Trade Area.						
MISCELANEOUS AREAS							
Stockpile Area							-
EB-18	Platty Kill Creek Area	ND	NM	ND	NM	NM	ND
EB-19	Platty Kill Creek Area	0.69	NM	0.70	NM	NM	3,88
EB-90	Platty Kill Creek Area	NM	NM	NM	NM	NM	NM
PKMW-1	Platty Kill Creek Area						
PKMW-2	Platty Kill Creek Area						
PKMW-3	Platty Kill Creek Area						
PKMW-4	Platty Kill Creek Area						
PKMW-8	Platty Kill Creek Area						
PKMW-9	Platty Kill Creek Area						
PKMW-10	Platty Kill Creek Area				••		
PKMW-11	Platty Kill Creek Area		-				
PKMW-12	Platty Kill Creek Area						
PKMW-13	Platty Kill Creek Area					-+	
PKMW-15	Platty Kill Creek Area						

## MDC Building Area

No monitoring wells currently exist in the MDC Building Area.

## Utilities Area

No monitoring wells currently exist in the Utilities Area.

See last page for footnotes.

GERAGHTY & MILLER, INC.

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		Product Thickness in Feet					
WELL ID	IRM AREA <sup>(a)</sup>	Dec. 91-Jan 92	Sep-92	Dec-92	6-Jan-93	11-Jan-93	31-Mar-93
Main Building Area		· · · · · · · · · · · · · · · · · · ·					
EB-31	Interceptor Trench Area	ND	NM	ND	NM	NM	ND
EB-33	Interceptor Trench Area	ND	NM	ND	NM	NM	ND
EB-34	Interceptor Trench Area	0.58	NM	0.60	NM	NM	0.42
EB-35	Interceptor Trench Area	ND	NM	ND	NM	NM	ND
EB-36	Interceptor Trench Area	0.01	NM	0.07	NM	NM	<0.01
EB-40	Interceptor Trench Area	0.01	NM	ND	NM	NM	ND
EB-41	Interceptor Trench Area	0.02	NM	ND	NM	NM	0.10
EB-42	Interceptor Trench Area	0.10	NM	ND	NM	NM	0.14
EB-44	Interceptor Trench Area	0.01	NM	ND	NM	NM	ND
EB-45	Interceptor Trench Area	ND	NM	ND	NM	NM	ND
EB-83	Interceptor Trench Area	NM	NM	NM	NM	NM	0.01
EB-94 *	Interceptor Trench Area	NM	NM	NM	NM	NM	NM
EB-95 *	Interceptor Trench Area	NM	NM	NM	NM	NM	NM
EB-96 *	Interceptor Trench Area	NM	NM	NM	NM	NM	NM
EB-97 *	Interceptor Trench Area	NM	NM	NM	NM	NM	NM
ÉB-98	Interceptor Trench Area	NM	NM	NM	NM	NM	NM
ITMW-2	Interceptor Trench Area						
ITMW-3	Interceptor Trench Area						
ITMW-4	Interceptor Trench Area	••					
ITMW-5	Interceptor Trench Area						
ITMW-6	Interceptor Trench Area						

	IRIVI areas as adapted from Dan Raviv Associates, Inc. (1993a, 1993b, and 1994).
IRM	Interim Remedial Measure.
LSSTF	Low Sulfur and Solvent Tank Fields.
NM	Not measured.
ND	Product not detected.
	Monitoring well not yet installed at this date.
<	Less than.

Greater than. > AV-Gas

MDC

\*

Aviation gasoline. Metropolitan Distribution Center. Well location is outside of the property boundary. Dan Raviv Associates, Inc. (1993d).

Source:

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Table 5-1.	Inventory of	f Aboveground St	orage Tanks a	it the Bayonne	Plant, Ba	yonne, New	Jersey.
------------	--------------	------------------	---------------	----------------	-----------	------------	---------

			Tank Dimensions	Appro	ximate		
Tank	Tank	Year	(Diameter x height	Сар	acity	Tank Content	CAS Number
Number	Туре	Built	in feet)	(Barrels)	(Gallons)		
ASPHALT PLAN	T AREA (CONT.)						
942	Carbon steel AST	1957	20x40	2251	94542	7060	
943	Carbon steel AST	1957	25x40	3517	147714	7037	64792-93-4
950	Carbon steel AST	1960	60x48	24227	1017534	AC-20	8052-42-4
955	Carbon steel AST	1948	60x48	23989	1007538	Out of service	
956	Carbon steel AST	1948	25x42	21269	893298	AC-20	8052-42-4
959	Carbon steel AST	1948	25x42	3678	154476	160/180 EMFLUX	
960	Carbon steel AST	1948	25x42	3686	154812	AC-5	8052-42-4
961	Carbon steel AST	1948	25x42	3681	154602	AC-20	8052-42-4
962	Carbon steel AST	1948	25x42	3693	155106	AC-10	8052-42-4
963	Carbon steel AST	1948	25x42	3669	154098	Out of service	
964	Carbon steel AST	1948	25x42	3683	154686	AC-5	8052-42-4
965	Carbon steel AST	1948	25x42	3683	154686	AC-20	8052-42-4
966	Carbon steel AST	1948	25x42	3683	154686	AC-10	8052-42-4
967	Carbon steel AST	1957	20x40	2235	93870	AC-10	8052-42-4
968	Carbon steel AST	1957	20x40	2226	93492	EXXPRINT 990	64742-93-4
969	Carbon steel AST	1960	20x40	2232	93744	7107 Rooters Flux	8052-42-4
970	Carbon steel AST	1957	20x40	2234	93828	160/180 EMFLUX	8012-42-4
971	Carbon steel AST	1957	10x32	2229	93618	LSFO	68476-33-5
972	Carbon steel AST	(a)	(a)	(a)	(a)	Out of service	
973	Carbon steel AST	1960	10x32	433	18186	EXXPAVEHP-60	8052-42-4
974	Carbon steel AST	1960	10x32	432	18144	AC-20	8052-42-4
975	Carbon steel AST	1960	10x32	432	18144	EXXPAVEHP-60	8052-42-4
986	Carbon steel AST	1924	25x30	2620	110040	Kerosene	8008-20-6
987	Carbon steel AST	1938	25x30	2625	110250	Varsol 18	8056-41-3
988	Horizontal Drum	(a)	10x25	349	14658	Cuthack Nantha	8050-41-5
990	Carbon steel AST	1934	710-1/2x129	115	4830	1419 Ind Oil	
993	Carbon steel AST	1959	25x40	3498	146916	NBH	
AVIATION (AV) (	GAS TANK FIELD						
1009	Carbon steel AST	1957	110×56	96374	4045608	Ort of arrive	NI (A
1010	Carbon steel AST	1957	75+56	44675	1874250	Taluana	N/A
1011	Carbon steel AST	1957	75456	44025	1079450	I oluene	108-88-3
1012	Carbon steel AST	1957	50256	10679	876476	NCTOSCIC Mantana	8008-20-6
1013	Carbon steel AST	1957	50,50	17076	820470	Heptane	142-82-5
1014	Carbon steel AST	1957	100-46	28212	1197304	Hexane	110-54-3
1014	Carbon steel AST	1957	100x36	79501	3339042	Out of service	
1016	Carbon steel AST	1937	40x36	12392	528864	Out of service	
1013	Carbon steel AST	1937	40X36	12396	529032	Cutback Naptha	Multiple
1019	Carbon steel AST	1937	/5856	44625	1874250	AVGAS	N/A
1010	Carbon seet AS I	1957	/3836	44620	1874250	260 Diesel	68476-34-6
CHEMICAL PLA	NT AREA						
730	Carbon steel AST	1959	10x32	440	18480	Out of service	
731	Carbon steel AST	1959	10x32	440	18480	Out of service	
732	Carbon steel AST	1959	10x32	440	18480	Out of service	
733	Carbon steel AST	1959	10x32	440	18480	Out of service	
See footnotes on last	page.						

GERAGHTY & MILLER, INC.

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	POTENTIAL	HAZARDOU	S WASTE SIT	Έ	I. IDENTI	FICATION
VERA	PRELIN PART 1-SITE IN	INARY ASS	ESSMENT	FNT	OT STATE C	2 SITE NUMBER 78
ILSITE NAME AND LOCATION						
OI SITE NAME (Legel, common, or desensing nom	e af site)	07 57				<u> </u>
Exxon Bayonne Plant		Foo	t of Eas	t 22nd St	reet	
ayonne		04 STA NJ	12 05 ZIP CODE 07002	OS COUNTY Hudson		OTCOUNTY OR
40 39 13.0	LONGITUDE 74 06 47	O BLOCA	381A	Lor 81		,I <u>_</u>
o Diffections to site (stering from Autor) and then on to 21st. Str last 22nd. Street.	eet East. 21	sey Turn Ist St t	pike Sou o Hook R	th Exit l oad which	4A to leads	Avenue E to
II. RESPONSIBLE PARTIES				<u> </u>		
T. OWNER (If known)		O2 STR	ET (Business, mering	(tesidennel)		
		Foot	: of East	t 22nd Sti	reet	
ayonne		04 STAT NJ	E 05 ZIP CODE 07002	05 TELEPHONE	NUMBER	
. B. Sounders	· .	Q8 STR	ET/Susness, menne,	residennei)	-/000	· · ·
9CITY	·····	10 STAT	E II ZIP CODE	12 TELEPHONE	NUMBER	
TYPE OF OWNERSHIP (Chece and )		• <u>•</u>	<u></u>			·
🖾 A. PRIVATE 🔤 🗍 8. FEDERAL	[Agenes ]	·	C. STATE	D. COUNTY	E. MU	NICIPAL
				3 W M		•
	(Specity)		—, <del>—</del>			
A. RCRA 3001 DATE RECEIVED:	ELE OIL THOS OPPIF	NTROLLED WASTE	(CERCLA 103e) DA	TE RECEIVED: 6/5	5/81	
CHARACTERIZATION OF POTENTIA	L HAZARD		· · · · · · · · · · · · · · · · · · ·			
ON SITE INSPECTION YES DATE NO CONTRACTOR NAME (S)	BY <i>ICANCE ON THAT AND</i> A EPA E. LOCAL HEAL	HIN EPA CONTR		. STATE	D. OTHER	CONTRACTOR
SITE STATUS (Check and)	O3 YEARS				······································	
A ACTIVE 08 INACTIVE 0C. UP	NKNOWN	187 BEGINNIN	7 Dr		UNKNOWN	
DESCRIPTION OF SUBSTANCES POSSIBLY P	RESENT, KNOWN, OR ALLE	GED				<u> </u>
emicals were dispos	ed of on-sit	tes and te at two	other or Separa	ganic and te locati	inorg	lanic
ckards Tankfield la	ndfill and E	Bayonne I	Plant la	ndfill. (	Attach	ment A)
DESCRIPTION OF POTENTIAL HAZARD TO EN	VIRONMENT AND/OR POPUL	ATION	•			
	<b>.</b> ·					
e tacllity contains tential evists for	two inactiv	∕e ⊂hemio	al land	fills. A		
e tacliity contains tential exists for ntamination. (Atta	two inactiv leachate mig	ve chemic gration (	al land ausing s	fills. A soil and q	ground	water
e tacliity contains tential exists for ntamination. (Atta PRIORITY ASSESSMENT	two inactiv leachate mig chment A)	ration (	al land: ausing :	fills. A soil and (	ground	water
e facility contains tential exists for ntamination. (Atta PRIORITY ASSESSMENT ROBITY FOR INSPECTION (Cross and If August	two inactiv leachate mic chment A)	ration (	al land	fills. A soil and (	ground	water
e facility contains tential exists for ntamination. (Atta PRIORITY ASSESSMENT PRIORITY FOR INSPECTION (Croces are. If August PRIORITY FOR INSPECTION (Croces are. If August (Answering argument) (Answering argument)	two inactiv leachate mig chment A)	ration (	al land ausing : 	fills. A soil and o	ground	water
e tacility contains tential exists for ntamination. (Atta PRIORITY ASSESSMENT PRIORITY FOR INSPECTION (Check and If August (Angeneration control or angent) (Angeneration control or angent) INFORMATION AVAILABLE FROM	two inactiv leachate mig chment A) modum (associated, commission form modum (associated, commission form modum (mission (imposed)	ration (	al land causing s ne fort 3-Concristion DO. NONE (Ne for the or	fills. A soil and o managed communication	ground «mcdunys)	water
e TACIIIty Contains tential exists for ntamination. (Atta PRIORITY ASSESSMENT PRIORITY FOR INSPECTION (Check and // Augo or JA. HIGH (Deserver rearres promoty) INFORMATION AVAILABLE FROM CONTACT Ed Schmitt	two inactiv leachate mic chment A) modum (schecked, commente for (modum (schecked, commente	<pre>/e chemic pration (</pre>	al land ausing s ad Apri 3-Concretion of Months and the former of Months and the former of	fills. A soil and o """"""""""""""""""""""""""""""""""""	ground • • • • • • • • • • • • • • • • • • •	water www.
e tacliity contains tential exists for ntamination. (Atta PRIORITY ASSESSMENT PRIORITY FOR INSPECTION (Check and Margher (And And Margher)) INFORMATION AVAILABLE FROM CONTACT Ed Schmitt PERSON RESPONSIBLE FOR ASSESSMENT	two inactiv leachate mic chment A)	/e chemic gration ( ////////////////////////////////////	al land ausing s ne fort 3-Concretion 0. NONE (Ne fur former of	fills. A soil and o "Mesorece Commence of new deal, commence our	97 ound 	water 
e tacility contains tential exists for ntamination. (Atta PRIORITY ASSESSMENT PRIORITY FOR INSPECTION (Chock and If August INFORMATION AVAILABLE FROM CONTACT ed Schmitt PERSON RESPONSIBLE FOR ASSESSMENT terics Stavrou	two inactiv leachate mig chment A) C.LOW (More OZ OF(Agenc NJDEP:/ OS AGENCY	Pation ( Pation	al land ausing s 0. NONE (No for for or o	OT TELEPHONE NU	ground mcauny) coarte 60' MBER log	water 

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€E	PA	POI	FENTIAL HAZAI PRELIMINARY PART 2- WAST	RDOUS WASTE ASSESSMENT E INFORMATION	E SITE F	I. ICENTIFICAT	ION NUMBER
II WASTES	TATES, QUANTITIES, AN	D CHARACTER	ISTICS				
OI PHYSICAL S	TATES (Check all mer analy )	OZ WASTE QUANT	TTY AT SITE	03 WASTE CHARACT	TERISTICS /Check all the	anaiy)	
	E. SLURRY	Measures of was must be incomen	ite eventitiee went)		. 🗍 E. SOL	UBLE	
	R. FINES TF. LIQUID	TONS		B. CORROSIN			OSIVE ,
		CUBIC VAROS	nknown		IVE 💭 G. FLA		TIVE
TD. OTHER	Dilv Wastes	NO. OF DRUMS					MPATIBLE
~	(Specity)	-		_ · ·			APPLICABLE
UI WASTE T	YPE	*		*			
CATEGORY	SUBSTANCE N	AME	OI GROSS AMOUNT	OZUNIT OF MEASURE	O3 COMMENTS		
SLU	SLUDGE			1	Oilv wast	es. oroani	cs
0.9	OILY WASTE		Unknown		and inord	anics were	,
SOL	SOLVENTS			<u> </u>	disposed	of in land	fills
PS0	PESTICIDES			<u> </u>	and an in	poundment	between
000	OTHER ORGANIC CHEN	UCALS	Inknown	1	1955 and	1965.	
	INORGANIC CHEMICAL	s	lloknows	1.	Attachmer	+ A	, <u>, , , , , , , , , , , , , , , , </u>
			1		FICCECTINE)		
AC0	P4055		+			······································	
BAS	BASES		1				
MES	HEAVY METALS		<u> </u>	<u> </u>			····
IV. HAZARU	OUS SUBSTANCES /See 4	ANE	OR CAS NUMBER				OG MEASURE OF
OI CATEGONT	UZ SUBSTANCE N	AME	US CAS NOMBER		FUSAL METHOD	US CONCENTRATION	CONCENTRATION
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			1	<u>                                      </u>		· · ·	1
V FEEDSTO	CKS (See Annual for Cat in			<b></b>	· · · ·	<u> </u>	,,,,,,,,,,
CATEGOR		NAME	02 CAS NUMBER	CATEGORY	01 FEFDSTO	CK NAME	OZ CAS NUMBER
Ene				FDS			
FU3			+	FDS			
FU3			<del> </del>	FDS			
FUS			·	FDS	<u> </u>		
			1	1	<u> </u>	1	<u> </u>
VI. SUURCES		) filme-		nt A			
NJUEP/ E⊡A =-→	DWR (Lentral	/ TII05;	<ul> <li>Attachme</li> </ul>	a = 1			
rr∺−red	Flaza, Edis	on T1185	a Metachini				
			۱				
							-

EPA FORM 2070-12(7-81)

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DOTENTIAL	AZADONIS WASTE SITE	
	NARY ASSESSMENT	QL STATE 102 SITE NUMBER
PART 3 - DESCRIPTION OF H	AZARDOUS CONDITIONS AND INCIDENTS	
		·····
II. HAZARUOUS CONDITIONS AND INCIDENTS		
OFALLA GROUNDWATER CONTAMINATION		POTENTIAL LACLEGED
03 POPULATION POTENTIALLY AFFECTED:	OA NARNATIVE DESCRIPTION	
ne facility was a petroledmi-re	A biob patroticl for each	
mpoundment from 1708 to 1780.	A high potential for grou	nd water
Ontamination exists. (Attachme		
01 A B. SURFACE WATER CONTAMINATION		POTENTIAL LALLEGED
03 POPULATION POTENTIALLY AFFECTED	O4 NARRATIVE DESCRIPTION	
xxon reported to ErA that appr	Oximately 40 gallons of e	muls1+120 011
ntered Kill van Kull Kiver. In	e spill resulted from the	OVERTION
t the slop oil sumo on fier l	While off-loading a ship.	(Att. B)
01 C. CONTAMINATION OF AIR	02 OBSERVED (DATE:)	POTENTIAL ALLEGED
03 POPULATION POTENTIALLY AFFECTED.	04 NARRATIVE DESCRIPTION	
•		
ON D. FIRE/EXPLOSIVE CONDITIONS	02 0085ERVED (DATE:)	POTENTIAL CALLEGED
03 POPULATION POTENTIALLY AFFECTED:	04 NARRATIVE DESCRIPTION	
•		
01 DE. DIRECT CONTACT	02 0085ERVED (DATE: )	POTENTIAL ALLEGED
03 POPULATION POTENTIALLY AFFECTED:	04 NARRATIVE DESCRIPTION	
	· · · · · · · · · · · · · · · · · · ·	
OF F. CONTAMINATION OF SOIL	OZ COBSERVED (DATE: ) X	POTENTIAL ALLEGED
OS AREA POTENTIALLY AFFECTED:	04 NARRATIVE DESCRIPTION	
ne facility has a lanoritill and	impoundment and that con	tain oily
astes from petroleum refining	operations. As a result,	the
otential for soil contaminatic	on is very high. (Attachm	ent A)
01 DG. DRINKING WATER CONTAMINATION	02 065ERVED (DATE: )	POTENTIAL ALLEGED
03 POPULATION POTENTIALLY AFFECTED:	04 NARRATIVE DESCRIPTION	
	_	
OI , H WORKER EXPOSURE/INJURY	02 0085ERVED (DATE: ) X	POTENTIAL ALLEGED
03 WORKERS POTENTIALLY AFFECTED:	04 NAREATIVE DESCRIPTION	-
art of the site was previously	a landfill and impoundme	nt
nere oily wastes were disposed	l of. A potential for wor	ker exposure
ists if there is contact with	contaminated soil or wat	er.
	02 OBSERVED (DATE:	POTENTIAL TALLEGED
03 POPULATION POTENTIALLY AFFECTED	04 NARRATIVE DESCRIPTION	

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		TAL HAZARDOUS WASTE SITE		I. IUENIIP	STE NUMBER
s epa		CELIMINART ASSESSMENT		NJ 7	5
	FART 3-DESCRIPTION			, <u> </u>	
II. HAZAHUOUS CUNU	THONS AND INCIDENTS ICAN				·····
OI UJ CANAGE TO FL	LORA	02 OBSERVED (DATE:	)	POTENTIAL	ALLÉGEI
04 NARRATIVE DESCRIP					
· · · · · · · ·					
	· · · · · · · · · · · · · · · · · · ·				
-OS. E-FR. DAMAGE TO FR		OZ OBSERVED (DATE:	)	POTENTIAL	ALLEGED
	N OF FOOD CHAIN	02 DOBSERVED (DATE)			
OA NARRATIVE DESCRIP			i	UPOTENTIAL	UALLEGED
	•				
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OS DESCRIPTION OF ANY OTHER KNOWN, POTEN	TIAL, OR ALLEGED HAZAROS			
III. TOTAL POPULATION POTENTIALLY AFFE	CTED:			
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#### VOLUME I OF III

#### TEXT AND TABLES

December 1995

Prepared for

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#### 1.0 INTRODUCTION

In September 1992, Geraghty & Miller, Inc. was retained by Exxon Company, U.S.A. (Exxon) to prepare a work plan for the implementation of a Remedial Investigation (RI) of the Bayonne Plant in Bayonne, New Jersey (the Site) pursuant to an Administrative Consent Order (ACO) issued by the New Jersey Department of Environmental Protection (NJDEP), dated November 27, 1991. The Bayonne Plant is an approximately 288-acre petroleum products terminal that was historically owned and operated by Exxon (Figure 1-1). Since the signing of the ACO, Exxon has sold the majority of the Bayonne Plant to International Matex Tank Terminals (IMTT). This report documents the activities and findings of Phase IA of the RI, which was carried out in accordance with the procedures and protocols specified in the Bayonne Plant RI Work Plan (RI Work Plan) submitted to the NJDEP on January 20, 1993 (Geraghty & Miller, Inc. 1993a); the Memorandum entitled "Modification to the RI Work Plan" (Memorandum Modification), submitted to the NJDEP in October 1994 (Geraghty & Miller, Inc. 1994a); and the NJDEP Field Sampling Procedures Manual (NJDEPE 1992a).

The RI Work Plan proposed a three-phase approach to characterize the Bayonne Plant and identified the phases as Phase IA, IB, and II. The Phase IA RI field work was carried out from October 1994 to January 1995. The majority of the field work included the drilling and sampling of soil borings to classify soil nature and quality, the advancement and sampling of temporary drivepoints and permanent monitoring wells to evaluate groundwater quality, and the installation of temporary well points to determine the presence and specific gravity of free-floating non-aqueous phase liquid (NAPL).

Phase IA RI field activities included the installation of a site-wide monitoring well network to complement the locations of existing on-site monitoring wells. These monitoring wells were

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screened in the unconsolidated deposits to evaluate groundwater flow conditions. Additional field activities initiated in Phase IA included the following: a stratigraphic soil boring program consisting of soil sampling, bedrock coring, and the installation of additional intermediate and deep monitoring wells in the shallow unconsolidated deposits; a synoptic round of groundwater level and NAPL thickness measurements; and a groundwater sampling event of selected RI and pre-existing interim remedial measure (IRM) monitoring wells. The Phase IA data collection activities were designed to develop a conceptual model of groundwater flow conditions and to explore the Site for areas of affected soil and groundwater.

As required by the ACO, NAPL IRM investigations are being conducted at the Bayonne Plant, in accordance with a NJDEP-approved work plan prepared by Dan Raviv Associates, Inc. (DRAI) (Dan Raviv Associates, Inc. 1993a). The NAPL IRM investigations at the General Tank Field, No. 3 Tank Field, Exxon Chemicals Plant Area, and Lube Oil Area, were conducted concurrent with RI activities, and involved the drilling of soil borings and installation of temporary well points and permanent monitoring wells. The results of the NAPL IRM field investigation were documented separately in the NAPL IRM investigation report submitted to the NJDEP on July 25, 1995 (Geraghty & Miller, Inc. 1995a).

#### 1.1 PURPOSE AND SCOPE

The purpose of the RI is to characterize the nature and extent of contamination in soil and groundwater resulting from past activities at the Bayonne Plant, consistent with the ACO and the intent of the NJDEP "Technical Requirements for Site Remediation" (NJDEP 1993). The information collected during the RI will be used in the context of other potential contamination sources in this highly industrialized region to support an informed technical and risk management decision regarding the most appropriate remedy (or, where appropriate, no further action) for the Bayonne Plant.

To accomplish the requirements outlined in the ACO for the Bayonne Plant, the scope of work for the RI is being conducted in a phased manner, in which data collected during the Phase

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IA field investigation will be used to refine the scope and focus of subsequent field activities. The Phase IA effort has facilitated planning of the scope of work for the remaining field efforts needed to achieve the objectives of the RI. The sampling efforts of the remaining RI field work in Phase IB will be focused to address Phase IA data gaps, as well as to fulfill the objectives of Phase (discussed below).

Phase IA of the RI was designed to develop a conceptual model of groundwater flow conditions and to explore the Site for areas of affected soil and groundwater. This objective was accomplished primarily by drilling 84 shallow soil borings at the Site and by installing a drivepoint, temporary well point, or monitoring well in these borings. At 69 of these locations, the boreholes were grouted after the completion of soil sampling and the removal of a drivepoint or temporary well point. At the remaining 15 borehole locations, groundwater monitoring wells were installed in accordance with NJDEP specifications. At four other locations, deep stratigraphic borings were drilled until bedrock was encountered to confirm the depth to bedrock. Three intermediate and four deep monitoring wells were installed at these locations. Ambient air monitoring data were collected to evaluate the impact of field activities on air quality; these data are briefly discussed in this report.

NAPL IRM investigations were implemented concurrently with the Phase IA field activities in the following areas of the Bayonne Plant: the No. 3 Tankfield, the General Tankfield, the Exxon Chemicals Plant (which involved the Utilities Area), and the Lube Oil Area. This work included the drilling of 32 additional soil borings and the installation of temporary well points, primarily to identify areas of the Bayonne Plant where NAPL can freely enter a standpipe or monitoring well and float on the water table. At five of these soil boring locations, a monitoring well was later installed because floating NAPL was detected in a temporary well point. To complement the Phase IA RI, the analytical scope of the IRM investigations was expanded to include soil sampling for laboratory analysis from 14 of the 32 IRM soil boring locations. The results of the soil analytical program and the temporary well point program are discussed in this report; detailed descriptions of the IRM methodologies are presented in the NAPL IRM Field Investigation Report (Geraghty & Miller, Inc. 1995a).

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Collectively, the Phase IA effort and the NAPL IRM investigations resulted in the installation of 20 shallow monitoring wells, three intermediate monitoring wells, and four deep (overburden) monitoring wells. Groundwater samples were collected from 31 monitoring wells at the Site that did not exhibit floating NAPL. These wells included newly installed monitoring wells, and historical and existing IRM wells.

Subsequent phases (Phase IB and II) of the RI will be designed to complete the requirements of the ACO. Phase IB will delineate the extent of floating NAPL and the extent of groundwater affected by dissolved constituents, and will address the soil quality data gaps that persist after the Phase IA RI effort. Phase II will be designed to complete site characterization and contaminant delineation and to provide the data needed to evaluate the feasibility of potential remedial approaches. Soil, sediment, and groundwater sampling for risk assessment purposes may be conducted throughout the RI investigation, as needed.

## 1.2 SITE LOCATION AND DESCRIPTION

A discussion of the general site location and setting and a detailed description of the terms used throughout the Phase IA RI report to designate specific "Operational Areas" and "Study Areas" are presented in the following sections.

### 1.2.1 General Site Location

The Bayonne Plant (the Site) is located at 250 East 22nd Street, Bayonne, New Jersey (see Figure 1-1). The Site occupies approximately 288 acres (250 land and 38 riparian waterfront acres) and is situated in the southeastern portion of Hudson County, which is referred to as Constable Hook, an industrialized peninsula in Upper New York Bay. The Site is located in the southwestern part of the Jersey City, New Jersey, U.S. Geological Survey (USGS) (1981) topographic quadrangle (see Figure 1-1). The Bayonne Plant property is shown on the 1986 City of Bayonne tax map(s) as the following block(s) and lot(s), in accordance with the ACO: Block

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419, Lots 1, 3, and 4; Block 427, Lot 3; Block 465, Lots 1 to 5 and 9; Block 466, Lots 1 through 4; Block 477.01, Lot 3; Block 478, Lot 1; Block 480, Lot 1; and Block 418, Lots 3 and 4. In 1993, most of the Bayonne Plant, with the exception of the Lube Oil Area, the Contiguous Pier No. 1 Area (Block 478, Lot 1), and the Stockpile Area (Block 477.01, Lot 3), was purchased by IMTT. Copies of the relevant tax maps and a list of tax map lot and block numbers for the Bayonne Plant is provided in Appendix A.

The Bayonne Plant consists of a variety of features including offices, process areas, mechanical shops, warehouses, tank fields, pipelines, substations and other utility areas, railroad sidings, a helipad, tanker docks and piers, truck loading stations, and two wastewater treatment plants. The Bayonne Plant is bounded to the north by 22nd Street and Hook Road, to the east by Upper New York Bay, to the south by neighboring industries and the Kill Van Kull waterway, and to the west by the Platty Kill Canal and adjacent property that is also owned by IMTT (see Figure 1-2).

The Bayonne Plant is surrounded by heavy and light industry, interconnected by a transportation network of roadways, railroads, and the navigable waters of the Kill Van Kull and Upper New York Bay. The general vicinity of the Site is the largest urbanized area (the New York-Northeastern New Jersey Urbanized Area) in the United States (Forstall 1992). This area is noted by the U.S. Census Bureau as the most populated in the United States (16,044,012 inhabitants) and one of the most populated areas in the world (U.S. Census Bureau 1990).

### 1.2.2 Definition of Operational Areas and Study Areas

The RI scope of work was designed to focus on potential or suspected locations of contamination. Due to the extensive history of operations (over 120 years) at the Bayonne Plant and the diversity of operations in the various areas within the plant, Exxon and Geraghty & Miller thought that RI activities may vary between areas based on the nature of the operations, the size of the area, and existing contamination information. Therefore, the Site was divided into 13 "operational areas." Details regarding the definition and boundaries of the operational areas are

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provided in the Site History Report (Geraghty & Miller, Inc. 1994b). The 13 operational areas, as shown on Figure 1-3, are as follows: "A"-Hill Tank Field, Lube Oil Area, Pier No. 1 Area, No. 2 Tank Field, Asphalt Plant Area, AV-Gas Tank Field, Exxon Chemicals Plant Area (Chemicals Plant Area), No. 3 Tank Field, General Tank Field, Solvent Tank Field, Low Sulfur Tank Field, Piers and East Side Treatment Plant Area, and Domestic Trade Area. Four miscellaneous areas were also identified. These are the Stockpile Area, the MDC Building Area, the Utilities (Power Plant) Area, and the Main Building Area (see Figure 1-3).

Throughout this report, the term "area" will be used to describe recognized parts of the Site, such as IRM study areas, former operational/process areas, and active operational/process areas. These areas will be described specifically with an appropriate modifier and the "A" in area will be capitalized (e.g., the Domestic Trade Area, the East Side Treatment Plant Area, or the Main Building Area). Other previously unrecognized areas will be discussed within this report to describe the results of the Phase IA RI. These areas will be cited with a modifier, but the "A" in area will not be capitalized (e.g., the Tanks 1066, 1067, and 1068 areas).

#### 1.3 REPORT ORGANIZATION

This Phase IA RI Report is consistent with the intent of NJDEP's "Technical Requirements for Site Remediation" (NJDEP 1993) and the ACO, and has been developed in a format suggested by the United States Environmental Protection Agency (USEPA). This report format is consistent with the format of the Phase IA RI Interim Report for the Bayway Refinery, which has been discussed and reviewed with the NJDEP Case Management Team. Section 2.0 provides historical information related to Bayonne Plant operations, surrounding land use, and previous environmental investigations. A more detailed discussion of Site background information has been presented in the Site History Report (Geraghty & Miller, Inc. 1994b). Section 3.0 discusses the field and analytical methods used during the implementation of Phase IA field activities, and Section 4.0 discusses the physical and hydrogeologic setting of the Site. Section 5.0 presents the findings of Phase IA of the RI, with subsections summarizing soil quality, occurrence of NAPL, and groundwater quality at the Bayonne Plant. Section 6.0 presents an overview of constituent and site

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properties affecting fate and transport. Section 7.0 provides an evaluation of the data, development of hypotheses, and conclusions regarding the fate and transport of contaminants in various areas of the plant. Section 8.0 presents the references used in the report. All tables and figures are provided at the end of the report, separated by tabs and enumerated in accordance with the section of the report in which they are first referenced.

Appendices A through K provide additional information. A map and list of the tax block and lot numbers for the Bayonne Plant is presented in Appendix A. Sample/core logs for soil boring and monitoring well boreholes are presented in Appendix B. These logs have been edited to provide uniform interpretation of conditions observed in the field. Sample event/criteria forms used for entering soil sample field information into the database, and chain-of-custody forms used for tracking samples during shipment, are provided in Appendix C. Monitoring well construction logs and the NJDEP Groundwater Monitoring Well Form B-Location Certification Forms are provided in Appendix D. Bedrock core logs prepared during the stratigraphic soil boring program are provided in Appendix E. Groundwater sampling logs from the January 1995 Phase IA groundwater sampling event are provided in Appendix F. Health and safety air monitoring readings and results of well head air monitoring are presented in Appendix G. The validated soil and groundwater sampling analytical results are provided in ASCII files on 3½-inch, high-density diskettes in Appendix H and Appendix I, respectively. A quality assurance/quality control (QA/QC) summary is provided in Appendix J. Downhole field parameter data are provided in Appendix K.

The report is intended to be viewed as an interim deliverable and not as the complete RI Report for the Bayonne Plant. Its purpose is to help guide subsequent data collection efforts under Phases IB and II. Many of the figures and tables and much of the text of this report will be revised to incorporate the addition of Phases IB and II data. All appropriate comments from the NJDEP regarding the information presented in this report will be incorporated into either the Phase IB or the Phase II draft RI reports. The Phase II draft RI report will document the activities and findings of all phases of the RI. Therefore, consistent with the goal of completing all phases of the RI in a timely manner and expediting remedial decisions, it is not planned for this report to undergo

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revision and resubmission. However, contents may be revised and incorporated into future deliverables, as discussed above.

#### CONSIDERATION OF REMEDIAL INVESTIGATION AND INTERIM 1.4 REMEDIAL MEASURE FINDINGS

As part of the Sewer IRM required by the ACO, plant sewers have been undergoing cleaning and video camera inspection under the direction of IT Corporation. During a November 2, 1995 meeting between Exxon and NJDEP, a means of consolidating findings of the Sewer IRM and the Phase IA RI effort were discussed. In subsequent discussions with NJDEP, Exxon has agreed that a series of reports will be prepared by IT Corporation, documenting the work performed, and the findings for the various trunk lines of the Bayonne Plant sewer system.

These reports will include maps of the sewer systems depicting findings of the Sewer IRM work programs, with the Phase IA RI NAPL plume configurations and groundwater contour overlaid on them. The reports will assess the extent to which there appear to be correlations between Phase IA RI findings and NAPL and Sewer IRM findings, the extent to which sewer pipe is likely to be submerged below the groundwater table, and other factors which aid in definition of data gaps for additional phases of the RI. Information from these reports will be used in consideration of long-term remedial measures for the site.

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### 2.0 HISTORICAL INFORMATION

This section provides a brief summary of the site history, surrounding land use, and previous environmental investigations, including previous and ongoing IRMs. Where appropriate, data from other investigations conducted prior to, or concurrent with, the Phase IA RI field activities were incorporated into this report. A detailed description of the history of Bayonne Plant operations and previous studies is presented in the Site History Report (Geraghty & Miller, Inc. 1994b).

### 2.1 SUMMARY OF SITE HISTORY AND SURROUNDING LAND USE

Since the late 1800s, nearly all of Constable Hook has been occupied by the petrochemical industry. The Prentice Refining Company established a small kerosene refinery in the Constable Hook Area in 1875. This operation consisted of 12 refining stills and was located in the areas of the Bayonne Plant currently occupied by the Lube Oil Area and a portion of the "A"-Hill Tank Field (Fairchild 1994). In 1877, John D. Rockefeller, representing Standard Oil Company (the predecessor company of Exxon), purchased the Prentice Oil Company refinery and several adjacent tracts of land totaling 176 acres (Fairchild 1994). From 1877 to approximately 1971, the Bayonne Plant was operated as a refinery and, up to 1936, underwent significant growth and expansion. During this period, Exxon, under the name of its predecessors (Standard Oil Company [New Jersey] and Standard Oil Company of New Jersey), purchased numerous surrounding tracts of land on Constable Hook.

The Standard Oil Company owned and operated approximately 650 acres on Constable Hook during the peak of plant operations in 1936 (Exxon Company, U.S.A. 1988). From 1936 through 1947, Standard Oil Company sold numerous parcels of land to various industries.

Between 1940 and 1947, the Constable Hook Area was extensively developed as a petrochemical area containing a network of railroad lines, roads, and piers for shipping. The northern portion of Constable Hook was undergoing extensive reclamation from Upper New York

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Bay, and the southern portion of Constable Hook was occupied by hundreds of storage tanks. A major modernization and dismantling program began in 1955, and by 1963 one-third of the 330-acre plant lay vacant. In 1961, under an industrial development program adopted by Humble Oil & Refining Company (an affiliated company of Standard Oil) in cooperation with the City of Bayonne, numerous tracts of the plant property were sold to various industries for immediate construction (Humble Oil & Refining Company 1961).

The downsizing of plant operations continued throughout the 1960s until 1971, when all plant refining and manufacturing operations ceased, with the exception of the Exxon Chemicals Plant Area. Between 1974 and 1984, the area to the south of the Bayonne Plant was developed further by the petrochemical industry. By this time, the reclaimed area north of the General Tank Field was overgrown with vegetation. By 1989, the Bayonne Plant and its environs on Constable Hook resembled its present-day configuration.

In 1991, when the ACO was executed, Exxon owned 288 acres on Constable Hook, as depicted on Figure 1-2. On April 1, 1993, Exxon sold most of the property to IMTT, with the exception of the Lube Oil Area, the Pier No. 1 Area, and the Stockpile Area. Exxon still operates and maintains the Lube Oil Area as a lube oil and wax products storage, blending, and packaging terminal. The majority of the Bayonne Plant presently serves as a petroleum products storage terminal. The Asphalt Plant presently stores various grades of asphalt in aboveground storage tanks (ASTs). The Chemicals Plant area was formerly used by Exxon Chemical Americas to manufacture lube oil additives.

### 2.2 CHRONOLOGY OF PREVIOUS ENVIRONMENTALLY RELATED INVESTIGATIONS

Previous environmental investigations or pertinent environmental activities (including IRMs) at the Bayonne Plant for which documented data are available are described below. IRM activities at the Bayonne Plant are associated with NAPL, chromium, and the sewer system. The locations of NAPL IRM areas at the Bayonne Plant are shown on Figure 2-1. Historical

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monitoring wells and recovery wells that currently exist at the Bayonne Plant are shown on Figure 2-2.

- In 1958, Hydrotechnic Corporation Engineers conducted a hydrogeologic investigation
  of the Bayonne Plant (Hydrotechnic Corporation Engineers, Inc. 1958). The
  hydrogeologic study involved a review of the stratigraphy and hydrogeology
  underlying the Site, based on available well records in the Bayonne area. The purpose
  of the study was to explore the potential to develop freshwater resources for refinery
  usage and the feasibility of disposing acid waste by underground injection. There is no
  indication that this activity was ever conducted at the Bayonne Plant. The geologic
  descriptions and stratigraphic data provided in this 1958 report were used by Geraghty
  & Miller to support the development of a preliminary conceptual model of Site
  geologic conditions.
- In 1974, Leggette, Brashears & Graham, Inc. conducted a groundwater monitoring
  program at the Bayonne Plant to evaluate shallow hydrocarbon contamination
  (Leggette, Brashears & Graham, Inc. 1974a,b,c). Monitoring wells were installed
  along the Lehigh Valley Railroad right-of-way and near the piers. NAPL thickness and
  water-level data from these wells were used by Geraghty & Miller in this report to
  supplement more recent NAPL IRM data in assessing areas of the Site that contain
  floating NAPL.
- Dames & Moore conducted a hydrogeologic investigation of the Bayonne Terminal and Chemical Plant in 1979 (Dames & Moore 1979). The study included a description of the regional and local hydrogeology based on geotechnical soil borings drilled in the 1950s, and a preliminary assessment of the potential to obtain permits for the oil/water separators at the East and West Side Treatment Plants. The data provided in this report were used to support the development of a preliminary conceptual model of Site hydrogeologic conditions.

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- From the late 1970s to approximately 1989, Roy F. Weston, Inc. (Weston) conducted a subsurface oil recovery program at the Bayonne Plant (Roy F. Weston, Inc. 1980; 1981a,b; 1985; 1986a,b,c; and 1989a,b,c,d,e). Monitoring wells were installed in the Pier No. 1 Area near the helipad (formerly known as the Pier No. 3 Area), Pier 6 and Pier 7 Areas, "A"-Hill Tank Field, and Low Sulfur Tank Field. During this period, Weston initiated NAPL recovery programs in the pier areas and in the Low Sulfur Tank Field. NAPL thickness data collected by Weston were used by Geraghty & Miller in this report to help evaluate areas of the Bayonne Plant that contain floating NAPL.
- In 1985, Malcolm Pirnie, Inc. conducted a Potential Hazardous Waste Site Preliminary Assessment of the Bayonne Plant on behalf of the USEPA (Malcolm Pirnie, Inc. 1985). Background information in this document regarding site conditions and historical operations were used by Geraghty & Miller in the development of the Site History Report and the RI Work Plan (Geraghty & Miller, Inc. 1994b, 1993a).
- Sandaq, Inc., P.C. conducted a toxic substance investigation of the sewer system at the Bayonne Plant in 1986 (Sandaq, Inc., P.C. 1986). The sewer investigation involved a review and sampling of the sewer systems in nine areas of the plant. The results of the investigation concluded that certain areas of the plant had significant concentrations of organic compounds in the sewer system, and that steps should be taken to reduce organic loading to the sewers. The locations and analytical data for the sewer system were evaluated by Geraghty & Miller in the design and development of the scope for the Phase IA RI.
- In 1988, CH2M Hill, Inc. prepared a site water budget for the Bayonne Plant (CH2M Hill, Inc. 1988). Information regarding input and output wastewater and storm-water streams were incorporated by Geraghty & Miller into the Site History Report (Geraghty & Miller, Inc. 1994b).

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- In 1990, the NJDEP conducted a site inspection of the Bayonne Plant and collected surface soil samples for chromium analysis (NJDEP 1990). In conjunction with the NJDEP study, Exxon conducted its own soil sampling and analytical program for chromium in January 1990. Chromium analytical data for soils were used in the development of the Site History Report (Geraghty & Miller, Inc. 1994b) and in the development of the scope for the RI Work Plan (Geraghty & Miller, Inc. 1993a).
- In April 1991, Environmental Resource Management, Inc. (ERM) collected soil samples throughout the Site for total and hexavalent chromium analysis (Dan Raviv Associates, Inc. 1992). The soil quality data from this study were incorporated into the Site History Report (Geraghty & Miller, Inc. 1994b).
- In 1992, ICF Kaiser Engineers, Inc., on behalf of Pittsburgh Plate and Glass Industries, Inc. (PPG), drilled soil borings in the General Tank Field and the No. 3 Tank Field areas (PPG Industries, Inc. 1992). Surface and subsurface soil samples collected from these soil borings were analyzed for chromium. The analytical results for chromium derived from this investigation were incorporated into the Site History Report (Geraghty & Miller, Inc. 1994b).
- NAPL IRM investigations, many of which are ongoing, have been conducted by DRAI and Geraghty & Miller. During the period from early 1994 through June 1995, DRAI conducted NAPL IRM investigations in the Platty Kill Canal Area, Helipad Area, Pier No. 6 Area, Pier No. 7 Area, and the Interceptor Trench (Dan Raviv Associates, Inc. 1994a,b; 1995a,b,c,d). Floating NAPL has historically been observed in all five of these areas, and NAPL containment/recovery systems are currently in operation in the Platty Kill Canal Area, the Pier No. 7 Area, and the Interceptor Trench area. NAPL containment/recovery systems are planned for the Helipad and Pier No. 6 Areas. Data collected during the NAPL IRM investigations typically included information regarding bulkhead construction, NAPL and water-level thickness data, pumping test data, NAPL recovery data, NAPL fingerprint data, and tidal fluctuation data. Similar data

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were also obtained during NAPL IRM investigations in the Low Sulfur and Solvent Tank Fields (also referred to as the "Tank 1066" area) conducted by DRAI in 1992 and 1993 (Dan Raviv Associates, Inc. 1993b). A vacuum enhanced recovery (VER) recovery system for NAPL containment and recovery is currently being designed by Geraghty & Miller for implementation in the Tank 1066 area (Geraghty & Miller, Inc. 1995b). Concurrent with the Phase IA RI, a NAPL IRM investigation was also conducted by Geraghty & Miller during the period from October 1994 through January 1995 at the General Tank Field, No. 3 Tank Field, Exxon Chemicals Plant (Utilities Area), and Lube Oil Area (Geraghty & Miller, Inc. 1995a). Data generated during this investigation included observations of hydrocarbons in soil, and NAPL and water-level data from temporary well points and permanent monitoring wells. Quarterly NAPL and water-level monitoring was conducted during a 1-year period from 1994 to 1995 as part of the "A"-Hill Tank Field NAPL IRM (Geraghty & Miller, Inc. 1995c). Generally, data from the above NAPL IRM investigations were incorporated in this Phase IA RI report, as appropriate, to supplement Phase IA RI data regarding the nature and extent of floating NAPL and dissolved phase plumes.

- In 1993, ICF Kaiser Engineers, Inc. conducted a site-wide IRM investigation at the Bayonne Plant to address chromium contamination (ICF Kaiser Engineers, Inc. 1993, 1994). The investigation involved the collection of soil, air, and wipe samples for total and hexavalent chromium analysis, as well as a site inspection.
- IT Corporation has recently completed mapping, sewer cleaning, inspection, and videotaping of the sewer system at the Bayonne Plant (IT Corporation 1993; Exxon Company, U.S.A. 1995). The findings from the sewer integrity evaluations will be considered in conjunction with Phase IA RI findings as discussed in Section 1.4 (Consideration of Remedial Investigation and Interim Remedial Measure Findings) of this report.

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# 3.0 TECHNICAL OVERVIEW - INVESTIGATION METHODOLOGY

This section discusses the field investigation methods used during the Phase IA RI. Specific details of the field procedures and protocols are discussed in the Field Sampling Plan (FSP) (Appendix A of the RI Work Plan [Geraghty & Miller, Inc. 1993a]). The organizational structure of the data collection activities was discussed in the Quality Assurance Project Plan (QAPP) (Appendix B of the RI Work Plan [Geraghty & Miller, Inc. 1993a]) and specific health and safety procedures are documented in the Health and Safety Plan (HASP) (Appendix C of the RI Work Plan [Geraghty & Miller, Inc. 1993a]). Generally, the methods employed in the field were either consistent with, or identical to, methods that are described in the NJDEP's Field Sampling Procedures Manual (NJDEPE 1992a). The Phase IB RI Work Plan will address the need to collect additional data throughout the Site to fulfill the intent of the Technical Requirements. Phase IA soil boring, monitoring well, and surface-water measurement point locations are presented on Figure 3-1. A summary of the number of soil and groundwater samples analyzed during the Phase IA RI is provided in Table 3-1.

#### 3.1 SAMPLE DESIGNATION

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Each sample collected during the Phase IA RI was given a unique designation that was documented in the field logs. The sample designation describes the following elements:

- The operational area code (representing each operational or miscellaneous area).
- The matrix code.
- The location number.
- The sample interval depth (for soil borings and drivepoints).

The operational area code is a prefix for each sample designation and is used to identify the part of the plant from which a given sample was collected or intended to evaluate.

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A summary of operational area prefix codes is provided in Table 3-2. An operational area code was not designated for the Low Sulfur Tank Field because no soil borings or monitoring wells were drilled in this area as part of the Phase IA RI. In some areas (e.g., the No. 3 Tank Field), more than one prefix was used in order to distinguish between RI and IRM soil borings. Some exceptions to this prefix scheme occurred for a variety of reasons. These exceptions are included in Table 3-2.

Matrix codes are as follows:

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Groundwater Monitoring Wells (GMMW) Soil Boring (SB) Drive Point (DP)

Because the sample identification is an important descriptive tool, examples are provided below to facilitate understanding of the various sample designations.

For the locations where soil borings were completed as monitoring wells, the monitoring well designation was used. Deep and intermediate monitoring wells were designated with the D and I suffixes, respectively.

Groundwater: GMMW10 (denotes a sample collected from Monitoring Well GMMW10, also designated as soil boring GTFSB6, a soil boring located in the General Tank Field Area).

Groundwater: GMMW23D (denotes a sample collected from the Deep Monitoring Well GMMW23D installed at the boring APSB-7 drilled in the Asphalt Plant Area to study the stratigraphy).

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For soil boring samples, the last sample number reflects the bottom depth of the 2-foot long sample interval in the test boring. Soil borings drilled as part of the investigatory IRM study were distinguished by adding "IRM" to the boring location.

<u>RI Soil Boring</u>: AHTFSB01-02 (denotes the split-spoon sample collected in the interval from land surface to a depth of 2 feet from RI Soil Boring SB1 in the "A"- Hill Tank Field).

<u>IRM Soil Boring</u>: GTFIRMB06-08 (denotes the spilt-spoon sample collected in the interval from 6 feet to a depth of 8 feet from investigatory IRM Soil Boring SB6 in the General Tank Field)

Examples of drivepoint sample designations are as follows:

<u>Drivepoint</u>: N3TFSB04-DP10 (denotes a drivepoint groundwater sample taken from the borehole of Soil Boring SB4 in the No. 3 Tank Field at the bottom depth of 10 feet).

Blind field replicate samples were given fictitious numbers, which were recorded in the file notes and project file.

Trip blank and field equipment blank samples were labeled as TB and FB, respectively, followed by a number and the date of shipment to the laboratory for trip blanks and date of concern for field blanks.

<u>Trip Blank</u>: TB102594 (denotes a trip blank sample prepared on October 25, 1994 for samples being shipped on the same day).

<u>Field Blank</u>: FBA110294 (denotes an aqueous field equipment blank prepared for aqueous samples collected on November 2, 1994).

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Field Blank: FBNA02-100694 (denotes aqueous field blank Number 2, prepared for nonaqueous samples collected on October 6, 1994).

#### 3.2 ANALYTICAL SOIL BORING AND DRIVEPOINT PROGRAM

As part of the Phase IA RI, 84 shallow soil borings were drilled at the Site from October 1994 through January 1995. Soil samples were collected for laboratory analysis from each of the Phase IA soil borings. At 69 of these Phase IA RI locations, the boreholes were grouted after the completion of soil sampling and the removal of a drivepoint or temporary well point (see Section 3.2.4 [Drivepoint Installation and Sampling] and Section 3.3.1 [Floating NAPL Delineation]). At the 15 remaining borehole locations, a groundwater monitoring well was completed according to NJDEP specifications. An additional 32 investigatory IRM soil borings were drilled at locations along the boundaries of the General Tank Field, No. 3 Tank Field, Exxon Chemical Plant (Utilities Area), and Lube Oil IRM study areas. Soil samples were collected for laboratory analyses at 14 of these 32 investigatory IRM Borings. Two of these 14 IRM soil borings were completed as shallow monitoring wells. Shallow soil boring locations were selected to investigate subsurface conditions near historical spills, former process areas, former oil/water separators, sewer and septic systems, and various potential areas of contamination (e.g., tanks, loading/unloading racks, drum storage areas), and to provide broad areal coverage of the Site. The rationale for Phase IA soil boring locations is outlined in Table 3-3 and presented in further detail in the Memorandum Modification (Geraghty & Miller, Inc. 1994a). Table 3-4 documents instances in which a planned boring or well was relocated because of specific site conditions. Location descriptions and the rationale for relocation of Phase IA monitoring wells and soil borings are presented in Table 3-4. The final locations of Phase IA soil borings, monitoring wells, and surface-water measurement points are shown on Figure 3-1.

All shallow soil borings were drilled using 4<sup>1</sup>/<sub>4</sub>-inch inside diameter (ID) hollow-stem augers. A center bit (4-inch diameter tricone roller bit or equivalent) attached to AW-rods was used to prevent cuttings from entering the augers. Split-barrel core (split-spoon) samples were collected continuously through the auger flights prior to advancing the augers and the drill bit

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assembly. Typically, a 24-inch long and 3-inch diameter, split-barrel core sampler was advanced into the formation by dropping a conventional 300-pound (lb) hammer from a height of 30 inches onto the sampling assembly. Occasionally, a 24-inch long by 2-inch diameter split-spoon core sampler was advanced with a 140-lb hammer where soil sampling was not conducted (e.g., investigatory IRM soil borings). Decontamination procedures for all sampling equipment and drilling equipment are presented in the FSP (Appendix A of the RI Work Plan [Geraghty & Miller, Inc. 1993a]).

Shallow soil borings were advanced into the formation until the water table was encountered. When water-table conditions were not easily identified (e.g., because a perched zone was present or saturated deposits were not encountered), soil borings were advanced to greater depths than originally planned. Except for stratigraphic soil borings, no soil borings were extended below a depth of 20 feet below land surface (bls). When hydrocarbon material was observed in soil samples, soil borings were advanced past the water table to a depth at which hydrocarbon was no longer present (without drilling through a confining soil unit). Final shallow soil boring depths ranged from approximately 12.5 to 18 feet bls.

Four of the six stratigraphic soil borings proposed in the Memorandum Modification (Geraghty & Miller, Inc. 1994a) were drilled at various locations throughout the Site (Figure 3-1). The purpose of the stratigraphic soil borings was to provide additional subsurface data to conceptualize site stratigraphy. Soil samples collected from stratigraphic borings were used to evaluate lithology, but were not submitted to the laboratory for analysis. Two of the proposed locations were not drilled during Phase IA because further information was not required (NJDEP 1994a). At three of the four stratigraphic soil boring locations, an intermediate and deep monitoring well cluster was installed (Figure 3-1). At the fourth stratigraphic soil boring location, a deep monitoring well was installed. The methods and procedures employed in the drilling of stratigraphic soil borings and the installation of intermediate and deep monitoring wells are described in Section 3.5 (Stratigraphic Borings).

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#### 3.2.1 Soil Sample Criteria

Split-spoon samples were collected continuously to the total depth of each boring for lithologic logging and screening with a flame ionization detector (FID). Two split-spoon samples were then collected at each borehole location for laboratory analysis. The two samples designated for laboratory analysis were selected based on criteria established in the RI Work Plan (Geraghty & Miller, Inc. 1993a) and the Memorandum Modification (Geraghty & Miller, Inc. 1994a) that incorporated visual evidence, FID headspace readings, determination of hydrocarbon presence, and QA/QC. The analyses conducted for Phase IA soil and groundwater are summarized in Table 3-1. Analytical parameters for surface and subsurface soil samples are also depicted on Figures 3-2 and 3-3.

Soil for potential volatile organic compound (VOC) analyses was collected from every 2foot vertical interval immediately after the split-spoon sampler from a given 2-foot interval was opened. Soils from all of the intervals in the boring were then compared for FID headspace and the visual presence of hydrocarbon. Based on this comparison, two intervals were selected and sufficient additional soil was collected from these intervals for analysis of total petroleum hydrocarbons (TPH), semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), target analyte list (TAL) inorganic parameters, and hexavalent chromium. Detailed soil-collection procedures are discussed below.

Once retrieved from the borehole, the split-spoon sampling device was placed on clean plastic sheeting covering a sturdy wooden table. On opening the split-spoon sampler, the field personnel used an FID and/or photoionization detector (PID) to screen the recovered soil in approximately 6-inch intervals within the 24-inch split-spoon sampler. The 6-inch soil interval that exhibited the highest FID/PID readings within the sampler was immediately placed in a laboratoryprovided vial for potential laboratory analysis for VOCs. If elevated FID/PID readings were not observed within the 2-foot interval, a potential VOC sample was taken from a 6-inch interval at the center of the split-spoon sampler. In addition to FID screening, the entire contents of the splitspoon sampler were described for lithology, using the Unified Soil Classification System, and

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measured with a ruler to determine sample recovery. Database-generated sample/core logs are presented in Appendix B. When recording the lithology of each split-spoon sample, the field hydrogeologist included a description of any hydrocarbons in the soil based on the visual appearance of the sample (see Section 3.2.3 [Hydrocarbon Identification in Soil]). A small amount of soil from the same 6-inch interval where VOC samples were collected was placed in a plastic Zip-lock bag for headspace screening with an FID or PID. The split-spoon sampling device was then closed, and its ends were covered with small plastic bags and sealed with rubber bands. The split-spoon sampler was stored in a sturdy, covered, wooden rack with slots marked with the sample depth. After all of the split-spoon samplers had been recovered, sampled, and stored as described above, headspace readings for each 2-foot interval were taken using the procedures outlined in the FSP (Appendix A of the RI Work Plan [Geraghty & Miller, Inc. 1993a]).

Using the headspace readings and the sample descriptions, the field hydrogeologist applied the following criteria to select the two laboratory sample intervals from each boring and assigned the boring a criteria number based on the following observations and sampling selection protocol:

- 0 Insufficient recovery from sample intervals throughout the boring <u>or</u> sample intervals are predetermined (i.e., QA/QC replicate) <u>or</u> other deviation from criteria (e.g., unknown materials, anomalous color change).
- 1 No visual evidence of hydrocarbons. No FID readings. Collect 0- to 2-foot interval and the interval located directly above the water table.
- 2 No visual evidence of hydrocarbons. FID readings. Collect samples from the interval with the highest FID reading and interval with next highest FID reading. If possible, sampling intervals should be 2 feet apart.
- 3 Hydrocarbons visually present but in less than 75 percent of total boring depth. Collect one sample from the zone containing hydrocarbons and the second sample from the interval with the highest FID readings. If possible, the soil collection

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intervals should be separated by several feet for broader vertical characterization of soil quality.

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Hydrocarbons visually present in greater than 75 percent of total boring depth.
Collect samples from the shallowest and deepest intervals containing hydrocarbons.

After the two sample intervals selected for laboratory analysis had been determined, the split-spoon samplers for those intervals were re-opened, homogenized in stainless-steel bowls, and transferred to laboratory-supplied containers. The samples previously collected from the two selected intervals for VOC analysis were retained, and the other samples previously collected from the boring for VOC analysis were properly disposed.

## 3.2.2 Soil Sample Analytical Selection Criteria

The two soil samples selected from each borehole (see Section 3.2.1 [Soil Sample Criteria]) were analyzed for TPH and hexavalent chromium. In instances where a borehole was terminated at depths of less than 5 feet because of shallow groundwater conditions or subsurface interference, only one sample was analyzed. Soil samples selected for TPH and hexavalent chromium analysis were also considered for potential analysis of the following:

- Target compound list (TCL) VOCs plus hexane, methyl tertiary butyl ether (MTBE), 1,2-dibromoethane, tertiary butyl alcohol (TBA), N-butyl alcohol, sec-butyl alcohol, Npropyl benzene, and isopropyl alcohol.
- TCL SVOCs.
- TCL pesticides/PCBs.
- TAL inorganic compounds plus cyanide.

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The initial goal of the Phase IA field program was to analyze approximately 25 percent of those samples being analyzed for TPH and chromium for this expanded list of constituents. After the analytical results of TPH in soil for a given sample group (e.g., those samples collected in a day) were received, a "secondary request for analysis" was made. The laboratory was instructed to further analyze selected samples that had been containerized and refrigerated for an expanded list of parameters. The samples selected for secondary analysis were chosen based on the following criteria:

- · Bias was given to those soil samples with relatively high TPH results in a given area.
- Samples were selected for broad areal distribution across the Site and within each operational area.
- Samples were selected to represent the vertical profile of the vadose zone, but were biased toward the 0 to 2-foot interval because of the surface-exposure potential. Where the 0 to 2-foot interval from a soil boring was selected for laboratory analyses based on the soil sample criteria (Section 3.2.1), the analyses were pre-designated for the expanded parameter list.
- Other predetermined locations were analyzed for the expanded list of constituents based on site history and operations information as discussed in the Site History Report and Memorandum Modification (Geraghty & Miller, Inc. 1994b, 1994a) or for QA/QC purposes.

#### 3.2.3 Hydrocarbon Identification in Soil

Determining the visual presence of hydrocarbon in split-spoon soil samples was an important part of the Phase IA soil boring program because of its significance to the Site soil characterization and because the presence or absence of hydrocarbon was used to govern the selection of soil samples for laboratory analysis. When recording the lithology in each split-spoon.

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sample, the field hydrogeologist included a description of any hydrocarbons in the soil based on the visual appearance of the sample. The following determination regarding the presence of hydrocarbon was made and documented on the sample event/criteria forms provided in Appendix C.

- Y Yes, hydrocarbon appears to be present in the soil as "visually observed" and confirmed with the FID and/or odor.
- N No, hydrocarbon is not present in the soil. There are no visual or instrument indications of hydrocarbon.
- T Trace, there is either an extremely small amount of hydrocarbon present (e.g., only 1 inch of tar-like residual or droplets over the length of a 10-foot boring) or hydrocarbon is suspected because of the presence of a sheen, but generally not over a vertical interval greater than 2 inches.

High total VOC readings from the initial screening of the soil with an FID was considered an indicator of the possible presence of hydrocarbons. In addition to visual and field instrument screening of the soil, several field methods were used to determine the presence of hydrocarbon. Typically, a small amount of soil from the split-spoon sampler was placed on the plastic-covered sample table, squirted with a small amount of distilled water, and observed for the presence of a sheen on the surface of the water. Occasionally, a small amount of soil was placed in a Zip-lock bag with sufficient water added to saturate the soil. The bag was sealed and agitated, then opened to check for the presence of a sheen on the surface of the water.

### 3.2.4 Drivepoint Installation and Sampling

Where no hydrocarbons or only trace hydrocarbons were observed in soil samples from a boring, a temporary drivepoint was installed to collect a groundwater sample from this location. Thirteen groundwater samples were collected from drivepoints or temporary well points at soil

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boring locations during Phase IA of the RI. These samples were analyzed in the laboratory for TCL VOCs (and eight additional site-specific VOCs).

Drivepoints consisted of a 3-foot long and 2<sup>1</sup>/2-inch diameter, continuously wound, stainless-steel screen with 0.020-inch (20-slot) openings and a conical point to facilitate advancement into the formation. Five-foot long, galvanized steel riser sections were threaded to the drivepoint screen to construct the desired length. The drivepoint technique used during the Phase IA RI was a modification of one of the methods outlined in the NJDEP "Alternative Groundwater Sampling Techniques Guide" dated July 1994 (NJDEP 1994b). The drivepoints and riser sections were decontaminated according to the procedures outlined in the RI Work Plan (Geraghty & Miller, Inc. 1993a) and stored in clean plastic until use.

Continuous split-spoon sampling was conducted at each soil boring. At the first clear indications of water-table conditions (i.e., the fully water-saturated split-spoon sampler), the drivepoint was inserted through the auger flights to a depth of approximately 2 feet below the water-table depth. In some cases, the drivepoint was pushed to the desired depth using the hydraulic drill head. In most cases, a split-spoon sampler was advanced below the water table to confirm water-table conditions and lithology, and the drivepoint was lowered into the hole made by the final split-spoon sampler.

Prior to being sampled, the drivepoint was purged of either three volumes of standing water (if it recharged) or one volume of standing water (until complete evacuation) using a clean Teflon bailer to promote collection of a representative groundwater sample. A 40-milliliter (mL) sample of groundwater was collected for laboratory analysis of the TCL VOCs from the drivepoint consistent with the procedures outlined in the Memorandum Modification (Geraghty & Miller, Inc. 1994a).

Based on the geology and water-table conditions encountered at specific boring locations, a few exceptions to the guidelines for the depth of drivepoint installation and purging were made. At some locations, perched groundwater existed at shallow depths. Where perched water was

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suspected in a boring, split-spoon sampling continued until 3 to 4 feet of saturated soil were encountered, indicating true water-table conditions. In other instances, marginally confined conditions caused the water level inside the augers and drivepoint to rise above the top of the drivepoint screen; in this situation, samples did not represent the water-table surface. In still other locations, particularly in clayey soils, the soil did not yield sufficient water for sampling. In these instances, the drivepoints were left in the borehole for as long as 24 hours to allow groundwater to enter the screen. Drivepoints were always removed within 48 hours. In extremely low permeability deposits that did not recharge the drivepoint, the drivepoints were not purged before sampling, and the auger flights were entirely removed to allow water from the entire depth of the borehole to enter the drivepoint.

# 3.3 HYDROCARBON DELINEATION - TEMPORARY WELL POINT PROGRAM AND HYDROMETER TESTING

Hydrocarbon in soil was observed in accordance with the procedures outlined in Section 3.2.3 (Hydrocarbon Identification in Soil). Evidence of petroleum hydrocarbons was observed in 94 of the 116 soil borings (i.e., 84 RI soil borings and 32 investigatory IRM borings) drilled. Delineation of floating NAPL in the subsurface involved the use of temporary well points. Temporary well points were installed in 77 of the 94 soil borings in which petroleum hydrocarbons were observed in soil. To characterize the physical characteristics of floating NAPL and to apply an appropriate correction factor to site groundwater elevation data, NAPL observed in temporary well points and monitoring wells was subjected to hydrometer testing. The methodologies and procedures employed in implementing the temporary well point program and hydrometer testing are described below.

#### 3.3.1 Floating NAPL Delineation

Determining the presence or absence of floating NAPL was an important part of Phase IA; this determination was accomplished by installing temporary well points. These temporary well points were installed at locations where hydrocarbon appeared to be present in soils based on a

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"yes" determination, as specified in Section 3.2.3 (Hydrocarbon Identification in Soil). The well points were used to evaluate if the hydrocarbon was free to migrate into a well screen or if it was bound to the soils and would not migrate. If the hydrocarbon observed in the subsurface environment was saturated enough to migrate into a temporary well point or well screen, then it was defined as floating NAPL. Floating NAPL was typically described as a sheen or as a measurable thickness on the water table. Non-saturated bound hydrocarbons were typically described as droplets within soil interstices, as thick tar-like material, or as unique or unknown materials.

When the field hydrogeologist determined that hydrocarbon was visually present in the soil samples from the boring as confirmed with an FID (a "yes" determination), a temporary 2-inch diameter polyvinyl chloride (PVC), stainless-steel, or galvanized steel well screen (continuously wound, 20 slot) was placed in the open borehole to monitor the presence and/or thickness of floating NAPL on the water table. The well screen was inserted to the total depth of the boring and the auger flights were removed. The temporary well point was left in place undisturbed for a maximum period of approximately 2 weeks, during which time the water surface was measured using an electronic oil-water interface probe at 2- to 4-day intervals for floating NAPL. If NAPL was consistently measured in a well point within several days of its installation and a determination was made that the thickness of NAPL was not likely to change over time, the well point was often removed. If the oil-water interface probe indicated that NAPL was present, a visual inspection of the water surface and the water at the bottom of the well screen was made by lowering a bailer and retrieving a sample.

Well permits were obtained from the NJDEP Bureau of Water Allocation for temporary well points that were left in place for more than 48 hours. Soil borings that did not exhibit petroleum hydrocarbons in soil and/or did not reveal floating NAPL in a temporary well point were abandoned in accordance with the procedures outlined in the NJDEP Field Sampling Procedures Manual (NJDEPE 1992a). These temporary well points were removed and the boreholes were grouted to the surface. Well abandonment forms for these temporary well points will be filed with the NJDEP Bureau of Water Allocation.

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### 3.3.2 <u>Hydrometer Testing</u>

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Hydrometer testing was performed in the field on NAPL samples from temporary well points and monitoring wells during Phase IA of the RI. The purpose of hydrometer testing was to evaluate the physical characteristics of floating NAPL, where present, and to determine the appropriate correction factors to apply to groundwater elevation data in generating a site-wide groundwater contour map. Specific gravity analyses were performed on NAPL samples from nine temporary well points (including RI and IRM well points), five Phase IA monitoring wells, and 35 existing monitoring wells at the Bayonne Plant. Hydrometer testing was conducted on NAPL samples from selected RI and historical wells concurrent with the collection of NAPL and water-level measurements on December 12, 1994.

Where a sufficient amount of NAPL was observed in either a temporary well point or a monitoring well, a sample of floating NAPL was collected using a disposable bailer. The NAPL was transferred in the field to a graduated cylinder, into which a hydrometer was placed. NAPL specific density was then read directly from the assembly.

## 3.4 SHALLOW MONITORING WELL INSTALLATION

As part of the Phase IA RI, 15 shallow monitoring wells were installed at the Site from October 1994 through January 1995. Five additional shallow monitoring wells installed in the General Tank Field, No. 3 Tank Field, Exxon Chemical Plant (Utilities Area), and Lube Oil investigatory IRM study areas were also utilized as part of the Phase IA RI for soil and/or groundwater sample collection. Monitoring well locations were selected to provide broad areal coverage to evaluate groundwater flow conditions and to investigate soil and groundwater quality near potential locations of contamination (e.g., spills, former process areas, former oil/water separators, septic systems, loading/unloading racks). The rationale for Phase IA monitoring well locations in each investigative unit is presented in Table 3-3. Final monitoring well locations are shown on Figure 3-1.

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Monitoring wells were constructed using 4-inch diameter, flush-joint, internally threaded, schedule 40 PVC well screen and riser. The PVC well screens were made of continuous wire wound screen (Johnson V-Wire) with a 0.020-inch slot size (20 slot). A No. 0 Morie Sand was placed approximately 0.5 to 3 feet below the bottom of the screen to approximately 1 to 2 feet above the top of the screen in all wells. A 0.5 to 2.5-foot thick bentonite seal was emplaced by tremie pipe above the sand pack, and a cement grout slurry was emplaced by tremie pipe above the sand pack, and a cement grout slurry was emplaced by tremie pipe above the bentonite seal extending to land surface. Typically, wells were completed with the PVC riser 2 feet above grade, with a PVC slip cap or expanding gasket cap, and a locking, 6 5/8-inch diameter, protective steel casing that was set and grouted down to 2 feet below land surface. In high traffic areas, monitoring wells were completed at grade and filled with a flushmount cast iron manhole cover. A vent hole was drilled in the PVC riser to maintain atmospheric pressure in the well and prevent potential pressure and suction from interfering with water-level fluctuations. Monitoring wells were affixed with a permanent identification marker, including the well permit number, in accordance with NJDEP requirements.

Shallow monitoring well soil borings were completed according to the same procedures described in Section 3.2 (Analytical Soil Boring and Drivepoint Program), except that these soil borings were drilled with 6 5/8-inch augers instead of 4 ¼-inch augers.

Phase IA shallow monitoring well screens were set to straddle the water table, except where marginally confining conditions were encountered. Generally, the top of the well screen was set 2 to 5 feet above the depth at which water-table conditions were encountered in split-spoon soil samples. The bottom of the well screen varied in depth depending on the thickness of the stratigraphic unit in which the water table was encountered. Often, a judgment was made between constructing a well with sufficient screen length to yield water for efficient groundwater sampling and constructing a well discretely screened across only one lithologic type resulting in one unique hydraulic gradient. Shallow well screens ranged in length from 10 to 13 feet. Upon completion of all Phase IA monitoring wells, a datum marked at the top of the well casing was surveyed by Taylor, Weissman & Taylor of Dayton, New Jersey, a New Jersey-licensed land surveyor. Table

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3-5 provides a summary of construction details for all monitoring wells installed during the Phase IA RI, and Appendix D contains the well construction logs and the Form B-NJDEP Location Certification Forms.

### 3.5 STRATIGRAPHIC BORINGS

To characterize and evaluate the vertical extent of the stratigraphy and the hydrogeologic conditions underlying the Site, a series of stratigraphic soil borings were drilled throughout the Bayonne Plant. Stratigraphic borings were drilled in the Pier No. 1 Area, Lube Oil Area, Asphalt Plant, and Piers and East Side Treatment Plant Area. At three of the four stratigraphic boring locations, an intermediate and deep overburden monitoring well cluster was installed. The fourth stratigraphic soil borings was converted into a deep overburden monitoring well. The locations of the stratigraphic borings and the intermediate and deep monitoring wells are shown on Figure 3-1.

### 3.5.1 Intermediate and Deep Well Installation

The intermediate wells were installed by casing off the upper shallow zone by drilling with a hydraulic (mud) rotary method and installing an upper steel casing; a lower PVC casing and screen were then installed through this upper steel casing. Wells were designed in this manner to permanently seal off any potential upper soil or groundwater contamination from lower waterbearing strata. Monitoring well construction details for the intermediate and deep wells are included in Table 3-5.

Specifically, the methodology used to install the intermediate wells during Phase IA of the RI was as follows:

• A 12-inch diameter borehole was drilled by the hydraulic (water or water plus pure bentonite) rotary method and advanced at least 2 feet into the meadow-mat layer.

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- An 8-inch diameter steel casing, with a PVC cap on the bottom, was inserted into the 12-inch diameter borehole. The 12-inch diameter borehole was grouted in place by first filling half of the borehole with cement by the tremie pipe method and then sinking the casing, which was sealed at the bottom with a PVC cap, into the grout. This method is called displacement grouting and it was also used to install the deep wells. The casing was held down with the drill rig for a minimum of 12 hours.
- The PVC plug was penetrated, and split-spoon samples were collected through the 8inch casing ahead of the 7 7/8-inch drilling bit; these soil samples were evaluated to select the screen setting of the well within the water-bearing zone.
- A 4-inch diameter PVC casing and screen were installed in the 7 7/8-inch diameter borehole and constructed in a fashion similar to the shallow monitoring wells.

All of the deep overburden monitoring wells were similarly installed using hydraulic mud rotary methods. Deep monitoring wells were installed with a double-cased borehole to prevent cross-contamination of water-bearing units and/or to permanently seal off shallow soil contamination that was observed in the vadose zone. The following is a description of the well installation method used for these wells:

- A 16-inch diameter borehole was drilled at least 2 feet into the local confining unit (either the meadow-mat layer and/or the glacial till unit).
- A 12-inch diameter steel casing (with PVC cap) was inserted into the 16-inch diameter borehole and grouted in place by using a displacement grouting technique.
- The casing and grout were allowed to set for at least 12 hours.
- The PVC cap was penetrated and split-spoon samplers were advanced and telescoped through the 12-inch diameter casing to the next encountered confining unit.

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- An 11 7/8-inch diameter borehole was drilled by hydraulic rotary method and was telescoped through the 12-inch diameter steel casing at least 2 feet into the next encountered confining unit (alluvial clay layer or glacial till).
- An 8-inch diameter steel casing (with PVC cap) was inserted into the 12-inch diameter borehole, grouted in place, and allowed to set for 12 hours.
- The PVC cap was penetrated and split-spoon samplers were advanced and telescoped through the 8-inch diameter casing to the borehole.
- A 7 7/8-inch diameter borehole was drilled by hydraulic rotary method and was telescoped through the 8-inch diameter steel casing to bedrock.
- A clean, 7 <sup>3</sup>/<sub>4</sub>-inch diameter, temporary casing (with diamond but hollow tip) was drilled approximately 0.5 foot into the top of the bedrock to create a watertight seal.
- The casings were flushed clear with potable water.
- Bedrock coring equipment was advanced and cores were obtained in 5-foot lifts using the standard, Diamond Core Drill Manufacturer Association (DCDMA) specifications for the "G"-group core barrels and NX-sized, flush-coupled casing and diamond bits.
- Bedrock coring was completed into competent rock (i.e., rock that was not significantly weathered) to a depth of 10 feet.
- The borehole was grouted to the approximate top of bedrock elevation.

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• A 4-inch diameter PVC casing and well screen were installed in the 8-inch diameter borehole and constructed in a manner similar to the shallow monitoring wells.

## 3.5.2 Bedrock Coring

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Bedrock coring was conducted at stratigraphic boring locations that were ultimately converted into deep monitoring wells. The bedrock cores have been retained by Exxon and are stored at the Bayonne Plant. Bedrock coring was conducted using the field methods described in the preceding section. During the 5-foot coring runs, the following information was recorded: depth of run, penetration, run duration (per foot), penetration rate, and down pressure (in pounds per square inch [psi]). After completion of the coring run, the core barrel was brought to the surface and analyzed by a Geraghty & Miller geologist. The following information was recorded: recovery, percent recovery, rock quality designation (RQD), lithology, fracture frequency, fracture fit, fracture spacing, orientation of fractures, degree of weathering, and any odors or discoloration observed in the rock core. Bedrock core logs are provided in Appendix E.

## 3.6 SYNOPTIC WATER-LEVEL MEASUREMENTS

On December 12, 1994, synoptic water-level measurements were obtained at the 22 monitoring wells installed during Phase IA (including five investigatory IRM monitoring wells), at 157 existing and historical IRM monitoring wells and recovery wells, and at seven surface-water measuring points. Water-level measurements were collected from 171 shallow monitoring wells, seven intermediate monitoring wells, and one deep monitoring wells. Each well was measured at low tide (approximately 10:18 a.m.) and at high tide (at approximately 16:15 p.m.) on this date. Measurements were made using either an electronic interface probe, or a weighted steel tape and indicator chalk, according to the measurement and decontamination procedures outlined in the RI Work Plan (Geraghty & Miller, Inc. 1993a). The water-level data were used to determine groundwater flow directions and the general presence and degree of influence of the tidal fluctuations in the Kill Van Kull and Upper New York Bay on groundwater levels across the Site. Surface-water elevations were also obtained relative to seven surface-water measuring points

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established at fixed structures (i.e., points on piers and bulkheads) and existing staff gauges (i.e., PVC casing markers in the Platty Kill Canal) (Figure 3-1). Interpretation of the measurement data and Site groundwater flow is presented in Section 4.6.2.1 (Shallow Groundwater Flow).

### 3.7 GROUNDWATER SAMPLING

From January 23 to 27, 1994, groundwater samples were collected from 21 Phase IA monitoring wells and ten historical and existing IRM monitoring wells. Phase IA monitoring wells sampled included 14 shallow Phase IA monitoring wells, three intermediate monitoring wells, and four deep monitoring wells. Groundwater samples were not collected from six shallow monitoring wells (which includes five IRM monitoring wells) due to the presence of floating NAPL, as detected with an electronic oil/water interface probe or a steel tape and indicator paste, and confirmed with a bailer. Whenever possible, three volumes of the standing water in a well were purged prior to sampling, and no sampling was performed unless the total water column (at least one volume) was replaced by groundwater directly from the formation. Groundwater samples were not collected from new wells until at least 2 weeks after well development. Each well was purged using a centrifugal pump or a stainless-steel submersible pump, and dedicated tubing. All equipment used to purge the wells was documented on the water sampling logs, which are provided in Appendix F.

The temperature, pH, conductivity, dissolved oxygen (DO) content, and redox potential (eH) of the groundwater were generally measured during the purging of every well volume. Samples were collected within 2 hours after the well was evacuated. Low-yielding wells were evacuated to dryness and allowed to recover prior to sampling. All purge water was containerized in 55-gallon drums; then properly disposed into the on-site sewers or into a storage tank and transported for disposal at the on-site wastewater treatment plant.

Samples were collected using decontaminated, dedicated, bottom-loading Teflon bailers and Teflon-coated stainless-steel leaders (3 to 6 feet in length). In general, wells were sampled in the ascending order of contamination, with the least contaminated well being sampled first.

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Samples were carefully poured into laboratory-supplied containers, avoiding agitation or turbulence that can result in the loss of VOCs and/or excessive oxygenation of the samples.

Sample bottles were filled in the following order: VOCs, SVOCs, TPH, PCBs/pesticides, total metals, dissolved metals, phenols, cyanide, sulfate and chloride, preserved inorganics, and non-preserved inorganics. Samples were shipped to the laboratory, CompuChem Environmental Corporation Laboratory of Raleigh, North Carolina (CompuChem), at the end of every day of the sampling event. Samples for analysis of dissolved gases (i.e., oxygen, nitrogen dioxide, methane, carbon dioxide, and carbon monoxide) were collected from monitoring wells using a peristaltic pump and transferred directly into zero-headspace sample containers. Samples for analyses of dissolved gases were shipped to Microseeps Laboratories of Pittsburgh, Pennsylvania (Microseeps). The chain-of-custody forms are provided in Appendix C with the sample/event criteria forms.

As required by the NJDEP, temperature, pH, specific conductance, DO, and eH measurements were also made at the time of sampling (after the VOC sample was taken) because these properties may change during storage. These field parameters were measured in situ using a HydroLab multiparameter downhole instrument. Field parameter readings were obtained at 2-foot depth intervals throughout the water column in each monitoring well. These data were recorded on the water sampling logs, which are presented in Appendix F. Field instrument types are outlined in the RI Work Plan (Geraghty & Miller, Inc. 1993a). Instruments were calibrated at the beginning of the day and checked periodically during the day.

To monitor the effectiveness of decontamination procedures, field blanks were collected during groundwater sampling. At the field location, analyte-free water was poured through the clean sample equipment and into sample containers for analysis. Field blanks were preserved in the same manner as other samples. Trip blanks were used to monitor possible VOC contamination of water samples during handling and transport. Blind duplicate samples were collected at a frequency of one for every 20 samples collected.

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Groundwater samples were collected for analysis of both dissolved (filtered) and total (unfiltered) metals during the Phase IA field activities. Samples collected for dissolved metals analysis were filtered on-site prior to sample preservation. A glass flask and filter apparatus was used and precleaned with a 10 percent nitric acid (HNO<sub>3</sub>) solution, followed by a distilled/deionized water rinse. A dedicated, cellulose-based, 0.45-micrometer (um) membrane filter was used to filter samples. Field blanks for dissolved metals were collected by pouring laboratory-provided, deionized/distilled water through the entire filtering apparatus.

## 3.8 AMBIENT AIR MONITORING

The ambient air monitoring program was conducted to determine the appropriate level of protection for workers performing RI tasks. Appendix B, Section E.5(a) of the ACO required the characterization of baseline ambient air quality conditions throughout the Bayonne Plant and the identification of RI activities that may adversely impact ambient air quality.

Ambient air monitoring was conducted at the Site during all tasks and was implemented using appropriate field methods and instrumentation (PID or FID), as discussed in the FSP and HASP, Appendix A and Appendix C, respectively, of the RI Work Plan (Geraghty & Miller, Inc. 1993a). Characterization of baseline conditions and the development of a field screening program was accomplished by (1) wellhead monitoring and soil sample emissions analyses, and (2) air monitoring as outlined in the HASP. The results of the ambient air monitoring are summarized and presented in a table in Appendix G.

### 3.8.1 Flame Ionization and Photoionization Detectional Equipment

During intrusive RI activities, one of the following instruments were used to determine levels of personal protective equipment (PPE): a Foxboro OVA-128 FID, a Foxboro TVA-1000 FID/PID combination meter, or an HNU PID. To define appropriate levels of PPE, readings upwind of the work zone were monitored to determine background air quality. If action levels were exceeded within the work zone, intrusive work was stopped and workers were instructed to

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move upwind of the work zone to let the area vent. If readings remained above the action levels, appropriate upgrades in PPE were made and work was continued. Approximately 95 percent of the RI investigative activities were conducted in Level D health and safety protection. The remaining 5 percent (work in the No. 3 Tank Field and Chemical Plant Areas), was conducted in Level C.

## 3.8.2 Draeger/Sensydine Tubes

If air monitoring readings were obtained (by the methods described in Section 3.8.1 [Flame Ionization and Photoionization Detectional Equipment]) above the action levels (as specified in the HASP), Draeger tube tests were conducted to determine the concentrations of benzene. If action levels for benzene were exceeded within the work zone, intrusive work was stopped and workers were instructed to move upwind of the work zone to let the area vent. If readings remained above the action levels, appropriate upgrades in PPE were made and work was continued.

### 3.8.3 Dust Monitoring

Historical use of chromium slag as fill material at various parts of the site necessitated the use of a random air monitor (RAM) for continuous measurement of dust (potentially chromium) within the work zone. The RAM was used to monitor for ambient particulate matter smaller than 10 microns (um). If action levels were exceeded within the work zone, dust was suppressed by using a water spray before work was resumed. Data were collected and stored in the RAM during the day and downloaded into a hard copy printout at the end of each work day.

#### 3.9 QUALITY ASSURANCE/QUALITY CONTROL

During the Phase IA RI of the Bayonne Plant, 116 soil borings, including 32 IRM borings, were drilled; and 20 shallow monitoring wells, including five investigatory IRM wells, were installed. One hundred and eighty-one soil samples, 13 groundwater samples from drivepoints, and 31 groundwater samples from monitoring wells were collected and shipped to CompuChem for

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analysis. A summary of the number of analyses conducted for Phase IA soil and groundwater samples is provided in Table 3-1. Figures 3-2 and 3-3 present the scope of the analyses performed on soil samples collected from the various soil boring and monitoring well locations.

All of the soil samples collected were analyzed for TPH by New Jersey-modified USEPA Method 418.1 and for hexavalent chromium by New Jersey-modified USEPA Method 3060A/7196. In addition, over 55 percent of the soil samples were analyzed for TCL VOCs and eight additional site-specific VOCs, TCL SVOCs, TCL pesticides/ PCBs, and TAL metals and cyanide. These analyses were performed according to the USEPA Contract Laboratory Program (CLP) methodology for organics and inorganics (USEPA 1991a, 1991b). Throughout this report, reference to the TCL/TAL plus miscellaneous parameters will include the parameters listed in the tables cited in Section 5.0 (Phase IA Findings). Analytical results for soil are provided on diskette in Appendix H.

Where NAPL was not detected in a drivepoint or temporary well point, a groundwater sample was collected. Of the 84 Phase IA RI soil borings drilled, 48 exhibited NAPL thicknesses of at least 0.01 foot or greater. A temporary drivepoint was installed in 13 of the remaining 36 soil borings where NAPL was not detected in a temporary well point. Groundwater samples were collected from the 13 drivepoints and analyzed for VOCs. Thirty-one monitoring wells were sampled and analyzed for TCL VOCs (and eight additional site-specific TCL VOCs), TCL SVOCs, TCL pesticides/PCBs, TAL metals (dissolved) plus total cyanide, hexavalent chromium, total iron and manganese, and TPH. The samples from these 31 wells were also analyzed for the following wet chemistry parameters: chemical oxygen demand (COD), biological oxygen demand (BOD), total organic carbon (TOC), ammonia, chloride, nitrate, sulfate, sulfide, total dissolved solids (TDS), phosphate, and alkalinity; and for the following dissolved gases: methane, carbon monoxide, carbon dioxide, nitrogen dioxide, and dissolved oxygen. Approximately 15 percent of the monitoring wells were analyzed for both total and dissolved TAL constituents. The TCL/TAL analytes were analyzed according to the USEPA CLP methodology (USEPA 1991a, 1991b). The remaining remedial parameters and the gases were analyzed by various standard USEPA methods

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not regulated under CLP (see Section 5.3.2 [Groundwater Sampling Laboratory Analytical Results]). Analytical results for groundwater are provided on diskette in Appendix I.

Validation of 20 percent of the data based on the NJDEP guidelines (NJDEP 1991, 1992b, and 1992c) and a data usability assessment based on 100 percent of the data were performed in accordance with a letter dated October 12, 1994 from Ms. Susan Chapnick of Gradient Corporation to Ms. Linda Caramichael and Mr. James Bover of Exxon. Twenty percent of the Phase IA RI laboratory analytical data were selected for validation in accordance with NJDEP guidance (Boyer 1994), based on the following: (1) focusing on results indicating relatively low to moderate contaminant levels; (2) validating the sample results from all of the representative matrices (soil, sediment, and groundwater); (3) providing validation from a representative set of sample results from all operational areas; and (4) reducing data validation time by evaluating samples from the same sample delivery group (SDG), when feasible. The results of the field QA/QC for Groundwater Samples). A summary of the data usability assessment is provided in Appendix J.

#### 3.9.1 Soil Quality QA/QC

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Field QA/QC samples included field blanks, blind field replicates, and matrix spike and matrix spike duplicates (MS/MSDs). The frequency of collection and associated analytical parameters are described below.

#### 3.9.1.1 Field Blanks

Field blanks were collected at a rate of 10 percent of the total number of samples to evaluate potential cross-contamination during sampling and also to check the laboratory-prepared analyte-free water. Figures 3-2 and 3-3 present the scope of the laboratory analyses performed on soil samples collected from various locations at various depths, and Table 3-1 presents the total number of analyses conducted. A total of 18 field blanks was collected during the soil boring

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program; all of them were analyzed for TPH and hexavalent chromium, except for four of the field blanks, which were not analyzed for hexavalent chromium because the hexavalent chromium analyses were suspended for 2 weeks (from October 5 to October 18, 1994) to give the laboratory sufficient time to implement modifications to Method 3060A/7196. In addition, nine of the field blanks were analyzed for the TCL/TAL parameters.

#### 3,9.1.2 Blind Field Replicates

Blind field replicate samples were collected at a rate of one for every 20 soil samples to evaluate the reproducibility of the sampling technique. A total of nine replicates was collected during the soil boring program. All of them were analyzed for TPH and hexavalent chromium, except for one of the replicates, which was not analyzed for hexavalent chromium because the hexavalent chromium analyses were suspended for 2 weeks (see Section 3.9.1.1 [Field Blanks]). In addition, six of the replicates were also analyzed for the TCL/TAL parameters.

## 3.9.1.3 Matrix Spike and Matrix Spike Duplicates

MS/MSD samples were collected at a rate of one for every 20 soil samples to determine the precision (i.e., reproducibility) and the accuracy (i.e., the true analytical result) of the data. During the soil boring program, 12 MS/MSD samples were collected and analyzed for TPH. In addition, ten of the MS/MSD samples were also analyzed for the TCL/TAL parameters as well as hexavalent chromium.

#### 3.9.2 Groundwater Quality OA/QC

As previously discussed, groundwater samples were collected during the soil boring program using drivepoints and temporary well points. A total of 13 drivepoints or temporary well points was installed for collection of groundwater samples and laboratory analyses for VOCs.

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Two field blanks were collected with the drivepoint samples. Five trip blanks were analyzed for VOCs only on days that the drivepoints were shipped to the laboratory for analyses. Two blind field replicates were collected and analyzed for VOCs. Two MS/MSD samples were collected at a frequency of one per 2-week period that drivepoint samples were collected.

Thirty-one monitoring wells that did not contain floating NAPL were sampled for TCL VOCs (and eight additional site-specific VOCs), SVOCs, pesticides/PCBs, TAL dissolved metals plus cyanide, TPH, hexavalent chromium, dissolved gases, and wet chemistry parameters. Five of these wells were sampled for both total and dissolved metals to meet the requirements specified in the draft "Field Verification Procedures and Analysis Plan," prepared in conjunction with RI activities at the Bayway Refinery (Geraghty & Miller, Inc. 1993b).

Five field blanks and trip blanks were collected, one for each day of groundwater sampling. Two blind field replicates were collected to meet the requirement of one for every 20 samples. Two MS/MSD samples were collected to meet the requirement of one for every 20 samples.

## 3.9.3 Technical Data Usability Assessment

A technical data usability assessment was performed by Gradient Corporation on 100 percent of the TCL/TAL, and hexavalent and total chromium analytical data. The primary objective of the data usability assessment was to quantify, where applicable, the uncertainty in the data so that the end user was aware of the potential biases, false-negatives, and false-positives in the analytical data. The data usability was performed in accordance with the criteria defined in the NJDEP Data Validation Statement of Procedures (SOP) (NJDEP 1991, 1992b, and 1992c), National Functional Guidelines for Evaluating Organic and Inorganic Analytes (USEPA 1992a), Guidance for Data Usability in Risk Assessment (USEPA 1993), USEPA CLP Statement of Works for Organics and Inorganics Analyses (USEPA 1991a, 1991b), and Gradient Corporation's professional judgment. Qualifiers were applied to the data during the data usability assessment to flag these uncertainties. Data rejected (qualified "R") are unusable because the level of uncertainty in the value is unacceptable as a basis for

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project decisions. Overall, 1.2 percent of the soil data, 0.8 percent of the aqueous data, and 5.8 percent of the aqueous dissolved metals data were rejected.

Overall the data quality objectives (DQOs) for completeness as defined in the QAPP were achieved and the data reported were of good quality. A detailed summary of the data usability assessment is provided in Appendix J.

## 3.10 DATA EVALUATION METHODS

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In the absence of site-specific, risk-based criteria, analytical data for soil and groundwater samples collected during the Phase IA RI have been evaluated on a preliminary basis by comparing the concentrations to the NJDEP cleanup criteria, guidelines, and standards for these media. The following sections discuss the purpose and application of these criteria.

#### 3.10.1 NJDEP Soil Cleanup Criteria

Analytical data collected for soils have been compared to the most recently developed "Soil Cleanup Criteria," published and distributed by the NJDEP on February 3, 1994. These criteria were derived from Tables 3-1 and 7-1 and the accompanying text of the Proposed New Rule, New Jersey Administrative Code (NJAC) 7:26D published in the New Jersey Register on February 3, 1992. These criteria are included in the appropriate analytical data tables in this report to facilitate comparison.

## 3.10.1.1 Non-Residential Direct Contact Soil Cleanup Criteria

The NJDEP has developed surface soil cleanup criteria based on assumptions of long-term contact between a human receptor and the contaminated soils. Separate criteria have been established for residential and non-residential settings. Surface soil cleanup criteria were established to reduce the risks associated with chronic ingestion and/or inhalation of relatively small amounts of soil. Because the Site is located in an industrial zone, is used for industrial operations

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and its use is limited by a deed restriction, the Non-Residential Direct-Contact Soil Cleanup Criteria (non-residential criteria) are more applicable for screening the soil results. However, for characterization purposes, detected analyte concentrations are also compared to the Residential Direct-Contact Soil Cleanup Criteria (residential criteria).

## 3.10.1.2 Impact to Groundwater Soil Cleanup Criteria

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Subsurface Impact to Groundwater Soil Cleanup Criteria were developed by the NJDEP to protect groundwater quality in areas where groundwater is an actual or potential potable drinking water source. These criteria are based on assumptions regarding the rate at which contaminants will potentially leach to groundwater. For example, the criteria established for VOCs are based on a model that predicts the percentage of contaminants that may leach to groundwater over a 70-year period, while criteria developed for SVOCs were developed using a ranking system that considered solubility, biodegradability, and toxicity.

Additional criteria established by the NJDEP and used in this Phase IA RI Report to evaluate soil conditions at the Bayonne Plant included the 10,000 parts per million (ppm) guidance for total organic contamination, which includes TPH, and the 1,000-ppm guidance for total VOC contamination. Analytical TPH data were also compared to the criterion of 30,000 ppm for defining New Jersey hazardous waste when soil is excavated.

#### 3.10.2 Total and Hexavalent Chromium Cleanup Criteria

For the purposes of conducting the chromium IRM investigation at the Bayonne Plant and of establishing which areas of the plant require IRMs, a site-specific action level of 500 ppm for total chromium in soil was established in discussions between Exxon, NJDEP, and ICF Kaiser Engineers, Inc. (ICF Kaiser Engineers, Inc. 1993). The NJDEP has published suggested soil cleanup criteria for chromium (NJDEP 1995a). A residential soil cleanup criterion of 78,000 ppm is suggested for trivalent chromium and the NJDEP recommends that trivalent chromium not be regulated in a non-residential situation. The NJDEP-suggested values, based on human health

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inhalation exposure, for hexavalent chromium are: 130 ppm for residential use and 190 ppm for non-residential settings. Other suggested guidance values for hexavalent chromium are 10 ppm based on dermal exposure risk and 15 ppm for protection of groundwater.

Because the final levels upon which decisions regarding chromium will be based are not established, comparative criteria for total and hexavalent chromium in soils were established for use in this report. The criteria established for this report encompass all but the highest NJDEP suggested guidance values. A comparative criterion of 10,000 ppm was used for total chromium. Comparative values of 100 ppm and 10 ppm were used to evaluate hexavalent chromium concentrations in soil.

### 3.10.3 NJDEP Groundwater Quality Standards

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In January 1993, the NJDEP promulgated the Groundwater Quality Standards (NJAC 7:9-6), which classified groundwaters of the state based on their potential for use for drinking water supply and their ability to support sensitive ecosystems. These regulations established numerical standards for the groundwater classification that pertains to most of the state. Laboratory analytical data for groundwater samples collected from the shallow intermediate and deep overburden were evaluated by comparing concentrations to the NJDEP groundwater quality standards. However, groundwater on portions of the Site may be amenable to reclassification based on high natural concentrations of iron and manganese, which render it unusable for drinking water.

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### 4. PHYSICAL SETTING

This section provides a general description of the site-wide physical setting and prevailing hydrogeologic conditions at the Bayonne Plant. It includes a description of topography and drainage, land use, climate, soils and vegetation, geology, and hydrogeology.

## 4.1 TOPOGRAPHY AND DRAINAGE

The Bayonne Plant is located in the portion of Bayonne known as Constable Hook, which can be described as a spit or peninsula protruding into Upper New York Bay (Figure 1-1). The topography in the Constable Hook area is gentle, with elevations ranging from 0 to about 25 feet above mean sea level (msl). Most of the Site is at an elevation of 10 to 15 feet above msl, with the exception of the shoreline, which has lower elevations, and the tops of the berms surrounding the tank fields, which have higher elevations.

Under natural, undisturbed conditions, direct runoff from the Site would drain directly into Upper New York Bay or the Platty Kill Canal and Kill Van Kull Waterway. However, under current conditions at the Site, precipitation in the tank field areas does not run off directly because of the spill containment berms. Most of the Site is graded to direct runoff into the sewer system, which flows to the East Side Treatment Plant, treated water ultimately being discharged near the confluence of the Kill Van Kull and Upper New York Bay (Figure 3-1) under New Jersey Pollutant Discharge Elimination System (NJPDES)-Discharge to Surface Water (DSW) Permit No. NJ0002089. Only precipitation falling at the extreme perimeter of the Site (e.g., the undeveloped area immediately east of the General Tank Field), adjacent to the waterfront (riparian land), runs off directly into the adjacent waterways.

## 4.2 LAND USE

The Bayonne Plant is located in Hudson County, a 46-square mile urbanized area in northeastern New Jersey. The population density in Hudson County, as of the 1990 census, was 11,920 people per mile (Hudson County Department of Planning and Economic Development

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1992). It is geographically the smallest and the most densely populated county in New Jersey. The general area surrounding the Site consists of heavy and light industry, interconnected by a transportation network of roadways, railroads, and the navigable waters of the Kill Van Kull and Upper New York Bay. Neighboring industries include petroleum and petrochemical companies, warehouses, distribution facilities, and various manufacturing operations. The closest non-industrial (commercial or residential) establishments are approximately 0.4 mile to the south across the Kill Van Kull Waterway in Staten Island, New York, and about 0.65 mile to the west along 22nd Street in Bayonne.

### 4.3 CLIMATE

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Although greatly modified by the Atlantic Ocean, the climate of Hudson County is humidcontinental. The climate is dominated by continental influences because air masses and weather systems affecting Hudson County have their origin principally over the land areas of North America. A maritime influence is also significant. Characteristics of the climate such as an extended period of freeze-free temperatures, a reduced range in both diurnal and annual temperature, and heavy precipitation in winter relative to that in summer are a result of the county's maritime exposure.

Periods of extreme cold are of short duration in most years. The average annual rainfall in the area is about 42 inches, as measured at Newark International Airport (National Oceanic Atmospheric Administration [NOAA] 1991). The average annual temperature is 53.4 degrees Fahrenheit (°F). The highest average monthly temperature occurs in July (76.8°F) and the lowest average monthly temperature occurs in January (31.3°F) (NOAA 1991). The predominant wind direction on a regional scale is from the west-southwest; however, localized flow patterns (eddies) do exist.

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## 4.4 SOILS AND VEGETATION

Because of the extensive urbanization in Hudson County, no recently published information describing the soils in the area is available. A study conducted by researchers at Rutgers University (Lueder et al. 1952) describes the soil at the Site as reclaimed because of the extensive amount of filling that took place on Constable Hook to bring it to its present configuration. Historic aerial photographs confirm that a significant portion of the Site has been filled and reclaimed from Upper New York Bay and the Kill Van Kull Waterway. The extent of filling in the northern portion of Constable Hook can be observed on aerial photographs and historical maps dating back to 1940. However, much of the filling along the southern portion of the hook predates available aerial photographs. The nature of the fill varies across the Site and is described in more detail in Section 4.5.1 (Regional Geology).

The Site is sparsely vegetated due to the extensive industrial setting. Vegetation is limited to grasses and low-lying shrubs (native and ornamental), with occasional ornamental hardwood trees planted near the main building. More natural vegetation exists on the Site in limited undeveloped pockets adjacent to Upper New York Bay (e.g., the area to the east of the General Tank Field).

#### 4.5 REGIONAL AND SITE GEOLOGY

This section provides a description of the regional and site-specific geology. Interpretation of the regional geology is based on information provided in regional or county-wide studies conducted by the USGS or other researchers as referenced below. Local geologic information has been interpreted by reviewing hundreds of logs of historical borings drilled across the Site for geotechnical purposes (e.g., foundation analysis for tanks and buildings) or monitoring and recovery well installation. The majority of the historical soil borings were drilled at the Site in the 1950s and 1960s. Historical borings and wells depicted on Figure 2-2 have been extensively evaluated by Geraghty & Miller, and the corresponding lithologic information has been put into a geographic information system (GIS) database. Information from 512 soil borings, 40 monitoring

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wells, and ten recovery wells was compiled and is currently in the GIS database. In addition, lithologic information from soil borings and monitoring wells, installed in 1993 and 1994 as part of the ongoing NAPL IRM investigations, has been compiled.

## 4.5.1 <u>Regional Geology</u>

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The Site is located in the glaciated portion of the Piedmont physiographic province, which is underlain by mostly late Triassic-age rocks. The Piedmont is characterized in New Jersey by a long and narrow fault-blocked basin bordered on the west by uplifted fault-blocked mountains. The eastern border of the Piedmont lies near Bayonne and Staten Island (Schuberth 1968) and has been mapped by the Geological Survey of New York (1970) as running directly through Constable Hook. The Triassic-age rocks of the Piedmont include the sedimentary rocks of the Newark Basin Super group and intruded units of diabase and interbedded flows of basalt. The Triassic rocks comprise a sequence that attains a thickness on the order of 22,000 feet and dips generally northwestward; the sequence is locally faulted and folded. From northwest to southeast, or youngest to oldest, the sedimentary rocks include the Brunswick Formation, the Lockatong Formation, and the Stockton Formation (McGuinness 1963). More recent studies provide a more detailed stratigraphic sequence nomenclature within the Newark Basin Super Group. The Stockton Formation rests on the folded and extensively eroded metamorphic rock complex of the New York City Group. The sedimentary basin deposits are interlayered with extensive basaltic intrusive and extrusive rocks.

The Brunswick Formation has been reclassified as the Brunswick Group and is comprised of several sedimentary and volcanic formations (Olsen et al. 1989). The Passaic Formation (within the Brunswick Group) is the most abundantly exposed unit of the Newark Basin Super Group. It consists mostly of red shale, but includes sandstone beds that are thicker and more numerous in the northeastern part of the Newark Basin. The Lockatong Formation consists mostly of dark shales and argillites, but may include some thin-bedded sandstone or conglomerate. The Stockton Formation is mostly an arkosic sandstone and conglomerate.

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The igneous deposits consist of either extrusive lava flows of the Watchung Basalt that are interbedded with the sedimentary rocks of the Newark Super Group, or the intrusive diabase of the Palisades, which forms a ridge of massive bedrock with a dark gray, mottled appearance extending from Rockland County, New York, through Hudson County, New York (west of the Site), and ending in Staten Island, New York. Based on regional mapping, the bedrock bordering the eastern extent of the Triassic deposits in the vicinity of the Site is either the Manhattan Formation, which consists principally of mica schist (Geological Survey of New York 1970) or a post-Ordovician serpentinite common to Staten Island (State of New Jersey Department of Conservation and Economic Development 1950). Geologic maps depicting bedrock for both New York and New Jersey show a geologic contact beneath the overlying unconsolidated deposits at the Site; however, the maps differ in their interpretation of the formations present. Both interpretations are consistent in that they hold that part of Constable Hook is underlain by crystalline metamorphic bedrock. A review of the historical boring logs indicate that under most of the Site, glacial till deposits are underlain by the Triassic-age (Newark Super Group) Stockton Formation, which is comprised primarily of arkosic sandstone and conglomerate. However, drilling activities did confirm the presence of the Manhattan Formation (Manhattan Schist) beneath the eastern portion of the Site.

Unconsolidated sediments deposited by glaciers or by glacial meltwater during the Pleistocene mantle the bedrock surface in much of the vicinity of Constable Hook. These deposits consist of clay, silt, sand, gravel, and boulders. Recent age deposits, primarily marine and nearmarine sediments composed of silt, clay, and peat (where present), overlie the glacial sediments.

## 4.5.2 Site Geology

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Previous soil investigations by various drilling and geotechnical engineering contractors provided hundreds of soil boring logs covering much of the Site. The Site History Report for the Bayonne Plant (Geraghty & Miller, Inc. 1994b) presented a summary of these historical borings. Based on shallow, intermediate, and deep subsurface borings drilled during this Phase IA RL, the geologic characterization of the Site as presented in the Site History Report has been refined. The significant modifications of the Site geologic characterization include the following: (1) a more

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detailed characterization of the shallow deposits overlying the glacial till deposits, and (2) verification of a relatively consistent bedrock surface at approximately 100 feet bls directly overlain by a thick continuous layer of pre-glacial or interglacial alluvium (below the glacial till).

The generalized geology of the Site, from the surface downward, consists of the following five main stratigraphic units: (1) fill, (2) marsh deposits, (3) glacial till, (4) alluvium, and (5) bedrock. The stratigraphic units are classified based on the inferred depositional environment and the stratigraphic position of these units. Figure 4-1 shows the locations of hydrogeologic cross sections that illustrate the subsurface stratigraphy of the Site. Within each stratigraphic unit, subunits based on lithologic and hydrogeologic characteristics are also identified; these subunits are presented on the cross sections (see Figures 4-2 through 4-5). Abbreviations given in parentheses following soil descriptions in this section are designations from the United Soil Classification System.

### 4.5.2.1 Fill

The fill unit is the uppermost stratigraphic unit, extending across the entire Site. Fill material was used to modify site elevations, to provide structural support for foundations of tanks and other structures, and to reclaim parts of the Kill Van Kull Waterway and Upper New York Bay Shoreline. The fill unit varies from approximately 3 to 25 feet in thickness, and consists of a heterogeneous mixture of cinders, ash, clay, silt, sand, gravel, construction debris, and miscellaneous slag (F-M). In limited areas such as the coastal Piers and East Side Treatment Plant Area, the fill does not contain appreciable quantities of ash, cinders, or fine grained sediments, but is composed primarily of sand and gravel (F-SM). These more permeable sandy zones are found infrequently across the Site and appear both spatially and vertically discontinuous.

#### 4.5.2.2 Marsh Deposits

The marsh deposits comprise a discontinuous, interlayered mixture of fine, medium, and coarse granular deposits. The marsh deposits include a thin (less than 1 to 4 feet), organic, fiber-

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rich silt and clay subunit, referred to as the meadow mat (MM-PT), a more continuous alluvial subunit consisting of black organic silt and clay (AL-OL), and an organic, sandy clay with abundant plant fibers (MM-SP). Along the eastern coastline, a loose, organic silt subunit (AL-OL) extends into Upper New York Bay and is interpreted as an esturarine deposit.

#### 4.5.2.3 Upper Alluvium

The upper alluvium is composed of four subunits that form a continuous, permeable unit underneath the marsh deposits. The upper subunit (AL-SW) is a gray to tan, very fine sand that varies in thickness from 0 to 18 feet. The thickest portion of this subunit fills an east-west buried stream channel that runs across the northern portion of the Site and has eroded to the underlying glacial till unit. The lower three alluvial subunits consist of red-brown, coarse-grained alluvial deposits (AL-SM, AL-SP, AL-GP) that become more coarse with depth and are interpreted as reworked glacial deposits or glacial outwash. Collectively, the lower three units vary in thickness from 0 to 19 feet.

#### 4.5.2.4 Glacial Till

The glacial till unit generally consists of a densely compacted, red to brown deposit of poorly sorted clay, silt, sand, and gravel (GT-GM). Three subunits can be differentiated based upon grain size and permeability characteristics. The upper subunit (GT-SM) is gradational with the overlying alluvium and is composed of red, silty sand or poorly sorted sand and clay. A very low permeability clayey silt (GT-ML) is interlayered with the more abundant GT-GM sediments across the site and usually forms the base of the glacial till unit. At one location, a dense, tan to red clay (GT-CH) overlies the other glacial till subunits and may have formed as a ponded lake deposit following the last glacial recession. The upper surface of the glacial till is variable and exhibits up to 35 feet of relief across the Site, much of which is due to past stream activity which eroded channels into the glacial till sediments. The channels were subsequently filled with upper alluvium or marsh sediments. The thickness of the glacial till unit varies from 19 to 71 feet, and the subunits form a continuous low permeability zone across the Site.

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## 4.5.2.5 Lower Alluvium

A continuous layer of brown to red-brown, medium to coarse sand (AL-SW) underlies the glacial till layer to bedrock. This sediment is approximately 55 to 60 feet thick across the Site and was deposited prior to the last glacial advance.

## 4.5.2.6 Bedrock

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Prior to this Phase IA RI, inconsistencies in the previously interpreted depth to bedrock on the historical soil boring logs were noted in the Site History Report (Geraghty & Miller, Inc. 1994b). These inconsistencies were attributed to variations in drilling techniques and effectiveness of subsurface penetration. The shallower depths to bedrock were suspected to be incorrect due to erroneous interpretation of inferred bedrock from drilling refusal at the top of the glacial till. To verify the depth to bedrock, four deep soil borings (Soil Borings PN1SB1, LOSB19, APSB7, and PESB3) were drilled across the Site during the Phase IA RI. These soil borings were converted into deep overburden Monitoring Wells GMW21D, GMW22D, GMW23D, and GMW24D, respectively. To confirm the presence of bedrock and to determine the bedrock lithology, bedrock core samples were obtained at these four locations. Soil boring logs and core logs are provided in Appendix B.

The deep borings confirmed that the shallow bedrock elevations inferred by previous workers were incorrect. The four deep borings encountered bedrock at a depth of approximately 100 to 125 feet bls. The actual depth to bedrock is similar to the deeper depths to bedrock reported in some historical borings on-site and at the adjacent IMTT property (Geraghty & Miller, Inc. 1994b). A relatively flat bedrock surface rather than a highly variable bedrock surface is more consistent with the erosion of the bedrock to a common base level during periods of lower sea levels. Bedrock recovered from the three deep borings on the western portion of the Site (Soil Borings GMMW-21D, GMMW-22D, and GMMW-23D) indicate that approximately 2 to 12 feet

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of weathered red siltstone overlies competent red sandstone. This sandstone is interpreted as the Stockton Formation of the Newark Basin Super Group.

The bedrock recovered from deep Soil Boring GMMW-24D indicates that the eastern edge of the Bayonne Plant is underlain by bedrock composed of gray mica schist. This mica schist bedrock is interpreted as the Manhattan Formation of the New York City Group. This interpretation is consistent with regional mapping by the New York State Geological Survey (Geological Survey of New York 1970). A weathered rock horizon was not encountered; only competent mica schist bedrock was encountered in deep boring GMMW-24D. An unconformable contact between the Stockton and Manhattan Formations apparently underlies the Site.

#### 4.6 HYDROGEOLOGY

This section provides a description of the regional and the site-specific hydrogeology.

#### 4.6.1 <u>Regional Hydrogeology</u>

The major aquifer systems in the northeast New Jersey metropolitan area include the following: (1) glacial till deposits, (2) stratified drift, and (3) Triassic-age shales and sandstones of the Newark Basin Super Group. Sedimentary coastal plain aquifer systems, such as the Sayerville Sand Member and the Farrington Sand Member, are not present in the vicinity of the Site. The glacial till deposits are only permeable in limited areas; in most areas, these deposits do not form a significant water-bearing sequence. West of Constable Hook, the City of Bayonne is underlain by the intrusive diabase of the Palisades Sill. This diabase bedrock commonly outcrops along the northeast-trending ridge underlying Bayonne. East of the diabase ridge, the stratified drift deposits and Triassic-age sedimentary rocks that are present underlying Constable Hook are not used as a source of groundwater.

A November 1992 computer survey of NJDEP Bureau of Water Allocation files, which document major groundwater withdrawals (greater than 100,000 gallons per day [gpd], indicates

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that no major withdrawals occurred within 4.5 miles of the Site (Geraghty & Miller, Inc. 1994b). According to Mr. James Monkowski of the City of Bayonne Health Department, there are no industrial, domestic, or public water supply wells within a 1-mile radius of the Site (Monkowski 1994). The USGS (McGuinness 1963) documented areas in New Jersey (including Bayonne, Linden, and Elizabeth) having groundwater quality problems as early as the 1960s. As of November 1992, 242 Comprehensive Site List cases were located within a 5-mile radius of the Bayonne Plant. In addition, 48 known contaminated sites are listed in the City of Bayonne (NJDEP 1994b). Known contaminated sites include Amerada Hess Terminal, Bayonne City Landfill, Bayonne Industries, Bayonne Terminals, Inc., ICI Americas, Inc., McGovern Trucking, Powell Duffryn, PSE&G, and White Chemical. Documented water-quality problems, the proximity to the saline near-shore environment, and the low yield of the subsurface deposits probably contribute to the lack of water supply development in the vicinity of Bayonne.

### 4.6.2 Site Hydrogeology

As discussed in Section 4.5.2 (Site Geology), six stratigraphic units have been identified at the Site. Based on the lithologic descriptions and hydrogeologic characteristics of these stratigraphic units, Geraghty & Miller has sorted these units into five hydrogeologic units. Three water-bearing units (shallow, intermediate, and deep) are separated by two confining layers (an upper leaky confining layer and a lower confining layer).

The uppermost water-bearing unit is the saturated fill deposits. Depth to groundwater ranges from 3.8 to 10 feet bls beneath the Site. The hydraulic characteristics of the fill are highly variable depending on the type of fill. However, the relatively thin saturated thickness (averaging less than 10 feet) and the variable lateral extent of more permeable fill results in limited groundwater withdrawal capacities. Shallow groundwater elevations range from 2.5 to 13.5 feet above msl. The base of this shallow water-bearing unit is most commonly defined by the upper leaky confining layer, which consists of the meadow mat and underlying marsh silt and clay unit. This confining layer is nearly continuous, with only a few limited areas that allow for hydraulic connection between the saturated fill and the intermediate water-bearing unit, which consists of the

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marsh/alluvial sand unit that overlies the glacial till. Significant differences between the potentiometric head of the intermediate marsh/alluvial sand and the shallow water-bearing fill illustrate the effectiveness of the upper confining layer. Vertical hydraulic head data are discussed in Section 4.6.2.2 (Vertical Flow Gradients). Occasionally, at a few locations, all of the marsh deposits are absent and the fill is directly underlain by the glacial till confining layer. No intermediate water-bearing unit is present at these isolated locations.

The lower confining layer at the Site consists of the glacial till unit. This dense, laterally continuous and thick (19 to 71 feet) layer of poorly sorted glacial till effectively isolates the shallow and intermediate water-bearing units from the deep water-bearing unit. The deep water-bearing unit consists of the alluvial sand unit and, to a lesser extent, the underlying fractured bedrock.

#### 4.6.2.1 Shallow Groundwater Flow

Water levels were measured in shallow monitoring wells at the Bayonne Plant on December 12, 1994; those data are presented in Table 4-1. On April 17, 1995, water levels were measured at all intermediate and deep monitoring wells and at selected shallow monitoring wells, as presented in Table 4-2. Water-level measurements confirm the existence of intermediate and deep hydrostratigraphic zones in the overburden. Water levels measured in shallow wells during low tide on December 12, 1994 were used to construct a contour map showing the configuration of the water-table surface (see Figure 4-6). Figure 4-6 illustrates multiple groundwater flow directions from four general areas of higher groundwater elevations (i.e., recharge areas or groundwater mounds) as described below. Shallower groundwater commonly flows in a radial pattern away from the recharge areas toward Upper New York Bay, the Kill Van Kull Waterway, and the Platty Kill Canal. Shallow groundwater elevations along the east and southwest portions of the Site are slightly below sea level during low tide, similar to the elevation of the nearby tidal surface-water bodies. Horizontal flow gradient calculations are summarized in Table 4-3.

The first groundwater mound (greater than 15 feet above msl) occurs in the northwest portion of the Site. In this area, a groundwater recharge ridge is present beneath the center of the

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"A"- Hill Tank Field and extends to the east beneath the southwest corner of the No. 2 Tank Field (see Figure 4-6). This groundwater divide results in a northeast flow direction beneath the Main Building Area, the No. 2 Tank Field, and the eastern portion of the "A"- Hill Tank Field. This northeast component of groundwater flow may be induced in part by pumpage of the interceptor trench, which is oriented northwest-southeast along the Site boundary. Horizontal gradients for this portion of the Site range from 0.012 to 0.017 foot per foot (fl/ft). On the other side of this divide, groundwater flows to the southwest under the western portion of the "A"- Hill Tank Field. In the center of the Bayonne Plant, near the Exxon Chemicals Plant Area, groundwater flow is generally to the east.

The second groundwater (hydraulic) mound is present beneath the center of the Lube Oil Area, with radial flow to the west, southwest, south, and southeast (see Figure 4-6). Groundwater flowing to the west and southwest discharges to the Platty Kill Creek and Pier No. 1 on the Kill Van Kull Waterway, with horizontal gradients ranging from 0.11 to 0.016 ft/ft.

In the eastern portion of the Site, the remaining two mounds, which are linear in form, straddle a groundwater trough that trends west to east beneath the eastern portion of the Low Sulfur Tank Field (see Figure 4-6). The groundwater trough effectively captures all shallow flow beneath the Solvent Tank Fields and the Low Sulfur Tank Field, with a very shallow gradient toward Upper New York Bay. Horizontal flow gradients are steeper between the mounds and the north and south sides of the trough (0.007 ft/ft), but become gentler within the trough (0.002 ft/ft). Shallow groundwater flow beneath the General Tank Field is generally to the north and northeast, with a horizontal gradient of approximately 0.010 ft/ft.

The elongated mounds in the water table apparently represent recharge areas for shallow groundwater. These recharge areas may be caused by several factors, including the following: (1) surface drainage patterns that direct run-off to the recharge areas; (2) more permeable surface deposits at the recharge areas that promote infiltration; (3) infiltration of leakage from aboveground and/or belowground water utilities and from sewers; and (4) depression of groundwater elevations

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in adjacent areas due to high permeability deposits, including backfill along sewers and utility trenches.

#### 4.6.2.2 Vertical Flow Gradients

After the Phase IA RI intermediate and deep monitoring wells were installed and developed, two rounds of water-level measurements were made on April 17, 1995 from these wells and nearby shallow wells to provide data to evaluate vertical flow gradients. Table 4-2 presents the water levels measured on April 17, 1995. Due to the lateral distance (100 to 200 feet) between the nearest shallow well and the intermediate and deep well pairs, estimation of vertical gradients between the shallow and deeper water-bearing units was conducted in more qualitative terms. General trends can be determined with the existing data by comparing the interpolated shallow water levels shown on Figure 4-5 with actual deep and intermediate water levels. At Monitoring Well Chuster GMMW-231/GMMW-23D near the center of the Site, the shallow groundwater elevation measured in Monitoring Well GMMW-23I. Therefore, there is the potential for a downward component to groundwater flow in this area. Comparison of shallow groundwater elevations with groundwater elevations in intermediate wells near the shoreline indicates that a slightly downward or horizontal potential exists near Monitoring Well GMMW-21I.

Table 4-4 presents a summary of the vertical gradient calculations for intermediate and deep well clusters. As indicated in Table 4-4, the vertical gradient is consistently downward between the intermediate wells and the deep wells in the each of the three well pairs. This represents a potential for downward flow; but downward flow from the intermediate to deeper zone is impeded by the intervening glacial till confining layer.

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#### 4.6.2.3 Tidal Influences

Table 4-1 presents product and water-level measurements made during two comprehensive rounds (during low and high tide) at shallow monitoring wells and surface-water measuring points on December 12, 1994. These measurements were made over 8 1/2 hours and included measurements made during a rising tide cycle. Water-level measurements at surface-water measuring points indicated tidal variations of 1.05 to 3.48 feet with an average tidal range of 2.65 feet. The variation of recorded surface-water levels is likely due to differences between the time of measurements and the peak tide, and to local variations due to wind, currents, and wakes from marine vessels. With the exception of a few shoreline areas, the groundwater elevations in shallow monitoring wells did not exhibit significant fluctuations with the tidal cycle. Shallow monitoring wells that exhibited a water-level rise of greater than 1 foot during the rising tide cycle on December 12, 1994 are located adjacent to the shoreline of the Platty Kill Creek, the Kill Van Kull, and the Upper New York Bay. Water-level fluctuations of less than 1 foot (and more frequently less than 0.10 foot) were recorded at the majority of the other shallow monitoring wells, including all wells in the inland areas of the Site. Thus, the tidal influence on the shallow water table is generally limited to areas within approximately 600 to 650 feet of Upper New York Bay (Piers No. 6 and 7), within 200 to 400 feet of the Kill Van Kull (i.e., Helipad and Pier No. 1 Area), and in the immediate vicinity (within 100 to 200 feet) of Platty Kill Canal. One exception to this generalization is the Tank 1066 area where tidal variations were evidenced further inland.

The tidal fluctuations of water levels in the intermediate and deep monitoring wells were evaluated using two rounds of water-level measurements made on April 17, 1995 during a falling tide cycle (see Table 4-2). Similar to the shallow wells, intermediate and deep monitoring well water-level fluctuations at well pairs near the shoreline (i.e., Monitoring Well Clusters GMMW211/GMMW21D and GMMW24I/GMMW24D) exhibited water-level fluctuations of 2.30 to 4.84 feet that correlated with the tide cycle. The two inland well pairs (i.e., Monitoring Well Clusters GMMW22I/GMMW22D and GMMW23I/GMMW23D) exhibited water-level fluctuations of 0.90 foot or less, and typically the groundwater elevations increased during the

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falling tide, demonstrating either no correlation with the tidal cycle or else a possible response, but with a time lag.

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### 5.0 PHASE IA - FINDINGS

This section describes the findings of the Phase IA RI program at the Bayonne Plant. It presents a summary and discussion of the results of soil and groundwater sampling, including a summary of QA/QC data evaluation. Observations of hydrocarbons in soil and floating NAPL are described in the context of the Phase IA findings and also in terms of sitewide NAPL plumes and ongoing NAPL IRM programs.

This section is not intended to provide a comprehensive assessment of the interrelationships between soil, groundwater, and floating NAPL in operational areas of the Bayonne Plant. These relationships are discussed in Section 6.0 (Overview of Constituent and Site Properties Affecting Fate and Transport) and Section 7.0 (Data Evaluation, Hypothesis Development, and Conclusions).

## 5.1 SOIL QUALITY

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Soil samples were collected for analytical purposes at 83 soil boring locations and 15 separate monitoring well locations during Phase IA of the RI. Of the 98 locations at which soil samples were collected, 84 locations were selected specifically for the RI and the remaining 14 locations were drilled in connection with contemporaneous IRM study activities. A total of 183 TPH, 108 TCL VOC (plus miscellaneous compounds), 108 TCL SVOC, 105 TCL pesticides/PCBs, and 112 TAL parameters, and 181 total and 141 hexavalent chromium analyses was completed on these soil samples, not including QA/QC blanks and replicates.

The analytical results of all soil samples collected at the Bayonne Plant during the RI and contemporaneous IRM study activities are provided in Tables 5-1 through 5-6 for TPH, TCL VOCs (plus miscellaneous compounds), TCL SVOCs, pesticides/PCBs, and TAL parameters (hexavalent chromium), respectively. Tentatively identified compounds (TICs) were not included in the analytical data summary tables for VOCs and SVOCs. The interpretation, evaluation, and use of TIC data for the Bayonne Plant RI were not deemed

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necessary, in accordance with a July 6, 1995 NJDEP guidance letter to Exxon (NJDEP 1995b) in connection with the Bayway Refinery RI. The quantifiable level of weathered TPH in soils is sufficient to characterize contamination at the Bayonne Plant. For screening purposes, the analytical results were compared to the following applicable cleanup guidance levels for soils at contaminated sites: (1) residential direct-contact soil cleanup criteria, (2) non-residential direct-contact soil cleanup criteria, and (3) impact to groundwater soil cleanup criteria. Analytical results for TPH were compared to the following criteria: (1) the NJDEP criterion of 10,000 milligrams per kilogram (mg/kg) for total organic compounds, and (2) the Construction, Maintenance, and Emergency Repairs Protocol (CMERP) criterion of 30,000 mg/kg, as shown in Table 5-1. Analytical results that exceed the non-residential directcontact soil cleanup criteria or the impact to groundwater soil cleanup criteria are identified in Tables 5-2 through 5-5 and are discussed in the following constituent group summary sections. Results for total chromium and hexavalent chromium are provided in Table 5-6, with total chromium compared to the value of 10,000 mg/kg, and hexavalent chromium compared to values of 100 mg/kg and 10 mg/kg pending finalization of NJDEP guidance for chromium. Table 5-7 provides the minimum and maximum quantified concentration of constituents detected in soil and presents the number and percentage of samples with constituent exceedance(s) of the applicable cleanup criteria for the whole site and for individual areas. It also provides the geometric mean concentration for each constituent for the entire site. This methodology was selected over the arithmetic mean because the data distributions were not normal and frequently tended to resemble a log normal distribution. It may not be meaningful for all constituents. The number and distribution of data points should

In addition to the summary tables, five figures (Figures 5-1 through 5-4) that depict summary soil quality are presented. Figure 5-1 depicts the TPH analytical data and identifies locations at which soil samples have or have not exceeded the soil quality criteria of 10,000 mg/kg and 30,000 mg/kg. Figures 5-2 and 5-3 provide specific constituent exceedances of the non-residential direct contact and impact to groundwater soil cleanup criteria for TCL/VOCs,

be evaluated when using this mean value for decision making.

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TCL SVOCs, TCL pesticides/PCBs, and TAL inorganics in surface and subsurface soils. Chromium (total and hexavalent) exceedances are shown on Figure 5-4.

## 5.1.1 Summary of Field QA/QC for Soil Samples

The QA/QC measures for Phase IA soil samples were conducted according to the QAPP of the RI Work Plan (Geraghty & Miller, Inc. 1993a) and are consistent with NJDEP guidance (NJDEPE 1992a). Sample collection and handling procedures and QA/QC sample collection frequency are discussed in Section 3.9 (Quality Assurance/Quality Control) and in the RI Work Plan (Geraghty and Miller, Inc. 1993a). Analytical results for soil replicate samples and field blanks associated with the samples collected during the RI are summarized below and discussed in detail in Appendix J. In accordance with the NJDEP Field Sampling Procedures Manual (NJDEPE 1992a), trip blanks were not required for soil samples.

Field replicates were collected to evaluate the reproducibility of the sampling technique, the laboratory precision in analyzing samples, and the degree to which variability in the soil type affects the analytical result. Ten "blind" field replicate samples were collected at Phase IA soil sampling locations. Analytical results for the ten replicate soil samples indicate a good degree of repeatability for the overall analytical data for soil samples collected at the Bayonne Plant. Six of these samples were analyzed for TPH, TCL VOCs plus site-specific alcohols and additional compounds, TCL SVOCs, TCL pesticides/PCBs, TAL metals and cyanide, and hexavalent chromium. This list constitutes the "full suite" of analyses at the Bayonne Plant and will be referred to in this report as the "full suite" or "full parameters." Two of the replicates collected were analyzed for TPH, total chromium, and hexavalent chromium only. One replicate sample was analyzed for TPH only, and one replicate sample The analytical results for each replicate were was analyzed for hexavalent chromium only. compared against the results for its associated soil sample to verify that the reported values for each constituent did not vary by more than 100 relative percent difference (RPD) (USEPA 1992a).

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The sample/replicate pairs exceeded the RPD limit of 100 for TPH in two soil samples, for some metals (chromium, zinc, arsenic, and lead) in three soil samples, for one pesticide in one soil sample, and for one VOC in one soil sample. These exceedances are discussed in detail in Appendix J. In these cases, the heterogeneity of the soil sample matrix probably effected the large difference in the analytical result between the sample and replicate. The soil samples collected at the Bayonne Plant exhibited the significant heterogeneity, which is common for filled industrial sites. Soil sample heterogeneity makes it difficult to replicate a sample. Therefore, differences in analytical results may not be indicative of laboratory precision, but instead may reflect the inherent variability of the soil matrix and the difficulty in homogenizing a soil sample. Samples selected for VOC analysis are not homogenized, thus creating the potential for greater heterogeneity. Analytical results for the ten replicate soil samples indicate a good degree of repeatability for the overall analytical data for soil samples collected at the Bayonne Plant.

Field blanks were prepared to evaluate the potential for cross-contamination. The field blank results were used to determine if the sampling tools or decontamination techniques affected the integrity of the analytical results for the samples collected in the field and also to check the laboratory-prepared analyte-free water. Twenty aqueous field blanks were prepared on days when soil samples were collected during the Phase IA RI at the Bayonne Plant. Nine of the 20 field blanks were analyzed for full parameters; four were analyzed for TPH, hexavalent chromium, and total chromium; four were analyzed for TPH only; one was analyzed for TPH and hexavalent chromium only; one was analyzed for hexavalent chromium and SVOCs only; and one was analyzed for hexavalent chromium only (some of these field blanks were associated with the re-sampling efforts for SVOCs and hexavalent chromium). PCBs were not detected in any of the non-aqueous field blanks associated with the soil samples. One field blank contained detectable concentrations of TPH and one pesticide; six contained detectable concentrations of VOCs (methylene chloride and acetone, which are common laboratory contaminants), and eight contained detectable concentrations of SVOCs (in seven of these, the only SVOCs detected were phthalates, a common sampling artifact). One field blank also contained three other base/neutral extractable organic compounds. Nine

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field blanks contained detectable concentrations of various metals; one of these field blanks contained detectable concentrations of lead. However, none of the field blanks yielded elevated concentrations of the above constituents. A detailed discussion of the field blank results is provided in Appendix J.

Analytical results from field blanks and soil samples collected on the same day were compared. In all cases, detected constituent levels in the blanks were at least an order of magnitude less than the constituent concentrations in their associated samples. Therefore, Geraghty & Miller concluded that no significant cross-contamination of samples had occurred due to sampling activities or decontamination procedures.

## 5.1.2 Total Petroleum Hydrocarbons in Soils - Analytical Results

A total of 183 soil samples obtained from 98 soil borings and monitoring well locations was submitted for TPH analysis (see Table 5-1). For screening purposes, all concentrations of TPH above the NJDEP soil cleanup guidance level of 10,000 mg/kg for total organic contaminants and the 30,000 mg/kg CMERP criteria are indicated in Table 5-1. TPH was detected in all soil samples at concentrations ranging from 75.2 to 479,000 mg/kg. The NJDEP soil cleanup guidance level of 10,000 mg/kg was exceeded for 109 samples (60 percent) at 73 locations (74 percent). TPH was more frequently detected in subsurface soil than in surface soils, and at higher concentrations. Thirteen surface-soil samples exceeded 30,000 mg/kg, whereas 50 subsurface soil samples exceeded this criterion. Thirteen surface-soil samples had concentrations exceeding 10,000 mg/kg but less than 30,000 mg/kg, as opposed to 33 subsurface soil sample exceedances over this range.

Figure 5-1 illustrates the areas of the Site where TPH has been detected in soil at concentrations greater than 10,000 and 30,000 mg/kg. As shown on this figure, high concentrations (above 10,000 mg/kg) of TPH are present in soils over much of the Site. The highest concentrations of TPH (greater than 100,000 mg/kg) in soil were observed in the General Tank Field, the Lube Oil Area, the Main Building Area, and the No. 3 Tank Field. In

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each of these areas, past practices are possible sources of these higher TPH concentrations. Separator bottoms were disposed in the area of the General Tank Field; separators were formerly operated in the Lube Oil and No. 3 Tank Field Areas; and storage tanks, pump houses, and sweetening stills were formerly located in the Main Building Area.

Detected TPH concentrations are attributable to historic activities throughout the Bayonne Plant's 120 years of operation. Some portion of the TPH in the soil may be attributed to the composition of the fill. Observations made during drilling and soil sampling indicate that the TPH detected at many locations is visually evident as stains and adsorbed liquid.

## 5.1.3 Volatile Organic Compounds in Soils - Analytical Results

Of the 183 samples analyzed for TPH, 108 samples (59 percent) from 75 locations were selected for VOC analysis. Table 5-2 presents the concentrations of VOCs in soil samples and, for screening purposes, indicates, in bold type and underlined, all concentrations of VOCs that exceeded the NJDEP non-residential direct-contact or impact to groundwater soil cleanup criteria. Figures 5-2 and 5-3 depict locations where VOC concentrations in soils were compared to the NJDEP non-residential direct-contact soil cleanup criteria and impact to groundwater soil cleanup criteria for surface soils (0 to 2 feet bls) and subsurface soils (greater than 2 feet bls), respectively. The most stringent of these criteria for VOCs is generally the impact to groundwater criteria, which the NJDEP based on empirical models of transport mechanisms.

VOCs were detected in eleven samples at seven locations at concentrations above the impact to groundwater criteria. Only one of the eleven VOC samples with concentrations above the impact to groundwater criteria also had concentrations above the non-residential direct contact soil cleanup criteria. For screening purposes, Table 5-2 also provides a tabulation of total TCL VOCs identified in soil samples during Phase IA, with total VOC exceedances in bold and underlined. Only one location (Soil Boring ECPSB2 at a depth of 10

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to 12 feet bls) contained total TCL VOCs (plus miscellaneous compounds) at concentrations above the NJDEP soil cleanup criteria of 1,000 mg/kg for total VOCs. The locations where VOCs were detected above the impact to groundwater soil cleanup criteria are discussed below.

The following VOCs were detected in soil above the impact to groundwater cleanup criteria (the number of exceedances is in parentheses): benzene (2), chlorobenzene (5), and xylenes (4). Only chlorobenzene at one location exceeded the non-residential direct contact soil cleanup criteria.

Of the seven locations at which soil criteria were exceeded, only three locations were surface soils (0 to 2 feet bls), and none of these surface soils exceeded the non-residential direct contact criteria. All three surface soil exceedances for VOCs detected at the Bayonne Plant were in the No. 3 Tank Field (Soil Borings N3TFSB6, N3TFSB7, and N3TFSB8) where mostly gasoline or light naphtha products were stored. The constituent exceedances in surface soil were benzene, chlorobenzene, and xylenes. The benzene and xylenes exceedances in this area can be related to a historic spill of light naphtha (Geraghty & Miller, Inc. 1994b) but the chlorobenzene source is not known. However, chlorobenzene may be present due to operations in the neighboring Exxon Chemicals Plant Area.

Five locations exhibited subsurface soil concentrations above the applicable criteria. At three locations (Soil Borings ECPSB2, ECIRMB3, and APSB6), chlorobenzene was observed in subsurface soils above the applicable criteria. One of these locations (Soil Boring ECPSB2) also showed xylene exceedances. Similar to the surface soil exceedances, chlorobenzene was observed in proximity to the Exxon Chemicals Plant Area. Xylene was observed above the applicable criteria at Soil Boring GTFSB9 in the General Tank Field. The presence of xylene at this location can be attributed to former spills in the General Tank Field. At one other location in the No. 2 Tank Field (Soil Boring N2TFSB4), xylene in the subsurface soil cannot be attributed to a specific spill; however, this constituent is typical of refined petroleum products.

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# 5.1.4 Semivolatile Organic Compounds in Soils - Analytical Results

Of the 183 soil samples submitted for TPH analysis, 108 samples (59 percent) from 76 locations were submitted for SVOC analysis. Table 5-3 provides the SVOC concentration results for soil samples, and, for screening purposes, also indicates SVOC concentrations in soil samples that exceeded the NJDEP non-residential direct contact or impact to groundwater soil cleanup criteria. Figures 5-2 and 5-3 depict locations where SVOC concentrations in soil exceeded one or both of the NJDEP soil criteria (the non-residential soil cleanup criteria, and the impact to groundwater soil cleanup criteria) for surface and subsurface soils, respectively.

SVOC concentrations in soil were detected above the applicable criteria in 40 samples at 34 locations. The following SVOCs were detected in soil above the applicable criteria (the number of exceedances is in parentheses): benzo(a)anthracene (11), benzo(b)fluoranthene (9), benzo(a)pyrene (36), benzo(k)fluoranthene (9), chrysene (2), dibenz(a,h)anthracene (15), indeno(1,2,3-cd)pyrene (4), naphthalene (2), pyrene (1), N-nitrosodiphenylamine (1), 1,2-dichlorobenzene (1), and 1,4-dichlorobenzene (1). All but three of these constituents (N-nitrosodiphenylamine, 1,2-dichlorobenzene, and 1,4-dichlorobenzene) are polycyclic aromatic hydrocarbons (PAHs). The non-PAH SVOCs were each detected above the impact to groundwater soil cleanup criteria and were observed at Soil Borings ECPSB2 and N3TFSB7, which are located in the Exxon Chemicals Plant Area and the No. 3 Tank Field Area, respectively. These constituents may have originated from smaller sources that released the VOCs observed in the same locations. Naphthalene was detected above the impact to groundwater criteria at two locations: one in the Solvent Tank Field and the other at the same location as the non-PAHs in the Chemical Plant.

The PAHs are generally observed above the non-residential direct contact soil cleanup criteria throughout much of the Bayonne Plant. The higher concentrations and densities of exceedances were observed in the Lube Oil Area (including the Stockpile Area), the Pier No. 1 Area, the Exxon Chemicals Plant Area, the AV-Gas Tank Field, parts of the Asphalt Plant,

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and the No. 3 Tank Field Area. Other exceedances were found but were sporadic. The greatest number of exceedances was observed for benzo(a)pyrene, with 36 samples exceeding Specific sources cannot be identified for observed the non-residential soil criteria. concentrations of PAHs. PAHs are present in various hydrocarbon products and residues associated with several generations of operating refinery history and smaller concentrations of PAHs are possibly associated with the coal-derived cinders that were used for fill on Constable Hook. In general, the highest concentrations of PAHs are found primarily in former processing areas, with lower concentrations observed in long-term tank field areas; this pattern would be expected based on the derivation of PAHs. In general, the relatively higher concentrations of PAHs at the Site are in the subsurface soils, with the exception of Soil Boring ECPSB5 where benzo(a)pyrene was detected at 33,000 ug/kg. PAH concentrations are higher in the subsurface soils, possibly because surface soils have been reworked in the course of multi-plant reconstruction/service change activities and probably because TPH concentrations tend to be higher in subsurface soils. There are, however, 14 locations in which PAHs were detected above the applicable criteria in surface soils compared to 20 subsurface locations above the applicable criteria.

#### 5.1.5 Pesticides and PCBs in Soils - Analytical Results

A total of 105 of the 183 soil samples (57 percent) collected at 75 locations at the Bayonne Plant was submitted for pesticide and PCB analysis during the Phase IA investigation. Table 5-4 presents all of the analytical data for pesticides and PCBs in soil samples collected during Phase IA, and, for screening purposes, also indicates concentrations that exceeded the non-residential and/or impact to groundwater soil quality criteria for pesticides/PCBs. Figures 5-2 and 5-3 depict locations where pesticides and PCB concentrations in soil exceeded one or both of the NJDEP soil quality criteria (the non-residential soil cleanup criteria and the impact to groundwater soil cleanup criteria) for surface and subsurface soils, respectively.

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Only one surface soil sample throughout the Site, Soil Boring LAIRMB1, located in the Lube Oil Area, exhibited exceedances of the applicable criteria for pesticides in soil. The following constituents were observed above the non-residential direct-contact soil cleanup criteria: 4,4'-DDD, 4,4'-DDT, and dieldrin. 4,4'-DDD also exceeded the impact to groundwater soil cleanup criterion. Because this was the only location where pesticide exceedances were observed and it was in a surface soil sample, it is possible that this detection is a remnant of pest control. Exxon's flea, lice, insect, and tick (FLIT) pesticides were manufactured for a short period at the plant; however, this specific exceedance cannot necessarily be attributed to this operation (Geraghty & Miller, Inc. 1994b).

No PCBs were observed above the applicable criteria at the Bayonne Plant.

## 5.1.6 Metals and Other Miscellaneous Analytes in Soils - Analytical Results

A total of 112 soil samples collected from 75 locations was analyzed for TAL constituents (i.e., metals). At 97 locations, 141 surface and subsurface soil samples were collected for total and hexavalent chromium analysis. Table 5-5 presents the analytical data for metals detected in soil, and, for screening purposes, also indicates which metal concentrations exceeded the NJDEP non-residential direct-contact soil criteria for metals, for all depths. Samples from 47 locations (64 percent) exceeded the non-residential soil criteria for the following metals, not including chromium (the number of exceedances is in parentheses): arsenic (49), beryllium (4), copper (6), lead (22), nickel (1), thallium (4), and zinc (3). Table 5-6 provides a list of individual results for total and hexavalent chromium. Figures 5-2 and 5-3 depict the number of exceedances for metals concentrations in surface and subsurface soils, respectively; these concentrations were compared to the non-residential soil cleanup criteria. Currently, the NJDEP has not published impact to groundwater soil cleanup criteria for metals. For evaluation purposes, chromium results were compared to 10,000 mg/kg for total chromium results, and 100 mg/kg and 10 mg/kg for hexavalent chromium pending establishment of regulatory standards for chromium. Figure 5-4 depicts the number and areas of exceedances for chromium. Sampling for chromium was generally

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not conducted in known chromium areas but was conducted to ascertain the extent to which chromium was present outside those areas.

49 of the 112 soil samples (44 percent) submitted for TAL metals analysis exceeded the 20 mg/kg applicable criteria for arsenic. Of the exceedances, 25 were between 20 and 40 mg/kg, 13 between 40 and 80 mg/kg, 3 between 80 and 120 mg/kg, and 8 greater than 120 mg/kg. Arsenic levels are above the criterion in both surface and subsurface soils. The highest concentrations were detected in the subsurface soil borings in the Exxon Chemicals Plant Area (Soil Boring ECPSB2), AV-Gas Tank Field (Soil Boring AGTFSB1), the Main Building Area (Soil Boring MBSB3), and the Asphalt Plant (Soil Boring N3TFSB2), and also in the surface samples at the No. 3 Tank Field (Soil Borings N3TFSB7 and N3TFSB8). Because arsenic was detected throughout the facility at concentrations not significantly above the applicable criterion, the arsenic may be related to the coal-derived cinders emplaced during historical operations, or to other background factors.

Lead has been observed above the applicable criterion in 22 of the 112 soil samples (20 percent) analyzed for TAL metals. Twelve of the exceedances (11 percent of the samples) at eight locations were detected at 1,000 mg/kg or more, compared to the criteria of 600 mg/kg. Nine of the 12 exceedances that exhibited concentrations of lead above 1,000 mg/kg were at five locations in the northwest part of the General Tank Field. The high lead concentrations in this area are likely derived from the historic disposal of lead-contaminated separator bottoms or possibly from former fire training operations in that area. Lead concentrations above 1,000 mg/kg were also observed in soil borings at the AV-Gas Tank Field (Soil Boring AGTFSB3), the Lube Oil Area (Soil Boring LOSB17), and the No. 3 Tank Field is not unexpected, since AV-gas is leaded; it is uncertain why there are high lead concentrations in the No. 3 Tank Field or in the Lube Oil Area.

All other metals detected above the criteria were sporadically located throughout the Site. Copper was detected above the applicable criterion in five areas of the Bayonne Plant;

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three times in the surface soils and three times in the subsurface soils. Thallium was also detected sporadically throughout the Site; however, it was only detected above the applicable criterion in subsurface soils. Zinc was detected above the criterion at two locations in the General Tank Field and was present where lead concentrations were also high.

Due to past filling activities, some emphasis was placed on soil sampling for total and hexavalent chromium. One hundred and eighty samples were analyzed for total chromium from 97 locations and 141 samples from 87 locations were analyzed for hexavalent chromium (Table 5-6). Twenty-nine samples (16 percent) exhibited quantifiable concentrations of both total and hexavalent chromium. Total chromium was not detected above 10,000 mg/kg. Hexavalent chromium was detected above 100 mg/kg in three soil samples (2 percent) and above 10 mg/kg in 16 soil samples (11 percent) (Figure 5-4).

The data provided in Table 5-6 do not suggest a bias in chromium concentrations when surface soil results are compared with subsurface results. Nine surface soil samples exceeded the hexavalent chromium criteria, while seven subsurface soil samples exceeded one or both of the comparative criteria for hexavalent chromium.

The deposits of chromium fill at the Bayonne property are being studied in more detail by ICF Kaiser Engineers as part of an IRM study.

## 5.2 SUBSURFACE HYDROCARBONS AT THE BAYONNE PLANT

This section describes the hydrocarbon/NAPL observations from the Phase IA RI field activities and the NAPL IRM study activities. The NAPL discussion focuses on the shallow water-table zone in which almost all the NAPL was encountered, with the exception of the NAPL observed in the intermediate water-bearing deposits adjacent to the Platty Kill Canal. A more detailed review of NAPL in the area adjacent to the Platty Kill Canal has been conducted by DRAI (Dan Raviv Associates, Inc. 1994b). Throughout this Phase IA RI report, reference is made to NAPL thickness or apparent NAPL thickness. In this report,

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these terms are synonymous because they refer to the observed thickness of NAPL in a temporary well point or monitoring well under static conditions, which is generally significantly greater than the true thickness of NAPL on the groundwater table in the geologic formation. To determine "true" NAPL thickness in the subsurface deposits, further testing, such as baildown tests, is warranted.

# 5.2.1 <u>Hydrocarbon Observations from the Phase IA RI and Contemporaneous IRM</u> Soil Boring and Well Installation Program

Temporary well points were installed at 99 of the 116 soil borings to determine whether the hydrocarbons visible in soil were free to migrate and accumulate on the shallow water table. Table 5-8 presents the results of the well point program conducted during Phase IA of the RI. Temporary well points were installed at the 99 locations in response to the visible presence of hydrocarbon sheens, products, or residual materials in soil (see Table 5-8). The field and construction techniques used to complete the well points are described in Section 3.3 (Hydrocarbon Delineation - Temporary Well Point Program and Hydrometer Testing).

NAPL was identified at measurable thicknesses (greater than 0.01 foot) in 54 of the 99 (55 percent) temporary well points installed during the RI/IRM field activities. NAPL thicknesses of less than 0.1 foot were measured at 13 of the 54 locations (24 percent); thicknesses between 0.1 and 1 foot were measured at 22 locations (41 percent); and thicknesses greater than 1 foot were measured at 19 locations (35 percent). The maximum NAPL thickness, 8.29 feet, was measured at Soil Boring N3TFSB1, which is located in the southern portion of the No. 3 Tank Field.

Five of the IRM well point locations that contained measurable thicknesses of floating hydrocarbons were completed as monitoring wells. Measurements were subsequently collected at the newly installed wells (before and after development) for comparison with the earlier well point measurements. NAPL thickness measured in each monitoring well was

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comparable to the measurement in the well point previously installed at the same location (see Table 5-8). RI monitoring wells were installed without temporary well points, but were monitored in a similar manner.

NAPL samples were collected from 16 temporary well points and four RI/IRM monitoring wells for specific gravity measurements using a hydrometer. NAPL samples were also collected from 38 pre-existing IRM monitoring wells; these results are discussed in Section 5.2.2 (Plant-Wide Overview). The results of the hydrometer analysis are presented in Table 5-9 and shown on Figure 5-5. The testing procedures are described in Section 3.3.2 (Hydrometer Testing). NAPL samples were not collected from every temporary well point location that contained NAPL; rather they were collected from a selection of temporary well points located throughout the Site, to provide areal information on the types of floating hydrocarbons. NAPL specific gravities ranged from 0.820 (a diesel fuel-range specific gravity) at Soil Boring AHTFSB1 (located in the northern portion of the "A"-Hill Tank Field) to 0.970 (a No. 6 Fuel Oil-range gravity) at Soil Boring AGTFSB4 (in the AV-Gas Tank Field).

### 5.2.2 Plant-Wide Overview

Figure 5-5 presents the apparent thickness of NAPL measured at the Site during the RI/IRM field activities. This figure was prepared by using maximum well point-measured NAPL thicknesses in conjunction with the synoptic NAPL thickness information obtained during the low-tide groundwater/NAPL level measuring event conducted on December 12, 1994. NAPL specific gravity information was derived from hydrometer analysis on NAPL samples collected from 20 RI/IRM well point/monitoring well locations and also from NAPL samples collected at 39 pre-existing IRM monitoring wells. This specific gravity information is provided in Table 5-9 and also shown near the temporary well point or monitoring well locations on Figure 5-5.

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Seventeen floating NAPL plumes (Plumes No. 1 through 17) were identified during the field activities associated with the RI/IRM, as summarized in Table 5-10 and shown on Figure 5-5. The plumes are enumerated on Figure 5-5. Only NAPL observed in at least two contiguous boring/well locations is designated and enumerated as a plume on Figure 5-5. The depicted shape of the NAPL plumes on Figure 5-5 was determined by evaluating the direction of shallow groundwater flow, the orientation of groundwater divides, and the specific gravity of the NAPL.

To facilitate a discussion of the NAPL findings and the relationship of NAPL to soil and groundwater contamination, the Site is discussed by operational area from east to west; in some instances, contiguous operational areas are grouped. NAPL findings are therefore described for ten areas at the Bayonne Plant. These areas are intended to provide a geographic/operational perspective for the evaluation of NAPL in this section and for the contaminant relationship evaluations provided in Section 7.0 (Data Evaluation, Hypothesis Development, and Conclusions). The following is a brief description of the NAPL plume areas, including apparent NAPL thickness/thickness range, specific gravity and type, potential sources, and other information obtained from recent IRM activities, such as gas chromatograph (GC) fingerprinting.

• Piers, and the East Side Treatment Plant and MDC Building Area

Three NAPL plumes (Plumes No. 1 through 3) have been identified in this area (Figure 5-5). The largest NAPL plume (Plume No. 1) in this area is a 850-foot long linear feature, oriented east-west.

No NAPL was measured at several wells located immediately south of the Plume No. 1, indicating that the plume is probably not very wide. Apparent NAPL thicknesses during the low-tide water-level measuring event ranged from 0.44 foot at Monitoring Well EB66R to 3.57 feet at Monitoring Well EB69 (see Table 4-1 and Figure 5-5). During past IRM activities, DRAI has measured apparent NAPL

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thicknesses as great as 7 feet in this area. NAPL specific gravity results in this area are indicative of diesel/No. 2 fuel oil products (0.860 at Monitoring Well EB59) at the western end of the plume, and of the No.6 fuel oil-product (specific gravities of 0.990 and 0.991 at Monitoring Wells EB69 and EB62, respectively) at the eastern end of the plume. Lighter product-specific gravity obtained from NAPL samples from monitoring wells at the nearby Pier 6 and Low Sulfur Tank Field indicates that the Plume No. 1 is not related to these other occurrences of floating NAPL.

As part of the Pier No 7 NAPL IRM, NAPL fingerprinting was conducted; results indicated that there is a mixture of NAPL in this area ranging from heavily degraded gasolines and diesel products to "fresh" heavy fuel oil, No. 6 fuel oil, and high viscosity lube base stock (Dan Raviv Associates, Inc. 1995c). NAPL samples from the Pier No. 7 Area were submitted for chemical analysis, the results indicating the presence of benzene, chlorobenzene, and xylenes (Dan Raviv Associates, Inc. 1995c). The original NAPL source is unknown, but may be related to ASTs that were present near Pier 7 between 1921 and 1970, or to a former oil-water separator that operated in the area between 1932 and 1970 (Geraghty & Miller 1994b). Additional potential migration pathways include backfilled sewer and piping trenches.

Two relatively small NAPL plumes (Plumes No. 2 and 3) were identified to the north and south of Pier 6 (see Figure 5-5). Apparent NAPL thicknesses ranged from 0.16 foot in a temporary well point installed in Soil Boring PESTSB2 to 1.05 feet at Monitoring Well EBR18 (see Table 4-1). NAPL specific gravity measurements by Geraghty & Miller indicate that the NAPL is in the kerosene/lube oil range (specific gravities of 0.851 and 0.852 at Monitoring Wells EBR71, EB72, and EBR18, respectively). DRAI obtained similar NAPL specific gravity results (0.851 to 0.854) for the Pier 6 area (Dan Raviv Associates, Inc. 1995b). The Pier 6 area has been a marine terminal since the early 1900s, and most likely the source of the NAPL is from historical spills (Dan Raviv Associates, Inc. 1995b).

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Temporary well points installed by Geraghty & Miller during Phase IA of the RI in locations to the west north and south of Plumes 2 and 3 indicated that they are isolated and is not contiguous with the nearby Pier 7 (Plume No. 1) and Low Sulfur Tank Field plume (Pier No. 4).

Low Sulfur and Solvent Tank Fields

A relatively large NAPL plume (Plume No. 4) is present in this area (Figure 5-5). The plume is centered in the vicinity of Tank 1066, and extends to the northwest toward Tank 1026, to the southeast toward Tank 1068, and to the east toward Tank 1035. NAPL thicknesses ranged from 0.51 foot at Monitoring Well EB81 to 13.6 feet at Monitoring Well MW8, located at the northeastern plume edge (see Table 4-1). Two types of NAPL appear to be present in this area. NAPL specific gravity measurements from various NAPL samples in the area indicate primarily a light product (specific gravity of 0.780 to 0.807). GC fingerprinting analyses of the NAPL in this area confirms that the NAPL has gasoline and kerosene Analytical results of NAPL samples indicated that benzene, characteristics. toluene, ethylbenzene, and xylene (BTEX), and naphthalene, PAHs, and lead are the major constituents present in the NAPL. This NAPL layer has been observed floating on the water table in this area since 1980. The source of this NAPL is likely to be from historical spills that occurred prior to 1967 when gasoline was stored in former ASTs in this area (Geraghty & Miller, Inc. 1994b).

A smaller, more localized pocket of heavier NAPL was observed in the vicinity of Tank 1066. This NAPL has a specific gravity of 0.990 and is indicative of a heavy fuel oil, such as No. 6 fuel oil or catalytic cracking fractionator tower bottoms (see Table 5-9). This NAPL was described as a viscous dark brown to black material (Dan Raviv Associates, Inc. 1993a). The source of this NAPL may be related to a historical release that occurred from Tank 1066 (Geraghty & Miller, Inc. 1994b).

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## General Tank Field

Two floating NAPL plumes (Plumes No. 5 and 6) are defined within the General Tank Field, not including the portion of Plume No. 1 in the southeast corner of the tank field that extends into the area from the Piers and East Side Treatment Plant Area (see Figure 5-5). The first plume (Plume No. 5) is located in the northcentral portion of the tank field, where one temporary well point (Soil Boring GTFSB2) and one Phase IA monitoring well (Monitoring Well GMMW10) showed floating NAPL in the range of 0.24 to 0.3 foot. The second plume (Plume No. 6) is located along the southern perimeter of the tank field, where temporary well points at Soil Borings GTFSB8 and GTFSB9 showed 1.2 feet and 2.07 feet of floating NAPL, respectively. A NAPL sample from Plume No. 6 had a specific gravity of 0.960, which is characteristic of No. 6 fuel oil. The NAPL in the northern plume appeared to be visually similar (i.e., very thick, black, weathered NAPL). The NAPL observed in the General Tank Field is most likely the result of historical spills from former ASTs that were located in the area between 1925 and 1974 and potentially from a pump house that operated near Soil Boring GTFSB8 between 1925 and 1951 (Geraghty & Miller 1994b). The two plumes may be contiguous since there is a lack of data points between them (see Figure 5-5).

• AV-Gas Tank Field and Domestic Trade Area (includes southern part of Interceptor Trench)

One NAPL plume (Plume No. 7) has been identified in this area. This plume occupies most of the AV-Gas Tank Field and extends southward into the Asphalt Plant Area. NAPL thicknesses ranged from 0.20 foot in the northern portion of the Asphalt Plant at the temporary well point for Soil Boring APSB4 to 9.9 feet in IRM Monitoring Well ITMW1 (see Tables 4-1 and 5-8). NAPL specific gravities in the interior part of the Tank Field were 0.965 (at Soil Boring AGTFSB3) and 0.970 (at Soil Boring AGTFSB4). These specific gravities are indicative of lube

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oils and No. 6 fuel oil products, and probably reflect historical spills from former ASTs (1932 to 1940), a former crude stills facility (1920 to 1930), or two historical oil-water separators (1940 and 1945); the tank field is currently used to store aviation fuel. Specific gravities obtained from NAPL samples at Monitoring Well ITMW1, located on the northern perimeter of the tank field and closer to the interceptor trench, indicated much lighter NAPL in this area, with a specific gravity of 0.830, which is in the diesel/aviation fuel range. The source of the light NAPL identified in Monitoring Well ITMW1 could be related to a diesel spill (amount unknown) that was discovered north of Tank 1014 in 1992 (Geraghty & Miller 1994b).

Considering the absence of floating NAPL in the upgradient well point and monitoring well locations that surround the AV-Gas Tank Field, the upgradient side of this NAPL plume is considered to be well defined. However, a performance evaluation conducted on the interceptor trench determined that the NAPL identified in IRM Monitoring Well ITMW1 is not being captured by the trench (Dan Raviv Associates, Inc. 1995a). DRAI has proposed additional monitoring wells to further evaluate the extent of the floating NAPL and the effects of the interceptor trench to the east (Dan Raviv Associates, Inc. 1995a).

• Asphalt Plant and Exxon Chemicals Plant (includes Utilities Area)

Two NAPL plumes (Plumes No. 8 and 9) have been identified in this area, not including Plume No. 7, which occupies most of the AV-Gas Tank Field and extends into the Asphalt Plant Area. The first and larger of the plumes (Plume No. 8) is located in the northwestern portion of the Chemicals Plant and Asphalt Plant Areas (Figure 5-5). Measured NAPL thicknesses ranged from 0.34 foot at historical Monitoring Well MW2 to 1.58 feet at the Phase IA temporary well point at Soil Boring ECPSB2 (see Table 5-8). NAPL samples collected from two of the temporary well point locations showed specific gravities of 0.968 and 0.970 at Soil

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Borings EC2SB1 and ECPSB2, respectively. These specific gravities are indicative of a heavier (or weathered) hydrocarbon, such as a No. 6 fuel oil or asphalt.

The second plume (Plume No. 9) is located along the southern boundary of the Utilities Area and extends into the No. 3 Tank Field. Apparent NAPL thickness in this area ranges from 0.11 foot to 4.67 feet (see Tables 4-1 and 5-8). NAPL specific gravities ranged from 0.853 to 0.870, as measured in NAPL samples from Monitoring Wells GMMW5 and GMMW18. This range may be indicative of lube oil or No. 2 fuel oil. There are many potential sources of the NAPL identified in the central portion of the Site, including spills related to former ASTs, a spill from Tank 916 in the No. 3 Tank Field (discovered in August 1978, unknown product and amount spilled), numerous documented asphalt spills to the ground, and several documented spills of slop oil and various Exxon lube oil additives (with specific gravities between 0.88 and 0.89) in the Chemicals Plant Area (Scerbo 1995, Geraghty & Miller, Inc. 1994b).

No. 3 Tank Field

One NAPL plume (Plume No. 10) was identified in this area, as depicted on Figure 5-5, not including Plume No. 9, which is described in the Chemicals Plant Area although it extends into the No. 3 Tank Field. Apparent NAPL thicknesses ranged from 0.41 foot to 4.81 feet (see Tables 4-1 and 5-8). NAPL specific gravities ranged from 0.830 to 0.841 as measured from NAPL samples at Monitoring Wells GMMW7 and GMMW16 (see Table 5-9). This range is indicative of a naphtha that was stored in the tank field (Bruzzi 1995) or a kerosene-range product. Temporary well points and soil borings completed between Plume Nos. 9 and 10 did not contain floating NAPL, indicating that these two plumes are distinct and separate. Potential sources of the NAPL identified in the No. 3 Tank Field include former ASTs that were in operation between 1921 and 1970 in the area east of

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present Tank 921, a former oil-water separator located south of Tanks 902 and 903, and spills at Tank 920 (500 gallons of F540 [powerformer feed stock, light product similar to kerosene] in January 1988) (Geraghty & Miller, Inc. 1994b, Scerbo 1995).

 No. 2 Tank Field and Main Building Area (includes northern part of Interceptor Trench)

Two NAPL plumes (Plumes No. 11 and 12) have been identified in this area, not including the portion of the NAPL plume (Plume No. 13) that extends into the area from the "A"-Hill Tank Field (Figure 5-5). The two plumes represent two isolated areas of floating NAPL along the northern and eastern/southeastern portion of the Main Building Area near the interceptor trench (see Figure 5-5).

In the northern area (Plume No. 11), five IRM monitoring wells contained floating NAPL at thicknesses ranging from 0.1 foot at Monitoring Well EB42 to 2.87 feet at Monitoring Well EB36 (see Table 4-1). Specific gravity measurements were performed on a NAPL sample from Monitoring Well ITMW4 and showed a specific gravity of 0.971, which is indicative of a heavy No. 6 fuel oil.

The second plume (Plume No. 12) is located north and east of the inter-refinery pipeline (IRPL) pump pad (see Figure 5-5). Three IRM monitoring wells and one Phase IA temporary well point location showed floating NAPL at thicknesses ranging from 0.11 foot at Soil Boring MBSB3 to 2.98 feet at IRM Monitoring Well ITMW2. Specific gravity measurements performed on a NAPL sample from Monitoring Well ITMW2 showed a NAPL specific gravity ranging from 0.866 to 0.870, which is characteristic of diesel or No. 2 fuel oil. These specific gravity values are similar to those obtained by DRAI during the Interceptor Trench NAPL IRM investigation (Dan Raviv Associates, Inc. 1995a).

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The source of the heavy NAPL identified near the interceptor trench is most likely related to spills associated with historical ASTs that were in operation in the northern part of No. 2 Tank Field and extended into the AV-Gas Tank Field and Main Building Area between 1921 and 1970 or from sweetening stills that operated in this area, circa 1920 (Geraghty & Miller, Inc. 1994b). A performance evaluation completed on the interceptor trench in June 1995 indicated that the NAPL in the two areas defined above is being captured by the trench, either by natural gradients, or by pumping-influenced conditions (Dan Raviv Associates, Inc. 1995a).

## • "A"-Hill Tank Field

One floating NAPL plume (Plume No. 13) has been identified in this area (Figure 5-5). The plume is centered on the "A"-Hill Tank Field and extends into the eastern portion of the Main Building Area (Figure 5-5). Five temporary well points installed in the "A"-Hill Tank Field and neighboring Main Building Area showed floating NAPL with similar NAPL specific gravities (see Figure 5-5). NAPL thickness in this area ranged from 0.11 foot at Soil Boring AHTFSB2, located in the northeastern portion of the tank field, to 6.56 foot at Soil Boring AHTFSB4, to 8.0 feet at Soil Boring MBSB2 located near the Main Building. Two NAPL samples obtained from well points installed within the tank field, and also from the well point installed near the Main Building, showed identical NAPL specific gravities of 0.820, which is indicative of a diesel-range product. IRM monitoring wells located on the up- and downgradient perimeter of the tank field have shown only trace amounts of floating NAPL, indicating that this NAPL is, for the most part, contained in the interior of the tank field.

Storage tanks that are still in operation in the "A"-Hill Tank Field currently hold heating oil. Historically, these tanks were known to contain heating oils and process gas oils. Two historical spills have been documented in this area, including

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a 252,000-gallon spill of heating oil that occurred at Tank 514 in October 1978 and a 42,000-gallon spill of process gas oil (heavy feed stock for gasoline refining) that occurred at Tank 508 in February 1983 (Geraghty & Miller, Inc. 1994b). Process gas oil is stored in heated tanks, and considering that the spill was in February, it is likely that the spilled material congealed quickly and did not penetrate beyond the top few inches of soil. Accordingly, the heating oil spill is the probable source for Plume No. 13.

## • Lube Oil Area and Stockpile Area (includes Platty Kill Canal)

Three NAPL plumes (Plumes No. 14, 15, and 16) have been identified in this area (Figure 5-5). One of the plumes (Plume No. 14) is located in the Lube Oil Area, and two are located in the Stockpile Area (Plumes No. 15 and 16). The first plume (Plume No. 14) is located in the northern part of the Lube Oil Area, to the east and northeast of Sub Station #18. This plume is defined by four historical monitoring wells and one Phase IA monitoring well containing floating NAPL. NAPL thicknesses ranged from 0.12 foot at Soil Boring EB24, located at the northern plume perimeter, to 0.77 foot at Monitoring Well GMMW1 located adjacent to the Blending and Packaging Warehouse. NAPL specific gravities for this plume ranged between 0.885 and 0.895, indicating a lube No. 2 oil-range product. The source of the floating NAPL in the northern portion of the Lube Oil Operational Area may be related to historical spills at two former pump houses (1932 to 1945) and at two tank car/tank truck loading racks (1932 to 1951) (Geraghty & Miller, Inc. 1994b). These facilities were located in the area between Monitoring Wells GMMW1 and EB24 (see Figure 5-5). A more likely source is the significantly damaged sewer which exists at the eastern edge of this plume. This sewer line formerly conveyed pumpage from the Interceptor Trench, which would have been water with small amounts of oil. This type of leakage could explain the large, but very thin plume observed in this area which has no apparent source area with greater NAPL thickness (Chapman 1995).

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The Stockpile Area contains two shallow NAPL plumes (Plumes No. 15 and 16) in the unconsolidated fill/alluvium and a NAPL plume in the deeper, confined unconsolidated deposits (see Figure 5-5). Both of the shallow NAPL plumes extend to the east into the Lube Oil Area. Apparent NAPL thicknesses in the shallow plumes ranged from 0.11 foot at Monitoring Well GMMW12 in the northern plume to 3.23 feet in the temporary well point installed at Soil Boring LOSB8 in the southern plume (see Tables 4-1 and 5-8). NAPL specific gravities of 0.916 at the temporary well point at Soil Boring SSB-1 in the northern plume and of 0.907 at Monitoring Well EB19 in the southern plume are indicative of lube oil. Several historical oil-water separators (which operated between 1921 and 1959) located near Soil Boring LOSB1, lube oil spills at Tanks 106 and 107, and an existing loading rack could be the source or sources of the NAPL identified as Plume No. 15.

Three IRM monitoring wells completed in deeper, confined unconsolidated deposits also contained measurable amounts of NAPL. NAPL plumes in the intermediate zone are depicted on Figure 4-5. Apparent NAPL thicknesses in the deeper wells ranged from 0.75 foot at Monitoring Well PKMW14 to 9.34 feet at Monitoring Well PKMW11. NAPL specific gravity obtained from samples in the deeper wells were indicative of a lighter product (0.870 to 0.882). GC fingerprinting conducted on NAPL samples from Monitoring Wells PKMW11 and PKMW12 indicated that the NAPL is similar to jet fuel (Dan Raviv Associates, Inc. 1994b). Heavier product (a specific gravity of 0.920) was identified in one of the deep monitoring wells (Monitoring Well PKMW14), located at the northwestern edge of the plume. This observation may indicate a different source, and a potential mixing zone. A number of historical activities, as well as other unknown factors, may be sources of these plumes.

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## • Pier No.1 (includes Helipad Area)

During the synoptic low-tide groundwater level measuring event, a floating NAPL plume (Plume No. 17) was measured in many of the IRM monitoring wells located near the old No. 1 Pier and Helipad IRM areas (see Figure 5-5). Apparent NAPL thicknesses ranged from 0.19 foot at several monitoring wells in the southern and southeastern portion of this area to 4.18 feet at Monitoring Well EB12 (see Table 4-1). NAPL samples obtained from four IRM monitoring wells indicated specific gravities of 0.885 to 0.995. This range is indicative of a mixture of lube oils and heavier fuel oils, such as No. 6 fuel oil. Potential sources of the NAPL identified in the Pier No. 1 and the Helipad IRM area could be related to several loading/filling racks that operated near, north, and east of Monitoring Well EB12 between 1932 and 1945 (Geraghty & Miller, Inc. 1994b). The heavier NAPL (specific gravity of 0.995) was identified at Monitoring Well EB13, located at the western edge of the plume. NAPL samples collected as part of the Helipad NAPL IRM investigation indicate that the shallow NAPL is primarily composed of base neutral extractable compounds and benzene, toluene, and xylene (BTX) compounds.

This source may be related to two pump houses (No. 3 and No. 22), a loading rack, and former ASTs that were in operation between 1921 and 1951 in the area of the western portion of this plume (presently near Monitoring Wells EB6 and EB13) (see Figure 5-5). Monitoring wells completed in the deeper, confined unconsolidated deposits (Monitoring Wells GMMW21I and GMMW21D) did not contain floating NAPL, indicating that the NAPL observed in this area is confined to the shallow water-bearing zone. Temporary well points and/or soil borings completed along the property boundary to the east and at the southern edge of the tank field to the north did not contain floating NAPL. This lack of floating NAPL indicates that the plume does not extend onto adjacent property to the east and also does not extend significantly to the north. However, few data points are available to the west and northwest of the plume (see Figure 5-5).

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A summary of the Phase IA RI findings with respect to the NAPL plumes discussed above, and a discussion of NAPL and contaminant fate and transport in the various plume areas, is provided in Section 7.0 (Data Evaluation, Hypothesis Development, and Conclusions) of this report.

## 5.3 GROUNDWATER QUALITY AT THE BAYONNE PLANT

A total of 48 groundwater samples, including associated QA/QC samples, was collected from monitoring wells and drivepoints at the Bayonne Plant as part of Phase IA of the RI. Groundwater samples collected from 31 monitoring wells were analyzed for TPH, TCL VOCs, TCL SVOCs, TCL pesticides/PCBs, TAL metals, and miscellaneous inorganic parameters. In addition, groundwater samples collected from 13 temporary drivepoints were analyzed for TCL VOCs. Analytical results of groundwater samples for TPH, TCL VOCs, TCL pesticides/PCBs, TAL metals, and miscellaneous inorganic parameters are provided in Tables 5-11 through 5-16. The number of groundwater samples from drivepoints is relatively small because NAPL was frequently encountered.

To evaluate constituent concentrations in groundwater underlying the Bayonne Plant, analytical results were compared to the NJDEP groundwater quality standards. This groundwater classification represents groundwater that is suitable for potable water use following treatment. As groundwater underlying Constable Hook is not used as a potable water supply, the application of these groundwater standards to the Bayonne Plant provides a very conservative comparison. A summary of the minimum and maximum quantified concentration of constituents detected in groundwater and the percentage of samples with constituent exceedances is provided in Table 5-17. Exceedances of the groundwater quality standards for organic compounds, metals, and inorganic constituents are shown on Figures 5-6 and 5-7. It also provides the geometric mean concentration for each constituent for the whole site summary section. This methodology was selected over the arithmetic mean because the data distributions were not normal and frequently tended to resemble a log normal

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distribution. It may not be meaningful for all constituents. The number and distribution of data points should be evaluated when using this mean value for decision making.

The following sections provide a brief discussion of field QA/QC groundwater samples and laboratory analytical results by fraction.

### 5.3.1 Summary of Field QA/QC for Groundwater Samples

The QA/QC measures for Phase IA groundwater and drivepoint samples were conducted according to the QAPP, as provided in Appendix C of the RJ Work Plan (Geraghty & Miller, Inc. 1993a) and are consistent with NJDEP guidance (NJDEPE 1992a). Sample collection and handling procedures and QA/QC sample collection frequency are discussed in Section 3.9 (Quality Assurance/Quality Control) and in the RI Work Plan (Geraghty and Miller, Inc. 1993a). Analytical results for aqueous replicate samples, field blanks, and trip blanks associated with the samples collected during the RI are summarized below and are discussed in detail in Appendix J.

Two field replicates were collected in conjunction with drivepoint groundwater sampling at the Bayonne Plant. Both replicates were analyzed for VOCs only, similar to drivepoint groundwater samples. The analytical results for each replicate were compared against the result for its associated groundwater sample to verify that the reported values for each constituent did not vary by more than 50 RPD (USEPA 1992a). Both sample and replicate pairs met the criteria.

Two field replicates were collected in conjunction with groundwater sample collections from monitoring wells at the Bayonne Plant. Samples and field replicates were analyzed for the full suite of compounds as well as miscellaneous inorganic parameters (such as BOD, COD, nitrate, sulfide, alkalinity, total phosphorus, sulfate, TDS, ammonia, organic carbon, and chloride) and dissolved gases (carbon dioxide, carbon monoxide, dissolved oxygen, methane, and dissolved oxygen). Both groundwater sample/replicate pairs exceeded

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the standards for some metals and inorganic constituents. The analytical results from the field replicates associated with the Phase IA monitoring well and drivepoint groundwater sampling indicate that, both from an overall view and for the significant constituents, the analytical data from Phase IA water samples are precise.

Trip blanks were analyzed to determine if contamination was introduced into the sample during shipment or storage on-site. Field blank results were analyzed to determine if the sampling tools or decontamination techniques affected the integrity of the analytical results for samples collected in the field. The analytical results of each field and trip blank were compared to the results of all groundwater samples collected on the same day to identify constituent concentrations in the samples that were potentially raised above the NJDEP groundwater standards because of cross-contamination from the sampling containers, sampling equipment, field conditions, or filtering equipment.

Five field blanks and five trip blanks were prepared on days when groundwater samples were collected from monitoring wells at the Bayonne Plant. The field blanks were analyzed for the full suite of compounds that samples were analyzed for. The metals analyses were for the dissolved constituents only, except for cyanide, which was quantitated as total cyanide. Five samples were analyzed for both dissolved and total metals to satisfy NJDEP requirements according to the Field Verification Procedures and Analysis Plan (Geraghty & Miller, 1993b). The field blank associated with these samples was also analyzed for both dissolved and total metals. Trip blanks were analyzed for TCL VOCs plus site-specific compounds. Dissolved metals, phthalates, and common VOC laboratory contaminants were detected in all the field blanks at low concentrations, but these detections are not believed to have any significant effect on sample results. Two field blanks were reported with low concentrations of two pesticides, but these results did not impact the sample results. Acetone, methylene chloride, and chlorobenzene were detected in the trip blanks at low concentrations.

In general, the analytical data for field blanks and trip blanks prepared on days when groundwater samples were collected from drivepoints and monitoring wells at the Bayonne

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Plant indicate that the data are useable and that no significant cross-contamination occurred during sampling activities or decontamination procedures.

# 5.3.2 Groundwater Sampling Laboratory Analytical Results

As part of Phase IA of the RI, a total of 48 groundwater samples was submitted to the laboratory for analysis. These samples included groundwater samples collected from 31 monitoring wells, 13 drivepoints, and four field replicate groundwater samples. Groundwater samples from 21 Phase IA monitoring wells and ten existing monitoring wells were analyzed for TPH, TCL VOCs, TCL SVOCs, TCL pesticides/PCBs, TAL metals, and miscellaneous inorganic constituents. Groundwater samples from monitoring wells containing NAPL were not submitted for laboratory analysis due to the obvious presence of floating petroleum hydrocarbons. Analytical results of groundwater samples collected from monitoring wells were used to evaluate the groundwater quality in three different hydrostratigraphic zones. These samples consisted of the following: 24 groundwater samples from wells screened in the shallow overburden (primarily fill), three groundwater samples from intermediate overburden wells, and four groundwater samples collected from monitoring wells screened in the deep overburden, immediately above the bedrock.

## 5.3.2.1 Total Petroleum Hydrocarbons in Groundwater

Of the 31 groundwater samples collected from monitoring wells and analyzed for TPH, 30 of the samples (97 percent) exceeded the groundwater quality standard of 1 milligram per liter (mg/L) for TPH (Table 5-11). TPH concentrations in groundwater samples collected during the Phase IA RI are provided in Table 5-11.

All 24 groundwater samples collected from shallow overburden monitoring wells exceeded the groundwater quality criterion for TPH. TPH exceedances ranged from 4.25 to 121 mg/L in groundwater samples from shallow wells (Figure 5-6). TPH exceedances are widespread and are indicative of the long history, the site-wide refinery and petroleum storage

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operations, and the permeable nature of the cinder fill materials used over significant areas of the Site. Seventeen of the 24 shallow groundwater samples had TPH concentrations ranging from 4.25 to 25 mg/L. The highest concentrations of TPH were reported in Monitoring Wells GMMW3, GMMW10, and GMMW15 at 42.1 mg/L, 121 mg/L, and 40.2 mg/L, respectively. The highest TPH concentrations were found in the vicinity of the General Tank Field, the MDC Building Area, and the Asphalt Plant Area (Figure 5-6).

TPH exceeded the groundwater quality criterion of 1 mg/L in the samples from the three intermediate monitoring wells (Figure 5-6). TPH concentrations of 1.85 mg/L, 3.37 mg/L, and 14.1 mg/L were reported in intermediate Monitoring Wells GMMW21I, GMMW23I, and GMMW24I, respectively.

TPH was detected in three of the four deep overburden monitoring wells sampled (Figure 5-6). Groundwater samples collected from Monitoring Wells GMMW22D, GMMW23D, and GMMW24D had concentrations of TPH slightly exceeding the groundwater quality criterion. TPH concentrations in these samples were reported at 1.1 mg/L, 1.15 mg/L, and 3.08 mg/L, respectively.

The relatively lower TPH concentrations detected in the intermediate and deep overburden monitoring wells compared to the TPH concentrations in the shallow zone may be indicative of one or more of the following: background groundwater quality, limited downward migration of petroleum hydrocarbons from the shallow zone, and interconnection between the surrounding waterways and the intermediate and deep hydrogeologic zones.

#### 5.3.2.2 Volatile Organic Compounds in Groundwater

Of the 48 groundwater samples collected from monitoring wells and drivepoints and analyzed for TCL VOCs, 26 samples (54 percent) exceeded the NJDEP groundwater quality standards for one or more VOCs (Table 5-11). VOC concentrations in groundwater samples collected during the Phase IA RI are provided in Table 5-11. Thirteen VOCs exceeded the

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groundwater quality standards in at least one sample. The bulk of the exceedances were for petroleum hydrocarbon constituents, such as benzene, chlorobenzene, and xylene. Benzene exceeded the groundwater quality criterion at a frequency of approximately 41 percent.

Of the 37 groundwater samples collected from shallow overburden monitoring wells and drivepoints, 19 samples (51 percent) exceeded the groundwater quality standards for VOCs. Exceedances were reported for one or more monitoring wells in the Lube Oil Area, Main Building Area, Exxon Chemicals Plant Area, Utilities Area, General Tank Field, Low Sulfur and Solvent Tank Fields (Tank 1066 area), and Pier No. 7 Area (Figure 5-6). In many of these areas, concentrations of dissolved benzene in the groundwater were located downgradient or in the vicinity of floating NAPL plumes. The greatest number of exceedances were for benzene, chlorobenzene, and xylenes. At Monitoring Well MW6, located immediately downgradient of the Low Sulfur Tank Field, 1,2-dichloroethene (1,2-DCE) and vinyl chloride were reported in exceedance of the NJDEP standards.

Groundwater samples collected from the three intermediate overburden monitoring wells at the Bayonne Plant exceeded the NJDEP groundwater quality standards for one or more VOCs. Benzene and 2-butanone (MEK) exceeded the groundwater quality standards in Monitoring Wells GMMW23I and GMMW24I, respectively (Figure 5-6). Benzene and several chlorinated VOCs were reported in Monitoring Well GMMW22I in the Pier No. 1 Area. These chlorinated VOCs were 1,2-DCE, tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride. The source of these constituents is not known.

VOCs exceeded the NJDEP groundwater quality standards in groundwater samples collected from the four Phase IA deep overburden monitoring wells at the Bayonne Plant. Chloroform and/or bromodichloromethane exceeded the groundwater quality standards in Monitoring Wells GMMW22D, GMMW23D, and GMMW24D (Figure 5-6). Acetone exceeded the groundwater quality standards in Monitoring Well GMMW21D. The source of these VOCs in the deep overburden zone is not known.

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### 5.3.2.3 Semivolatile Organic Compounds in Groundwater

Of the 31 groundwater samples collected from monitoring wells and analyzed for TCL SVOCs, six samples (19 percent) exceeded the NJDEP groundwater quality standards for one or more SVOCs (Table 5-12). SVOC concentrations in groundwater samples collected during Phase IA of the RI are provided in Table 5-12. SVOCs that exceeded the criteria consisted of 1,4-dichlorobenzene, naphthalene, 2,4-dimethylphenol, 2-methylnaphthalene, and pentachlorophenol. Naphthalene most frequently exceeded the groundwater quality criterion. SVOC exceedances for groundwater samples collected during the Phase IA RI are shown on Figure 5-6.

Of the 31 samples analyzed for TCL SVOCs, four samples from shallow monitoring wells exceeded the NJDEP groundwater quality standards. Naphthalene exceeded the standard in one monitoring well in each of the following areas: the Asphalt Plant Area, the No. 2 Tank Field, and the Low Sulfur and Solvent Tank Fields (Figure 5-6). 1,4-dichlorobenzene exceeded the standard in Monitoring Well GMMW3 in the Asphalt Plant Area. 2,4-Dimethylphenol and 2-methylnaphthalene exceeded the NJDEP groundwater standard in Monitoring Well MW10 in the Solvent Tank Field. 2-Methylnaphthalene exceeded the standard in Monitoring Well GMMW2 in the No. 2 Tank Field. These SVOCs were detected in the vicinity of floating NAPL plumes in the Asphalt Area and the Tank 1066 Area and may be associated with the dissolution of floating NAPL constituents into the groundwater.

Of the three groundwater samples collected from intermediate monitoring wells at the Bayonne Plant, one sample from Monitoring Well GMMW211 had a concentration of pentachlorophenol in exceedance of the NJDEP groundwater quality standards.

No SVOCs exceeded the groundwater quality standards in the four deep overburden monitoring wells.

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#### 5.3.2.4 Pesticides and PCBs in Groundwater

Of the 31 groundwater samples collected from monitoring wells at the Bayonne Plant, two samples (6 percent) exceeded the NJDEP groundwater quality standards for two pesticides (Table 5-13). No PCBs were detected in the groundwater samples collected as part of the Phase IA RI. Pesticide and PCB concentrations in groundwater samples collected during the Phase IA RI are provided in Table 5-13. Pesticide exceedances for groundwater samples are included on Figure 5-6.

A total of 24 groundwater samples from shallow monitoring wells was analyzed for pesticides and PCBs. Of the 24 samples, 4,4'-DDT was reported at a concentration of 0.12 micrograms per liter (ug/L) in a groundwater sample from Monitoring Well GMMW17 in the No. 3 Tank Field (Figure 5-6). No other exceedances were reported in groundwater samples from shallow monitoring wells.

One pesticide, alpha-BHC, was estimated at a concentration of 5 ug/L in a sample from one of the three intermediate monitoring wells, Monitoring Well GMMW211 (Figure 5-6). Pesticides did not exceed the groundwater standards in the other two intermediate monitoring wells.

Pesticides or PCBs were not reported at concentrations exceeding the groundwater quality standards in groundwater samples collected from the four Phase IA deep overburden monitoring wells.

#### 5.3.2.5 Metals in Groundwater

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Thirty-one groundwater samples were collected from monitoring wells at the Bayonne Plant as part of the Phase IA RI; these samples were filtered in the field and analyzed for TAL metals. The resulting data represent dissolved metals in the groundwater. In addition, five of the 31 groundwater samples (16 percent) were submitted to the laboratory in unfiltered form

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to assess the relative concentration of total metals in groundwater. Iron and manganese were analyzed for total and dissolved metals for 27 of the 31 groundwater samples. Analytical results of total and dissolved metals in groundwater samples are provided in Tables 5-14 through 5-15. Exceedances of total and dissolved metals in groundwater samples are shown on Figure 5-7.

Of the 31 groundwater samples analyzed for TAL metals, 29 of the samples had exceedances of one or more dissolved metals (Figure 5-7). Iron and manganese were the most frequent exceedances of the NJDEP groundwater quality standards. Elevated concentrations of dissolved iron and manganese in almost all of the groundwater samples analyzed are likely indicative of background or regional groundwater quality conditions.

Twenty-four groundwater samples collected from monitoring wells screened in the shallow overburden were analyzed for TAL dissolved metals. Exclusive of the widespread exceedances of iron and manganese, 20 of the 24 samples exceeded the groundwater quality standards for one or more other dissolved metals. Dissolved sodium and/or aluminum exceeded the groundwater criteria in 16 of the 24 samples. These exceedances are probably indicative of background groundwater quality. Dissolved lead and arsenic exceeded the criteria at frequencies of approximately 6 and 23 percent, respectively. Dissolved lead and arsenic exceeded and arsenic exceedances occurred in one or more shallow monitoring wells in the General Tank Field, Asphalt Plant, No. 2 Tank Field, Lube Oil Area, and Pier No. 1 Area (Figure 5-7). Dissolved chromium exceeded the NJDEP groundwater quality standards at three locations. These locations were Monitoring Well GMMW17 in the No. 3 Tank Field, Monitoring Well MW6 in the Low Sulfur Tank Field, and Monitoring Well EBR19 in the Pier No. 6 Area.

Shallow Monitoring Wells MW6 and EBR19 in the vicinity of the Low Sulfur Tank Field and Pier No. 6 areas revealed sporadic exceedances of additional dissolved metals (Figure 5-7). These additional metals consisted of antimony, beryllium, cadmium, cobalt, nickel, and verillium. The source of these miscellaneous metals may be related to the former Case & Can Plant, which was historically located in the MDC Building and Pier No. 6 Areas.

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Groundwater samples collected from the three Phase IA intermediate wells at the Bayonne Plant exceeded the groundwater quality standards for the similar suite of metals reported in shallow overburden wells (Figure 5-7). Exclusive of iron and manganese, which were also elevated in the intermediate wells, there were exceedances for dissolved arsenic, sodium, and lead. Monitoring Well GMMW24I, in the Pier No. 6 Area, exhibited additional dissolved metals, specifically antimony, beryllium, cadmium, chromium, cobalt, and nickel.

Exceedances of one or more dissolved metals were reported in groundwater samples collected from the four deep overburden monitoring wells installed as part of the Phase IA RI. Two of the four monitoring wells exceeded the groundwater standards for dissolved iron and manganese. A groundwater sample from Monitoring Well GMMW21D exceeded the criteria for dissolved aluminum and sodium. Monitoring Well GMMW23D exceeded the groundwater criteria for dissolved sodium and arsenic.

#### 5.3.2.6 Miscellaneous Inorganic Compounds in Groundwater

Groundwater samples collected from 27 monitoring wells during Phase IA of the RI were analyzed for miscellaneous inorganic compounds. Groundwater samples were collected from ten shallow Phase IA monitoring wells, ten existing shallow monitoring wells, three intermediate monitoring wells, and four deep overburden monitoring wells. Miscellaneous inorganic compounds consisted of various wet chemistry parameters and intrinsic biological parameters, which included dissolved gases. Concentrations of inorganic compounds for each of the groundwater samples analyzed are provided in Table 5-16.

Chloride concentrations in groundwater samples ranged from 5.47 to 11,300 mg/L. Approximately 11 of the 27 groundwater samples exceeded the groundwater quality standard of 250 mg/L for chloride. TDS concentrations in groundwater samples ranged from 106 to 4,630 mg/L. Approximately 11 of the 27 groundwater samples exceeded the NJDEP standard of 500 mg/L. Overall, approximately one-third to one-half of the Bayonne Plant exceeds the

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criteria for both chlorides and TDS, as would be anticipated for a peninsular setting surrounded by the tidal estuaries of the Kill Van Kull and Upper New York Bay. However, these concentrations are not representative of Class III A groundwater. The minimum concentrations for Class III A groundwater are 3,000 mg/L for chloride and 5,000 mg/L for TDS.

Of the 20 groundwater samples collected from shallow monitoring wells, approximately ten samples (or 50 percent) had DO concentrations greater than 2 mg/L. DO data from shallow monitoring wells at the Bayonne Plant where NAPL and dissolved phase petroleum hydrocarbon constituents have been reported, indicate that site conditions are favorable for both aerobic and anaerobic biodegradation. Areas where groundwater has not been heavily impacted by organic contaminants tend to reflect moderate to high concentrations of DO. Case studies and the literature have shown that if sufficient DO (i.e., greater than 1 to 2 mg/L) is present in groundwater, aerobic biodegradation can degrade petroleum hydrocarbons at relatively higher rates than those achieved anaerobically (McAllister & Chiang 1994). Examples of such areas are Monitoring Wells EB29, EB1, and GMMW11. In areas of the plant that have sustained a higher degree of impact, the DO level has been depressed. Groundwater samples collected from intermediate and deep overburden wells generally yielded DO concentrations of less than 2 mg/L. When DO concentrations are depleted to less than 1 mg/L, anaerobic conditions prevail, and biodegradation of petroleum hydrocarbons can occur at relatively lower rates provided that nitrates, sulfates, or iron (ferrous iron) are available as electron acceptors. Examples of such areas are Monitoring Wells PKMW4, EBR13, and GMMW13, where DO levels are less than 1 mg/L. These monitoring wells are located in areas where floating NAPL and/or dissolved phase contaminants are present in groundwater.

Ammonia concentrations in groundwater samples range from 0.136 to 5.01 mg/L. The NJDEP groundwater quality standards for ammonia is 0.5 mg/L. Of the 27 groundwater samples analyzed, 15 samples exceeded the standard for ammonia.

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Concentrations of sulfate range from 12.5 to 1,840 mg/L. Approximately 3 of the 20 groundwater samples collected from shallow monitoring wells exceed the NJDEP standard of 250 mg/L for sulfate. One of the three groundwater samples from intermediate wells, and three of the four groundwater samples from the deep overburden monitoring wells, exceeded the standards for sulfate. Concentrations of nitrate ranged from 0.063 to 3.2 mg/L. Nitrate concentrations were well below the NJDEP groundwater standard of 10 mg/L for nitrate. Nitrate and sulfate are electron acceptors that support the anaerobic biodegradation of contaminants. Concentrations of these analytes may be depressed as a result of anaerobic biodegradation processes. Examples of this are groundwater samples from Monitoring Wells MW6 and MW10, which exhibit relatively lower concentrations of sulfate and nitrate.

Certain anaerobic bacterial processes involved in the breakdown of organic compounds produce methane. Methane is commonly present in groundwater in reduced geochemical systems. Methane was detected in 16 of the 20 shallow monitoring wells sampled at concentrations ranging from 0.3 to 13.4 mg/L. Methane concentrations in groundwater samples from intermediate monitoring wells ranged from 0.3 to 3 mg/L, while methane was not detected in deep overburden monitoring wells.

TOC and COD provide a relative indication of the organic load to groundwater. COD values for groundwater samples from shallow monitoring wells ranged from 86 to 800 mg/L. TOC concentrations in the shallow zone ranged from 9.4 to 100 mg/L. Although the intermediate and deeper overburden zones indicate higher concentrations of COD, lower concentrations of TOC are manifested in these zones compared to the shallow overburden. Higher TOC in the shallow zone may be derived from organic contaminants in the shallow zone. Relatively higher COD in the intermediate and deep zones may be caused by anaerobic conditions that facilitate reduction of inorganic components in the water. These compounds may exert a high oxygen demand during COD analysis.

BOD<sub>5</sub> concentrations range from 6.4 to 74 mg/L for groundwater samples from shallow monitoring wells. Higher BOD<sub>5</sub> concentrations of 17 to 700 mg/L and 420 to 1,600

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mg/L were reported for monitoring wells screened in the intermediate and deep overburden. The generally lower levels of  $BOD_5$  in the shallow wells may be caused by the presence of elevated metals, potentially suppressing microbial activity of the test seed stock.

### 5.3.2.7 Field Parameters for Groundwater Samples

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Field parameters were measured and recorded for groundwater samples from 25 shallow monitoring wells, three intermediate monitoring wells, and four deep monitoring wells during Phase IA of the RI. Measurement of field parameters was conducted concurrent with groundwater sampling activities on January 23 through January 27, 1995. Field parameters consisted of temperature, specific conductance, pH, DO, and redox potential. The parameters were recorded using a downhole probe, which was used to measure the parameters at approximately 2-foot intervals throughout the screened interval of each monitoring well. Measurement of the field parameters was conducted prior to and following monitoring well purging. Of the measurements recorded, the values recorded at the base of the water column in each monitoring well following purging were considered most representative of actual insitu groundwater conditions. A summary of these field parameters is provided in Table 5-18. Additional field parameter data are included in Appendix O.

The temperature of the groundwater underlying the Bayonne Plant ranged from approximately 49 to 63 degrees Fahrenheit (°F). These temperatures are within the normal range for groundwater.

The pH for naturally occurring groundwater ranges from 6.0 to 8.5. The pH of groundwater underlying the Bayonne Plant was generally within this range. Lower pH values of 4.4 and 4.91 were measured in deep intermediate monitoring wells GMMW21D and GMMW22D. Higher pH values of 8.61 and 9.63 were measured for samples from shallow monitoring wells GMMW1 and GMMW2. Local variations in pH may be due to a number of factors, including oxidation reactions and to the aerobic biodegradation process, resulting in the production of carbon dioxide.

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Specific conductance of groundwater is an indication of ion concentration. Specific conductance of groundwater samples collected from shallow, intermediate, and deep monitoring wells at the Site ranges from 100 to 9,280 micromhos per centimeter (umhos/cm). These values are similar to those for fresh to slightly brackish water. A typical specific conductance value for sea water is 50,000 umhos/cm. Local variations in specific conductance are likely to be due to variations in chloride, sulfate, nitrate, and hardness content.

DO concentrations of groundwater samples collected from shallow monitoring wells ranged from 0.39 to 11.73 mg/L. Approximately 15 of the 25 groundwater samples from shallow monitoring wells had DO concentrations of greater than 2 mg/L. Intermediate and deep overburden monitoring wells exhibited DO concentrations of less than 2 mg/L. Local variations in DO may be due to oxidation-reduction chemical reactions and/or may be indicative of active aerobic or anaerobic biodegradation processes. The field DO measurements are relatively consistent with those reported by the laboratory for groundwater samples.

Redox potential is a numerical index of the intensity of oxidizing or reducing conditions within a groundwater system. A positive value indicates a relatively oxidizing system, while a negative value indicates a relatively reducing system. Of the 25 shallow monitoring wells, 17 yielded negative values for redox potential. The three intermediate monitoring wells and two of the four deep overburden monitoring wells also indicated negative redox potential values. Thus, the results indicate that the majority of the shallow groundwater underlying the Site is under relatively reducing conditions, strongly implying that intrinsic bioattenuation processes are active at the Bayonne Plant. The intermediate and deep zones also appear to be reducing environments, perhaps because of the unavailability of oxygen in deeper zones.

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# 6.0 <u>OVERVIEW OF CONSTITUENT AND SITE PROPERTIES AFFECTING</u> FATE AND TRANSPORT

Migration of the constituents detected at the Site is dependent on the physical and chemical properties of the constituents and the characteristics of the surrounding environment. This section discusses the composition of the petroleum hydrocarbons; the physical and chemical properties of the constituents; and the influence of those properties on the potential for migration in soil, groundwater, and air. This information will be used in the risk assessment to identify exposure pathways and to evaluate potential human health and environmental effects from exposure to the constituents of potential concern.

## 6.1 CHEMICAL STRUCTURE OF CONSTITUENTS DETECTED

The constituents detected in environmental media at the Site can be classified into several groupings. The basic groups are VOCs, SVOCs, pesticides/PCBs, and inorganics. Within each of these groups, the constituents can be classified into categories according to their similarity in chemical structure and/or physical-chemical properties (factors that influence mobility in the environment). The constituent categories and the constituents within each category that were detected at the Site at concentrations above the NJDEP non-residential and/or impact to groundwater soil cleanup criteria, and in groundwater above the NJDEP groundwater standards, are listed below. The metals shown with an asterisk in this list are those that were reported at concentrations of more than ten times the non-residential soil cleanup criteria.

- Constituents in Soil
  - Monocyclic aromatics: Benzene, chlorobenzene, 1,2-dichlorobenzene, 1,4dichlorobenzene, and xylenes.
  - PAHs: Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, pyrene, and naphthalene.

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- Amines: N-nitrosodiphenylamine.
- Pesticides: 4,4-DDD, 4,4-DDT, dieldrin.
- Inorganics: Arsenic\*, beryllium, chromium, copper\*, lead\*, nickel, thallium, zinc, and chromium (although chromium does not have a cleanup criterion, its presence at the site warrants discussion).
- <u>Constituents in Groundwater</u>

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- Halogenated aliphatics: Bromodichlomethane, chloroform, 1,2-DCE, methylene chloride, PCE, TCE, and vinyl chloride.
- Monocyclic aromatics: Benzene, chlorobenzene, 1,4-dichlorobenzene, ethylbenzene, and xylenes.
- Ketones: Acetone and MEK.
- PAHs: 2-Methylnaphthalene and naphthalene.
- Phenols: 2,4-Dimethylphenol and pentachlorophenol.
- Pesticides: alpha-BHC and 4,4-DDT.
- Inorganics: Arsenic, antimony, beryllium, cadmium, chromium, cobalt, lead, and nickel.

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### 6.2 PHYSICAL AND CHEMICAL PROPERTIES INFLUENCING CONSTITUENT MIGRATION

The environmental fate and transport of constituents are dependent on the physical and chemical properties of the constituents, the environmental transformation processes affecting them, and the media through which the constituents are migrating. This section will describe the primary physical and chemical properties that affect the fate and transport of the constituents. Key chemical and physical properties discussed in this section include water solubility, specific gravity, volatility, organic-carbon partition coefficient ( $K_{sc}$ ), soil distribution coefficient ( $K_{d}$ ), octanol-water partition coefficient ( $K_{sc}$ ), and half-lives. Physical and chemical properties of the organic constituents are summarized in Table 6-1. The properties most often used to calculate  $K_d$  for organic constituents are the  $K_{sc}$ , which measures the selective affinity for soil organic carbon versus water, and the fraction of organic carbon ( $f_{sc}$ ) in soil. In the absence of site-specific data, the  $K_d$  is expressed as the product of the  $K_{sc}$  and  $f_{sc}$  (USEPA 1989). The coal-derived cinders in the fill and the peat deposits under the fill at the Site are materials typically posessing relatively high  $f_{sc}$  values.

Solubilities of organic chemicals range from the low microgram per liter range to miscible, with most common organic chemicals having solubilities between 1 and 1,000,000 mg/L (Lyman et al. 1990). The ketones (acetone and MEK) are the most soluble constituents detected. The other VOCs are soluble, although to a lesser extent. The SVOCs tend to be less soluble; hence, there are fewer SVOCs detected in groundwater. None of the PAHs observed in soils, except naphthalene, was observed in the groundwater above the applicable NJDEP standards.

Organic compounds with Henry's law constants in the range of  $10^{-3}$  atmospheres-cubic meter per mole (atm-m<sup>3</sup>/mol) and greater, and with molecular weights equal to, or less than, 200 grams per mole (g/mol) can be expected to readily volatilize from water (i.e., VOCs). Organic compounds with values ranging from  $10^{-3}$  to  $10^{-5}$  atm-m<sup>3</sup>/mol are associated with possibly significant, but not facile, volatilization, while compounds with values less than  $10^{-5}$  atm-m<sup>3</sup>/mol will only volatilize slowly from water and to a limited extent. The VOCs, with the exception of acetone and MEK, are expected to volatilize from water. Most of the other constituents detected

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are not expected to volatilize to an appreciable extent. Volatilization is the major removal mechanism from soil and surface water, and oxidation is the primary mechanism for atmospheric destruction of the monocyclic aromatic constituents.

The  $K_{ow}$  often is used to estimate the extent to which a constituent will partition from water into lipophilic parts of organisms, such as animal fat. Similarly, the  $K_{oe}$  reflects the propensity of a compound to adsorb to the organic matter found in soil or sediments. The bioconcentration factor (BCF) is the ratio of the concentration of the constituent in fish tissue to its concentration in water. As a group, the VOCs have low values of  $K_{ow}$ ,  $K_{oe}$ , and BCF, indicating a tendency not to partition to soil from water. The SVOCs (PAHs) have higher values of  $K_{ow}$ ,  $K_{oe}$ , and BCF and have strong tendencies to partition to soil, depending in part on the organic matter content of the soils and available pathways. PAHs sorb strongly onto soil particles and are therefore observed in soils. Once sorbed to soil particles, mobility of PAHs is limited. In general, as the molecular weight increases, water solubility decreases. Biodegradation and biotransformation are the ultimate fate processes for PAHs in soil.

Adsorption potential typically is expressed in terms of a partition coefficient  $K_{\infty}$  or  $K_4$ . Higher values of  $K_{\infty}$  (greater than 10,000 milliliters per gram [mL/g]) indicate a greater potential for the constituent to adsorb to organic carbon in soil and aquifer materials. Constituents with low  $K_{\infty}$  values (less than 1,000 mL/g) do not adsorb strongly to soil and aquifer materials (Ney 1990). Values of  $K_{\infty}$  are shown in Table 6-1, and the values typically are based on several different types of studies or element-specific parameters. The VOCs are characterized by low  $K_{\infty}$ s. These constituents do not tend to adsorb readily to organic soil or aquifer materials, and thus are characterized by high mobility in the environment. The other constituents, including the components of weathered petroleum hydrocarbon, are not expected to be as mobile as the VOCs. The occurrence of subsurface materials with high  $f_{\infty}$  under most of the Site would tend to increase the  $K_4$  for all organic compounds and would reduce their mobility.

Persistence is a measure of the time constituents prevail in the environment and is commonly expressed in terms of half-lives  $(T_{12})$  for specific environmental media. The half-life of

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a constituent is the period of time required for one-half of the mass of a compound to be transformed into other constituents from the time of its introduction to the environment. Half-lives of the detected constituents are presented in Table 6-1 in ranges because the rate of degradation varies according to site-specific environmental conditions and concentration. Half-lives may be used to characterize the relative persistence of a constituent in various environmental media. The more persistent compounds detected at the Site include some of the PAHs [benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and pyrene] and the chlorinated aliphatics [TCE, PCE, 1,2-DCE, and vinyl chloride].

The inorganic constituents are not included in Table 6-1 because their properties are dependent on the form of the element. In soil, metals typically have very low mobilities, particularly under neutral or alkaline conditions. In addition, inorganic metal ions are not volatile. Metals in the soil tend to adsorb to soil particles, but may be desorbed when the conditions of the water moving through the soil are appropriate (primarily changes in pH and oxidation-reduction potential). Rain water is generally acidic due to the presence of carbon dioxide and industrial activity in the region. Therefore, the potential exists for inorganic constituents to migrate to some extent into groundwater. Once in groundwater, the inorganic constituents may be removed from the dissolved phase through reactions with ions of an opposite charge in the soil matrix. Since the inorganic elements do not degrade, the loss mechanisms are limited by such chemical interactions.

The mobility of inorganics depends on the soil bulk density, surface area, particle-size distribution, pH, redox status, ion exchange capacity, amount of organic matter, type and amount of metal oxides, and type and amount of clay materials. Soil pH is the property that most influences inorganic mobility. Cationic metals tend to be mobilized at low pH. The amount of organic matter, free iron oxides, and cation exchange capacity can significantly affect the amount of inorganics retained.

The K<sub>4</sub> for inorganics provides a general indication of potential subsurface migration. Beryllium, chromium (as Chromium<sup>3+</sup>), lead, and thallium have high K<sub>4</sub> values (650 to 1,500 mL/g) indicating relatively low mobility through soil. The K<sub>4</sub> values for arsenic, hexavalent chromium,

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copper, nickel, and zinc are lower (5 to 40 mL/g), indicating greater potential mobility. The different characteristics of the geologic strata beneath the Site result in different inorganic mobilities. For example, deposits of materials with relatively low hydraulic conductivities, such as cinders in the fill and the underlying marsh and related clay deposits beneath the Site, tend to reduce the mobility of inorganics. Because of the heterogeneity of the fill materials and the varying organic content of the subsurface deposits, it is very difficult to predict specific mobilities through the different deposits under the Site. However, a general discussion of the mobility of antimony, arsenic, beryllium, zinc, cadmium, chromium, cobalt, copper, lead, nickel, and thallium is provided in the following paragraphs.

Antimony is present as the oxide or antimonite salt in most natural waters. In reducing environments, volatile stibine (SbH<sub>3</sub>), which is a gas at room temperature and quite soluble in water, may be formed. It is, however, unstable in aerobic waters or air and is oxidized to form the oxide. Sorption to clays is the most important mechanism, resulting in the removal of antimony from solution, thus reducing the aqueous transport of antimony.

Arsenic has many forms, but most commonly appears as anions in the environment. The most common forms are arsenite  $(H_2AsO_3^- \text{ or } HAsO_3^{-2})$  and arsenate  $(H_2AsO_4^- \text{ or } HAsO_4^{-2})$ . Unlike the ten cations discussed above, ion exchange of arsenic in soil is limited, although some positively charged sites on soils can retard the migration of arsenic species. Also, adsorption of arsenic anions is increased and, therefore, mobility decreased at lower pH levels (that is, pH in the range of 3 to 7).

Beryllium ( $Be^{2^+}$ ) and zinc ( $Zn^{2^+}$ ) are divalent cations at low to moderate pH values in the environment. They do not form as many low solubility salts as lead; but as doubly charged cations, they undergo attenuation in soil through ion exchange reactions that are fairly strong. Beryllium is chemically similar to aluminum and therefore is expected to adsorb to clay particles. Zinc also complexes with clay, organic matter, and metal oxides.

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Cadmium is found in the divalent (Cd<sup>2+</sup>) state with pH controlling the speciation in water. Waters with pH values below 7 (acidic conditions) are more prone to leach inorganics. Higher pH values (basic conditions) usually result in decreased leaching potential and may also cause increased precipitation of metals as oxides and hydroxides. Cadmium is among the most mobile of the heavy metals, and its mobility depends more on sorption processes. Sorption of cadmium is influenced by the clay and metal oxide content of the soil and sediments.

Chemical speciation is critical in determining the fate and transport of chromium. Chromium in soil or water exists in either a trivalent ( $Cr^{3+}$ ) or hexavalent ( $Cr^{6+}$ ) oxidation state, depending on the presence of reducing agents. Hexavalent chromium is more commonly associated with residues from industrial processing of chromium and is soluble with adsorption to soil being an insignificant fate pathway. The presence of estuarine sediments can remove  $Cr^{6+}$  from solution by a two-step process: reduction of  $Cr^{6+}$  to  $Cr^{3+}$  followed by adsorption of  $Cr^{3+}$  to the sediments. Dominant fate processes of trivalent chromium include reaction with aqueous hydroxide ions to form an insoluble precipitate (chromium hydroxide) and adsorption of dissolved chromium to soil particulates and sediments. Consequently, migration of trivalent chromium is limited.

Cobalt is a relatively rare metal and its mobility is controlled by adsorption. This is governed by pH, redox potential, and concentration. Cobalt forms ionic chloride complexes in saltwater that are readily adsorbed to sediments. Elemental cobalt is otherwise relatively unreactive and is quite stable in water.

Copper, also a divalent cation  $(Cu^{2+})$ , is more immobile than lead. It does not form as many low-solubility salts, but through ion exchange, it is very strongly held to soil and organic matter particles. In addition, above approximately pH 7, substantial amounts of immobile solid copper hydroxide [Cu(OH)<sub>2</sub>] forms.

Lead is especially slow moving because of two important mechanisms. First, many salts of lead (for example, lead sulfate) have low solubilities; the presence of any number of negatively

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charged ions (anions) in soil can result in the creation of immobile lead salts. Second, lead is a divalent cation ( $Pb^{2+}$ ) and has a very high affinity for ion-exchange sites present on the surfaces of many soil fractions, including natural organic matter particles. This ion-exchange reaction will hold lead in place close to the source area. Soluble organic acids, such as might be found in the meadow mat, could increase the solubility of lead and other cations.

Nickel (Ni<sup>2+</sup>) is usually found in the divalent state and forms salts with sulfate, chloride, nitrate, carbonate, oxide, hydroxide, and organic ligands. These salts are sufficiently soluble under aerobic conditions and pH below 9. Fulvic acid and humic materials, ubiquitous in natural soils and waters, increase the solubility of nickel, with adsorption processes being moderately effective in limiting the mobility of nickel.

Thallium (TI<sup>+</sup>) is a monovalent cation. Although its migration through soil is slowed somewhat by ion exchange, most ion exchange sites on soil and organic matter particles will prefer to react with divalent cations such as lead, copper, berryllium, and zinc, thereby leaving TI in solution unless there is excess ion exchange capacity available. Thallium's metallic and covalent radicals are similar to lead and, therefore, it is expected to behave in a manner similar to lead.

For all 11 cations listed above, if soil conditions are reducing as is common at the Bayonne Plant, and sulfide (S<sup>2</sup>) is present, the mobility of the metals will be substantially lowered. All metal sulfides have extremely low solubilities in water.

### 6.3 COMPOSITION OF PETROLEUM HYDROCARBONS

TPH is an analytical method that quantifies concentrations of a complex mixture of petroleum-derived hydrocarbons. The hydrocarbons fall into four major classes, as follows: alkanes or paraffins (straight- or branched-chain hydrocarbons), cycloalkanes (ring structures), alkenes (carbon chains with one or more double-bonds), and aromatics (containing benzene-type rings) (Bergamini 1992).

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When TPH enters the soil and/or groundwater, compositional changes referred to as weathering begin immediately. Volatilization of the lighter compounds occurs at a higher rate than that of heavier compounds, resulting in a shift in the composition of the weathered TPH toward heavier compounds. The solubilities of the heavier hydrocarbons are generally lower and the adsorption characteristics are stronger than those of the lighter compounds. Therefore, these heavier compounds tend to remain adsorbed to soil organic matter for longer periods of time, while the more soluble components partition into soil moisture and/or groundwater more quickly and more completely. Rates of biotransformation also are different; short-chain alkanes generally are biodegraded more quickly than aromatics, cycloalkanes, and heavier alkanes (USEPA 1989). The net result of these weathering processes is that the TPH concentrations reported from older, weathered product such as that encountered in parts of the Site will reflect a greater proportion of the heavier TPH components than fresh product. These heavier components are comprised largely of cycloalkanes and straight-chained and branched-chain alkanes (Andrews and Snyder 1991).

### 6.4 BIODEGRADATION OF PETROLEUM CONSTITUENTS AT THE SITE

Many of the petroleum constituents detected in soil and groundwater at the Site are susceptible, to varying degrees, to biodegradation by indigenous bacteria. Biodegradation of petroleum constituents in soil is primarily an aerobic process because of the availability of oxygen in soil pores. Biological and chemical processes occurring in soil can be important in determining the ultimate fate of the constituents in soils and groundwater at the Site. Microorganisms naturally occurring in soils are able to use numerous organic compounds as a food source, degrading the components ultimately to carbon dioxide and water (Kostecki and Calabrese 1989).

In most cases, an organic contaminant is not broken down completely to carbon dioxide and water by a bacterium, but is metabolized to an intermediate, which is, in turn, degraded further. The metabolites isolated depend primarily on the time at which the reaction is stopped.

The monocyclic aromatics (e.g., benzene) can be degraded aerobically (i.e., in the presence of oxygen) in soil (Kostecki and Calabrese 1989). In surficial soil, biodegradation can be relatively

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rapid, provided adequate amounts of oxygen, moisture, and nutrients (e.g., nitrogen and phosphorus) are available. Aerobic metabolism of constituents under these conditions may result in the total depletion of oxygen. When this happens, the microorganisms may begin utilizing inorganic ions (such as nitrate or sulfate) as electron receptors and continue aerobic respiration, or other types of microorganisms may become active in metabolizing the constituents (USEPA 1989).

The PAHs also can be biodegraded. Factors contributing to the degree to which biodegradation occurs include biodegradability rates, production of intermediates, and the effects of mixtures. In general, smaller PAHs with two (e.g., naphthalene) or three rings (e.g., phenanthrene) are more readily degraded than larger PAHs (McKenna and Heath 1976).

In groundwater, biodegradation of petroleum constituents can proceed aerobically and anaerobically, depending primarily on the availability and replenishment of oxygen. In larger portions of the interior of the Site, it is likely that anaerobic processes dominate, as oxygen depleted by initial aerobic processes cannot be replenished by the slow groundwater flow rates to sustain aerobic degradation. Conversely, the alternative electron receptors needed for anaerobic degradation (sulfate, iron, manganese) are in abundant supply in Site groundwater and would be replenished at rates sufficient to sustain anaerobic degradation. In the near-shore zones adjacent to the Platty Kill Creek, the Kill Van Kull, and New York Bay, tidal flushing probably replenishes oxygen at rates sufficient to maintain aerobic degradation.

As described in Section 3.0 (Technical Overview - Investigation Methodology) and Section 5.0 (Phase IA - Findings), groundwater samples collected from selected monitoring wells were analyzed for a suite of organic and inorganic parameters that are indicators of the potential for, and the by-products of, aerobic and anaerobic degradation. The analytical results are provided in Table 5-16. The potential for aerobic biodegradation is determined primarily by the availability of DO and the redox potential; increases in carbon dioxide could be indicative of active aerobic biodegradation. Concentrations of these constituents are evaluated relative to background levela and/or pertinent references (McAllister and Chiang 1994; Wiedemeier et. Al. 1994) for assessing natural attenuation.

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The potential for anaerobic degradation is determined by the availability of electron receptors such as sulfate, iron, and manganese. All of these are abundant in groundwater under the Site (Table 6-1). By-products of anaerobic biodegradation include methane, carbon dioxide, and sulfides (reduced from sulfate); the presence of elevated concentrations of these constituents could be indicative of active anaerobic biodegradation.

Background groundwater quality is probably reflected in Monitoring Wells EB-1 and EB-29, which had relatively high DO, little or no sulfide, no methane, and moderate to low carbon dioxide concentrations. Several monitoring wells appear to show evidence of anaerobic biodegradation; these monitoring wells are near the edges of NAPL plumes. These monitoring wells, which include Monitoring Wells GMMW3 (Asphalt Plant Area), GMMW9 and GMMW10 (General Tank Field), GMMW14, and MW10 (Solvent Tank Field) are generally characterized by elevated methane, carbon dioxide, and sulfide concentrations and negative redox potentials. These monitoring wells are also characterized by low or no concentrations of BTEX constituents (except for Monitoring Well MW10), which suggests that anaerobic biodegradation processes are destroying dissolved constituents ernanating from NAPL plumes. More data are required to fully assess the extent of these processes around the margins of plumes, best obtained once NAPL removal measures are in effect.

#### 6.5 MECHANISMS OF MIGRATION

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There are several mechanisms by which constituents may migrate through environmental media at the Site. Migration into the air can occur via volatilization or fugitive dust emissions, and migration from soil into groundwater can occur by percolation of infiltrating rain water. Constituents can dissolve from NAPL bodies into groundwater. Dissolved constituents can be transported with prevailing groundwater flow. The mechanisms of migration are discussed in this section from a conceptual standpoint, together with a discussion of constituent persistence and transformations that may occur in the source or transport medium.

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#### 6.5.1 Migration into Air

The following two processes control migration of constituents into air: (1) Organic constituents may volatilize and migrate into the air; (2) constituents adsorbed to surface soil may migrate into the air through the generation of dust either by wind erosion in unpaved areas or by mechanical means. Constituents released into the atmosphere are subject to transport and dispersion by prevailing winds. Given the operations of the Bayonne Plant (i.e., well ventilated open areas), there is virtually no potential for volatilized constituents to present a risk to human health.

Fugitive dust emissions from wind or vehicle operations could occur from unpaved portions of the Site and during construction activities. During the entire 4-month field effort conducted for the Phase IA RI, dust monitoring was conducted; the results of the dust monitoring indicated that the dust generation at the Site was not a health concern to workers (see Appendix G). Constituents with relatively low organic carbon partition coefficients (K<sub>oc</sub> values less than 1,000) and moderate to high water solubility (greater than 1 mg/L) are more likely to be associated with the water or vapor phases than to remain in soil and, therefore, are unlikely to be present in emitted dust. The VOCs fall into this category; therefore, these constituents are not expected to be emitted in dust. The heavier fractions of TPH, SVOCs, pesticides, and metals are expected to adsorb to soil and hence could be emitted as fugitive dust.

Most of the metals can form insoluble compounds with constituents found in soils or sorb onto soil particles. These processes will result in the inorganic compounds remaining in the soil. As a result, inorganic constituents could be transported by fugitive dust.

#### 6.5.2 Migration in Soil

Solubility in water, area rainfall characteristics (which affect fluctuations in the groundwater levels), the tendency to bind to soil and organic carbon, the type of soil (particle size distribution, clay content,  $f_{\infty}$  content, porosity, and permeability), and the depth to groundwater

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are significant factors in determining the potential for constituents to be carried from soil to groundwater. The presence of the coal-derived cinders under much of the Site may tend to retard migration of constituents with high  $K_{oc}s$ . The more soluble constituents may migrate through soil to the groundwater with infiltrating precipitation. Typically, organic constituents with high water solubilities and low  $K_{oc}s$  are particularly susceptible to leaching. The more volatile constituents may migrate into air, as discussed in the previous section. In general, the pesticides, the PAHs, and the metals detected in soil are not very soluble or mobile.

The nature of the site soils significantly affects transport within the soil. Clays and certain minerals exhibit adsorptive behavior, while organic matter is capable of both adsorption and absorption. Coarse silica sands are very poor at sorbing chemicals. Because sorption is an equilibrium process, some of the sorbed constituents may "desorb" from the particles into the dissolved phase, be released into the soil moisture, and be transported with infiltrating precipitation. These dissolved constituents then may become sorbed to aquifer materials again, followed by dispersion by groundwater transport. The more mobile constituents are expected to be VOCs and the constituents with low molecular weight in the TPH mixtures, such as benzene.

The soils under the Site are composed of predominantly fine-grained fill materials with a high percentage of coal-derived cinders. The peat deposits under the fill have a high percentage of clay, silt, and organic matter, and will act to retard constituent migration.

The transport of the inorganic constituents through soil to groundwater is influenced by soil characteristics and water movement. Soil parameters to be considered are cation and anion exchange capacities (i.e., the interaction between positively and negatively charged ions),  $f_{\infty}$ , pH, oxidation-reduction potential, porosity, and permeability. In general, inorganic constituents with a positive charge (cations) will be retarded (sorbed) by clays that exhibit an overall negative charge. Arsenic and chromium typically are often present as anions (e.g., arsenates and chromates) and will not be retarded by clay as readily as other metals.

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#### 6.5.3 Dissolution from NAPL

Depending on their chemical composition, the NAPL bodies delineated under the Site, can act as sources of dissolved constituents that can partition to groundwater. Heavier NAPL bodies, such as products that have specific gravities characteristic of lube oils and No. 6 fuel oil, do not contain constituents that are readily soluble. Lighter fuels, such as kerosene, gasoline, and naphtha, could be sources of dissolved constituents that could partition to groundwater, such as benzene, ethylbenzene, and xylenes, all of which have been detected in groundwater near NAPL bodies.

#### 6.5.4 Migration in Groundwater

Transport of constituents in groundwater is expected to be a primary mechanism of transport of the lighter and more soluble constituents detected at the Site. Groundwater transport of organic compounds is controlled by many of the same processes discussed in Section 6.5.2 (Migration in Soil). Solubility and sorption are the most important constituent properties affecting leaching and groundwater transport. The moderate to high solubility values and low  $K_{oc}$  values of the halogenated aliphatics, monocyclic aromatics, ketones, naphthalene, and phenols detected in groundwater indicate that these constituents tend to dissolve and move with groundwater, and will adsorb to aquifer materials only partially, if at all. Constituents migrate in the subsurface primarily in the dissolved aqueous phase. TPH, PAHs, pesticides, and metals have low solubilities and tend to sorb to soils; they normally do not dissolve to appreciable concentrations nor migrate with groundwater over appreciable distances. Metals with a low K<sub>4</sub> value (arsenic, copper, and zinc) are potentially more mobile, while those with a high K<sub>4</sub> value (berryllium, chromium, lead, and thallium) will tend to be more immobile.

As soluble constituents are transported with groundwater, they are subject to various processes that can retard their migration or degrade them completely. The petroleum constituents and halogenated aliphatics will be retarded to some extent by adsorption on the fine-grained silt and clay that compose a large percentage of the fill, and by the carbonaceous compounds that make up the coal-derived cinders. Dissolved metals such as lead will also be retarded, given their potential

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to adsorb to clay particles. As discussed in Section 6.4 (Biodegradation of Petroleum Constituents at the Site), there is evidence that biodegradation, particularly anaerobic processes, are destroying soluble petroleum constituents as they migrate with prevailing groundwater flow. Finally, given that groundwater is discharging ultimately to surface-water bodies, tidal flushing in near-shore zones will act to replenish oxygen at rates sufficient to maintain aerobic biodegradation, which would tend to destroy any residual concentrations of soluble petroleum constituents. This process will serve to reduce dissolved constituent concentrations before they can ultimately discharge to the Platty Kill Creek, the Kill Van Kull Waterway, or New York Bay.

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# 7.0 DATA EVALUATION, HYPOTHESIS DEVELOPMENT, AND CONCLUSIONS

In this section, the distribution of contaminants in site media is analyzed, and the relationships between conditions in soil, floating NAPL, and groundwater quality are interpreted. This analysis and interpretation is based on the characterization of hydrogeologic conditions (Section 4.0 [Physical Setting]); contaminant distribution (Section 5.0 [Phase IA - Findings]); and the processes affecting contaminant fate and transport (Section 6.0 [Overview of Constituent and Site Properties Affecting Fate and Transport]).

A more detailed description of the relationships between soil quality, groundwater quality, and NAPL plumes is presented and organized geographically, consistent with the NAPL plume description in Section 5.0 (Phase IA Findings). Each area-specific description of relationships is followed by a discussion of area-specific contaminant fate and transport. NAPL plume areas with higher potential for requiring prompt remediation due to potential off-site impact(s) or other concerns are distinguished from those that are less significant because of their distance from site boundaries or their need for further characterization in Phase IB. Potential remedial technologies to remove or control the migration of floating NAPL are identified, and data gaps relative to the feasibility of potential remedial approaches for NAPL control/remediation are discussed on a sitewide basis. The primary focus of the discussion herein is NAPL removal, which is a priority not only to limit additional migration, but also because the presence of large amounts of NAPL limits characterization effectiveness for soil and groundwater.

#### 7.1 SUMMARY OF FINDINGS

This section presents a broad overview of the analytical findings (soil and groundwater quality) and NAPL observations discussed in detail in Section 5.0 (Phase IA - Findings). To facilitate the discussion of analytical findings and NAPL observations, Table 7-1 has been prepared as a reference. All exceedances are listed in Table 7-1, but only the most important exceedances are discussed in this section. Constituents detected above the NJDEP nonresidential direct contact or impact to groundwater soil cleanup criteria in both surface (0 to 2

feet bls) and subsurface (greater than 2 feet bls) soil are presented in Table 7-1. The numerical designations of the NAPL plumes observed on the water table, identified during the RI and IRM activities, and presented on Figure 5-5 and in Table 5-10, are included for each area in Table 7-1. Analytes detected in groundwater above the NJDEP standards or the interim generic groundwater quality criteria (IGGWQC) are also summarized in this table. The findings provided in Table 7-1 are presented for ten areas in the Bayonne Plant, the areas having geographic continuity and similarities in contamination characteristics. The areas discussed below are presented in order from east to west across the Site.

#### 7.1.1 Soil Quality Summary

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The following constituents, listed by frequency of occurrence, were observed above the NJDEP non-residential direct contact or impact to groundwater soil cleanup criteria in both surface and subsurface soils, on a site-wide basis: TPH, arsenic, and benzo(a)pyrene. Other constituents detected above criteria in surface and subsurface soils on a less frequent, and area-related, basis included the following: miscellaneous PAHs other than benzo(a)pyrene, VOCs (benzene, chlorobenzene, and xylenes), and some metals (lead, copper, beryllium, and zinc). Hexavalent chromium was also detected in areas where filling of chromate slag historically occurred, but was only detected above the criterion of 100 mg/kg in soils at three locations. Only one location in the entire Site exhibited a pesticide concentration above the criteria, and that was only in surface soil. PCBs were not detected in any soils at the Site.

#### 7.1.2 NAPL Observations Summary

Seventeen NAPL plumes were identified during the RI and IRM activities. For discussion purposes, a NAPL plume was defined in Section 5.2.2 (Plant-Wide NAPL Overview) as an area in which the presence of NAPL was observed in either a temporary well point or monitoring well in at least two contiguous locations (see Figure 5-5). The seventeen NAPL plumes enumerated on Figure 5-5 include only NAPL observed floating on the water

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table. A NAPL plume does exist in the intermediate water-bearing zone near the Platty Kill Canal; this deeper NAPL plume is depicted in cross-sectional view on Figure 4-5. This plume is the subject of a detailed IRM study (Dan Raviv Associates, Inc. 1994b) and IRM activities are ongoing. The plumes identified at the Site and enumerated on Figure 5-5 range in size from approximately 0.4 acre (Plume No. 3) to 7.6 acres (Plume No. 4) with apparent NAPL thicknesses ranging from 0.11 to 13.6 feet. Apparent thickness should not be confused with true "formation" NAPL thickness. Typically, in deposits with low hydraulic conductivities such as those observed at this site, true NAPL thicknesses are significantly less than apparent NAPL thicknesses. Product types have been differentiated based on specific gravity and on historical descriptions of tank contents, land use, or other anecdotal information. The following inferred product types were observed most frequently across the Site (see Table 5-10): diesel, No. 2 fuel oil, No. 6 fuel oil, kerosene, and lube oil.

#### 7.1.3 Groundwater Quality Summary

The following constituents, listed by frequency of occurrence, were detected above the NJDEP standards or the IGGWQC on a site-wide basis: iron, manganese, and TPH. Other constituents observed above the standard less frequently, and on an area-specific basis, are as follows: VOCs (mostly benzene, chlorobenzene, ethylbenzene, and xylenes), SVOCs (generally limited to naphthalene and 2-methylnaphthalene), miscellaneous metals (aluminum, arsenic, lead, sodium, cadmium, chromium, nickel, beryllium, cobalt, and vanadium). Of the pesticides, alpha-BHC and 4,4'-DDT were observed in only one location each, and PCBs were not detected in any of the groundwater samples collected. Several wells exhibited chloride and sulfate above the standards, which is consistent with their near-shore location.

### 7.2 RELATIONSHIPS BETWEEN CONTAMINANTS AND FATE AND TRANSPORT ON AN AREA-SPECIFIC BASIS

This section addresses the relationship between soil quality, groundwater quality, and NAPL observations on an area-specific basis. TPH was the only constituent detected above

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the soil and groundwater quality criteria on a site-wide basis. Concentrations of TPH were often detected significantly above the soil and groundwater quality criterion. These high TPH concentrations in soil and groundwater correlate well across the Site. The heavy PAHs [benzo(a)pyrene and other multi-ring compounds] that were observed often in soil were not observed above NJDEP groundwater quality standards at all in groundwater. With the exception of several locations, soil exceedances for metals were not significantly above the criteria. Most metal exceedances were no more than twice the cleanup criteria. Metals such as arsenic and lead were occasionally observed above the standards in groundwater, but to a lesser extent than they were observed in soil. VOCs found in soil were generally also found above standards in nearby groundwater but VOCs were more prevalent in groundwater than in soil. A discussion of area-specific contaminant fate and transport follows each area-specific discussion of contaminant relationships.

# 7.2.1 Piers and East Side Treatment Plant Area, and MDC Building Area

Contaminant relationships and contaminant fate and transport hypotheses are discussed below for the Piers and East Side Treatment Plant Area, and MDC Building Area.

#### 7.2.1.1 Contaminant Relationships

As presented in Table 7-1, soil exceedances of TPH were identified in this area during the Phase IA RI. The exceedances observed for benzene, chlorobenzene, xylenes, and TPH in groundwater are probably a result of dissolution from the NAPL bodies identified in the area. This dissolution is evidenced by the results of TCL analysis on NAPL samples collected during the Pier 7 IRM. These analytical results indicated maximum concentrations in the NAPL of 22,000 ug/L for benzene, 21,000 ug/L for chlorobenzene, and 360,000 ug/L for oxylene. Other target compounds, including ethylbenzene, methylene chloride, toluene, npropyl benzene, acetone, SVOCs, and several chlorinated VOCs, that were identified in the NAPL are apparently not partitioning into groundwater.

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The exceedances identified in the groundwater sample from the intermediate monitoring well (screened at 30 to 40 feet bls), including TPH, MEK (2-butanone), and pentachlorophenol (observed only in replicate sample), suggest that shallow groundwater may have leaked through the meadow mat/marsh clay confining unit in, or upgradient of, this area. Water-level measurements indicate that there is a downward vertical gradient between the shallow and intermediate zones. MEK, a very soluble VOC, and pentachlorophenol, a relatively insoluble SVOC, were not detected in the NAPL samples from Pier 7.

The source of the TPH and benzene identified in the groundwater sample from Monitoring Well GMMW15, near the MDC Building, is probably not related to the Solvent Tank Field NAPL plume. These dissolved constituents may be from past spills from historical drum-filling activities and a naphtha filling building that operated in this area (Geraghty & Miller, Inc. 1994b).

Two shallow monitoring wells near the MDC Building Area (Monitoring Well EBR19 and Monitoring Well MW6, which is located to the east of the Low Sulfur Tank Field) and Intermediate Monitoring Well GMMW24I exhibit exceedances for a suite of metals dissolved in groundwater. These metals are antimony, beryllium, cadmium, chromium, cobalt, nickel, and vanadium. With the exception of chromium, none of these metals occurs in excess of NJDEP groundwater standards in any other monitoring wells at the Site. The presence of these dissolved metals may be related to the former Case & Can Plant, which operated in this area (Geraghty & Miller, Inc. 1994b).

#### 7.2.1.2 Contaminant Fate and Transport

NAPL (Plumes No. 1 through 3) floating on the shallow water table and the dissolved constituents detected in shallow and intermediate monitoring wells have the potential to move toward, and eventually discharge into, New York Bay. Two parallel, concrete gantry walls, extending to a depth of 10 feet bls, are containing the NAPL in the vicinity of Pier 7. During extreme low tides, groundwater levels are sometimes lower than the two gantry walls, and

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NAPL can then migrate beneath the walls into New York Bay (Dan Raviv Associates, Inc. 1995c). During high tide, the NAPL is trapped behind the walls. Exxon has installed a fixed boom containment system along the entire length of Pier 7. This containment system is effectively containing any NAPL seeps and preventing them from migrating out of the pier area further into the bay. Tidal studies conducted as part of the Pier 6 IRM indicated that groundwater flow in this area is toward the bay (eastward) during low tide and landward (westward) during high tide (Dan Raviv Associates, Inc. 1995b). This back-and-forth motion may result in static conditions for the floating NAPL identified in the two smaller plumes, resulting in no net flow into the bay.

The dissolved constituents are capable of undergoing biodegradation. Biodegradation is most likely enhanced in this area due to the influx and cycling of groundwater by the tides. Tidal flushing could result in constant replenishment of dissolved oxygen to the shallow groundwater, thereby enhancing aerobic degradation.

It is likely that the dissolved constituents are being biodegraded by aerobic processes in the tidally influenced groundwater zones adjacent to the piers; it is not currently known if the combination of biodegradation and the back-and-forth tidal motion completely removes dissolved constituents prior to discharge to the bay.

#### 7.2.2 Low Sulfur and Solvent Tank Fields

The inter-media relationships and contaminant fate and transport hypotheses for the Low Sulfur and Solvent Tank Fields are discussed below.

#### 7.2.2.1 Contaminant Relationships

There appears to be a strong correlation between NAPL and groundwater quality with respect to VOCs, but little correlation (with the possible exception of naphthalene) between soil and groundwater quality in this area. BTEX and two chlorinated VOCs were reported in

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groundwater samples from monitoring wells in the Low Sulfur and Solvent Tank Fields. Concentrations of these constituents in groundwater were relatively high, as follows: benzene (73 to 710 ug/L), ethylbenzene (12,000 ug/L), and xylene (2,300 to 38,000 ug/L). These VOCs were identified as being primary constituents of the NAPL observed in the area (Dan Raviv Associates, Inc. 1993b). Thus, components of the NAPL appear to be partitioning into the groundwater and contributing to a dissolved phase plume. The chlorinated VOCs, 1,2-DCE (11,000 ug/L) and vinyl chloride (3,700 ug/L), were detected in one groundwater sample. The source of these constituents is not readily apparent. None of these chlorinated VOCs was reported in soil samples in concentrations that exceeded the soil cleanup criteria.

Naphthalene appears in groundwater at two locations at concentrations of 73 and 180 ug/L. 2-Methylnaphthalene and 2,4-dimethylphenol also exceeded the groundwater criteria at one location. Naphthalene was identified by DRAI (1993b) as being the most prevalent SVOC constituent of the NAPL present in the Low Sulfur and Solvent Tank Fields (Dan Raviv Associates, Inc. 1993b). Naphthalene exceeded the impact to groundwater soil cleanup criterion in a subsurface soil sample from one location in the Solvent Tank Field. Naphthalene in soil may be contributing to dissolved phase naphthalene, but is probably relatively insignificant compared to naphthalene partitioning from NAPL. Conversely, naphthalene associated with the NAPL (Plume No. 4) may be adsorbing to soils during rises in water levels and then dissolving into groundwater. 1,2-Methylnaphthalene and 2,4-dimethylphenol may also be present in the NAPL. Neither of these two constituents was reported in exceedance of the criteria in soil. Benzo(a)pyrene was reported in soil in exceedance of the non-residential soil cleanup criterion at one location in the Solvent Tank Field. The absence of benzo(a)pyrene in groundwater indicates that this compound is not partitioning to the dissolved phase.

There is little correlation between NAPL, soil quality, and groundwater quality with respect to metals. Of the metals reported in groundwater (antimony, arsenic, beryllium, cadmium, chromium, cobalt, and lead), only arsenic was detected in soil in exceedance of the non-residential soil cleanup criterion at one location. Lead, which was identified in NAPL, was detected in

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exceedance of the NJDEP groundwater quality criteria in a groundwater sample from only one location.

#### 7.2.2.2 Contaminant Fate and Transport

Most of the contaminants detected in soil [i.e., arsenic, copper, and benzo(a)pyrene] in the Low Sulfur and Solvent Tank Fields will tend to stay adsorbed in soil and will not partition to groundwater. Naphthalene may potentially partition from soil to groundwater, although this mechanism is probably not significant compared to partitioning from NAPL if it is present. Naphthalene was found in exceedance of the criteria in one soil sample and two groundwater samples in the area. The NAPL observed in the area (Plume No. 4) contains BTEX, naphthalene, a variety of PAHs, and lead. Based on the groundwater sampling results, the NAPL appears to be acting as a source of VOCs partitioning to groundwater. Soluble constituents (benzene, ethylbenzene, xylene, and naphthalene) were detected in groundwater in exceedance of the NJDEP groundwater quality criteria.

The dissolved constituents in groundwater are capable of undergoing biodegradation. Carbon dioxide and methane concentrations are elevated in Monitoring Wells MW6, MW9, and MW10, which indicates significant anaerobic biodegradation.

Although the regional groundwater flow is radial toward Upper New York Bay and the Kill Van Kull, migration of the floating NAPL plume in the vicinity of the Low Sulfur and Solvent Tank Fields appears to be limited. Based on the most probable source(s) of the NAPL in this area (i.e., historical spills in the tank fields prior to 1967 when gasoline was stored in the tank fields, and in 1979 when Tank 1066 released fuel oil), the floating NAPL plume does not appear to be migrating. Despite the relatively low density of the NAPL, the floating NAPL plume may be stabilized or contained within the apparent trough created in the shallow groundwater surface. The local trough may be the result of elevated hydraulic heads and tidal influence along areas of more permeable backfill along the northern and southern boundaries of the area.

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The floating NAPL plume (Plume No. 4) is creating an associated dissolved phase plume. The extent of the dissolved phase constituents in the groundwater is not fully known. Dissolved NAPL constituents were detected in groundwater samples collected from the furthest downgradient monitoring wells along the southern boundary of the tank field. Based on the apparent local groundwater flow regime, the potential for off-site migration of dissolved phase constituents exists. There is evidence that anaerobic biodegradation processes are active in the vicinity of the Low Sulfur and Solvent Tank Fields, so the dissolved constituents are being degraded as they migrate, lowering their concentrations. Implementation of an IRM and other natural attenuation mechanisms (e.g., adsorption) will also help to limit the migration of constituents off-site.

#### 7.2.3 General Tank Field

The inter-media relationships and the fate and transport hypotheses of contaminants in the General Tank Field are discussed below.

#### 7.2.3.1 Contaminant Relationships

With the exception of naturally occurring constituents (e.g., sodium, chloride, iron, and manganese), groundwater exceedances are limited to TPH at four locations (ranging from 5 to 121 mg/L) and benzene at one location (2 ug/L). The presence of naturally occurring constituents at relatively high concentrations is probably related to the geochemistry of the fill and this area's history and proximity to the shoreline. Prior to development of Constable Hook, the General Tank Field area was submerged by the waters of Upper New York Bay.

With the exception of TPH detected in relatively high concentrations in soil and groundwater, there is no correlation between specific constituents detected in soil and groundwater or the occurrence of NAPL. The metals and benzo(a)pyrene detected in soil have not been detected in groundwater, and the NAPL is apparently not a source of soluble constituents that partition to groundwater.

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#### 7.2.3.2 Contaminant Fate and Transport

Most of the contaminants detected in soil in the General Tank Field [arsenic, lead, benzo(a)pyrene] will tend to stay adsorbed in soil and will not partition to groundwater. The exception is TPH. Extremely high levels of TPH in soil have leached to the groundwater below the General Tank Field. The two NAPL bodies (Plumes No. 5 and 6) in this area are not believed to be sources of contaminants to groundwater because the No. 6 fuel oil that appears to comprise these plumes does not contain appreciable soluble constituents for which there are groundwater standards. Only xylene in the subsurface soil exhibits the potential to leach to groundwater, but it is not observed in groundwater in excess of the applicable standard.

The lack of soluble organic constituents in groundwater beneath the General Tank Field may be related to natural degradation activities. The presence of elevated methane, carbon dioxide (CO<sub>2</sub>), and sulfide in relatively high concentrations suggests that the decay of hydrocarbon constituents in the subsurface by anaerobic respiration of microorganisms is possible.

The NAPL bodies (Plumes No. 5 and 6) will potentially migrate to the north and east under the influence of groundwater flow, but migration will be significantly hindered by the high viscosity of the NAPL. The current NAPL plume bodies may be under equilibrium conditions, i.e., not migrating or growing appreciably over time.

## 7.2.4 <u>AV-Gas Tank Field and Domestic Trade Area (Includes Southern Part of</u> <u>Interceptor Trench)</u>

Contaminant relationships and fate and transport hypotheses for the AV-Gas Tank Field and Domestic Trade Area are discussed below.

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### 7.2.4.1 Contaminant Relationships

With the exception of TPH, there is no correlation between observations of soil quality and groundwater quality in the AV-Gas Tank Field and the Domestic Trade Area. Groundwater quality beneath the AV-Gas Tank Field Area has not been evaluated due to the widespread presence of NAPL in monitoring wells and temporary well points installed in the area. The presence of NAPL and soil contamination in the AV-Gas Tank Field appear to be related.

#### 7.2.4.2 Contaminant Fate and Transport

Most of the contaminants detected in soil in this area [i.e., arsenic and benzo(a)pyrene] will tend to stay adsorbed in soil and will not leach to groundwater. TPH was the only constituent observed in relatively high concentrations (i.e., above NJDEP criteria) in both soil and groundwater. The low carbon dioxide and methane concentrations in the one monitoring well sampled in the Domestic Trade Area suggest that little biodegradation is taking place, which may indicate that there is either limited organic contamination to act as a substrate for biological activity or oxygen levels may be insufficient to support aerobic bacteria.

The NAPL body (Plume No. 7) located along the plant perimeter in the AV-Gas Tank Field is migrating under the influence of groundwater flow. The western portion of this NAPL body is apparently captured by the interceptor trench. The eastern portion of this NAPL body should be investigated with regard to potential off-site migration. Although Figure 4-6 does not depict off-site migration of groundwater in this area, the potential for off-site migration does exist.

Dissolved constituents in groundwater may be migrating off-site; however, due to the presence of NAPL, dissolved constituents were not analyzed in the AV-Gas Tank Field. Dissolved organic constituents (other than TPH) were observed in one monitoring well in the Domestic Trade Area.

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## 7.2.5 Asphalt Plant and Chemicals Plant (Includes Utility Area)

Contaminant relationships and fate and transport hypotheses are discussed below for the Asphalt Plant and Chemicals Plant Area.

#### 7.2.5.1 Contaminant Relationships

Chlorobenzene appears in groundwater at a relatively high concentration (7,100 ug/L); it is possible that this chlorobenzene is related to the chlorobenzene detected in soil, particularly the high concentration (980,000 ug/kg) detected in the northern portion of the Chemicals Plant. It does not appear that chlorobenzene found in groundwater is related to NAPL, since the higher concentrations detected are not located downgradient of the NAPL plumes in this area (Plumes No. 8 and 9). A sewer investigation report by Sandaq, Inc. (1986) cited that chlorobenzene used at the Chemicals Plant was in the sewer system. However, although unrelated to this area, NAPL samples collected from monitoring wells at the interceptor trench area and Pier 7 IRM areas did show chlorobenzene present at concentrations up to 21,000 ug/L. The chlorobenzene was used solely at the Chemicals Plant and probably migrated to the pier area by way of the sewer system. Benzene detected in groundwater above the standard at one location did not have any related soil exceedances in this area. Chlorobenzene, 1,4-dichlorobenzene, and naphthalene were detected in soil above the impact to groundwater criteria and are also present in groundwater above New Jersey standards. The widespread benzo(a)pyrene exceedances in soil are apparently bound in the soil and, due to the chemical properties of benzo(a)pyrene (i.e., its high organic carbon partition coefficient), it is not expected to partition to groundwater. No monitoring wells are located immediately downgradient of the soil sample in the Chemicals Plant that showed high concentrations of xylenes, dichlorobenzene, and naphthalene, but a nearby monitoring well located in a side-gradient direction did show exceedances for 1,4-dichlorobenzene and naphthalene.

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#### 7.2.5.2 Contaminant Fate and Transport

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Most of the contaminants detected in soil in this area [i.e., benzo(a)pyrene, arsenic] will tend to preferentially stay adsorbed to soil rather than partition to groundwater. Constituents that may be potentially leaching from soil to groundwater include chlorobenzene, 1,4-dichlorobenzene, and naphthalene. The chlorobenzene detected in subsurface soil, and to a lesser extent some of the other constituents detected in the Chemicals Plant, have the potential to leach to groundwater. The two NAPL plumes (Plumes No. 8 and 9) have specific gravities of lube oil, No. 6 fuel oil, or asphalt, which do not have appreciable soluble constituents for which there are groundwater standards.

The dissolved constituents are capable of undergoing biodegradation. This is supported by the high methane and carbon dioxide concentrations in nearby Monitoring Well GMMW3, suggesting that anaerobic biodegradation is occurring in the interior of this area.

The NAPL bodies (Plumes No. 8 and 9) are migrating under the influence of groundwater flow. The apparent No. 6 fuel oil or asphalt plume under the interior portion of the Chemicals Plant (Plume No. 8) has the potential to migrate to the east and southeast, but given the low permeability of the fill and high viscosity of the NAPL, it is migrating very slowly, if at all. The lube oil plume located south of the Chemicals Plant (Plume No. 9) also has the potential to migrate to the southeast, and there is a potential that it may migrate from the Utilities Area onto a small corner of off-site property. Similar to Plume No. 8, this NAPL body is moving very slowly, if at all.

#### 7.2.6 No. 3 Tank Field

Contaminant relationships and fate and transport hypotheses for the No. 3 Tank Field are discussed below.

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## 7.2.6.1 Contaminant Relationships

Chlorobenzene appears in groundwater at relatively high concentrations (270 to 14,000 ug/L); it is possible that this chlorobenzene is related to high concentrations detected in soil (35,000 to 110,000 ug/kg). The benzene detected at concentrations ranging from 5 to 170 ug/L in groundwater may have leached from soil, due to the benzene exceedances found in soil (11,000 ug/kg maximum). Some of the benzene detected may be present as a result of dissolution from NAPL bodies, but otherwise NAPL does not appear to be loading high concentrations of dissolved constituents to groundwater. Chromium observed above the 100-mg/kg criterion for soil was also detected in groundwater in excess of the groundwater quality standard. Arsenic was also observed in soil and groundwater in excess of the respective criteria.

#### 7.2.6.2 Contaminant Fate and Transport

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The NAPL plume (Plume No. 10) may be a source of VOCs to partition to groundwater, since it has a specific gravity similar to kerosene. The kerosene-like product has the potential to migrate to the south and southeast; a portion of this NAPL body may have already migrated offsite, as discussed in the IRM report (Geraghty & Miller, Inc. 1995a).

Dissolved constituents in groundwater are being transported with groundwater flow to the south and southeast. There is evidence of anaerobic biodegradation, so it is likely that the chlorobenzene and benzene concentrations are being reduced as they migrate in groundwater. The potential for off-site transport of chlorobenzene exists along the southern and southeastern edge of the No. 3 Tank Field, where dissolved chromium may also be transported off-site.

## 7.2.7 <u>No. 2 Tank Field and Main Building Area (Includes Northern Part of Interceptor</u> <u>Trench</u>

The inter-media relationships and contaminant fate and transport hypotheses for the No. 2 Tank Field and Main Building Area are discussed below.

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#### 7.2.7.1 Contaminant Relationships

Benzene, xylenes, 2-methylnaphthalene, and naphthalene were reported in one groundwater sample from the No. 2 Tank Field, upgradient of the interceptor trench. Xylenes exceeded the impact to groundwater criterion in a subsurface soil sample collected from the eastern portion of the No. 2 Tank Field. It is possible that the xylenes present in subsurface soil, at least at this location, may be leaching to groundwater. Analytical results of NAPL samples collected from the Avenue J Sump and Sump A of the interceptor trench indicate that the primary constituents of the NAPL in this area (Plumes No. 11 and 12) are chlorobenzene, ethylbenzene, toluene, xylene, npropylbenzene, and a suite of PAHs (Dan Raviv Associates, Inc. 1995a). It does not appear that the benzene, 2-methylnaphthalene, and naphthalene reported in the groundwater are related to the NAPL collected by the interceptor trench, since the monitoring well from which this sample was analyzed (Monitoring Well GMMW2) is located a significant distance upgradient of the interceptor trench and the NAPL plumes. These dissolved phase constituents may be remnants of a source further upgradient of the area. Lead exceeds the non-residential soil cleanup criterion in subsurface soil at two locations in this area. Lead does not appear in groundwater. Copper, total chromium, and hexavalent chromium, which were detected in subsurface soil samples in this area in exceedance of the criteria or comparative values, were not detected in groundwater. These observations support the interpretation that these metals do not appear to be leaching from soil to groundwater in this area. Arsenic was reported in excess of the non-residential soil cleanup criterion in one soil sample from the eastern Main Building Area. Dissolved arsenic was also reported in one groundwater sample collected from a well upgradient of this area. However, it is difficult to make an assessment based on these two data points as to whether arsenic is leaching from the soil.

Dissolution of constituents from the two NAPL bodies in the area may be occurring locally in the vicinity of the interceptor trench. Groundwater samples were not collected from immediately adjacent wells because of the presence of floating NAPL.

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#### 7.2.7.2 Contaminant Fate and Transport

Most of the contaminants detected in soil in this area (i.e., arsenic, chromium, copper, lead, and thallium) will tend to stay adsorbed in soil and will not leach to groundwater. Xylenes are the most likely constituent to potentially leach from soil to groundwater. The two NAPL bodies (Plumes No. 11 and 12) located along the northeastern boundary of this area appear to be capable of contributing dissolved phase constituents (e.g., benzene, chlorobenzene, xylene) to groundwater at the boundary. This phenomenon cannot be confirmed using the available groundwater data in these areas since flow is collected by the Interceptor Trench and further downgradient areas are off-site. Indicator parameter results for one groundwater sample from this area suggest that conditions appear to be suitable for biodegradation.

The two NAPL plumes (Plumes No. 11 and 12) are migrating under the influence of the prevailing groundwater flow direction to the northeast. As discussed in the Interceptor Trench NAPL IRM report, pumping of the trench only affects those wells nearest to the trench and does not alter regional groundwater flow. The results of the performance evaluation of the interceptor trench indicated that the section of the trench in this area is effective in capturing these NAPL bodies (Dan Raviv Associates, Inc. 1995a).

Dissolved constituents (e.g., benzene and xylene) in the groundwater are being transported with groundwater flow to the northeast. Dissolved phase contaminants will ultimately be captured by the interceptor trench. Although insufficient data exist to evaluate if active bioattenuation of dissolved phase constituents is occurring in this area, conditions appear to be suitable for biodegradation.

#### 7.2.8 "A"-Hill Tank Field

The inter-media relationships and fate and transport hypotheses for contaminants detected in the "A"-Hill Tank Field are discussed below.

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#### 7.2.8.1 Contaminant Relationships

Arsenic and TPH exceed the NJDEP soil cleanup criteria in surface and subsurface soil samples analyzed. The arsenic was not detected in groundwater in excess of the groundwater quality standards, indicating that it does not appear to be leaching into the groundwater. TPH does appear to be leaching to the groundwater.

Based on the specific gravity (0.82) of the floating NAPL in this area, the NAPL is similar to diesel. Exclusive of iron and manganese, which appear to be regionally elevated in groundwater, benzene, xylenes, 2-methylnaphthalene, naphthalene, and dissolved lead (estimated 17.8 ug/L) were the constituent exceedances in groundwater. Although these constituents were observed upgradient of NAPL Plume No. 13, it is possible that the floating NAPL contributed dissolved phase benzene to the groundwater.

The PAHs [benzo(a)anthracene, benzo(a)pyrene, and benzo(a,h)anthracene] detected in subsurface soil indicates that the NAPL is adsorbing to the soil in the vadose zone and capillary fringe.

#### 7.2.8.2 Contaminant Fate and Transport

The arsenic detected in soil in this area will tend to stay sorbed in soil and will not leach to groundwater.

The floating NAPL plume (Plume No. 13) appears to be acting as a source of dissolved phase benzene to partition to groundwater, since it has a specific gravity similar to diesel fuel and benzene also appears in groundwater downgradient of the NAPL plume. Dissolved VOCs and SVOCs are capable of undergoing biodegradation under either aerobic or anaerobic processes, assuming that suitable conditions prevail. One groundwater sample was collected from an upgradient monitoring well in the "A"-Hill Tank Field. Although it is not possible to demonstrate

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that biodegradation is occurring in this area based on the results of one well, values of DO (7 mg/L) and pH (6.15) are consistent with a potential for aerobic degradation.

If the local groundwater divide interpreted in this area exists as shown on Figure 4-6, part of the floating NAPL plume (Plume No. 13) has the potential to spread and migrate to the east and northeast toward the Main Building Area. This portion of Plume No. 13 would ultimately be captured under the hydraulic influence of the interceptor trench, thereby preventing it from migrating off-site. In addition, a component of the NAPL plume located west of the interpreted groundwater divide has the potential to flow to the southwest. This will be further investigated during Phase IB. Given the low permeability of the fill and viscosity of the NAPL, the plume is migrating very slowly, if at all.

#### 7.2.9 Lube Oil and Stockpile Area (Includes Platty Kill Canal)

The inter-media relationships and fate and transport hypotheses for contaminants detected in the Lube Oil and Stockpile Area are discussed below.

#### 7.2.9.1 Contaminant Relationships

There is very little relationship between the compounds detected in soil in the Lube Oil/Stockpile Area and the compounds detected in groundwater. No VOCs were detected in soil at concentrations above the impact to groundwater criteria, although there were a few low exceedances of the groundwater standard for benzene in shallow monitoring wells. There were numerous exceedances for PAHs and metals in both shallow and subsurface soil samples. Two SVOCs [benzo(b)fluoranthene and pyrene] were detected in soil at concentrations above the impact to groundwater criteria, but these compounds were not identified at elevated concentrations in groundwater samples. The only metal detected in soil that may be partitioning into groundwater is arsenic, which was detected in one groundwater sample at a concentration an order of magnitude above the groundwater quality standard.

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The lack of VOCs in soil samples and the presence of VOCs in groundwater indicates that the source of the VOCs in groundwater is probably related to historical spills or NAPL plumes that have been recently identified. The source of the VOCs is probably not related to ongoing leaching from soils.

#### 7.2.9.2 Contaminant Fate and Transport

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NAPL floating on the shallow water table and NAPL identified in the confined intermediate zone has the potential to move toward and eventually discharge to the Platty Kill Canal. Dissolved constituents that are most likely associated with these NAPL bodies also have the potential to eventually discharge to the Platty Kill Canal. However, none of the shallow wells located directly adjacent to the canal contains floating NAPL. IRM studies conducted in the Platty Kill Canal Area found that the tidal influence on the shallow water table is limited to wells located directly adjacent to the canal; these gradient and flow reversals were observed (Dan Raviv Associates, Inc. 1994b). However, although the potential exists, no migration of NAPL in the shallow groundwater zone to Platty Kill Canal has been observed.

A laterally continuous and relatively thick clay and silt layer exists beneath the Platty Kill IRM Area. This layer separates the unconfined and confined zones and provides a confining layer to the deep zone (Dan Raviv Associates, Inc. 1994b). The lateral continuity of the clay and silt layer was confirmed by tidal and pumping test water-level measurements that suggested a lack of hydraulic connection between the two zones. Tidal influence was observed in all of the deeper intermediate zone monitoring wells. A dampened tidal amplitude and a succession of longer delay times was observed in these wells as distance from the canal increased. These tidal effects provide a tidal barrier between the confined zone and the Platty Kill Canal, effectively preventing the discharge of NAPL from this deeper zone to the canal.

Very little DO was detected in both the shallow (0.7 mg/L) and intermediate groundwaters (1.0 mg/L). Both of these zones contained little to no methane and moderate

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concentrations of carbon dioxide, suggesting that little biodegradation is taking place due to lack of significant substrate or not enough oxygen to support aerobic biological activity.

The absence of floating NAPL in monitoring wells located downgradient and adjacent to the Platty Kill Canal indicates that the floating NAPL in all of the identified plumes is well defined and is not posing an imminent threat to the nearby surface-water bodies. Both the NAPL and dissolved constituents have the potential to flow toward the Platty Kill Canal, but IRM studies indicate that tidal effects are effectively preventing discharge into the canal.

#### 7.2.10 Pier No. 1 Area (Includes Helipad)

The contaminant relationships and fate and transport hypotheses for the Pier No. 1 Area are discussed below.

#### 7.2.10.1 Contaminant Relationships

One soil sample from the Pier No. 1 Area contained exceedances for several PAHs and arsenic. Low concentrations of PAHs (below the groundwater quality standard) were identified in the shallow groundwater sample from existing Monitoring Well EB1, indicating that these compounds are not partitioning in significant quantities to shallow groundwater. Several chlorinated compounds, including TCE, PCE, 1,2-DCE, and vinyl chloride, were identified at elevated concentrations in the groundwater sample from intermediate Monitoring Well GMMW211. These compounds were not detected in soil samples collected in this area, nor were they detected in the TCL analysis of NAPL collected from the shallow water-bearing zone (Dan Raviv Associates, Inc. 1995d). The source of the chlorinated compounds is unknown. The pesticide, alpha-BHC, which was also detected in the intermediate groundwater sample may have been mobilized by the presence of the other dissolved chlorinated compounds.

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#### 7.2.10.2 Contaminant Fate and Transport

NAPL (Plume No. 17) floating on the shallow water table and the dissolved constituents detected in shallow and intermediate monitoring wells have the potential to move toward, and eventually discharge into, the Kill Van Kull Waterway. Bulkheading installed to depths of 40 to 60 feet in the area of the old Pier No. 1 appears to channel groundwater movement toward the deteriorated portion of steel sheet pile bulkhead near the Salt Water Pumping Station.

The dissolved constituents are amenable to biodegradation. Biodegradation is most likely enhanced in this area due to the influx and cycling of groundwater by the tides. Tidal flushing could result in a constant supply of dissolved oxygen to the dissolved-phase portion of the plume, thereby enhancing aerobic degradation.

Both floating NAPL and dissolved constituents in groundwater have the potential to migrate and eventually discharge to the Kill Van Kull Waterway. NAPL (Plume No. 17) migration is significantly hindered by the tidal reversal of groundwater flow and also by the bulkheading that has been installed along the local western, central, and eastern shores. The IRM studies indicate that the eastern bulkheading is in poor, deteriorating condition, and NAPL and groundwater do have the potential to migrate and possibly discharge to the Kill Van Kull Waterway in this direction. The western and southern shore bulkheads are deeper, extend to clay layers, are constructed with concrete, and are in better condition, forming an effective barrier to migration.

The chlorinated VOCs detected in Intermediate Monitoring Well GMMW211 have the potential to be transported to the Kill Van Kull Waterway. However, the migration will be retarded by attenuation and by tidally influenced reversals in gradient. Any chlorinated VOCs that ultimately discharge to the Kill Van Kull Waterway will be immediately diluted to concentrations below detection limits due to the enormous flow in this surface-water body and the extremely low groundwater discharge rates from the intermediate water-bearing stratum.

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## 7.3 POTENTIAL REMEDIAL REQUIREMENTS FOR NAPL

This section describes the goals of remediation specific to the NAPL plumes delineated at the site. NAPL plumes that warrant mitigation in accordance with the established goals are identified, followed by a list of potential remedial technologies that could satisfy the remedial objectives.

#### 7.3.1 Remedial Goals for NAPL

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NAPL remedial decisions for the Bayonne Plant will be guided by the following remedial goals:

- Intercept off-site migration and reduce potential off-site exposure.
- Reduce potential on-site exposure to workers either by direct contact or other concerns (e.g., explosion or vapor generation).
- Eliminate sources of dissolved groundwater contamination if it is a threat to significant resources.
- Mitigate significant volumes of NAPL where recoverable by practical means before it becomes more difficult to recover.

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## 7.3.2 NAPL Areas That Warrant Remediation

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Listed below are the areas of the Bayonne Plant with NAPL plumes that warrant remediation in accordance with the goals described above. These plumes are enumerated consistent with Figure 5-5 and Tables 5-10 and 7-1.

		Remedial Goal(s)
Area	Plume No.	To Be Addressed
Piers and East Side Treatment Plant	1, 2, 3	Off-site migration.
Low Sulfur and Solvent Tank Fields	4	On-site exposure. Significant volume. Probable dissolved migration.
AV-Gas Tank Field	7	Off-site migration.
Utilities Area	9	Off-site migration.
No. 3 Tank Field	10	Off-site migration. On-site exposure.
"A"-Hill Tank Field	13	Significant volume. Probable dissolved migration.
Stockpile/Platty Kill Area	15, 16	Eventual off-site migration.
Pier No. 1 Area (Helipad)	17	Off-site migration.

Each of the areas listed above except Plume No. 15 has been investigated during IRM studies and will remain a focus of remedial efforts. Plumes 5, 6, 8, and 14 appear to be stable on-site at present. Plumes 11 and 12 seem to be controlled by the Interceptor Trench. These will be further characterized during subsequent phases of the RI.

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The following remedial technologies will be considered for NAPL mitigation at the Bayonne Plant:

- Conventional recovery/containment in wells by either pumping of total fluids (single pump), dual phase pumping (two pumps), or passive skimming.
- Vacuum-enhanced recovery by low vacuum (generally less than 5 psi), with a skimmer pump for NAPL recovery only.
- Vacuum-enhanced recovery by high vacuum (generally greater than 10 psi), for NAPL and water recovery.
- Horizontal wells.
- Interceptor trenches with either passive skimming or pumping.
- Impermeable barriers to funnel NAPL migration to a collection well or trench.
- Natural attenuation.

## 7.4 DATA GAPS FOR NAPL REMEDIATION

Some or all of the following data gaps will need to be addressed for each NAPL body listed in Section 7.3.2 (NAPL Areas That Warrant Remediation) to design optimal remedial systems for NAPL mitigation:

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- The actual extent of the NAPL body in the vertical plane (i.e., apparent versus true NAPL thickness) by performing bail-down tests in existing wells.
- The horizontal extent of some of the NAPL bodies, particularly the southernmost NAPL plume in the No. 3 Tank Field (Plume No. 10 on Figure 5-5), as noted in the NAPL IRM report (Geraghty & Miller, Inc. 1995a).
- The mobile or static nature of some of the NAPL bodies and the direction of migration, through continued monitoring of existing wells and additional wells installed during subsequent phases of the RI.
- Hydraulic characteristics of the saturated subsurface materials through pumping tests, slug tests, and physical testing (e.g., grain size distribution)...
- Physical and chemical characteristics of the NAPL, through laboratory analysis.

These data gaps will be addressed in formulating work plans for subsequent phases of the RI.

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Zone	Operational Area	Prefix Codes	Prefix Code Exceptions*
AHTF	"A"-Hill Tank Field	AHTF	
LO	Lube Oil Area	LO, LA	
P1	Pier No. 1 Area	PN1	LA (1)
N2TF	No. 2 Tank Field	N2TF	
AP	Asphalt Plant	AP	N3TF (1)
AGTF	AV-Gas Tank Field	AGTF	
ECP	Exxon Chemical Plant	ECP	EC2 (1)
N3TF	No. 3 Tank Field	N3TF	EC (1)
GTF	General Tank Field	GTF	EGTF (1)
STF	Solvent Tank Field	STF	GF (1)
PEST	Piers and East Side Treatment Plant	PEST	
DT	Domestic Trade Area	DT	
МВ	Main Building Area	MB	PS (1)
MDC	MDC Building Area	MDC	
U	Utilities Area		EC (2), T998 (1)
SS	Stockpile Area	SS	LO (1)

Table 3-2. Summary of Operational Area Prefix Codes, Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Prefix code exception with number of prefix code exceptions indicated in parentheses.

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Matrix	ТРН	TCL VOCs <sup>3</sup>	TCL SVOCs	TCL Pesticides/PCBs	TAL <sup>1, 2, 7</sup> Metals	Total <sup>2</sup> Chromium	Hexavalent <sup>2</sup> Chromium	Wet Chemistry <sup>4</sup>	Dissolved Gases <sup>5</sup>
Soil									
Phase IA RI Soil Borings (84 locations)	155	91	92	88	88	153	125	NA	NA
IRM Soil Borings (14 locations)	28	17	16	17	24	28	16	NA	NA
Groundwater							_		
Phase IA RI Wells	21	21	21	21	216 4	21 4	21 7	17	17
Phase IA RI Drivepoints		13							
Existing Wells		10	10	10	106 '	10'	10	10	10

Table 3-1. Number of Analyses Conducted for Phase IA Soil and Groundwater Samples, Bayonne Plant, Bayonne, New Jersey.

QA/QC samples (i.e., replicates, matrix spike/matrix spike duplicates [MS/MSDs], field blanks, and trip blanks) are not included.

QA/QC Quality assurance/quality control.

TPH Total petroleum hydrocarbons.

- TCL Target compound list.
- VOCs Volatile organic compounds.
- SVOCs Semivolatile organic compounds.
- PCBs Polychlorinated biphenyls.
- TAL Target analyte list.
- NA Not analyzed.
  - Does not include chromium analysis, which are tabulated separately.
- <sup>2</sup> Unless otherwise indicated, groundwater samples were analyzed for dissolved constituents. A subset of the number of dissolved samples were also analyzed for total constituents, as indicated in parentheses and italics.
- <sup>3</sup> Include miscellaneous alcohols and site-specific compounds.
- Wet chemistry parameters consist of chloride, alkalinity, sulfate, sulfide, total dissolved solids, biological oxygen demand, chemical oxygen demand, nitrate, phosphate, total organic carbon, ammonia, total iron, and total manganese.
- 5 Dissolved gases consist of carbon monoxide, carbon dioxide, dissolved oxygen, methane, and nitrogen dioxide.
- A total of 28 groundwater samples was analyzed for total and dissolved iron and manganese.
- 7 One sample was also analyzed as a total due to the high turbidity.

## Table 3-3. Rationale for Selection of Soil Borings and Monitoring Wells for the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Baring/Well Identification	Adjaotat 10 Sewer	Adjacent to Sanitary Septio System	Documented SpH1	Historical Process Area	Adjacent to Former Oil-Water Separator	Location Selected to Provide Broad Areal Coverage	Contentents
"A" -Hill Tank Area		<u></u>					
AHTERRI	х						Current and former storage tunks.
ANTESB	x						Current and former storage tanks.
AHTFERS	х		х		x		Corrett and former storage varia.
AHTESB4	x		x				Current and former storage taxes.
Labe Oil Area							
10881	x		x	x			Former MEK Plant, Phono Plant, and truck roading area.
1050	x			x			Former experisor and agriator tanks, recervy sociation transformer most
LOSDI				x		x	Former clay filler building, shops, and pump mouse.
LOSBA .	x		x		x		Former storage tanks.
LASD						x	Former storage tanks. Nearby restroad sources area.
LOBR		. x					Former shops.
10825		x					Former barrel factory and bolter nosite.
(A/35/	x		x				Former storage tanks. Nearby week to access areas.
LU889	x	х	x				Former storage tanks. Nearby Etick and relificed roading weak.
		x					Former storage tarks and shops,
LOBIT	x		x	x			Former MEK and Phenoi Plana, purp incluse, rock roading and entry and
LOSBIZ			x				Former storage tanks, separation, and pairs, noner.
LOSBIS	x						Former storage tanks and acte tarks.
LOSDIA	~					x	Former restructs and touching ments.
			x				Former storage take the such meaning more
		х		x	x		Forester Refrage Large and reparation.
LOSDI				x	x		Pormeti man experimenta for Line on Pares.
	x					x	Stratigraphic boring former suppry mount
LU3B19/OKM W220							Former gues tosong ment man one can internationed
						x	The second state of the second states
							East of context plans and policy bolicy.
LAURANDA ANNI WIG							FORMER CALLER FORMER EXAMINENTIAL Information
1 ATBARS							Production of Commer experimental laboratory
A ATTACANA A							Some and the second s

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Table 3-3. Rationale for Selection of Soil Borings and Monitoring Weils for the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

	Boring/Well Identification	Adjacent to Server	Adjecent to Sanitary Septic System	Documented Spili	Historical Process Area	Adjacent to Former Oil-Water Separator	Location Selected to Provide Broad Areal Coverage	Construction
•	<u>Pier No. 1 Ares</u> GMMW211 PN18B1/GMMW21D						x	Intermodiate monitoring well. Sensigraphic boring and deep associating well.
‡ †	PNISE2 LAIRMB7						x	Former pump house and transformer area. East of old saltvaler pump house in transformer area.
	No. 2 Tank Field							
	N2TF3BI/GMMW2 N2TF3B2 N2TF3B3	x		x	x x			Former boiler house and sweetnamg at 100. Former storage tanks, boiler house, and sweetening stills. Former storage tanks, pipe shop, and pamp house.
	N2TF3B4 N2TF3B5	x x	·		x	x		Former storage tanks. Pramp house, separator, stacks, and flamaces. Former pump house and storage tanks.
	Autob Plant Area							
	A <b>75</b> 81	x						Former pitch drum filling and storage shed, edjacent to former tarks and egitators. Former pitch drum shed, pump house and piping manifolds. Transformer area.
	APSB2/GMMW3 APSB3	x x	^	x			x	Former storage tasks. Active track loading area. Former storage tasks and pump house.
	APSB5/OMMW4 APSB6	×			x	x	x x	Former syamp house and storage tanks. Former off-gas incidentation, oxidizor, ferrie chloride tank; asse & transformer area.
•	GMMW231 AP\$87/GMMW23D	x x	x x x				x	intermediate exput west. Stratigraphic boring and deep well. Railroad car filling area, former drum filling area and storage area. current and former storage tanks.
	AV-Close Tank Field							
	AGTER	x			x	x		Former storage tanks and crude stills; near transformer area.
	AGTFSB2 AGTFSB3	x x		x x	x x			Former crude salls. Former storage tanks and colprovism suphalt pans. Near former pitch filling plant and asphalt pans.

See Lut page for footnotes.

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Boring/Well Identification	Adjacent to Sewar	Adjacent to Sunitary Septic System	Documented Spill	Historicsi Process Ares	Adjucent to Former Oil-Water Separator	Location Selected to Provide Broad Areal Coverage	Correntends
Exxon Chemicals Plant							
ECPSB)	x					1	Transformet area.
ECPSB2	х	x	х				Former storage tanks and pipe trench near substation and truck loading area.
ECPSB3	x		х	х			Pipe still and chemical plant units.
ECP384	x	x	x	х			Condenser and pipe stills, separator, and pipe trench.
ECPSBS			x	х			Chlorine car and truck yard, former underground storage tasks, acid neutralization pit, perspoid and persitow plants.
No. J Tank Field							
LISTER DI ALLANYS	x		x			x	Current and former storage tanks.
NJ F SB COMM W J	^		~			x	Current and former storage tanks.
N3 1F8B3/UMM WO					x		Current and former storage tanks.
N31r304	v						Current and former storage tanks.
NJ I F3DJ	Ŷ						Current and former storage tanks.
NJIJSDO	Ŷ		×				Current, and former storage tariks.
NJ I FOR	^		Ŷ			x	Current and former storage tanks.
Na LESBECHMM H						x	•
							Former storage tanks south of pipe trench.
313100B1/000000000							Former storage tanks south of pipe trench.
							Former slop tank near severator.
31PIRMBS/GMMWI/					х (		Former separator, concrete separator outfail, and slop well.
ECIRMES	· x						Former tile acid sever.
General Tank Field							
						x	Current and former storage tanks near former separator studge area potentially containing lead.
GTFSBI/OMMW6	v					~	Current and former storage tasks.
OTFSB2	*					x	Current and former stones tasks.
OTFSB3/OMMW9	v					**	Current and former storage tanks within old municipal landfill ares.
GTFSB4	x					x	Current and former storage tanks.
OTF585						Ŷ	Current and former storage lanks.
GTFSB6/OMMW10			v			~	Current and former storage lateks.
GTF5B7	x		x				Current and former storage tasks near purp bouse.
OTF8B#	х						

Table 3-3. Rationale for Selection of Soil Borings and Monitoring Wells for the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersay.

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See last page for footnotes.

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Table 3-3. Rationale for Selection of Soil Borings and Monitoring Wells for the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Boring/Well [dentification	Adjacent to Sever	Adjacent to Sunitary Septic System	Documented Spill	Historical Process Area	Adjacent to Former Oil-Weter Separator	Location Selected to Provide Broad Areal Coverage	Commenta
General Tank Field (continued)							
OTENBO	x						Current and former storage tanks.
FOTESRI			x			x	Fill area sast of current and fourier storage tanks.
OTVIDUR					x	,	Current and former storage tanks.
OTOPM81						X	Current and former storage tanks.
OTFIEMEN							Current and former storage tanks.
OTFININ							Convent and former storage tanks.
OTTEMBS/OMMW20							Current and former storage tasks.
OTFUMBE							Current and former storage tanks.
GTFIRMB7							Current and former storage tanks.
OTFIRMB							Current and former storage tarks.
OTFIRMB9							Current and former storage tanks.
OTFIRMBIO							Current and former storage tasks.
OTFIRMBLL							Current and former storage units.
OTHIRMBI2							Current and former storage tanks.
OTFIRMBI3			x				
OTFIRMB)4			x				
GTFIRMB15			x				Current and General shortest later.
OTFIRMB16			х				Current and former denness tasks.
GTFIRMB17	x		x				Current and former storage tarks.
<b>GTFURMBI</b>	x		x				
Solverst Tank Field							
STF5Bi	x		x	×		x	Former pump house, truck loading area, manifold pits, and transformer area near former Lower House Nap and Acto Fact, Free, and drum filling building. Former truck loading area.
		~	v				Former storage tanks and pump pad with nearby buck, and rail loading areas and transformers.
STFSB2	x	*	^				Former slorage tanks.
STFS83	x	x				х	Former truck rack and Norton apheroid.
OFSB1/OMMW14	<u>x</u>						

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See last page for footnotes.

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			Adjacent to		Ristorical	Adjacent to	Location Stlected	
	Boring/Well Identification	Adjacent to Sewer	Sanitary Septic System	Documented Spill	Ргосевя Агся	Former Oil-Water Separator	to Provide Broad Areal Coverage	Commente
	Piere and East Side Treatment Plant Area PESTSB1 PESTSB2 GMMW241	x x	x x	x		×	×	Current and former large separator. Near former pump house and truck loading area. Barrel filling building. Near truck loading area. Intermediate depth well. Stratismathic boring and deep monitoring well barrel staging area near transformers and truck loading area.
•	PESTBB3/GMMW240						~	
	<u>Domenic Trade Area</u> DTSBI/GMMW11				x			Former cracking coil area near truck loading area, former underground storage tasks, and pump house.
	D7582				x			Former eracking coil area near truck loading area, former underground storage tanks, and pump house.
	DISB						. <b>x</b>	
	MISCELLANEOUS AREAS							
	Utilitier Area FECTRMB1 FECTRMB2X0MMW18 FECTRMB2X0MMW18 FECTRMB2X0MMW18	v	x		x		x x	Former boiler house and former studge tank, near transformers. Former transformer area. Former boiler house.
-	Maha Building Area MB6BI MB6BI	x x				x		Former storage tanks near transformers. Former storage tanks near underground storage tanks. Former storage tanks, reveatening stills, and underground storage tanks.
	MBSB3 MBSB4 PSSB1		×		x x			Former storage tanks, stårring tanks, and compound building, near transformers. Former reducing stills, paraffin boiler house, and pump house.

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Table 3-3. Rationale for Beloction of Soil Borings and Monitoring Wells for the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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See last page for footnotes.

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Table 3-3. Rationale for Selection of Soil Borings and Munikoving Wells for the Phase IA Remedial Investigation, Bayonne Plan, Bayonne, New Jersey.

Boring/Weil Identification	Adjucent to Sever	Adjacent to Sanitary Septic System	Documented Spill	Historical Process Area	Adjacent to Former Oil-Water Separator	Location Selected to Provide Broad Areal Coverage	Corements
MDC Building Area MDCS 81	×	x		x			Former Butterworth System, Inc. building, light oil filling building, and fuel station. Near former drum filling building and underground storage tanks.
MDCSB1/GMMW15				x		x	Former Naptha filling building.
<u>Stockolik Arts</u> SSB1 \$582/GMMW12 SSB3 1.0588				x x x x	x x		Former MEK Dewaxing Plant and Phenol Plant area near former transformers. Former MEK Dewaxing Plant and Phenol Plant area near former transformers. Former MEK Dewaxing Plant and Phenol Plant area, and stills area. Former MEK Dewaxing Plant and Phenol Plant area, and stills area.

Construction Measures Emergency Repairs Protocol. CMERP

Interim Remotial Measure. DR.M

Non-equeous phase liquid. NAPL

Denotes a stratigraphic soil boring that was converted into a deep monitoring well. ٠

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Denotes an IRM soil boring/monitoring well. t

Soil Borings N3TFSB9 and PN1882 added to the RI field program: PN1SB2 was a CMERP soil boring added at the request of Exxon; N3TFSB9 was added to delineate NAPL in the No. 3 Tank Field. ...

Soil borings and monitoring wells are listed above under the operational area in which the soil boring /monitoring well is located and not necessarily under the operational area that they were intended to evaluate (i.e., certain IRM soil borings in the Pier No. 1 Area and in the Utilities Area were intended to address potential NAPL originating from the Note: Lube Oli Area and Chemical Plant Area, respectively).

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Location I.D.	Distance and Direction Moved from Formerly Proposed and Approved Location	Rationale for Moving the Location	Final Location Description
"A" Hill Tank Field			North of task 516
AHTFSB4	60 ft SE	Surface water inside fire bank prevented access.	
Lube Oil Area			
LOSB1	220 ft SE	Moved at request of John Boyer of the NJDEP to area near spill culvert at Tank 411.	Northeast of tank 411.
LOSB10	80 ft N	Moved due to subsurface concrete.	West of Control House at Lube Oil Area.
LOSB15	60 ft W	Moved into open area to complement spacing between RI and IRM borings.	East of tank 57.
LOSB16	40 ft WSW	Moved downgradient of documented spill or release.	Southwest of tank 46.
<u>Pier No. 1 Area</u> PN1SB1	60 ft NW	Moved north due to bulkheading along pier.	East southeast of the Helipad Pier No. 1
<u>No. 2 Tank Field</u> N2TFSB6	100 ft ESE	Moved to former process area.	East of tank 1001.
<u>Asohalt Plant Area</u> N3TFSB2	40 ft N	Moved to previous truck loading rack on other side of fence. Location was inaccessible due to pipe racks and utilities.	East of truck loading rack.
Erxon Chemical Plant	Area		
EC2SB1	100 ft E	Moved as close as possible to sanitary sewer due to low overhead utilities at original location.	East of the Exxon Chemical Building No. 2.
ECPSB5	100 ft WSW	Moved downgradient (to a gravel area) along railroad loading area due to poor access and train traffic at original location.	Northwest of tank 916.

Table 3-4. Location and Rationale for Relocation of Phase IA Soil Borings and Monitoring Wells, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Location I.D.	Distance and Direction Moved from Formerly Proposed and Approved Location	Rationale for Moving the Location	Final Location Description
No. 3 Tank Field			
GMMW7	BO ft NE	Moved towards area containing visually stained soil.	West of GMMW16.
General Tank Field			
GTFIRMB8	140 ft WSW	Moved into the interior of the tank field to complement spacing of IRM and RI borings.	Inside the firebank north of tank 1073.
GTFBIRMB18	60 ft E	Moved to road edge due to overhead utilities.	Northwest of electrical Substation No. 3.
EGTFSB1	100 ft S	Construction debris prevented access to original location.	North of Substation No. 3.
<u>Piers and East Side</u> Treatment Plant Area			
PESTSB1	40 ft W	Moved to edge of former oil/water separator.	East of Granular Activated Carbon Building.
PESTSB2	40 ft W	Moved to other side of fence due to pipe rack.	
PESTSB3	200 ft SW	Moved based on access problems due to buikhead along pier, and also to complement well spacing.	East of Substation No. 4.
Domestic Trade Area			
DTSB3	40 ft W	Moved due to low overhead utility line.	
Utilities Area			
GMMW13	40 ft W	Moved to complement spacing with IRM borings.	West of tank 998.

Table 3-4. Location and Rationale for Relocation of Phase IA Soil Borings and Monitoring Wells, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Location	1.D.	Distance and Direction Moved from Formerly Proposed and Approved Location	Rationale for Moving the Location	Final Location Description
Main Bu	ilding Area			and the second second second
PSSB1		150 ft NW	Moved due to low overhead utilities and old buried railroad ties; also to delineate the extent of NAPL which was observed in the "A"-Hill Tank Field and Main Building areas.	North of the Paramins Store House.
MBSB1		40 ft N	Moved due to proximity to Main Building.	North of Main Building (middle of parking lot).
<u>Stockpil</u> GMMW	<u>e Area</u> 12	185 ft NW	Moved to complement spacing with DRAI wells.	Stockpile Area.
SSB1		100 ft ESE	Moved due to access problem at original location.	West of tank 404.
ft	Feet.			
SE	Southeast.			
w	West.			
WSW	West southw	est.		
ESE	East southeas	st.		•
E	East.			
NE	Northeast.			
sw	Southwest.			
NJDEP	New Jersey [	Department of Environmental Prote	ction.	
RI	Remedial Invo	estigation. Idial Measure.		
NAPL	Non-aqueous	phase liquid.		·
DRAI	Dan Raviv As	ssociates, Inc.		

Table 3-4. Location and Rationale for Relocation of Phase IA Soil Borings and Monitoring Wells, Bayonne Plant, Bayonne, New Jersey.

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Depth to Well Well Top of Measuring Point Depth to Top of Depth of Depth to Screen Total Screen Bedrock Top of Elevation\* Top of Bentonite Screened Depth and Casing Material Well Elevation Bedrock Interval Sand Pack Slurry of Well (20-slot Completion Diameter Top of PVC (ft bls) (ft bis) (ft bis) Ground (ft bls) (ft bls) (ft bls) (inches) wound) Well ID Date **Shallow** NA 10.3 9.70 NA 0.5 1.5 2.5 . 12.5 PVC 12.5 10/11/94 4 GMMW1 NA NA 17.6 17.44 4.0 2.0 6.0 - 16.0 PVC 16.0 4 10/12/94 GMMW2 NA 15.17 NA 3.0 15.9 5.0 7.0 - 17.0 17.0 PVÇ 4 GMMW3 10/26/94 NA NA 9.72 10.3 1.0 4.0 - 14.0 2.0 PVC 14.0 4 10/12/94 GMMW4 NA NA 9.26 9.7 1.0 2.0 3.0 - 13.0 13.0 PVC 10/18/94 4 GMMW5 NA 14.43 NA 12.4 2.0 3.0 4.0 - 14.0 14.0 PVC 10/13/94 4 GMMW6 NA NA 9.1 8.36 1.0 2.0 13.0 3.0 - 13.0 PVC 4 GMMW7 10/18/94 NA NA 9.4 8,80 2.0 1.0 3.0 - 16.0 PVC 16.0 4 10/10/94 GMMW8 NA NA 8.6 7.91 1.5 2.0 3.0 - 13.0 PVC 13.0 10/10/94 4 GMMW9 NA NA 8.88 9.3 2.0 1.0 3.0 - 13.0 13.0 PVC 4 10/11/94 GMMW10 NA NA 11.58 2.0 11.8 3.5 5.5 - 15.5 15.5 4 PVC 10/27/94 GMMW11 NA 13.73 NA 10.5 2.0 1.0 3.0 - 13.0 PVC 13.0 10/12/94 4 GMMW12 NA NA 11.85 9.8 1.0 3.0 - 13.0 2.0 13.0 PVC 10/12/94 4 GMMW13 NA NA 9.30 1.0 9.6 3.0 4.0 - 14.0 PVC 14.0 4 GMMW14 10/12/94 NA NA 9.45 9.6 4.0 2.0 6.0 - 16.0 16.0 PVC ۵ 10/11/94 GMMW15 NA NA 11.61 8.9 0.5 2.5 - 12.5 1.5 12.5 PVC 4 10/17/94 NA GMMW16 10.91 NA 8.8 0.5 1.5 2.5 - 12.5 12.5 PVC 4 GMMW17 11/1/94 NA NA 15.09 0.5 12.2 3.0 4.0 - 14.0 14.0 PVC 4 11/2/94 NA GMMW18 NA 11.12 8.3 0.5 1.0 2.0 - 12.0 PVC 12.0 4 GMMW19 11/2/94 NA NA 8.22 1.0 8.9 2.0 4.0 - 14.0 PVC 14.0 4 11/1/94 GMMW20 Intermediate NA 13.2 NA 10.5 24.0 26.0 30.0 - 40.0 40.0 PVC 4 NA 11/17/94 NA GMMW21I 15.14 51.0 15.8 53.0 55.0 - 65.0 65.0 PVC 4 12/30/94 NA NA GMMW23I 8.93 24.0 9.4 26.0 30.0 - 40.0 PVC 40.0 11/30/94 4 GMMW241 .

Table 3-5. Phase IA Remedial Investigation Monitoring Well Construction Details, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Table 3-5. Phase IA Remedial Investigation Monitoring Well Construction Details, Bayonne Plant, Bayonne, New Jersey.

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Weil ID	Well Completion Date	Well Screen and Casing Diameter (inches)	Well Screen Material (20-slot wound)	Total Depth of Well (ft bls)	Depth of Screened Interval (ft bls)	Depth to Top of Sand Pack (ft bls)	Depth to Top of Bentonite Slurry {ft bls}	Measuring Point Elevation* Ground Top of PVC		Depth to Top of Bedrock (ft bls)	Top of Bedrock Elevation (ft bis)	
Bedrock						<u> </u>	<u> </u>					
GMMW21D GMMW22D GMMW23D GMMW24D	12/8/94 12/16/94 12/29/94 11/30/94	4 4 4 4	PVC PVC PVC PVC	107.0 120.0 110.0 128.0	97.0 - 107.0 110.0 - 120.0 100.0 - 110.0 118.0 - 128.0	93.0 108.0 98.0 115.0	89.0 105.0 90.0 112.0	10.9 10.7 15.3 9.4	12.43 10.37 15.29 8.85	110.0 120.0 117.0 129.0	-99.1 -109.30 -101.70 -119.6	

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Based on National Geodetic Vertical Datum 1929.

PVC Polyvinyl chloride.

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NA Not applicable.

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ft bis Feet below land surface.

IRM Interim Remedial Measure.

NAPL Non-aqueous phase liquid.

Note: A summary of monitoring well construction details for IRM monitoring wells in the General Tank Field, No. 3 Tank Field, Exxon Chemical Plant (Utilities Area) and Lube Oil Area, was provided in the NAPL IRM Investigation Report (Geraghty & Miller, Inc., 1995a).

Well Designation				Low Tide (10:18)										
	Measuring Point Elevation (ft msl)	Product Density (gm/mL)	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) (ft msl)	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) (ft msl)	Water Level <sup>n1</sup> Difference with Rising Tide	Comments
Phase IA RI N	Ionitoring Wells													
Shallow.														CD 43 40 4 1 (2)
	9.70		11-45	3.39	4.16	0.77	6.22	16:55	3.42	4.19	0,77	6.19	-0.03	GMMWI
GMMW1	3.70	NA	11.20	NA	3.92	NA	13.52	17:04	NA	3,95	NA	13.49	-0.03	
GMM/WZ	17.44	0 070	0.53	8 18	R.19	0.01	6.99	15:12	NA	8.20	NA	6.97	-0.02	ECPSB2
GMMW3	10.17	0.370	10.08	5.30	E 305	0.005	4.42	15:24	NA	5.33	NA	. 4.39	-0.03	GMMW5
GMMW4	9.72	0.853	10:08	0.30	7.300	4.87	6 88	16:00	2.64	7.31	4.67	5.93	0.05	GMMW5"
GMMW5	9.26	0.853	11:58	2.69	7.30	4.07 NA	4.36	14:43	NA	10.1	NA	4.36	-0.02	
GMMW8	14.43	NA	10:22	NA	10.05	4.61	4,50	15-56	2.64	. 7.57	4.93	4.94	0.04	GMMW7 <sup>(2)</sup>
GMMW7	8.36	0.841	11:42	2.70	7.51	4,81	4.30	18.27	NA	4.60	NA	4.20	0.02	
GMMW8	8.80	NA	12:39	NA	4.62	NA	9.10	16:22	NA	4.90	NA	3.01	-0.01	
GMMW9	7.91	NA	12:30	NA	4.83	NA	A 22	16:38	NA	4.63	NA	4.25	0.03	
GMMW10	8.88	NA	13:01	NA	4.00	NA	4.99	16:14	NA	6.57	NA	5.01	0.02	
GMMW11	11.58	NA	12;16	NA	0.53	NA	4,00 £ 48	15-55	7.23	7.26	0.03	6.50	0.02	SSB1 <sup>(2)</sup>
GMMW12	13.73	0.916	10:28	7.24	7.35	0.11	7.45	16.47	NA	4.02	NA	7.83	-0.02	GMMW1 <sup>19</sup>
GMMW13	11.85	0.885	11:35	4.00	4.02	0.02	7.85	17:03	NA	3.81	NA	5.49	0.04	
GMMW14	9.30	NA	13:26	NA	3.85	NA	0.40 0.45	16.27	NA	6.90	NA	2.55	0.20	
GMMW15	9.45	NA	10:10	NA	7.10	NA	2.35	15.47	5 76	9.84	4.08	5.16	0.01	GMMW16 <sup>13</sup>
GMMW18	11.61	0.830	11:24	5.76	9.88	4.12	5,15	10:42	NA	4.88	NA	6.03	-0.05	
GMMW17	10.91	NA	11:08	NA	4.83	NA	80.0	10:37	7.00	7.92	0.92	7,97	-0.01	
GMMW18	15.09	0.870	11:40	6.99	7.94	0,95	7.96	10.00	5.00 NA	6 7 8	NA	5.34	0.07	GMMW5 <sup>(3)</sup>
GMMW19	11.12	0.853	11:30	5.85	5.86	0.01	5.27	10:45	NA NA	5.70	NA	3.18	0.01	
GMMW20	8.22	NA	12:47	NA	5.05	NA	3,17	16:32	NA	0.04	110			
intermediate										10.8	NA	2 59	2.37	
GM444/211	13.20	NA	10:23	NA	12,98	NA	0.22	15:06	NA	10.8	110	NE	N	
CHANW/221	15.14	N	NI	NÍ	NI	N	N	N	NI	101	PI+	NI	N	
CI4437241	8.93	NI	Ni	NI	NI	NL .	NI	NI	NI	PNI	141		•••	

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Table 4-1. Summary of Water-Level Measurements Collected on December 12, 1994, Bayonne Plant, Bayonne, New Jersey.

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Weil Designation	Measuring Point Elevation (ft msl)	Product Density (gm/mL)			Low Tk	de (10:18)								
			Measuring Time	Depth to Product (It bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) (ft msl)	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) (ft msl)	Water Level <sup>(1)</sup> Difference with Rising Tide	Comments
Phase IA, Fil M	onitaring Wells (co	ntinued)		··- <u></u> -							-			
Deen														
CLARAW/210	12 43	NA	10:19	NA	11.94	NA	0.49	15:05	NA	9.39	NA	3.04	2.55	
SMMW22D	10.37	NI	N	N	N	NI	NI	NE	NI	NI	NI	Nł	NI	
3MMW23D	15.29	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	Ni	NI	
GMMW24D	8.85	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	Nt	NI	
iurfaca-Watar	Measuring Point													
	3 76	NA	13-13	NA	2.5	NA	0.86	16:48	NA	1.45	NA	1.91	1.05	
	7.04	-	-				-					••		
	10.21	NA	10:03	NA	11.34	NA	-1.13	15:08	NA	8.04	NA	2.17	3.30	
WAAPA	9.65	NA	10:04	NA	10.69	NA	-1.04	15:28	NA	7.28	NA	2.37	3.41	
WMP5	8.27	NA	9:35	NA	9.14	NA	-0.87	15:29	NA	6.01	NA.	2.26	3.13	
SWMP6	9.91	NA	10:50	NA	11.22	NA	-1.31	15:18	NA	7,74	NA	2.17	3,48	
SWMP7	11.42	NA	11:43	NA	12.69	NA	-1.26	16:59	NA	9.97	NA	1.45	2.71	
Existing Monit	oring Wells													
Shallow														
EB 1	8.92	0.901	10:24	5,81	5.82	0.01	3.11	15:07	NA	5.80	NA	3.12	0.01	EB2(3)
82	8.93	0.901	9:15	8.10	9.15	1.05	0.73	15:11	7.48	8.53	1.05	1.35	0.62	EB2 <sup>(1)</sup>
	8.96	0.901	9:17	7.67	8,75	1.08	1,18	15:15	7.58	8.62	1.04	1.28	0.09	EB2"
:B4	9.01	0.901	9:20	8.05	8.72	0.67	0.89	15:17	7.39	8.03	0.54	1.56	0.66	EB 2'3'
	0.09	0 901	9:23	8.20	8.58	0.38	0.85	15:20	7.58	7.97	0.39	1,47	0.62	EB2'5'
	. 3.03	0.001	9.25	7.79	7.80	0.01	1.41	15:23	NA	7.93	NA	1.27	-0,14	E82 <sup>(3)</sup>
	J.2V 8 87	0.801	9.30	7.71	7.74	0.03	1.16	15:25	7.77	7.78	0.01	1.10	-0.05	E8R5 <sup>(3)</sup>
CD / ED Å	0.07 8 13	NA	9:32	NA	8.92	NA	-0.80	15:27	NA	5.94	NA	2.18	2.98	

Table 4-1. Summary of Water-Level Measurements Collected on December 12, 1994, Bayonne Plant, Bayonne, New Jersey.

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High Tide (16:15) Low Tide (10:18) Water Level (1) Comments Measuring Depth to Depth to Product Water-Table Elevation Water-Table Elevation Depth to Product Depth to Well **Measuring Point** Product Measuring **Difference with** Time Product Water Thickness icorrected where Thickness (corrected where Water Elevation Density Time Product Designation **Rising Tide** (feet) applicable) (ft bmp) (ft bmp) (feet) applicable) (gm/mL) (ft bmp) (ft bmp) (ft mai) (ft msi) (ft msl) Existing Monitoring Wells (continued) Shallow EB2<sup>(3)</sup> 0.08 8.44 1.62 1.83 15:30 6.82 1.75 9:39 6,91 8.40 1.49 0.901 E8R5<sup>131</sup> 8.81 † EB9 4.09 -0.02 7.41 3.07 15:36 4.34 7.42 4.10 3.1 4.32 8.76 0.885 9;49 **EB**10 Well caved in. ---... 15:03 3.61 EB12<sup>(2)</sup> 9.30 3.60 ---EB11 0.34 ---8.57 4.55 3.95 0.60 8.23 16:07 10:40 0.92 5.10 4,18 9.53 0,910 EB13(2) EB12 0.05 5.58 0.72 15:44 4,10 4.82 5.53 0.52 4.15 4.67 9:58 9.68 0.995 † EB13 2.70 -0.02 8.31 NA 16:20 NA 2,72 NA 8.29 11.01 NA 10:56 NA EB14 2.05 1.75 16:25 NA 7.69 NA 0.30 9.44 NA NA 11:07 NA EB16(2) 9.74 † EB15 0.00 1.73 1.34 12.8 11,02 16:42 1.71 1.34 11.02 12.73 11:15 EB17121 12.56 0.885 E816 -0.03 10.30 0.02 17:17 2.06 2.08 10.33 2.05 0.02 12,36 0.918 12:08 2.03 EB19<sup>121</sup> EB17 0.00 4,25 6.08 1.83 5.25 5.25 16:32 4.23 6.24 2.01 EB 24 131 11:16 0,907 9.67 EB19 0.02 10.50 C.25 2.78 3.03 10,48 15:47 3.05 0.25 2.80 EB24<sup>(3)</sup> 0.895 10:20 EB22 13.31 0.01 11,79 2.92 3.07 0.15 15:40 11.78 9:59 2.93 3.09 0.16 E824171 14.73 0.895 EB23 10.56 0.02 0,12 5.37 15:36 5,25 10.54 5.40 0.13 5.27 9:53 AHTFSB1<sup>[3]</sup> 15.82 0.895 **EB24** -0.01 10.65 15:32 3.10 3.13 0.03 10.67 0.02 0.820 9:47 3.09 3.11 EB26 13.76 12.35 -0.02 3.63 NA 15:28 **NA** 12.38 NA 3.61 NA 9:42 EB26 15.99 NA 11.07 -0.05 NA NA 5.16 15:26 11.12 NA 9:38 NA 5,11 AHTFSB113 16.23 NA EB27 10.32 0.16 5.74 0.01 5.73 10.16 15:21 5.90 5.91 0.01 AHTFSB1<sup>(3)</sup> 16.06 0.820 9:31 **EB**28 -0.05 15.64 15:15 NA 2.10 NA 15.69 0.01 2.05 2.06 AHTESB1<sup>(3)</sup> 0.820 9:24 17.74 -0.02 EB29 9.66 3.39 NA NA 15:18 0.01 9.68 3.38 9:27 3.37 0.820 EB30 13.05 7.76 -0.08 NA NA 9.00 7.84 15:11 NA 8.92 9:12 NA 16.76 NA 2.88 -0.04 EB31 NA NA 8.17 2.92 15:02 NA 9:39 NA 8.13 ITMW4<sup>(3)</sup> NA EB33 11.05 0.02 4.29 8.54 8.75 0.21 14:58 4.27 8.56 8.83 0.27 0.971 9:33 12.84 -0.04 EB34 NA 4.02 6.60 15:12 NA 6.56 Trace 4.06 9:37 NA Dry NA **EB35** 10.62 -2.71 15:04 2.87 5.35 5.53 2.66 ITMW4<sup>(3)</sup> 0.971 9:51 8.09 -0.03 EB36 2.72 0.06 15:15 8.17 8.23 2.75 8.27 0.13 0.971 9:47 8,14 10.89 EB40

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Table 4-1. Summary of Water-Level Measurements Collected on December 12, 1994, Bayonne Plant, Bayonne, New Jersey.

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			<u> </u>		Low Tie	de (10:18)				High Tid	e (16:15)			
Well Designation	Measuring Point Elevation (ft msl)	Product Density (gm/mL)	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) ( (ft msl)	Measuring Time	Depth to Product (It bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) (ft mst)	Water Lovel <sup>(1)</sup> Difference with Rising Tide	Commenta
Existing Moni	toring Wells (contin	ued)												
Shallow														
		0.071	10-01	7 35	7 39	0.04	2.49	15:07	7.37	7.38	0.01	2.47	-0.02	iTMW4 <sup>131</sup>
EB41	9.84	0.371	10:01	7.00	0.01	0.04	2.40	15:25	9.82	9.93	0.11	2.19	-0.01	ITMW4 <sup>191</sup>
EB42	12.01	0.971	10:11	9,01 NA	3.31	NA	2.26	15:28	NA	6.88	NA	2.3	0.04	Trace
EB44	11.18	NA NA	0:10	NA	A 33	NA	3.50	15:07	NA	6.33	NA	3.50	0.00	
EB47	9.83	NA	3;20	NA	6.32	NA	2.74	15:08	NA	6.37	NA .	2.69	-0.05	
2848	3.00		9.22	NA	8.42	NA	2.20	15:09	NA	8.47	NA	2,15	-0.05	
6848	10.02	0.050	3.44	8 51	6 79	0.27	4.36	15:12	6.52	6.67	0.15	4.37	0.01	EB59 <sup>(3)</sup>
EB50	10.91	0.802	9:40	0.51	5.78	ALA	4.49	15:11	NA	5.74	NA	4.47	-0.02	
EBDT	10.21	NA	0.04	8.04	10.01	2.07	3 17	15:17	6.89	10	3.13	3.21	0.04	EB59 <sup>(3)</sup>
EB52	10.53	0.862	9:34	0.34	10.01	3.07	5.00	15.23	2 74	2.76	0.01	5.99	0.01	E859 <sup>(3)</sup>
EB53	8.73	0.862	9:65	2.75	2.76	0.01	0.30 R 16	15-34	NA	2.34	NA	6.14	-0.01	
EB54	8.48	NA	\$:53	NA	4.33	NA	4 83	15:37	NA	4.27	NA	4.63	0.00	
EB56	8.90	NA	9:07	NA NA	4.46	NA	3:68	15:36	NA	4.44	NA	3.70	0.02	
EB67	8,14	- NA	10:12	6.21	4 6 2	0.21	2 60	15:42	6.33	8.51	2.18	2.31	-0.29	EB59 <sup>04</sup>
EB58	8.94	0.862	10:07	0.31	0.02	1.01	2.00	16-45	7 14	7.97	0.83	3,16	0.54	E859 <sup>(1)</sup>
EB69	10.41	Q.862	10:14	7.66	8.67	1.01	2.01	15.40	0 61	11.7	3 73	2.41	3.33	EB59 <sup>(3)</sup>
EB60R	11.37	0.862	10:22	12.11	13.38	1,27	-0.92	10:02	0.01	e en	0.29	2.04	0.32	EB59 <sup>434</sup>
EB61	10.59	0.862	10:37	8.84	9.05	0.21	1.72	10:00	0.01	10.00	2 3 3	2 39	3.12	EB59 <sup>(3)</sup>
EB62	10.83	0,991	10:37	11.54	13.99	2.45	-0.73	15:58	8,42	10.8	2.33 NA	1 98	0.16	
EB63	10,11	NA	10:40	NA	8.29	NA	1,82	16:00	NA T AT	9.13	0.21	1 95	-0.08	EB59 <sup>131</sup>
E864	9.25	0.862	10:05	7.28	7.64	0.26	1,93	15:41	7.37	7.58	0.21	1.00	7 47	EB59 <sup>(3)</sup>
EB65	12.46	0.862	10:16	12,14	15.18	3.04	-0.10	15:47	9.88	11.7	1.86	4.34	4,74 3 A7	EREO
ERAAR	11.98	0.862	10:23	12.75	13.19	0.44	-0.83	15:50	9.69	10.1	0,39	2,24	3.07	CD33
6067	10.57	0.991	10:50	10.95	12.17	1.22	-0.39	16:12	7.90	10,40	2.5	Z.65	3,04	CB2A.
200/ 5089	11.52	NA	10:48	NA	12.25	NA	-0.73	16:10	NA	9.15	NA	2.36	3.09	5000121
EDEO	11.47	0.990	10:44	12.33	15.90	3.57	-0.90	16:05	9.15	11.4	2.29	2.30	3.19	FROA

Table 4-1. Summary of Water-Level Measurements Collected on December 12, 1994, Bayonne Plant, Bayonne, New Jersey.

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					Low Tic	Je (10:18)				High Tic	e (15:15)		·	
Well Designation	Measuring Point Elevation (ft msi)	Product Density (gm/mL)	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) (ft msl)	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) (ft msi)	Water Level <sup>(1)</sup> Difference with Rising Tide	Comments
Existing Mon	itoring Wells (contin	ued)												
Shallow				•										Durind Mall
E870	_		-	-		-	-	-	••		-•		~	
2071	12 16	0.852	9:56	10.56	10.57	0.01	1.59	15:21	10.58	10.6	Trace	1.57	-0.02	50710
EB/1	40.97	0.001	9.50	10.69	11.33	0.64	1.54	15:49	10.66	11.10	0,44	1.58	0.04	EB/2
EB72	12.27	0.84	0.39	9.81	10.35	0.54	1.67	15:16	9.76	10.3	0.57	1.72	0.05	EB73
EB73	11.51	0.94	9.35	10.69	10.00	0.05	1.33	15:10	10.7	10.8	0.07	1,31	-0.02	EB73"
EB74	12.01	0.94	9:34	NA	R 64	NA	6.83	16:00	NA	6.55	NA	6.92	0.09	/*
EB75	13.47	NA	10:42	160	0.04	0.74	4.30	16:15	7.58	8.20	0.62	3.68	-0.62	EB76'''
EB76	11.88	0.889	10:43	7.50	0.44	0.74	1 90	16:01	6.63	16.8	10.13	2,30	0.40	MW13 <sup>57</sup>
EB77	10.94	0.802	-	7.11	10,00	9.70	1.50	15.47	7.16	14.3	7.16	2.92	0.07	MW13 <sup>(3)</sup>
EB78	11.50	0.802	13:10	7.23	14,40	7.17	2.00	10.40	9 10	14.9	5.69	3.03	0.29	MW8 <sup>(3)</sup>
EB79	12.34	0.832	13:22	8.50	15.08	6.58	2.73	10:43	0,13	12.0	1 84	3.58	0.07	EB60 <sup>(2)</sup>
E880	13.21	0.800	13:30	8.92	12.82	3.9	3.51	16:27	2.00	2.70	0.14	9.95	-0.04	EB81 <sup>(2)</sup>
EB81	13.04	0.990	13:32	3.05	3.20	0.15	9.99	16:29	3.09	3.43	NA	2.22	0.14	
EB82	10.70	NA	10:00	NA	8.62	NA	Z.08	15:39	114	0.40 8.84	NA	4.94	-0.01	
EB83	11.58	NA	9:43	NA	6.63	NA	4.95	15:03	NA NA	4 73	NA	4.75	0.01	
EB84	8.98	NA	9:48	NA	4.24	NA	4./4	14.56	NA	7 94	NA	NA	NA	
EB85	NS	NA	9:17	NA	8.94	NA	NA T AA	16.07	NA NA	0.65	NA	7.95	-0.03	
EB87	8.60	NA	11:36	NA	0.52	NA	7.30	16 10	NA	0.45	NA	7.79	0.04	
EB88	8.24	NA	11:33	NA	0.49	NA	7,70	18.05			NA	-	••	Casing blocked
EB89	9.08	-	11:39	-		NA	4.00	16:30	NA	5,45	NA	4.00	0.00	
EB90	9.45	NA	11:09	NA	5,45	11A, N.A.	3.34	16:00	NA	5.89	NA	3.31	-0.03	
EB91	9.20	NA	11:46	NA	5.00		3.04	15-52	5.66	5.75	0.09	2.89	0.00	EB10413
EB92	8.56	0.917	11:49	5.66	5.74	0.08	4.07	15:53	NA	6.45	NA	3.03	-1.02	
EB93	9.48	NA	, 11:54	NA	5.43	NA	9.00	15.40	5 84	5.89	0.05	1.67	-0.03	ITMW2 <sup>131</sup>
EB94	7.52	0.870	12:00	5.81	5.88	0.07	1.70	15:43	5.04	E 99	0.02	1.85	0.01	ITMW2 <sup>(3)</sup>
EB95	7.82	0.870	10:37	5.96	6,10	0.14	1.84	16:45	5.9/ 6.4P	0.33 6 53	0.07	-		No water.
EDGA	7.71	0.870	10:35	6.49	6.58	0.09	1.21	12:44	0.40	9,35	0.07			

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Table 4-1. Summary of Water-Level Measurements Collected on December 12, 1994, Bayonne Plant, Bayonne, New Jersey.

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					Low Tid	le (10:18)				High Tid	le (16:15)			
Weil Designation	Measuring Point Elevation (ft msl)	Product Density (gm/mL)	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness {feet}	Water-Table Elevation (corrected where applicable) . (ft msl)	Measuring Tima	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) (ft msi)	Water Level <sup>(1)</sup> Difference with Rising Tide	Comments
xisting Moni	toring Wells (continu	ued)												
Shallow														Caeina biocirei
ED 0 7	6 54	-	11:45	5.87	-	NA		15:42	5.87				0.01	Cashig biocher
2037	10 90	NA	10:23	NA	9.21	NA	1.89	16:21	NA	9.20	NA	1.70	0.05	
2899 2899	8.95	NA	11:43	NA	2.78	NA	6.19	16:01	NA	2.71	NA	0.24	0.00	Dry well.
EB100	NS	-	10:37	-		NA		16:51	-			NA	NA	- /
B101	NS	0.917	10:13	9.43	9.45	0.02	NA	16:50	NA	8.43	NA	NA	NA	
B107	NS	0.917	10:10	9.59	9.60	0.01	NA	16:48	NA n 7	9.71	0.01	NA	NA	
B102	NS	0.917	10:07	8.69	B.70	0.01	NA	16:45	8.7	0.71	0.01	NA	NA	
CD 103	NS	0.917	10:03	9.00	9.73	0.73	NA	16:45	9,01	9.52	0.61	NA	NA	
	NS	0.917	9:39	8.97	9,94	0.97	NA	16:43	8.90	5.01	0.08	NA	NA	
EB108	NS	0.927	9:35	8.45	9,15	0.7	NA	16;41	3.1	3.43	0.33			
											0.01	1 32	-0.01	EB813 <sup>(3)</sup>
6001	13.83	0.995	10:12	12.50	12.51	0.01	1.33	15:55	12.51	12.8	0.01	1.24	1 71	EB2 <sup>(3)</sup>
EDAI	0.03	0.901	10:26	9.30	9.31	0.01	-0.37	15:09	7,59	7.80	0.01	1.34	0.29	FBB5 <sup>(3)</sup>
EBH2	0.33	0.301	9.44	7 20	8.84	1.64	1.79	15:37	6.89	. 8.73	1.84	1.48	0.29	ERR5 <sup>(2)</sup>
EBR4	8.58	0.865	3.77	7 15	8.85	1.7	1.25	15:34	6.94	8.81	1.87	1.44	0.19	EDDE (3)
EBR5	8.60	0.865	3:47	4.00	5.47	0.52	5.42	15:50	4.9	5.19	0.29	5.45	0.03	Chean
EBR6	10.38	0.885	10:04	4.80	3.00	NA	6.64	16:07	NA	3.05	NA	6.59	-0.05	Sileen
EBR7	9.64	NA	10:35	NA	3.00	1.0	5.06	15:40	4.19	6.04	1.85	5.08	-0.01	EBH5
EBR8	9.46	0,885	9:53	4.19	2.23	1.8	1.33	15-10	NA	7.09	NA	1.60	0.28	EB59
EBR9	8.69	NA	9:25	NA	7.37	NA	1.32	15:20	8.00	8.01	0.01	1.30	-0.13	
EBR10	9.30	0.862	9:27	7.87	7.88	0.01	10.71	15:22	NA	8.62	NA	0.62	11.33 *	
EBR11	9.24	NA	9;43	NA	19.95	- NA	-10.71	15-00	8.37	9.43	1.06	1.53	0.59	EBR12"
FRR12	10.04	0.865	9;19	8.96	9,99	1.03	V.34	15:00	NA	8.54	NA	1.52	0.20	
FRR13	10.06	NA	9:21	NA	8.74	NA	1.32	15:04	NA	8.50	NA	1.55	0.34	
FRR14	10.05	NA	9:25	NA	8.84	NA	1.21	15.05	NA	7.84	NA	1.68	-0.01	
EBRIK	9.52	NA	9:27	NA	7.83	NA	1.69	15:08	NA	8.82	NA	1.47	NA	
FBB 18	10.29		9:30		-	NA	-	10.00	7 77	7 80	0.03	1.85	-0,14	EBR16 <sup>(3)</sup>
CD017	9.68	NA	9:33	NA	7.69	NA	1.99	10:08						

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## Table 4-1. Summary of Water-Level Measurements Collected on December 12, 1994, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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														• <u> </u>
				•	Low Ti	de (10:18)				High Tid	le (16:15)			
Well. Designation	Measuring Point Elevation (ft msi)	Product Density {gm/mL}	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) (ft mai)	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) (ft msl)	Water Level <sup>to</sup> Difference with Rising Tide	Comments
Existing Mon	itoring Wells (contin	ued)												
Shallow														
60010	11 44	0 852	9.35	9.94	10.99	1.05	1.34	15:09	9.82	10.9	1.06	1,46	0.12	
CDN10	9.54	NA	9:37	NA	6.64	NA	2.90	15:14	NA	6.62	NA	2,92	0,02	
58821	10.12	NA	9:40	NA	8.41	NA	1.71	15:18	8.44	8.44	Trace	1.68	-0.03	
FRR27	10.10	0.885	12:00	8.02	8.03	0.01	2.07	17:10	ŃA	7.92	NA	2.18	0.11	
EBR23	9.50	NA	9:42	NA	6.62	NA	2.88	15:15	NA	6.75	NA	2.75	-0,13	
176.014/5	13 86	0.830	11:08	7.95	17.85	9.9	4.22	16:55	7.78	17.70	9.92	4.38	0.17	
1100100	15.00	0.870	10:38	11.77	14.75	2.98	3.12	16:24	11.71	14.8	3.13	3.16	0.04	ETMW2'
11 MIVY 2	10.20	0.870	10:40	11 98	14 71	2.73	3.17	16:26	11.97	14.8	2.8	3.17	0.00	ITMW2 <sup>(3)</sup>
ITMW3	15.50	0.870	10:40	857	6 77	0.25	3 67	15:21	6.49	8.77	0.28	3.70	0.03	1TMW4 <sup>(2)</sup>
ITMW4	10.20	0.971	0-59	0.02 NA	2.89	NA	5.66	15:19	NA	2.96	NA	5.59	-0.07	
ITMW6	11,76	NA	9:28	NA	7.51	NA	4.25	14:55	NA	7.43	NA	4.33	0.08	
			0.13	7.94		0.88	8 20	15:02	7.36	8.22	0.86	8.18	-0.02	ECPSB2 <sup>131</sup>
MW1	15.57	0.970	9:12	7.34	7 24	0.00	9.47	15:08	7.33	7.63	0.3	8.31	-0.11	ECPSB2 <sup>(3)</sup>
MW2	15.65	0.970	9:26	7.24	7.50	0.34	2.74	16:03	7.47	16.2	8.68	2.91	-0.15	MW3 <sup>th</sup>
MW3	12.06	0,807	10:35	7.50	15.24	1.74	3.00	15.35	NA	3.56	NA	5.54	0.02	MW13 <sup>131</sup>
MW4	9.10	0.802	11:04	3.58	3,60	0.02	5.04	15:35	NA	5 4 3	NA	5.80	-0.11	
MW6	11.23	NA	10:56	NA ·	5.32	NA	5.51	10.01	6 30	7.69	1 38	5.47	0.15	MW7 <sup>(2)</sup>
MW7	12.00	0.79 <b>0</b>	13:50	6,45	7.83	1.38	5.20	10:36	7.61	17.4	9.74	31	0.17	MW8 <sup>ra</sup>
MW8	12.35	0.832	13:45	7.73	21.33	13.6	2.34	16:25	7.51	7.4	3./= NA	5.41	0.02	
MW9	9.02	NA	11:10	NA	3.63	NA	5.39	10:37	NA	4.91	NA	6.63	-0.41	
MW10	. 11.54	NA	13:40	NA	4.50	NA	/,U4 E 89	18-55	NA	4.89	NA	5.84	-0.04	
MW11	10.73	NA	13:40	NA	4.85	NA	Q.60	10.00	8.02	14.5	8 4 6	2.49	0.00	MW12 <sup>(2)</sup>
.MW12	10.24	0.797	12:58	6.02	14.55	8,53	2.49	10:32	0.03	17.0	10 4 1	2 12	0.22	MW13 <sup>121</sup>
MW13	11.66	0.802		7.75	17,89	10,14	1.90	15:59	/.40 NA	4 75	NA NA	5.34	-0.01	
MW14	11.59	NA	13:05	NA	6.24	NA	5.30	15:40	NA	0.20		0.07		

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Table 4-1. Summary of Water-Level Measurements Collected on December 12, 1994, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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					Low Tk	de (10:18)				High Tid	a (16:15)	•		
Well Designation	Measuring Point Elevation (it msi)	Product Density (gm/mL)	Measuring Time	Depth to Product (It bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) . (ft msl)	Measuring Time	Depth to Product (ft bmp)	Depth to Water (It bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable) (ft msl)	Water Level <sup>(1)</sup> Difference with Rising Tide	Comments
Existing Moni	toring Wells (contin	ued)												
Shailow													<b>.</b>	CD 1 0 <sup>(3)</sup>
	0.25	0 907	11.26	4.42	5.81	1.39	4.80	16:38	4.40	5.79	1.39	4.82	0.02	6013
PKMWY I	3.30	NA	11:06	NA	7.17	NA	5.12	16:27	NA	7.16	NA	5,13	0.01	ED 10 <sup>[3]</sup>
PKMVV2	12.23	0.007	11.51	4 56	4.95	0.39	4.13	17:05	4.69	4.98	0.29	4.01	-0.12	EB 19
PKMW3	6.73	0.907	41.41	11.50	11.51	0.01	0.49	16:58	10.01	10	0.01	1.98	1.49	FRIA
PKMW4	11,99	0.907	11:41	NA	17 47	NA	-0.09	16:33	NA	10.3	NA	2.02	2,11	
PKMW5	12.33	NA	11:10	NA	9 30	NA	2.98	16:30	NA	1.63 *	P NA	10.65	7.67	
PKMW8	12.28	NA	11:05	NA NA	3.50	NA	1.92	16:28	11.44	11.5	0.04	2.02	0.10	EBIS
PKMW7	13.46	0.885	11:01	NA	11.04	0.31	7.74	16:02	6.32	5.64	0.32	7.75	0.01	PKMW8**
PKMW8	13.09	0.945	10:38	5.34	5.55	0.21	6 7A	16:20	NA	5.93	NA	6.79	0.03	
PKMW9	12.72	NA	10:57	NA	5.30	10	0.70							-
							0.78	15-51	8.36	10	1.65	2.47	3.24	EB62''
P7MW1	10.84	0.991	10:25	11.60	13.32	1.72	-0.76	15.40	10.21	12.1	1.87	2.41	3.22	EB59 <sup>137</sup>
P7MW2	12.88	0.862	10:32	13.42	15.35	1.93	-0.81	10.43	10.21					
	NC	NÅ	9:28	NA	10.81	NA	NA	1 <b>5:07</b>	NS	7.80	NA	NA	NA	
10100										0.00	114	NA	NA	
CLIEDI 1	NS	NA	9:23	NA	9.84	NA	NA	15:03	NA	3.89	T	NA	NA	EBR 1 8 <sup>131</sup>
CHEDI?	NG	0.852	9:32	11.09	11.10	0.01	NA	15:02	11,13	11,1	0.53	NA	NA	
	20	0.936	9:37	12.27	12.77	0.5	NA	15:16	11.92	12,4	0.54			
SUFUR S	na	41440			•							2 64	0.81	MW3 <sup>(3)</sup>
	10.07	0.807	13-15	8.49	19.10	10.61	1.83	15:55	7,75	18	10.24	4.04	0.01	MW3 <sup>IST</sup>
VER1	12.37	0.007	12.70	0.20	22.22	12.83	1.73	15:52	8.94	20,8	11.84	2.37	V.04	14114
VER2	13,60	0.807	13:20	3.33	~~						•			

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Table 4-1. Summary of Water-Level Measurements Collected on December 12, 1994, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Table 4-1. Summary of Water-Level Measurements Collected on December 12, 1994, Bayonne Plant, Bayonne, New Jersey.

		Low Tide (10:18)					High Tide (16:15)							
Well Designation	Measuring Point Elevation (ft mai)	Product Density {gm/mL}	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness . (fest)	Water-Table Elevation {corrected where applicable] {tt msi}	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation [corrected where applicable] (ft msl)	Water Level <sup>(1)</sup> Difference with Rising Tide	Comments
Existing Moni	toring Wells (continu	ued)												
<u>Intermediate</u>														
DEMM/10	17 48	NA	11:01	NA	11.92	NA	0.56	16:23	NA	11.2	NA	1.26	0.70	
DKMM11	10.33	0.882	11:30	8.96	18.25	9.29	0.26	16:48	7.92	17.7	9.8	1.24	0.98	PKMW11 <sup>III</sup>
PRIMANIA	10.32	0.002	11.40	7 47	16 76	9 34	0.33	17:00	6.35	16.3	9,93	1.32	0.99	PKMW12""
PKMW12	8,90	0.870	11:40	7.42 NA	12.04	NA	-0.06	16:50	NA	10.8	NA	1.23	1.29	
PKMW13	11.98	NA	11:36	11.00	12.04	0.75	0.85	16-15	11.40	12.2	0.75	1.31	0.46	PKMW14 <sup>(2)</sup>
PKMW14	12.77	0.920	10:52	11.86	12.61	0.70	1 35	16.12	NA	10.7	NA	1.59	0.24	
PKMW15	12.28	NA	10:48	NA	10.93	NA	1.35	10:12						

Gram per milliliter. gm/mL

ft msl Feet above mean sea level.

ft bmp Feat below measuring point.

Positive water-level differences indicate water-level increase with rising tide. Negative water-level differences indicate water-level decrease with risks tide. (1)

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121 Density determined by hydrometer analysis at this location.

Well was used on basis for product density determination; density estimated by hydrometer analysis. un,

NA Not applicable.

Not installed. NI

Not surveyed. NS

Measurement not taken. ---

Low tide water level for Monitoring Well EBR11 was low due to active pumping from this well. ٠

... Anamolous values.

... Pump in well on.

These wells are scheduled to be abandoned. t

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				ŀ	ligh Tide (9:	05 a.m.)		Law Tide (2:30 p.m.)				p.m.)		
Well Designation	Measuring-Point Elevation (it mai)	Product Density (gm/mL)	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Teble Elevation (corrected where applicable)	Measuring Time	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Water-Table Elevation (corrected where applicable)	Water-Level <sup>(1)</sup> Difference with the Falling Tide	Comments
Phase IA RI Mo	nitoring Wells					•	· · ·							
Shallow														
GMMW1	9.70	0.885	9:50	3.87	4.35	0.48	5.77	3:06	3.84	4.32	0.48	5.80	0.03	GMMW1 <sup>ch</sup>
GMMW3	15.17	0.970	10:10	9.27	9.71	0.44	5.89	3:29	9.32	9.68	0.36	5.84	-0.05	ECPSB2
intermediate														
GMMW211	13.20	NA	9:38	NA	9,48	NA	3.72	2:57	NA	12.57	NA	0.63	-3.09	
GMMW23I	15.14	NA	10:07	NA	12.17	NA	2.97	3:25	NA	12,11	NA	3.03	0.06	
GMM24I	B.93	NA	10:28	NA	6.40	NA	2.53	3:41	NA	8.70	NA	0.23	-2,30	
Deep							-							
GMMM/21D	17.43	NA	9:41	NA	8.60	NA	3.83	2:59	NA	13,44	NA	-1.01	-4,84	
GMMW27D	10.37	NA	9:55	NA	7.56	NA	2.81	3:09	NA	7.74	NA	2.63	-0.18	
GMMM/23D	16.29	NA	10:03	NA	12.04	NA	3.25	3:23	NA	12.94	NA	2.35	-0.90	
GMMW24D	8.85	NA	10:25	NA	4,67	NA	4.18	3:42	NA	8.80	NA	0.05	-4.13	
Existing Monito	ring Wells													
Shallow														- 19
	0 07	0 901	9.39	NA	7.11	1.81	3.44	2:55	8.89	6.90	0.01	2.02	-1.42	EB2""
	0.34 13 78	0.001	11.20	3.85	3.67	0.02	10.11		-		••	-		AHT#581""
EB25	10./0	NA NA	11.49	4.15	4.16	0.01	11.01			-		-	••	
EB20*	16 23	NA	10:45	5.64	5.65	0.01	10.58	-	-		-	-	-	· · · · · · · · · · · · · · · · · · ·
CD2/	16.23	0.820	10:54	6.29	6.30	0.01	9.77		-	••	-	-	**	AHTFSB1"
CR18-	17.74	0.820	11:00	NA	3.04	NA	14.70		-	-	••	**		AHTFSB1"
EB29*	1/./*	0.020	11-17	NA	2.67	NA	10.38			-		·		AHTESB1"
EB30.	13.00	U.82U		8 18	8.18	0.02	1.88	3:43	8.98	9.00	0.02	1.06	-0.82	Trace of product
EBR13	10.08	nw.	-	0.14										

15 cm

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Table 4-2. Summary of Water-Level Measurements Collected on April 17, 1995, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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High Tide (9:05 a.m.) Low Tide (2:30 p.m.) Water-Level<sup>(1)</sup> Comments Water-Table Measuring Depth to Depth to Product Water-Table Measuring-Point Product Measuring Depth to Depth to Product Well Time Product Water Thickness Elevation **Difference** with Elevation Density Time Product Water Thickness Elevation Designation the Falling Tide (ft bmp) {ft bmp} (feet) (corrected where (om/mL) (ft bmp) (ft bmp) (feet) (corrected where {ft msl} applicable) applicable) . **Existing Monitoring Wells** (continued) Intermediate 11.25 NA 1.23 0.58 NA 11.83 NA 0.65 2:37 NA 9:12 NA PKMW10 12.48 Pump system in well ---------10.32 0.882 ... ----PKMW11 .... -... ... PKMW12<sup>th</sup> 0.1B 0.93 9.30 0.75 7:40 6.79 16.30 9.51 7.0 16.30 PKMW12 8.96 0.870 9:15 11.92 NA 0.05 -0.72 0.78 2:42 NA 11.98 NA 9:20 NA 11.20 NA PKMW13 PKMW14<sup>131</sup> 13,74 1.50 0.81 2.69 2.76 0.70 2:34 11.05 9:06 11.85 14.61 PKMW14 12.77 0.920 EB59<sup>(21</sup> 0.84 2:30 10.43 10.44 0.01 1.84 NA 1.0 9:05 NA 11.28 PKMW15 12.28 NA Gram per milliliter. gm/mL ft mai Feet above mean sea level. Feet below measuring point. ft bmp Positive water-level differences indicate water-level decrease with falling tide. Negative water-level differences indicate water-level increase with falling tide. Density determined by hydrometer analysis at this location. Well was used on basis for product density determination; density estimated by hydrometer analysis. Not applicable. .

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Table 4-2. Summary of Water-Level Measurements Collected on April 17, 1995, Bayonne Plant, Bayonne, New Jersey.

(2)

(3)

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NA

(1)

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NS Not surveyed.

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Measurement not taken. -

Groundwater and product measurements from the "A"-Hill Tank Field area were collected after completion of the first round (high tide) of measurements. Only one round was taken. .

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Operational Area	Reference Points	Difference in Hydraulic Elevation (ft)	Difference in Horizontal Distance (ft)	Hydraulic Gradient (ft/ft)	Flow Direction
Solvent Tank Field	MW10 SWMP1	7	720	0.0097	Northeast
Solvent Tank Field	MW7 EB77	3	430	0.007	Southeast
Piers and East Side Treatment Plant Area	EB77 EBR12	2	1345	0.0015	East
No. 2 Tank Field	GMMW2 ITMW3	10	600	0.0167	Northeast
Main Building Area	EB28 EB98	9	770	0.0117	Northeast
Pier No. 1 Area	EB12 SWMP6	8	500	0.016	Southwest

Table 4-3. Horizontal Hydraulic Gradients, Bayonne Plant, Bayonne, New Jersey. \*

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Horizontal hydraulic gradients were calculated along lines drawn perpendicular to the hydraulic head contours shown on Figure 4-6. Lines for calculating the hydraulic gradients originated and terminated near the reference points listed above.

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Table 4-4. Vertical Hydraulic Gradie	nts, Bayonne	Plant, Bayonne,	New Jersey.

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Well Pair (Screen Zone/ Open Interval)*	Vertical Distance Between Center Point of Screen/Open Interval (feet)	Groundwater Elevation Difference**	Vertical Gradient (f <del>ee</del> t/feet)	Vertical Gradient Direction
GMMW21I (Intermediate) GMMW21D (Deep)	66.6	1.64	0.025	Downward
GMMW23I (Intermediate) GMMW23D (Deep)	40.2	0.68	0.017	Downward
GMMW24I (Intermediate) GMMW24D (Deep)	88.6	0.18	0.002	Downward

All monitoring wells were screened in the overburden material.

•• Synoptic groundwater elevations measured on April 17, 1995. Measurements taken at low tide were used for all calculations.

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		Sample Depth	TPH Concentration
Sample ID	Sample Date	(ft bls)	(mg/kg)
Samples With Concentrations Less Th	an 10,000		
	10/6/94	04	2280
STEIRMB3-14	10/6/94	14	295
3TEIBMB4-02	10/17/94	02	5340
AGTESB3-02	10/27/94	02	7560
AHTESB1-02	10/19/94	02	.7150
AHTESB2-02	10/14/94	02	4900
AHTESB2-06	10/14/94	06	7360
APSB2-02	10/26/94	02	897
APS82-06	10/26/94	06	1170
APSR4-04	10/21/94	04	3390
APS85-02	10/12/94	02	2480
DTSB1-06	10/27/94	06	723
DTSB1-08	10/27/94	08	398
DTSB2-04	10/27/94	04	325
DTSB3-04FB2	10/27/94	04	683
FCIRMB1-02	10/24/94	02	671
ECPSB3-04	10/21/94	04	3950
EGTESB1-04	10/27/94	04	5200
GTEIRMB1-02	10/5/94	02	501
GTEIRMB1-08	10/6/94	.08	1980
GTEIRMB2-02	10/17/ <del>9</del> 4	02	4320
GTEIBMB2-08	10/17/94	08	2550
GTEIBMB3-02	11/16/94	02	2870
GTFIRMB3-10	10/5/94	. 10	8640
GTFIRMB4-02	10/17/ <del>9</del> 4	02	6680
GTFIRMB4-08	10/17/ <del>9</del> 4	08	7190
GTFIRMB5-02	10/5/ <b>94</b>	02	3130
GTEIBMB7-08	10/17/94	08	1460
GTFIRMB8-02	10/18/94	02	9670
GTFIRMB9-02	10/5/94	02	4320
GTFIRMB9-06	10/5/94	02	880
GTESB1-02	10/10/94	02	5900
GTFSB2-02	10/13/94	02	2450
GTFSB3-02	10/10/94	02	776
GTFSB3-08	10/10/94	08	4600
GTESB4-02	10/13/ <del>9</del> 4	02	1940
GTFSB5-02	10/13/94	02	75.2
GTFSB5-08	10/13/94	08	5130
GTFSB6-02	10/11/94	02	5710
GTFSB7-02	10/13/94	02	3530
GFFSB8-02	10/18/94	02	9670
GTFSB9-02	10/13/94	02	4230
GTFSB9-06	10/5/94	06	880

See last page for footnotes.

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GERAGHTY & MILLER, INC.

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		Sample Depth	TPH Concentration
Sample ID	Sample Date	(ft bis)	(mg/kg)
Samples With Concentrations Less	Than 10,000 (continu	ued)	
LAIRMB1-02	10/24/94	02	5320
LAIRMB1-08	10/24/94	08	3460
LOSB3-02	10/24/94	02	2850
LOSB6-04	10/25/94	04	1520
LOSB7-04	10/14/94	04	6030
LOSB11-06	10/25/94	06	6920
LOSB17-02	10/24/94	02	1820
LOSB18-02	10/24/94	02	3370
MBSB2-06	10/21/94	06	9090
MDCSB1-04	10/26/94	04	9730
N2TFB1-04	10/12/94	04	6340
N2TFB2-02	10/19/94	02	520
N2TFB2-06	10/19/94	06	2750
N2TFB3-06	10/19/94	06	596
N2TFB3-10	10/19/94	10	8370
N2TFB6-04	10/19/94	04	453
N2TFB6-06	10/19/94	06	3650
N3TFB2-02	10/19/94	02	9210
N3TFB3-02	10/13/94	02	506
N3TFB4-06	10/17/94	06	1390
N3TFB5-04	10/19/94	04	1090
N3TFB6-06	10/18/94	06	8880
N3TFB8-02	10/18/94	02	4180
N3TFB9-02	11/2/94	02	675
PESTSB2-10	10/20/94	10	5270
PN1SB2-04	11/2/94	04	6060
SSB1-06	10/24/94	06	7900
SSB2-04	10/12/94	04	4280
SSB2-08	10/12/94	08	141
STESB3-04	10/26/94	04	7180
T998SB1-08	10/12/94	08	1510
Samples With Concentrations Gr	eater Than 10.000 Bu	<u>t Less Than 30,000</u>	
3TEIRMB4-06	10/17/94	06	13000
AGTESB3-06	10/27/94	06	_ 26600
AGTESB4-02	10/20/94	02	19500
AHTESB1-04	10/19/94	04	10100
AHTESB4-02	10/14/94	02	15000
AHTESB4-08	10/14/94	08	20900
APSB1-06	10/27/94	06	15100

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Samala ID	Sample Date	Sample Depth (ft bis)	TPH Concentration (mg/kg)
	Obmpie Pete		
Samples With Concentrations	Greater Than 10,000 But	<u>Less Than 30.000 (cc</u>	intinued)
APSB1-10	10/27/94	10	22700
DTSB2-08	10/27/94	08	11500
EC2SB1-04	10/27/94	04	14800
EC2SB1-12	10/27/94	12	11900
ECIRMB1-06	10/24/94	06	17300
FCIRMB3-02	10/19/94	02	27300
FCPS85-02	10/19/94	02	17200
GESB1-02	10/12/94	02	14000
GESB1-06	10/12/94	06	11200
GTEIRMB5-02FR	10/5/94	02	13600
GTEIRMB6-04	10/5/94	04	18400
GTEIRMB6-08	10/5/94	08	23600
GTESBA-08	10/13/94	08	25000
GTESB8-08	10/13/94	08	29400
LOSB3-04	10/24/94	04	13200
10585-08	10/11/94	08	10600
LOSB3-08	10/24/94	08	11600
LOSB0-00	10/25/94	02	22900
LOSB14-02	10/25/94	02	11200
LOSB14-02	10/25/94	06	24100
LOSB14-00	10/24/94	02	28200
LOSB16-08	10/25/94	08	19200
MBSB1-02	10/25/94	02	28400
MBSB1-08	10/25/94	08	28500
MBSB2-02	10/21/94	02	11300
MBSB4-04	10/21/94	04	12400
MBSB4-10	10/21/94	10	19200
MDCSP2-02	10/11/94	03	14600
MDCSB2-03	10/26/94	08	14300
NOTEDI AN	10/12/94	08	16900
NOTERE OO	10/19/94	02	29600
N2TERA.02	10/17/94	02	19200
NOTEDE 09	10/19/94	08	10000
NJ1502-00	11/2/94	08	12700
PCCR1_02	10/31/94	02	28800
CCB2.06	10/3//04	06	18100
3303°00 CCP2.10	10/24/34 10/2 <i>4</i> /94	10	22400
SSS-IV	10/24/54	04	13400
317302-04 T009601 04	10/20/34	∩4 ∩4	14300
1330301-04	10/12/34	~~	

See last page for footnotes.

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		Sample Depth	TPH Concentration
Sample ID	Sample Date	(ft bis)	(mg/kg)
Samples With Concentrations Great	ter Than 30.000		
AGTESB1-02	10/20/94	02	69200
AGTESB1-06	10/20/94	06	129000
AGTFSB2-04	10/28/94	04	53800
AGTFSB4-06	10/20/94	06	43000
AHTFSB3-06	10/20/94	06	41400
AHTFSB3-10	10/20/94	10	50600
APSB3-06	10/21/94	06	62100
APSB4-08	10/21/94	08	39700
APSB5-06	10/12/94	06	69000
APSB6-06	10/21/94	06	333000
APSB6-10	10/21/94	10	84700
DTSB3-04	10/27/94	04	74200
DTSB3-04FR1	10/27/94	04	76900
ECIRMB3-06	10/19/94	06	70500
ECPSB1-02	10/20/94	02	44500
ECPSB1-08	10/20/94	08	154000
ECPSB2-06	10/20/94	06	115000
ECPSB2-12	10/20/94	12	125000
ECPSB4-08	10/19/94	08	110000
ECPSB5-08	10/19/94	08	37400
GTFIRMB5-06	10/5/94	06	220000
GTFIRMB7-02	10/17/94	02	33600
GTFIRMB8-08	10/18/94	08	373000
GTFSB1-08	10/ <b>10/94</b>	08	479000
GTFSB2-08	10/13/94	08	53500
GTFSB4-08FR	10/13/94	08	30300
GTFSB6-12	10/11/94	12	95400
GTFSB7-08	10/13/94	08	37300
GTFSB8-04	10/13/94	04	52300
GTFSB9-08	10/13/94	08	92200
LOSB1-04	10/25/94	04	86500
LOSB1-08	10/25/94	08	/0800
LOSB2-04	10/14/94	04	109000
LOSB2-08	10/14/94	08	96800
LOSB4-02	10/24/94	02	40500
LOSB4-06	10/24/94	06	31700
LOSB5-04	10/11/94	04	51900
LOSB8-02	10/24/94	02	64500 50000
LOSB9-02	10/25/94	02	53000
LOSB9-06	10/25/94	06	110000
LOSB10-04	10/28/94	04	41300
LOSB10-08	10/28/94	08	32300

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		Sample Depth	TPH Concentration
Sample ID	Sample Date	(ft bis)	(mg/kg)
Samples With Concentrations Gre	eater Than 30.000 (con	tinued)	
LOSB12-02	10/25/94	02	33200
LOSB12-02	10/25/94	06	47900
LOSB12-00	10/31/94	02	83700
LOSB13-02FB1	10/31/94	02	80600
LOSB13-02FR2	10/31/94	02	59100
LOSB13-08	10/31/94	08	81400
LOSB16-04	10/25/94	04	33000
LOSB18-08	10/24/94	08	371000
LOSB18-08FR	10/24/94	08	135000
MBSB3-06	10/25/94	06	47900
MBSB3-10	10/25/94	10	138000
MBSB3-10FR	10/25/94	10	164000
N2TFB4-02	10/28/94	02	49600
N2TFB4-06	10/28/ <del>9</del> 4	06	82900
N2TFB5-06	10/19/94	06	93000
N3TFB1-02	10/18/94	02	61900
N3TFB1-12	10/18/94	12	44300
N3TFB2-06	10/19/94	06	43700
N3TFB2-06FR	10/19/94	06	85000
N3TFB3-08	10/13/94	08	36700
N3TFB6-02	10/18/94	02	126000
N3TFB7-02	10/18/94	02	166000
N3TFB7-06	10/18/94	06	146000
N3TFB8-06	10/18/94	06	146000
PESTSB1-04	10/20/94	04	34400
PSSB1-06	10/31/94	06	42000
SSB1-16	10/24/94	16	72000
STFSB1-02	10/26/94	02	46500
STFSB1-06	10/26/94	06	40500
STFSB2-08	10/26/94	08	51000
Field Blanks			
FBNA1-100594	10/5/94		0.3
FBNA2-100694	10/6/94		0.250
FBNA3-101194	10/11/94		.0.25U
FBNA4-101394	10/13/94	<b>←</b>	0.250
FBNA5-101994	1019/94		0.250
FBNA6-102094	10/20/94		0.250
FBNA7-102194	10/21/94	••	0.250
FBNA7-102594	10/25/94		0.250
FBNA8-102594	10/25/94		0.250

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Sample ID	Sample Date	Sample Depth (ft bls)	TPH Concentration (mg/kg)
Field Blanks (continued)			
			0.2511
FBNA9-102694	10/26/94		0.250
FBNA10-102694	10/26/94		0.250
FRNA11-102794	10/27/94		0.250
EDNA 12-102794	10/27/94		0.25U
FDNA12-102704	10/28/94		0.250
FBNA 13-102094	10/20/04		0.250
FBNA14-102894	10/20/94		0.2511
FBNA15-102894	10/28/94		0.200
FBNA16-102894	10/28/94	-	0.250
FBNA17-103194	10/31/94		0.250

Analyte concentrations and New Jersey Department of Environmental Protection (NJDEP) criteria in milligrams per kilogram (mg/kg) (parts per million [ppm]).

Analyses were performed by CompuChem Environmental Corporation, Research Triangle Park, North Carolina, using New Jersey Modified U.S. Environmental Protection Agency (USEPA) Method 418.1.

TPH Total petroleum hydrocarbons.

FBNA Indicates a field blank associated with non-aqueous samples.

FR Field replicate of previous sample.

ft bis Feet below land surface

mg/kg Milligrams per kilogram

Not applicable.

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Table 5-2.	Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.	
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	NJDE	P Soli Cleanup Cr	iteria *	Sample ID: Depth:	3TFIRMB4 02 N3TE	3TFIRMB4 06 N3TF	AGTFSB1 02 AGTF	AGTFSB1 06 AGTF	AGTFSB2 04 AGTF	AGTFSB3 02 AGTF	AGTFSB3 06 AGTF	AGTFSB4 02 AGTF
Applicate (ug/kg)	Residential	Non-Residential	Groundwater	Date:	10/17/94	10/17/94	10/20/94	10/20/94	10/28/94	10/27/94	10/27/94	10/20/94
Andiate (08/48/												1 2(1
1 1 1-Trichlorosthans	210000	1000000	50000		12U	1400U	1600U	16000	14000	120	810	120
1 1 2 2-Tetrachlorgethane	34000	70000	1000		12U	1400U	1600U	1600U	14000	120	610	120
1 1 2 Trichloroathans	22000	420000	1000	*	120	1400U	1600U	1600U	1400U	120	610	120
1.1-Dichloroethene	570000	1000000	10000		1 <b>2</b> U	14000	1600U	16000	14000	120	610	120
1.1-Dichloroethene	8000	150000	10000		12U	1400U	1600U	1600U	1400UJ	120	1001	2411
1. 2-Dibromosthene	••	••			24U	2900U	3 200U	3200U	28000	240	1200	240
	6000	24000	1000		120	1400U	1600U	1600U	1400U	120	610	120
1,2-Dichloroethane	1079000	2000000	51000		12U	14000	1600U	1600U	1 <b>400U</b>	120	610	120
1.2-Dichioroethene(Total)	10000	43000			12U	1400U	1600UJ	1600U	1400UJ	120	610	120
1,2-Dichloropropane	10000				600U	74000UJ	81000U	280000	71000UJ	600U	30000	6000
1-Butanol	-	_			600U	74000UJ	\$1000U	81000U	71000U	600U	30000	6000
2-Butanol	1000000	1000000	50000		12UJ	1400UJ	1 600UJ	1600UJ	1400UJ	120	61UJ	1203
2-Butanone	1000000				1 2U	1400UJ	1600UJ	1600UJ	1400UJ	120	61U	120
2-Hexanone		-	-		600U	74000UJ	81000U	81000U	71000UJ	600U	30000	6000
2-Methyl-2-propanol					600U	74000UJ	81000U	81000U	71000U	\$00U	300000	8000J
2-Propanol		1000000	50000		12U	1400U	1 600U	16000	1 <b>400U</b>	12U	610	120
4-Methyl-2-pentanone	1000000	1000000	100000		16U	1400UJ	1600UJ	1600UJ	1400UJ	180	210UJ	32UJ
Acetone	100000	12000	1000		120	1 400U	1600U	1600U	1400U	120	12J	4J
Benzene	3000	48000	1000		1 2U	1400U	1 600U	1600U	14000	120	610	120
Bromodichloromethene	11000	370000	1000		120	1400U	1600U	1 500U	1400U	· 12U	61U	120
Bromoform	86000	370000	1000		120	1400U	1600U	1600U	1400U	120	610	120
Bromomethane	/9000	1000000			120	1400UJ	1800U	1600U	1400UJ	1 2 U	610	120
Carbon disulfide		4000	1000		120	14000	1600U	1600U	1400U	120	610	120
Carbon tetrachloride	2000	4000	1000		120	190J	1600U	1600U	1400U	12U	61U	120
Chlorobenzene	37000	680000	1000		120	1400UJ	1600U	1600UJ	14000	120	610	120
Chloroethane			1000		120	1400U	16000	1600U	,1400U	1 2U	610	120
Chloroform	19000	28000	1000		120	1400UJ	1600UJ	1600UJ	1400UJ	120	61U	120
Chloromethane	520000	1000000	10000		120	1400U	1600U	16000	1 400U	12U	61U	120
Dibromochloromethane	110000	1000000	1000		1 211	14000	1 600U	1600U	190J	12U	61U	1J
Ethylbenzene	1000000	1000000	100000		2411	29000	3200UJ	3200UJ	2800UJ	<b>2</b> J	28J	10J
Hexene					240	29000	3200U	3200U	2800U	24U	120U	24U
Methyl-t-butyl ether					240	20000	+ <del>-</del>					

See last page for footnotes.

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	NJDE	P Soil Cleanup C	iteria * Impact to	Semple ID: 3TFIRMB4 Depth: 02 Zone**: N3TF	3TFIRMB4 06 N3TF	AGTFSB1 02 AGTF	AGTFSB1 06 AGTF	AGTFSB2 04 AGTF	AGTFSB3 02 AGTF	AGTFS83 06 AGTF	AGTFSB4 02 AGTF
Analyte (ug/kg)	Residential	Non-Residential	Groundwater	Date: 10/17/94	10/17/94	10/20/94	10/20/94	10/28/94	10/27/94	10/27/94	10/20/34
Mathylana chlorida	49000	210000	1000	130	1400U	1600U	16000	1400U	28U	130UJ 720	12U 24U
n-Propylbanzene Styrene	- 23000	 97000	 100000	24U 12U	1200J 1400U	3200U 1600U	1600U	1400U	120	61U	120
Tetrachioroethene	4000	6000 1000000	1000 500000	12U 12U	1400U 1400U	1600U 1600U	1600U 1600U	1400U 1400U	120 120	9J	2J
Frichloroethene	23000	54000	1000	12U 12U	1400U 1400UJ	1600U 1600U	1 600U 1 600UJ	1400U 1400U	12U 12U	61U 61U	12U 12U
/inyl chloride (ylenes (Total)	410000	1000000	10000	120	1400U	1600U	1600U 1600U	1400U 1400U	12U 12U	78 61U	2J 12U
sis-1,3-Dichloropropene trans-1,3-Dichloropropene	4000 4000	5000 5000	1000	120	14000	16000	1600U	14000	120	61U	12U
Fotal Volatile Organic Compo	unds			o	1390	0	293000	190	2	847	19

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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				Sample ID: AHTFSB1	AHTFSB2	AHTFSB4	AHTFSB4	APSB2	APSB5	APSB5	APSB6
		P Soil Cleanup C	riteria *	Depth: 02	02	02	08	02	102	AP	AP
			Impact to	Zone**: AHTF	AHTE	AHIF	AHIF	AF 10/28/94	10/12/94	10/12/94	10/21/94
Analyte (ug/kg)	Residential	Non-Residential	Groundwater	Date: 10/19/94	10/14/94	10/14/94	10/14/94	10/20/34	10/12/04		
					14000	12001	1400U	120	110	15000	110
1,1,1-Trichloroethene	210000	1000000	50000	110	14000	12000	14000	120	110	1500U	110
1,1,2,2-Tetrachioroethane	34000	70000	1000	110	14000	12000	14001	1 21	110	1500U	110
1,1,2-Trichloroethane	22000	420000	1000	110	14000	13000	14000	120	110	1500U	110
1,1-Dichloroethane	570000	1000000	10000	110 4	14000	13000	14000	1 211	110	1500U	110
1,1-Dichloroethene	8000	150000	10000	110	14000	13000	28000	2311	2111	3200U	22U
1,2-Dibromosthans			-	220	29000	28000	28000	120	1111	1500UJ	110
1,2-Dichloroethane	6000	24000	1000	110 -	14000	130000	14000	5 211	110	15000	110
1,2-Dichloroethens(Total)	1079000	2000000	51000	110	14000	13000	14000	120	110	1500U	110
1,2-Dichloropropane	10000	43000		110	14000	13000	70000111	58011	53011	80000	560U
1-Butenol	**			540UJ	720000	690000	7000000	5800	5300.0	80000U	560U
2-Butanol	••		••	5400	720000	690000	1400003	12111	110	1500UJ	14J
2-Butanone	1000000	1000000	50000	8J	1400UJ	130000	140003	1205	110	1500UJ	110
2-Hexanone	**			11UJ	1400UJ	130003	740003	52017	530111	80000U	5600
2-Methyl-2-propenol				540U	720000	690000	7000000	5800	53001	800000	560UJ
2-Propanol	-		••	540UJ	720000	690000	140000	58005	1111	15000	110
4-Methyl-2-pentanone	1000000	1000000	50000	11UJ	14000	13000	14000	120	150	1500UJ	50UJ
Acetona	1000000	1000000	100000	51UJ	1400UJ	1300UJ	140005	1305	110	15000	2.J
Benzene	3000	13000	1000	110	14000	13000	14000	120	1111	15000	110
Bromodichioromethane	11000	46000	1000	110	14000	13000	14000	120	110	15000	110
Bromoform	86000	370000	1000	110	1400U	13000	14000	120	1111	15000	110
Bromomethane	79000	1000000	1000	11U	1400U	13000	14000	120	1113	15000.0	110
Carbon disulfide				110	1400UJ	130003	140003	120	110	1500U	110
Carbon tetrachloride	2000	4000	1000	110	14000	13000	14000	120	110	390J	110
Chlorobenzene	37000	680000	1000	110	14000	13000	14000	120	111	15000	110
Chloroethane		••		110	14000	13000	14000	120	110	15000.J	110
Chloroform	19000	28000	1000	110	14000	1300UJ	14000	120	110	15000	110
Chloromethane	520000	1000000	10000	11UJ	14000	13000	14000	120	110	15000	110
Dibromochloromethane	110000	1000000	1000	110	14000	13000	14000	1011	111	1500U	91
Ethylbenzene	1000000	1000000	100000	4J	1400U	13000	*2000 7801	120	11	32000	22U
Hexane	••			22U	2900U	28000	17000	230	2111	32000	22U
Methyl-t-butyl ether				220	2900U	28000	28000	230	210	02000	

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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	NJDE	P Soil Cleanup C	ritoria •	Sample ID: AHTFSB1 Depth: 02	AHTFSB2 02	AHTFSB4 02	AHTFSB4 08	APSB2 02	APS85 02	APS85	APSB6 O6 AP
			Impact to	Zone**: AHTF	AHTF	AHTE	AHTE	AP 10/26/94	AP 10/12/94	AF 10/12/94	10/21/94
Analyte (ug/kg)	Residentia	Non-Residential	Groundwater	Date: 10/19/94	10/14/94	10/14/94	10/14/34	10/20/34	10/12/04		
Methylene chloride	49000	210000	1000	11UJ	1400U	1300U	1400U	23UJ	18U	21000	19UJ
n-Propylbenzene			••	82	1300J	12000	7300	230	210	40000	1111
Styrene	23000	97000	100000	110	1400U	1300U	1400U	120	110	15000	110
Tetrachloroethene	4000	6000	1000	110	1400U	1300U	1 <b>400</b> U	120	110	15000	110
Tokiese	1000000	1000000	500000	110	1400U	1300U	1400U	120	110	300J	<b>9</b> ]
Trichlesethere	23000	54000	1000	110	1400U	1300U	1400U	120	110	1500U	110
	20000	7000	10000	110	1400U	1300U	1400U	12U	11U	1500U	110
	2000	100000	10000	1.1	1400U	1300U	610J	12U	110	1500U	14
Xylenes (Total)	410000	500000	10000	111	1400U	1300U	1400U	12U	110	1500U	110
cis-1,3-Dichloropropene	4000	5000	1000	110	14000	13000	1400U	12U	11UJ	1500U	110
trans-1,3-Dichloropropene	4000	5000	1000	110	14000						
Total Volatile Organic Compo	unde			95	1300	12000	25890	0	1	40690	54

Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Analyte (ug/kg)	NJDEP Soil	Cleanup Criteria	Impact to Groundwater	Sample ID: Depth: Zone**: Date:	APSB6 10 AP 10/21/94	DTS83 04 DT 10/27/94	DTSB3FR 04 DT 10/27/94	ECiRMB1 02 U 10/24/94	ECIRMB3 02 N3TF 10/19/94	ECIRMB3 06 N3TF 10/19/94	ECPSB1 02 ECP 10/20/94	ECPS82 06 ECP 10/20/94	ECPSB2 12 ECP 10/20/94
			70000		2800	1500U	15000	120	110	7900U	1400U	110	56000U
1,1,1-Trichloroethane	210000	1000000	50000		14000	15000	15000	120	110	7900U	1 <b>40</b> 0U	110	56000U
1,1,2,2-Tetrachloroethane	34000	70000	1000		16000	15000	1500U	120	110	7900U	14000	11U	58000U
1,1,2-Trichloroethene	22000	420000	1000		10000	15000	15000	121	110	7900U	1400U	110	56000U
1,1-Dichloroethane	570000	1000000	10000		10000	15000	15000	120	110	7900U	1400U	11U	56000U
1,1-Dichloroethene	8000	150000	10000		10000	19000	20000	2311	220	16000U	2900U	23U	120000U
1,2-Dibromosthane					32000	30000	15000	1211	110	79000	1400U	11U	56000U
1,2-Dichloroethane	6000	24000	1000		10000	150000	15000	1211	110	7900U	1400U	110	56000U
1,2-Dichloroethene(Total)	1079000	2000000	51000		16000	15000	15000	120	110	7900U	1400UJ	110	56000UJ
1,2-Dichleropropane	10000	43000			16000	15000	7800000	52011	5600	410000U	720000	570UJ	2900000U
1-Butanoi			••		81000UJ	760000	7600000	58000	5600	410000U	72000U	570UJ	2900000U
2-Butanol	-		••		8100003	150000	150000	12111	1111	7900UJ	1400UJ	11UJ	56000UJ
2-Butanone	1000000	1000000	50000		160003	150000	150003	1200	110	7900UJ	1400UJ	110	56000UJ
2-Hexanone	- '	*-			160000	150000	760000	520111	5600	410000U	72000U	570UJ	2900000U
2-Methyl-2-propanol		••			810000	760000	780000	580111	5600.	410000U	72000U	570UJ	2900000U
2-Propanol	••				810000J	150000	150000	1213	1111	7900U	14000	110	56000U
4-Methyl-2-pentanone	1000000	1000000	50000		16000	15000	15000	20111	110	7900UJ	1400UJ	38UJ	56000UJ
Acetone	1000000	1000000	100000		1600UJ	150000	150000	1211	110	7900U	1400U	43	56000U
Benzene	3000	13000	1000		16000	15000	15000	120	110	79000	1400U	11U	56000U
Bromodichloromethane	11000	46000	1000		16000	15000	15000	120	110	7900U	1400U	110	56000U
Bromoform	86000	370000	1000		16000	15000	15000	120	110	7900U	1400U	110	56000U
Bromomethane	79000	1000000	1000		16000	15000	15000	120	110	79000	1400UJ	2J	56000UJ
Cerbon disulfide	-				16000	15000	150003	120	110	7900U	1400U	11U	56000U
Carbon tetrachloride	2000	4000	1000		16000	15000	15000	1211	110	110000	280J	8100	<u>980000J</u>
Chlorobenzene	37000	680000	1000		6900	15000	15000	121	110	7900UJ	1400UJ	11U	56000UJ
Chloroethane					180000	15000	15000	120	110	7900U	1400U	110	56000U
Chloroform	19000	28000	1000		16000	15000	15000	121	110	7900UJ	1400UJ	11UJ	56000UJ
Chloromethane	520000	1000000	10000		160001	15000	15000	1211	110	7900U	1400U	110	56000U
Dibromochloromethane	110000	1000000	1000		16000	15000	15000	121	110	79000	1 <b>400</b> U	100	13000J
Ethylbenzene	1000000	1000000	100000		16000	15000	200011	21	220	16000UJ	2900U	10J	110000J
Hexane			~		3200UJ	30000	20000	230	220	16000U	2900U	23U	1200000
Methyl-t-butyl ether					32000	30000	50000						

Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

GERAGHTY & MILLER, INC.

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Anelyte (ug/kg)	NJDEP Soil	Cleanup Criteria Non-Residential	Impact to Groundwater	Sample ID: Depth: Zone**: Date:	APS86 10 AP 10/21/94	DTS83 04 DT 10/27/94	DTSB3FR 04 DT 10/27/94	ECIRMB1 02 U 10/24/94	ECIRMB3 02 N3TF 10/19/94	ECIRMB3 06 N3TF 10/19/94	ECPSB1 02 ECP 10/20/94	ECPSB2 06 ECP 10/20/94	ECPSB2 12 ECP 10/20/94
Methylene chloride n-Propylbenzene Styrene Tetrachloroethene Toluene Trichloroethene Vinyl chloride Xylenes (Totel) cis-1,3-Dichloropropene trane-1,3-Dichloropropene Totel Volatile Organic Compo	49000  23000 4000 1000000 23000 23000 2000 410000 4000 4000	210000 97000 6000 1000000 54000 7000 1000000 5000 5000	1000 1000 50000 1000 1000 10000 10000 1000		1600U 6800 1600U 1600U 1600U 1600U 1600U 1600U 1600U 1600U	1500U 3000U 1500U 1500U 1500U 1500U 1500U 1500U 1500U 1500U	1500U 3000U 1500U 1500U 1500U 1500U 1500U 1500U 1500U 1500U	12UJ 23U 12U 12U 12U 12U 12U 12U 12U 12U 12U	11UJ 22U 11U 11U 11U 11U 11U 11U 11U 11U	7900U 13000J 7900U 7900U 7900U 7900UJ 1000J 7900U 7900U 7900U	1400U 1100J 1400U 1400U 1400U 1400U 1400U 1400U 1400U 1400U 1400U	24UJ 120 11U 11U 10J 11U 11UJ 120 11U 11U 8505	56000U 120000U 56000U 56000U 11000J 56000U 56000UJ 56000U 56000U 56000U 1162000

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jarsey.

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			iento 9	Semple ID; ECPSB4	ECPSB5	GFSB1	GTFIRMB1	GTFIRMB2 02	GTFIRMB3 02	GTFIRMB4 02
Aneivte (ua/ka)	Residential	Non-Residential	Impact to Groundwater	Zone **: ECP Date: 10/19/94	ECP 10/19/94	STF 10/12/94	GTF 10/06/94	GTF 10/17/94	GTF 10/05/94	GTF 10/17/94
										1.011
1.1.1-Trichloroethane	210000	1000000	50000	120	170	14000	110	110	110	120
1.1.2.2-Tetrachiorosthane	34000	70000	1000	12U	170	1400U	110	110	110	120
1.1.2-Trichloroethane	22000	420000	1000	12U	170	14000	110	110	110	120
1.1-Dichioroethane	570000	1000000	10000	12U	170	1400U	110	110	110	120
1 1-Dichioroethene	8000	150000	10000	120	170	1400U	110	110	110	120
1.2-Dibromoethene			-	240	33U	2800U	220	230	220	240
	6000	24000	1000	12U	170	1400U	110	110	110	120
1,2-Dichlososthene(Totel)	1079000	2000000	51000	12U	170	1400U	110	110	110	120
	10000	43000		12U	170	1400U	110	110	110	120
1,2-Dichloropropane	10000			000 <del>0</del>	830U	71000U	560UJ	570UJ	550UJ	6000
1-Butanol				600U	830U	71000U	580UJ	570UJ	550UJ	900U
2-Butanol		100000	50000	12UJ	1703	1400UJ	110	11UJ	110	2J
2-Butanona	1000000	1000000	-	120	170	1400UJ	110	110	110	120
2-Hexanone			-	BOOU	830U	71000U	560UJ	570UJ	550UJ	600U
2-Methyl-2-propenol	••	••		60000	830UJ	71000U	560UJ	570UJ	550UJ	600UJ
2-Propanol		-		121	170	1400U	7J	110	110	12U
4-Methyl-2-pentenone	1000000	1000000	100000	1911	3601	1400UJ	33U	130	130	13U
Acetone	1000000	1000000	100000	111	41	1400U	110	110	110	120
Benzene	3000	13000	1000	171	170	14000	110	110	110	12U
Bromodichloromethane	11000	46000	1000	120	170	14000	110	110 -	110	12U
Bromoform	86000	370000	1000	120	170	14000	110	11U	110	1 2U
Bromomethane	79000	1000000	1000	120	170	1400U	110	110	110	12U
Carbon disulfida		••		120	170	140000	110	110	110	1 2 U
Carbon tetrachloride	2000	4000	1000	120	170	140005	110	110	110	12U
Chlorobenzene	37000	680000	1000	6J	330	14000	1111	110	110	12U
Chloroethane		**		120	170	14000	110	110	110	1 2 U
Chloroform	19000	28000	1000	120	170	14000	110	1101	110	12U
Chloromathane	520000	1000000	10000	- 12U	170	14000J	110	1100	110	12U
Dibromochioromethene	110000	1000000	1000	120	170	14000	110	110	110	120
Ethylbenzene	1000000	1000000	100000	4J -	170	14000	110	21	3.1	1J
Usvana				78	4J	2800UJ	LI LI	2.1	2211	2411
Mathudat hutul ather				24U	33U	2800U	220	230	220	244

Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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	NJDE	NJDEP Soil Cleanup Criteria *			ECPSB5 02	GFSB1 02	GTFIRMB1 02	GTFIRM82 02	GTFIRMB3 02	GTFIRMB4
Analyte (ug/kg)	Residential	Non-Residentisi	impact to Groundwater	Zone**: ECP Date: 10/19/94	ECP 10/19/94	STF 10/12/94	GTF 10/08/94	GTF 10/17/94	GTF 10/05/94	GTF 10/17/94
	49000	210000	1000	21UJ	33UJ	1400U	27Ų	18U	27U	15U
	40000			4J	14J	1400J	220	23U	22U	24U
h-Propylbenzene	12000	97000	100000	12U	17U	1400U	110	11U	11U	12U
styrene	23000	\$7000	1000	120	170	1400U	110	110	110	1 2U
letrachieroethene	4000	1000000	E00000	2_; 2.1	170	250J	1J	11U	110	120
foluene	1000000	1000000	1000	1 21 1	171	14000	110	110	11U	1 2 U
Frichloroathene	23000	54000	1000	120	170	14000	110	110	11U	1 2U
/inyl chloride	2000	7000	10000	120 81	170	280.1	110	110	110	1 2U
(ylenes (Totel)	410000	1000000	10000	0J 1.0111	170	14000	110	110	110	12U
cis-1,3-Dichloropropene	4000	5000	1000	1205	170	14000	1101	110	11UJ	1 2 U
rans-1,3-Dichloropropene	4000	5000	1000	120	170	14000				
Total Volatile Organic Compo	unde			112	352	1930	9	2	3	3

Table 5-2. Volatile Organic Compounds in Soll Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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				Sample ID: GTFIRMB5	GTFIRMB5FR	GTFIRM85	GTFIRMB6	GTFIRMB7	GTFIRMB8	GTFIRMB
	NJDE	P Soil Cleanup Cr	iteria *	Depth: 02	02	06	04	02	02	08
			Impact to	Zona**: GTF	GTF	GTF	GTF	GTF	GTF	GTF
Analyte (ug/kg)	Residential	Non-Residential	Groundwater	Date: 10/05/94	10/05/94	10/05/94	10/05/94	10/17/94	10/18/94	10/18/94
1,1,1-Trichloroethane	210000	1000000	50000	1 2U	130	13U	15U	110	110	130
1,1,2,2-Tetrachioroethane	34000	70000	1000	1 2U	130	1 <b>3</b> U	15U	110	110	130
1.1.2-Trichlorosthane	22000	420000	1000	1 2U	130	130	150	110	110	130
1.1-Dichloroethane	570000	1000000	10000	120 4	13U	13U	150	110	110	130
1.1-Dichloroethene	8000	150000	10000	1 2U	130	13U	150	110	110	130
1.2-Dibromoethane				25U	25U	26U	29U	230	230	260
1 2-Dichloroethene	6000	24000	1000	12U	130	13U	150	110	110	130
1 2-Dichlorgethene(Total)	1079000	2000000	51000	12U	13U	13U	150	110	110	130
1.2-Dichlorontopana	10000	43000		12U	13U	130	150	110	110	130
1,2-Dicradiopropulio				620U	630U	680UJ	740U	570U	570UJ	650U
1 Butanol		++ <b>-</b>		620UJ	630UJ	660UJ	740UJ	570U	570U	650U
2-Butenon	1000000	1000000	50000	42J	14J	55	12J	11UJ	11UJ	13ŲJ
2-Butandria		-		12UJ	13UJ	13U	15UJ	110	11UJ	130
2-rtexanone				62QU	630U	660UJ	7 <b>4</b> 0U	570U	570U	650U
2-Mathyi-2-properior				620U	630U	650UJ	7 <b>4</b> 0Ų	570UJ	570UJ	650UJ
	1000000	1000000	50000	10J	13U	160	15U	110	11UJ	130
4-ivetryi-2-pentenono	1000000	1000000	100000	170	49U	160	58U	110	16UJ	150UJ
Acetone	3000	13000	1000	1 2U	130	6J	12J	110	110	130
Banzene	11000	46000	1000	12U	13U	13U	150	110	110	13U
Bromodicnioromethane	86000	370000	1000	12U	13U	13U	15U	110	110	13U
Bromotorm	79000	100000	1000	1 2U	13U	13U	150	110	110	13U
Bromomethene	/3000			12U	13U	13U	15U	110	110	13U
	2000	4000	1000	12U	13U	13U	15U	110	110	13U
Carbon tetrachiorida	2000	680000	1000	12U	130	13U	3J	11U	110	40
Chiorobenzene	37000			1 2U	130	13U	15U	110	110	130
Chioroethane	10000	78000	1000	120	13U	13U	1 <b>5</b> U	110	43	130
Chloroform	19000	1000000	10000	12UJ	13UJ	130	15UJ	110	11UJ	13U
Chloromethane	520000	1000000	1000	12U	13U	130	15U	110	110	130
Dibromochloromethane	110000	1000000	100000	120	130	12J	35	110	110	130
Ethylbenzene	1000000	1000000	100000	2.1	1J	9J	зJ	2J	2J	4J
Hexane Methyl-t-butyl ether	•• ••			25U	<b>25</b> U	26U	29UJ	23U	230	26U

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Teble 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jereey.

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GERAGHTY & MILLER, INC.

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Analyte (ug/kg)	NJDE Residential	P Soil Cleanup Cl Non-Residential	iteria * Impact to Groundwater	Semple ID: GTFIRMB5 Depth: 02 Zone**: GTF Dete: 10/05/34	GTFIRM85FR 02 GTF 10/05/94	GTFIRM85 06 GTF 10/05/94	GTFIRMB6 04 GTF 10/05/94	GTFIRMB7 02 GTF 10/17/94	GTFIRMB8 02 GTF 10/18/94	GTFIRM <b>B8</b> 08 GTF 10/18/94
Methylene chloride n-Propylbenzene Styrene Tetrachioroethene Toluene Trichloroethene Vinyl chloride Xylenes (Total) cis-1,3-Dichloropropene trans-1,3-Dichloropropene Total Volatile Organic Compou	49000  23000 4000 1000000 23000 23000 2000 410000 4000 4000	210000 97000 6000 1000000 54000 7000 1000000 5000 5000	1000  10000 1000 500000 1000 10000 10000 10000 1000	29U 2J 12U 9J 12U 9J 12U 12U 10J 12U 12UJ 245	13U 25U 13U 13U 3J 13U 13U 5J 13U 13U 13UJ	25U 7J 13U 13U 62 13U 13U 45 13U 13UJ 516	32U 44 15U 3J 20 15U 15U 42 15U 15U 15UJ	19U 23U 11U 11U 11U 11U 11U 11U 11U 11U 11U	25UJ 23U 11U 11U 11U 11U 11U 11U 11U 11U 11U	43UJ 18J 13U 13U 13U 13U 13U 12J 13UJ 13U 13U

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Table 5-2, Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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				Sample ID: GTFIRM89	GTFSB1	GTFSB1	GTFSB2	GTFSB3	GTFSB4	GTFSB5	GTFSB6	GTFSB7
		P Soil Cleanup C	riteria •	Depth: 02	02	08	UZ CTE	UZ GTE	OZ GTE	GTE	GTF	GTF
			impact to	Zone**: GTF	GTF	GIF	GIF 10/13/04	10/10/94	10/13/94	10/13/94	10/11/94	10/13/94
Analyte (ug/kg)	Residential	Non-Residential	Groundwater	Date: 10/05/94	10/10/94	10/10/94	10/13/94	10/10/54	10113/34	10/10/04		
	010000	1000000	50000	120	120	17000	120	1.2U	11U	110	110	110
1,1,1-Trichloroethene	210000	7000000	1000	120	120	17000	12U	12UJ	11U	11U	1 <b>1U</b>	110
1,1,2,2-Tetrachioroethane	34000	70000	1000	120	120	17000	12U	120	110	11U	110	110
1,1,2-Trichlorosthans	22000	420000	1000	120	1211	1700U	120	12U	110	110	110	110
1,1-Dichloroethane	570000	1000000	10000	120	120	1700U	120	120	11U	110	1 TU	11U
1,1-Dichloroethene	8000	150000	10000	120	2411	26000	250	240	22U	220	23U	23U
1,2-Dibromoethane	-			250	240	170000	1211	120	110	110	110	110
1,2-Dichloroethane	6000	24000	1000	120	120	170000	120	1 211	110	110	110	110
1,2-Dichloroethene(Total)	1079000	2000000	51000	120	120	17000	120	120	110	110	110	110
1,2-Dichloropropane	10000	43000	-	120	120	17000	120	500111	FACUL	5400.1	570U	570UJ
1-Butanol				620U	600UJ	910000	62000	53005	58011	5400	570UJ	570U
2-Butanol				620UJ	600UJ	910000	6200J	100	1111	1111	1103	11UJ
2-Butanone	1000000	1000000	50000	12UJ	120	170003	11J	120	1100	110	110.1	110
2-Hexanone	-		-	12UJ	120	1700UJ	120	120	EROLL	540111	5700	570UJ
2-Methyl-2-propanol	-			620U	600UJ	91000U	620UJ	5900	50000	54003	5701	570UJ
2-Propanel				620U	LU003	910000	820UJ	5900	50003	34000	1 111	110
4-Methyl-2-pentanone	1000000	1000000	50000	120	1 2U	1700U	120	120	110	110	160	270
Acetone	1000000	1000000	100000	1BU	170	1700UJ	66U	200	270	180	1100	1111
Benzene	3000	13000	1000	12U	120	1700U	120	120	110	110	110	110
Bromodichloromethane	11000	46000	1000	1 2U	12U	17000	120	120	110	110	110	110
Bromotorm	86000	370000	1000	12U	12U	1700U	120	120	110	110	110	1111
Bromorothane	79000	1000000	1000	120	120	1700U	120	120	1100	1103	110	110
	-		•	120	12U	1700UJ	120	120	110	110	110	110
	2000	4000	1000	120	12U	1700U	120	120	110	110	110	110
Carbon tetrachionde	37000	680000	1000	120	120	1700U	2J	12U	110	110	110	110
Chlorobenzene	37000			120	120	17000	120	12U	11UJ	11UJ	110	1105
Chloroethane	18000	28000	1000	12U	12U	1700UJ	120	12U	.110	110	110	110
Chloroform	13000	100000	10000	12UJ	120	1700U	12UJ	12U	11UJ	11UJ -	11UJ	1100
Chloromethane	520000	1000000	1000	120	12U	1700U	12U	12U	11U	110	110	110
Dibromochloromethane	110000	1000000	10000	120	12U	17000	1 2U	120	110	110	110	110
Ethylbenzene	1000000	1000000	100000	2.1	24U	3600U	25U	1J	2J	22U	23U	23U
Hexane	-			25	24U	3600U	25U	24U	22U	22U	23U	230
Methyl-t-butyl ether				200	6-7V							

Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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	NJDE	P Soil Cleanup C	riteria * Impact to	Semple ID: GTFIRMB9 Depth: 02 Zone**: GTF	GTFSB1 02 GTF	GTFSB1 08 GTF	GTFSB2 02 GTF	GTFSB3 02 GTF	GTFSB4 02 GTF	GTFS85 02 GTF	GTFSB8 02 GTF	GTF587 02 GTF
Analyte (ug/kg)	Residential	Non-Residential	Groundwater	Date: 10/05/94	10/10/94	10/10/94	10/13/94	10/10/94	10/13/94	10/13/94	10/11/34	10/13/94
Methylene chioride	49000	210000	1000	1 2U 25U	33U 24U	2700U 3600U	32U 25U	63U 24U	23U 22U	22U 22U	46U 23U	23U 23U
п-гюруювалене	23000	97000	100000	120	12U	1700U	12U	120	110	110	110	110
Tetrachioroethene	4000	6000	1000	120	120	17000	12U	120	110	110	11U	11U 11U
Toluene	1000000	1000000	500000 1000	12U 12U	12U 12U	3900 1700U	120 120	120 120	110	110	110	110
Trichloroethene Vinyl chloride	2000	7000	10000	120	120	1700U	12U	1 2U	11UJ	11UJ	11U 11U	11UJ 11U
Xylenes (Total)	410000	1000000	10000	12U 12U	12U 12U	310J 1700U	120J 120	120 120	110	110	110	110
cis-1,3-Dichloropropene trans-1,3-Dichloropropene	4000 4000	5000	1000	1 2UJ	12UJ	1700U	120	12UJ	110	110	110J	110
Total Volatile Organic Compou	nds			2	0	4210	13	1	2	0	0	o

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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					• · · · · · · · · · · · · · · · · · · ·								10000
				Semple ID: GTF	FSB7 GT	FSB8	GTFSB8	GTFSB9	GTFSB9	LAIRMB1	LOSBI	L0581	LUSBZ
	NJDE	P Soil Cleanup Cr	iteria •	Depth: 08	04	ł	Q8	02	08	02	04	10	10
			impact to	Zone**: GTF	F GŢĨ	F	GTF	GTF	GTF		10/05/04	10/25/94	10/14/94
Analyte (ug/kg)	Residential	Non-Residential	Groundwater	Date: 10/	13/94 10	/13/94	10/13/94	10/13/94	10/13/94	10/24/94	10/20/04	10/23/04	1011-1701
								1 4 1 1	140011	1311	120	1400U	140
1,1,1-Trichloroethene	210000	1000000	50000	160	100 11	0	1403	110	14000	130	120	1400U	14U
1,1,2,2-Tetrachloroethane	34000	70000	1000	160			1403	110	14000	130	120	1400U	14U
1, 1, 2-Trichloroethane	22000	420000	1000	160		0	1400	110	14000	130	120	1400U	14U
1,1-Dichlorosthane	570000	1000000	10000	160	200 11	0	14UJ	110	1400U	130	120	1400U	14U
1,1-Dichloroethene	8000	150000	10000	160	11	U	140J	110	29000	2711	230	2900U	28U
1,2-Dibromoethane				340	23		2703	1111	14000	130	120	1400U	14U
1,2-Dichloroethane	6000	24000	1000	160			1403	110	140011	130	120	1400U	14U
1,2-Dichloroethene(Total)	1079000	2000000	51000	160	00 11		1400	110	14000	130	120	1400U	14U
1,2-Dichloropropane	10000	43000		160	11 000	0	1400	540111	7200011	670U1	5800	72000U	700UJ
1-Butenol				860	000U 57	70UJ	680UJ	54000	730000	870U.1	5800	720000	700UJ
2-Butanol				860	DOOU 57	001	68001	54003	1400111	81	1201	1400UJ	19J
2-Butanone	1000000	1000000	50000	160	00UJ 10	) J	14UJ	4J	140000	1311	120	1400UJ	140
2-Hexanona	-			160	00UJ 11	IU	14UJ	1 I UJ	720000	67001	5800	72000U	700UJ
2-Methyl-2-propend				. 860	000U 57	70UJ	68001	54003	730000	#70UU	5800.1	7 2000U	700UJ
2-Propanol			-	860	000U 57	70UJ	68003	54003	14000	1211	1211	1400U	140
4-Mathyl-2-pentanone	1000000	1000000	50000	160	000 11	10	140J	2411	140000	3711.1	3103	1400UJ	71U
Acetone	1000000	1000000	100000	160	00UJ 47	70	23UJ	2003	4201	13U	120	1400U	14U
Benzene	3000	13000	1000	.160	11 000	10	1J	110	14000	130	120	1400U	14U
Bromodichloromethane	11000	46000	1000	160	000 11	10	1403	110	14000	130	120	1400U	14U
Bromoform	86000	370000	1000	160	000 11	10	1403	110	14000	130	120	1400U	†4U
Bromomethane	79000	1000000	1000	160	000 11	10	1403	110	14000	130	120	1400U	11J
Carbon disulfide				160	000 11	10	1403	110	14000	130	120	1400U	14U
Carbon tetrachloride	2000	4000	1000	160	00UJ 11	10	14UJ	110	14000	130	120	1400U	14U
Chlorobenzene	37000	680000	1000	16	000 11	10	140J	110	14000	130	120	1400U	14U
Chloroethane				16	000 1	10	14UJ	110	14000	130	120	1400U	14U
Chloroform	19000	28000	1000	16	000 1	10	140J	110	14000	130	120	1400U	14U
Chioromethane	520000	1000000	10000	16	00UJ 1	103	140J	1105	14000	130	120	1400U	14U
Dibromochloromethane	110000	1000000	1000	16	000 1	10	140J	110	6600	130	4.1	650J	4J
Ethylbenzene	1000000	1000000	100000	16	100U 1	10	14UJ	110	2000	2711	5J	2900U	6J
Hexane		••	-•	34	00UJ 2.	J	BJ	3J	29000	270	230	2900U	28U
Methyl-t-butyl ether		**		34	100U 2	30	27UJ	220	79000	270			· · · · · · · · · · · · · · · · · · ·

Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Anelyte (valia)	NJDE	P Soil Cleanup C Non-Residential	riteria " Impact to Groundwater	Sample ID: GTFSB7 Depth: 08 Zone**: GTF Date: 10/13/94	GTF\$B8 04 GTF 10/13/9 <u>4</u>	GTFSB8 08 GTF 10/13/94	GTFSB9 02 GTF 10/13/94	GTFSB9 08 GTF 10/13/94	LAIRMB1 02 LO 10/24/94	LOSB1 04 LO 10/25/94	LOSB1 08 LO 10/25/94	LOSB2 04 LO 10/14/94
Methylene chloride n-Propylbenzene Styrene Tetrachloroethene Toluene Trichloroethene Vinyl chloride Xyfenes (Totel) cis-1,3-Dichloropropene trans-1,3-Dichloropropene Totel Volatile Organic Compou	49000 23000 4000 1000000 23000 2000 410000 4000 4000	210000 97000 6000 1000000 54000 7000 1000000 5000 5000	1000  10000 500000 1000 10000 10000 10000 10000	1600U 3000J 1600U 1600U 1600U 1600U 1600U 1600U 1600U 3000	31U 1J 11U 3J 11U 11U 7J 11U 11U 23	20UJ 35J 14UJ 14UJ 2J 14UJ 14UJ 9J 14UJ 14UJ 55	42U 22U 11U 2J 11U 11UJ 4J 11U 11U 11U	1 400U 13000 1400U 230J 1400U 1400U 26000 1400U 1400U 1400U	25UJ 27U 13U 13U 13U 13U 13U 13U 13U 13U 13U	12UJ 60 12U 12U 12U 12U 12U 93 12U 12U 12U	1400U 1300J 1400U 1400U 270J 1400U 1400U 3000 1400U 1400U 1400U	32U 28U 14U 2J 14U 14U 14U 24 14UJ 14U 66

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Ramedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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A luck (ucks)	NJDE	P Soil Cleanup Cr Non-Residential	iterie * Impact to Groundwater	Sample ID: Depth: Zone**: Date:	LOSB2 08 LO 10/14/94	LOSB3 02 LO 10/24/94	LOSB4 02 LO 10/24/94	LOSB4 06 LO 10/24/94	LOS <b>B8</b> 02 SS 10/24/94	LOSB8 08 SS 10/24/94	LOSB9 02 LO 10/25/94	LOS89 06 LO 10/25/94
Anaryta (Ug/kg)	110012011001											
1 1 1-Tricblorgetbage	210000	1000000	50000		2200U	12U	53U	1300UJ	58U	120	13U	110
1 1 2 2-Tetrachloroethane	34000	70000	1000		2200U	12U	53U	1300UJ	58U	12U	13U	110
1 1 2.Trichloroethane	22000	420000	1000		2200U	120	53U	1300UJ	58U	120	130	110
1.1-Dichloroethane	570000	1000000	10000		2200U4	120	53U	1300UJ	58U	120	130	110
L 1-Dichloroethene	8000	150000	10000		2200U	12U	53U	1300UJ	58U	120	13U	110
1. 2-Dibromosthene		++			4600U	25U	1100	2700UJ	1200	230	26U	ZZU
1.2-Dichloroethane	6000	24000	1000		2200U	120	53U	1300UJ	58U	120	130	110
1.2-Dichloroethene(Totel)	1079000	2000000	51000		2200U	120	53U	1300UJ	58U	120	130	110
	10000	43000			2200U	12U	53U	1300UJ	58U	120	130	110
1 2-Dicheropropano			••		120000U	620UJ	2700UJ	66000UJ	2900UJ	580U	640UJ	560UJ
-Dutanoi					120000U	620UJ	2700UJ	66000UJ	2900UJ	580U	640UJ	560UJ
	1000000	1000000	50000		2200UJ	12UJ	53UJ	1300UJ	82J	12UJ	13UJ	25J
		+			2200UJ	120	53U	1300UJ	58U	120	130	110
			-		120000U	620UJ	2700UJ	66000UJ	2900UJ	580U	640UJ	560UJ
2-Metry-2-propano					1200000	620UJ	2700UJ	66000UJ	2900UJ	280UJ	640UJ	580UJ
2-Proparko	1000000	1000000	50000		2200U	12U	53U	1300UJ	58V	120	130	110
4-Mariah-S-hariterione	1000000	1000000	100000		2200UJ	21UJ	87UJ	1300UJ	230UJ	19UJ	13UJ	8003
Acetone	3000	13000	1000		2200U	12U	53U	1300UJ	58U	120	130	110
Denzene Denzene	11000	46000	1000		2200U	12U	53U	1300UJ	580	120	130	110
Bremederm	86000	370000	1000		22000	1 2U	53U	1300UJ	58U	120	130	
Dromotorm	79000	1000000	1000		2200U	1 2 U	530	1300UJ	58U	120	130	110
promomeunane Certeen disulfide					2200UJ	1 2U	53U	1300UJ	58U	120	130	110
Carbon distinge	2000	4000	1000		2200U	1 <b>2</b> U	53U	1300UJ	58U	120	130	110
	37000	680000	1000		2200U	1 2U	53U	1300UJ	58U	2J	130	110
Chloropenzene					2200U	120	53U	1300UJ	58U	120	130	110
	19000	28000	1000		2200U	12U	53Ú	1300UJ	58U	12U	130	110
Chiororom	. 520000	1000000	10000		2200U	120	53U	1300UJ	58U	12U	130	110
Chloromethane	110000	1000000	1000		2200U	1 2U	53U	1300UJ	58U	120	130	110
Dibromochlorometnane	100000	1000000	100000		290J	120	53U	200J	58U	12U	130	3J
Ethylbenzene	1000000				4500J	1J	14J	2700UJ	19J	8J	26U	15J
Hexane		,			4600U	25U	1100	2700UJ	1200	23U	26U	220
Methyl-t-butyl ether	**	==										

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey,

See last page for footnotes.

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Analyte (ug/kg)	NJDE Residential	P Soil Cleanup Cr Non-Residential	iteria * Impect to Groundwater	Sample ID: LOSB2 Depth: 08 Zone * *: LO Date: 10/14/94	LOSB3 02 LO 10/24/94	LOSB4 02 LO 10/24/94	LOSB4 06 LO 10/24/94	LOSB8 02 SS 10/24/94	LOSB8 08 SS 10/24/94	LOSB9 OZ LO 10/25/94	LOSB9 06 LO 10/25/94
Methylene chloride n-Propylbenzene Styrene Tetrachloroethene Trichloroethene Vinyl chloride Xylenes (Totel) cis-1,3-Dichloropropene trans-1,3-Dichloropropene	49000  23000 4000 1000000 23000 2000 410000 4000 4000	210000 97000 6000 1000000 54000 7000 1000000 5000 5000	1000 - 100000 1000 500000 1000 10000 1000 1	2200U 4500U 2200U 2200U 260J 2200U 2200U 1600J 2200U 2200U 2200U 2200U	17UJ 25U 12U 12U 12U 12U 12U 12U 12U 12U	140UJ 110U 53U 53U 53U 53U 53U 53U 53U 53U 53U	1300UJ 3600J 1300UJ 1300UJ 1300UJ 1300UJ 1300UJ 1300UJ 1300UJ 1300UJ 8500	91UJ 200 58U 58U 58U 58U 24J 58U 58U 58U	17UJ 110 12U 12U 12U 12U 12U 12U 8J 12U 12U 12U	39UJ 264 13U 13U 13U 13U 13U 13U 13U 13U	32UJ 30 11U 1J 2J 11U 11U 24 11U 11U

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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	NJDE	P Soil Cleanup Crit	eria *	Sample ID: LOSB10 Depth; 04	LOSB10 08	LOSB11 Q2	LOSB12 02	LOSB12 06	LOSB13 02	02
			Impact to	Zone**: LO	LO	LO	LO	LO	LO	LO
nelvte (ua/ka)	Residential	Non-Residential	Groundwater	Date: 10/28/94	10/28/94	10/25/94	10/25/94	10/25/94	10/31/94	10/31/94
and a contract to								150011	14000	14000
1.1-Trichloroethane	210000	1000000	50000	13000	14000	130	140	15000	14000	14000
1,2,2-Tetrachlorosthane	34000	70000	1000 .	1300U	14000	130	140	15000	14000	14000
1.2-Trichioroethane	22000	420000	1000	1300U	1400U	130	140	15000	14000	14000
1-Dichloroethane	570000	1000000	10000	1300U	14000	130	140	15000	14000	14000
1-Dichlorosthene	8000	150000	10000	1300U	1400UJ	130	140	15000	19000	29000
2-Dibromoethane			<b>-</b> -	2800U	2900U	27U	28U	31000	140001	14000
2-Dichloroathane	6000	24000	1000	1300U	1400U	130	140	15000	140003	14000
2-Dichloroethene(Total)	1079000	2000000	51000	13000	1400U	130	140	15000	14000	14000
7-Dichloropropaga	10000	43000		1 300U	1400UJ	130	140	150000	7100011	720001
Rutenol	-			7000000	73000UJ	670UJ	700UJ	770000	720000	720000
Butenoi				700000	73000U	670UJ	700UJ	770000	1400111	140001
Butanone	1000000	1000000	50000	1300UJ	1400UJ	13UJ	14UJ	1500UJ	140003	140001
Dereihus		-		1300UJ	1400UJ	13U	14U	1500UJ	14000J	720000
				700000	73000UJ	670UJ	700UJ	770000	720000	720000
Metnyi-2-propano:				700000	73000U	670U	700UJ	770000	720000	14000
Propanol	1000000	1000000	50000	1300U	14000	13U	140	1500U	14000	14000
metnyi-2-pentanona	1000000	1000000	100000	2500UJ	1400UJ	13UJ	14UJ	1500UJ	1400UJ	140000
Celone.	3000	13000	1000	1300U	1400U	13U	1 <b>4</b> U	1500U	14000	14000
	1 1000	46000	1000	1300U	1400U	13U	14U	1500U	14000	14000
remodichieromethene	28000	370000	1000	1300U	14000	13U	14U	1500U	14000	14000
romotorm	79000	1000000	1000	13000	1400U	130	140	1500U	14000	14000
romomethane			••	1300U	1400UJ	130	140	1500UJ	14000	14000
arbon disulfide	2000	4000	1000	1300U	1400U	13U	140	1500U	14000	14000
arbon tetrachloride	27000	680000	1000	1300U	1400U	130	140	15000	1400U	14000
hlorobenzene	37000			1300U	1400U	130	14U	1500UJ	1400U	14000
hioroathana	10000	28000	1000	1300U	14000	130	14U	1500U	1400U	1400U
hloroform	19000	1000000	10000	1300U	1400UJ	13U	14U	1500UJ	14000	1400U
hioromethane	520000	1000000	1000	13000	1400U	130	140	1500U	14000	14000
ibromochloromethane	110000	100000	100000	150J	1400U	13U	14U	1500U	1400U	14000
thylbenzene	1000000	100000		260J	2900UJ	27U	28U	31000	2900U	2900U
even				2000				310011	2900U	2900U

Teble 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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	NJDE	P Soil Cleanup Crit	eria *	Sample ID: LOSB10 Depth: 04	LOSB10 08	LOSB11 02	LOSB12 02	LOSB12 06	LOSB13 02	LOSB13FR 02
Analyte (ug/kg)	Residential	Non-Residential	Impact to Groundwater	Zone**: LO Dete: 10/28/94	LO 10/28/94	10/25/94	10/25/94	10/25/94	10/31/94	10/31/94
Methylene chioride n-Propylbenzene Styrene Tetrachloroethene Toluene Trichloroethene Vinyl chioride Xylenes (Total) cis-1,3-Dichloropropene	49000  23000 4000 1000000 23000 2000 410000 4000	210000 97000 6000 1000000 54000 7000 1000000 5000 5000	1000 100000 1000 500000 1000 10000 10000 10000 10000	1300U 2800U 1300U 1300U 1300U 1300U 1300U 390J 1300U 1300U	1400U 6800 1400U 1400U 1400U 1400U 1400U 1400U 1400U 1400U	16U 4J 13U 13U 13U 13U 13U 13U 13U 13U	24UJ 28U 14U 14U 14U 14U 14U 14U 14U 14U	1 500U 3 100U 1 500U 1 500U 1 500U 1 500U 1 500U 1 500U 1 500U	1400U 2900U 1400U 1400U 1400U 1400U 1400U 1400U 1400U 1400U	1400U 2900U 1400U 1400U 1400U 1400U 1400U 1400U 1400U 1400U
Total Volatile Organic Compounds				800	6800	4	o	0	o	0

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jarsey.

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See last page for footnotes.

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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		. *		Sample ID: LOSB13	LOSB14	LOSB15	LOSBIE	LOSB17	LOSBIS	LUSBIB	LUSBIER
	NJDE	P Soil Cleanup Crit	eria *	Depth: 08	02	02	04	02	02		10
			impact to	Zone**: LO	LO	LO	LO	LO		10/24/24	10/04/04
Analyte (ug/kg)	Residential	Non-Residential	Groundwater	Date: 10/31/94	10/25/94	10/24/94	10/25/94	10/24/94	10/24/94	10/24/94	10/24/34
				2011	1 41 1	1 211	270011	1 211	110	13U	13U
1,1,1-Trichloroethane	210000	1000000	50000	560	140	120	27000	120	110	130	130
1,1,2,2-Tetrachiorcethane	34000	70000	1000	560	140	120	27000	1 211	110	130	130
1,1,2-Trichloroethane	22000	420000	1000	560	140	120	27000	1911	110	130	130
1,1-Dichloroethane	570000	1000000	10000	56U	140	120	27000	120	1100	1311	130
1,1-Dichloroethene	8000	150000	10000	560	140	120	27000	120	1911	2711	260
1,2-Dibromoethane	-	+-		1100	270	230	55000	240	1111	1211	130
1.2-Dichloroethane	6000	24000	1000	56U	140	120	270003	120	110	1211	130
1.2-Dichloroethane(Total)	1079000	2000000	51000	56U	140	120	27000	120	110	130	130
1.2-Dichioropropane	10000	43000		56U	140	120	27000	120	110	130	45011
1.Butanol	-			2800U	1700J	580UJ	1400000	600UJ	5700J	6700	650U
2-Butanol		••		2800U	680UJ	580UJ	1400000	600UJ	5700J	6/00	8500
2-Butenone	1000000	1000000	50000	56UJ	14UJ	5J	2700UJ	3J	110J	103	140
				56U	31	12U	2700UJ	12U	110	130	130
2 Method 2-propagal	*=	-		2800U	680UJ	580UJ	140000U	600UJ	570UJ	6700	6500
2-Methy-2-propano,	-			2800UJ	680UJ	580UJ	1400000	600UJ	570UJ	670UJ	65003
	1000000	1000000	50000	56U	26	12U	2700U	12U	110	130	130
4-Metnyi-2-pentanone	1000000	1000000	100000	170UJ	20UJ	34UJ	2700UJ	22UJ	16UJ	43UJ	5100
	3000	13000	1000	56U	140	120	2700U	120	11UJ	130	130
Benzene	11000	46000	1000	56U	140	120	2700U	120	110	130	130
Bromodicnioromethane	86000	370000	1000	56UJ	14U	12U	2700U	120	110	130	130
Bromotorm	79000	1000000	1000	56U	14U	1 2U	2700U	120	110	130	130
Bromomethane	/3000			56U	14U	12U	2700U	12U	110	13Ų	130
Carbon disulfide	1000	4000	1000	56U	14U	120	2700U	120	110	13U	130
Carbon tetrachloride	2000	680000	1000	56U	14U	12U	27000	120	11UJ	1 <b>3</b> U	130
Chlorobenzene	37000	00000		56U	14U	1 2U	2700U	12U	110	13U	130
Chioroethene			1000	56U	14U	12U	2700U .	12U	110	1 <b>3</b> U	13U
Chloroform	19000	28000	10000	561	14U	12U	2700U	12U	11U	130	13U
Chloromethane	520000	1000000	10000	561	140	12U	27000	1 2U	110	13U	13U
Dibromochloromethane	110000	1000000	1000	300 a i	141	120	2700U	12U	110	13U	13U
Ethylbenzene	1000000	1000000	100000	3J 21 I	2711	1.1	5600U	1J	1J	6J	3J
Hexane	••			21J -	270	230	5600U	24U	23U	27U	26U
Methyl-t-butyl ether		••		100	47 4			-			

See last page for footnotes.

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	NJDE	P Soil Cleanup Crit	eria *	Sample ID: LOSB13 Depth: 08	LOS814 02	LOSB15 02	LOSB16 04	LOSB17 02	LOSB18 02	LOSB18 08	LOSB18FR
Analyta (ug/kg)	Residential	Non-Residential	impact to Groundwater	Zone**: LO Date: 10/31/94	LO 10/25/94	LO 10/24/94	LO 10/25/94	LO 10/24/94	LO 10/24/94	LO 10/24/94	10/24/94
	49000	210000	1000	74UJ	40UJ	16UJ	2700U	15UJ	15UJ	61UJ	18UJ
Netnyiene chionde	43000			. 86J	27U	23U	5600U	24U	23U	27U	260
-PropyDenzene	12000	97000	100000	56U	14U	12U	2700U	12U	11U	13U	130
styrens	23000	6000	1000	56U	14U	120	2700U	12U	110	130	13U
Tetrachioroethene	4000	100000	500000	58U	140	12U	2700U	12U	110	13U	130
foluene.	1000000	F4000	1000	560	140	12U	2700U	12U	11UJ	13U	130
Frichloroethene	23000	54000	10000	560	140	120	2700U	12U	11U	13U	13U
vinyi chloride	2000	7000	10000	131	140	120	2700U	120	110	13U	2J
Kylenes (Total)	410000	1000000	10000	EGU	140	120	2700U	120	110	13U	13U
cis-1,3-Dichloropropene :rans-1,3-Dichloropropene	4000 4000	5000	1000	56U	1 <b>4</b> U	12Ú	2700U	12U	110	13U	13U
Tract Valarile Organia Compound	<i>م</i>			129	1757	6	o	4	1	16	19

Table 5-2. Volatila Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jarsey.

See last page for footnotes.

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				Semula ID: MRSR1	MBSB2	MBSB3	MBSB3	MBSB3FR	MDCSB2-03	N2TFSB2
		B Soil Cleanup Crit	eria *	Denth: 02	02	-06	10	10	03	02
	NJDE	r don cleanup on	Impect to	Zone**: MB	MB	MB	мв	мв	MDC	N2TF
Anaivte (un/ko)	Residential	Non-Residential	Groundwater	Date: 10/25/94	10/21/94	10/25/94	10/25/94	10/25/94	10/11/94	10/19/94
L.1.1-Trichloroethane	210000	1000000	50000	110	12U	15U	17000	17000	110	120
1.2.2-Tetrachioroethane	34000	70000	1000	. 110	12U	15U	17000	1700U	110	120
1.2-Trichloroethane	22000	420000	1000	្វារប	12U	15U	1700U	17000	110	120
1-Dichloroethane	570000	1000000	10000	<b>1</b> 10	12U	15U	1700U	17000	110	120
1-Dichloroethene	8000	150000	10000	110	1 <b>2U</b>	15U	1700U	17000	110	120
2-Dibromosthana				23U	23U	29U	3400U	3300U	220	250
	8000	24000	1000	110	12U	15U	1700U	17000	110	120
2 Dichleresthese/Totel)	1079000	2000000	51000	110	12U	15U	1700U	17000	110	120
2 Dichleroptenenal	10000	43000		110	12U	15U	1700UJ	1700UJ	110	12U
,2-Dienioropropane				570UJ	580U	740UJ	86000U	83000U	540UJ	620U
Butenol				570UJ	580U	740UJ	86000U	83000U	540U	620U
	1000000	1000000	50000	11UJ	12UJ	15UJ	1700UJ	1 <b>700U</b> J	11UJ	12UJ
-Butanone	1000000			11U	120	15UJ	1700U	1700UJ	110	120
-Hexenone				570UJ	580U	740UJ	860000	83000U	540UJ	620U
-Methyl+2+propanol				570UJ	580UJ	740UJ	<b>86000</b> U	83000U	540UJ	620UJ
-Propanol	100000	1000000	50000	110	12U	15U	17000	17000	110	120
~Metnyl-2-pentanone	1000000	1000000	100000	61UJ	34UJ	15UJ	1700UJ	1700UJ	140	22UJ
cetone	2000	13000	1000	5J	12U	15U	17000	17000	110	1 2U
lenzene	11000	45000	1000	11U	12U	15U	17000	1700U	11U	12U
Iromodichloromethane	64000	370000	1000	110	12U	15U	1700U	1700U	110	120
iromotorm	79000	1000000	1000	110	1 2U	15U	1700U	1700U	110J	120
Bromomathene	79000			4J	1 2U	15U	1700UJ	1700UJ	110	120
Carbon disulfide		4000	1000	110	12U	15U	1700U	1700U	110	120
Carbon tetrachloride	2000	~~~~~	1000	7J	1 <b>2U</b>	15U	530J	460J	110	120
Chlorobenzene	37000	080000		110	12U	15U	1700UJ	1700UJ	11UJ	12U
Chloroethane			1000	110	120	15U	1700U	1700U	110	1 2U
Chloroform	19000	28000	1000	110	120	15U	1700UJ	1700UJ	11UJ	120
Chloromethane	520000	1000000	10000	110	120	15U	1700U	1700U	110	120
Dibromochloromethane	110000	1000000	1000	31	8.1	15U	1700U	1700U	1J	12U
Ethylbenzene	1000000	1000000	100000		3.1	29U	3400U	3300U	1J	5J
Hexane	-			170	2311	29U	3400U	3300U	22U	25U
Methyl-t-butyl ether				200						

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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	NJDE	P Soil Cleanup Crite	eria *	Sample ID: MBSB1 Depth: 02	MB5B2 02	MBSB3 06	MBSB3 10	MBSB3FR 10	MDCSB2-03 03	02
Anaiyta (ug/kg)	Residential	Non-Residential	Impact to Groundwater	Zone**: MB Date: 10/25/94	MB 10/21/94	MB 10/25/94	MB 10/25/9 <u>4</u>	MB 10/25/94	MDC 10/11/94	N2TF 10/19/94
tethulene obloride	49000	210000	1000	15UJ	26UJ	22UJ	1700U	1700U	25U	25UJ
Brondhenzene				31	20J	29U	11000	7800	22U	25U
-Propyluenzene	23000	97000	100000	110	1 2U	15U	1700U	1700U	110	12U
tyrene	4000	6000	1000	110	12U	15U	1700U	1700U	110	120
artaculoroarnano	1000000	1000000	500000	3J	12U	15U	1700U	1700U	<b>2</b> J	120
oluene	23000	54000	1000	110	12U	15U	1700U	17000	110	12U
nonioroethene	23000	7000	10000	110	1 2U	150	1700UJ	1700UJ	11UJ	12U
inyi chloride	2000	1000000	10000	10.1	4J	15U	1700U	1700U	7J	12U
ylenes (Total)	410000	5000	1000	110	12UJ	15U	1700U	1700U	110	1 2U
-1,3-Dichloroptopene	4000	5000	1000	110	121	15U	1700U	1700U	110	12U
ans-1,3-Dichloropropene	4000	5000	1000	110						
				77	35	0	11530	8260	11	5

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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				Semple ID: N2TESR4	N2TESR4	N2TFS85	N2TFS85	N3TFSB1	N3TFSB2
	NUD	B Sail Classus Crite		Denth: 02	06	02	06	02	02
	NJD0	P Soli Cleanup Chi	impact to	Zone**: N2TE	N2TF	N2TF	N2TF	NJTF	AP
	Desidential	Nan Basidantisi	Groundwater	Date: 10/28/94	10/28/94	10/19/94	10/19/94	10/18/94	10/19/94
Analyte (ug/kg)	Nesigential	Non-residentie	Ground Hato.						
1 1 1-Trichlomethane	210000	1000000	50000	13U	1500U	11U	57U	110	110
1 1 2 2-Tetrachloroethene	34000	70000	1000	13U	1500U	11U	57U	110	110
1 1 2-Trichloroethene	22000	420000	1000	13U	1500U	110	570	110	110
1 1-Dichloroethene	570000	1000000	10000	13U	1500U	110	570	110	110
1.1 Dichloroethene	8000	150000	10000	13U	1500UJ	11U	57U	110	110
1.2 Dibromoethane				26U	3100U	23U	1100	23U	230
1,2-Dipfortoethene	6000	24000	1000	13U	1500U	110	570	110	110
1,2-Dictioroethane/Totel)	1078000	2000000	51000	13U	1500U	11V	57U	110	110
1,2-Dichloroethenatiotal	10000	43000		13U	1500UJ	110	57U	110	110
1,2-Dienioropropana	10000			660U	78000UJ	570UJ	2800U	570U	5700
1-Butanol				660U	78000U	570U	2800U	570U	570U
2-Butanol	1000000	1000000	50000	13UJ	1500UJ	39J	57UJ	25J	14J
2-Butanone	1000000			13U	1500UJ	11UJ	57U	110	110
2-Hexanone	-			660U	78000UJ	570U	2800U	570U	570U
2-Methyl-2-propanol				660UJ	78000U	570UJ	2800UJ	570UJ	570UJ
2-Propanol		1000000	50000	130	1500U	11UJ	57U	110	110
4-Methyl-2-pentenone	1000000	1000000	100000	13UJ	1500UJ	55UJ	85UJ	1200	86UJ
Acetone	1000000	12000	1000	130	290J	11U	57U	5J	110
Benzene	3000	13000	1000	13U	1500U	110	57U	110	110
Bromodichloromethane	11000	40000	1000	13U	1500U	110	57U	110	110
Bromoform	86000	370000	1000	13U	1500U	110	57U	110	110
Bromomethane	79000	100000	1000	130	1500UJ	110	57U	2J	110
Carbon disulfide	-		1000	130	1500U	110	57U	110	110
Carbon tetrachioride	2000	4000	1000	130	1500U	110	57U	10J	2J
Chlorobenzene	37000	680000	1000	130	1500U	110	57U	11U	110
Chloroethane			1000	130	1500U	110	57U	110	110
Chloroform	19000	28000	*0000	13U	1500UJ	11UJ	57U	11U	110
Chloromethane	520000	1000000	10000	13()	15000	110	57U	110	11U
Dibromochloromethane	110000	1000000	1000	1211	8700	110	57U	10J	6J
Ethyłbenzene	1000000	1000000	100000	21	7100.	230	290	23	<b>4</b> J
Hexane				3J 9211	31000	230	1100	23U	23U
Methyl-t-butyl ether	-	••		200	01000			_	

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

	NJDEP Soil Cleanup Criteria *			Sample ID: N2TFSB4 Depth: 02	N2TFSB4 06	N2TFSB5 02	N2TFSB5 06	N3TFSB1 02	N3TFSB2 02
Analyte (ug/kg)	Residential	Non-Residential	Impact to Groundwater	Zons**: N2TF Date: 10/28/94	N2TF 10/28/94	N2TF 10/19/94	N2TF 10/19/94	N3TF 10/18/94	AP 10/19/94
Asthviene chloride	49000	210000	1000	46UJ	1500U	15UJ	120UJ	290	37UJ
-Propylbenzene			·	26U	6300	230	260	45	110
tyrene	23000	97000	100000	130	15000	110	570	110	110
etrachioroethene	4000	6000	1000	13U 13U	1500U 5000	110	57U	3J	110
oluene	1000000	1000000	1000	13U	1500U	110	57U	110	110
richlorosthene Invit chloride	23000 2000	7000	10000	130	1500U	110	57U	110	11U 71
vienes (Totel)	410000	1000000	10000	3J 13U	36000 1500U	110 110	11J 57UJ	11UJ	110
is-1,3-Dichloropropene rans-1,3-Dichloropropene	4000 4000	5000	1000	130	1500U	110	570	110	110
otal Volatile Organic Compounds				6	63390	39	561	135	33

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Impact to nelvre (ug/kg)    Zone**: AP    AP    N3TF    <		NJDE	P Soil Cleanup Crite	oria *	Semple ID: N3TFSB2 Depth: 06	N3TFSB2FR 06	N3TFSB3 02	N3TFSB4 02	N3TFSB5 08	N3TFSB6 02
Payle (ug/kg)    Residential    Non-Residential    Groundwater    Date: 10/19/94    10/10/04				Impact to	Zone**: AP	AP	N3TF	N3TF	N31F	N31F
1.1-Tichlorosthane    210000    1000000    50000    68U    68U    12U    12U    1400U    1400U      1.2.2-Tetrachiorosthane    34000    70000    1000    68U    66U    12U    12U    1400U    1400U      1.2.2-Totrachiorosthane    22000    420000    10000    68U    66U    12U    12U    1400U    1400U      1-Dichlorosthane    570000    100000    10000    68U    66U    12U    12U    1400U    1400U      2-Dichorosthane    6000    150000    10000    68U    66U    12U    12U    1400U    1400U      2-Dichorosthane    6000    2000000    51000    68U    66U    12U    12U    1400U    1400U      2-Dichorosthane    100000    2000000    51000    68U    68U    60U    12U    12U    1400U    1400U      2-Dichorosthane    100000    1000000    50000    68U    68U    12U    12U    1400U    1400	nalyte (ug/kg)	Residential	Non-Residential	Groundwater	Date: 10/19/94	10/19/94	10/13/94	10/17/94	10/19/94	10/18/84
1,1-Trichkrosethane  210000  1000000  50000  680  680  120  120  14000  14000    1,2.2-TetrikeNotesthane  22000  10000  680  680  120  120  1200  14000  14000    1,2-Trikhorosthane  22000  100000  10000  680  680  120  120  1200  14000  14000    1-Dickhorosthane  8000  150000  10000  680  680  120  120  120  14000  14000    2-Dichorosthane  8000  24000  10000  680  680  120  120  14000  14000    2-Dichorosthane  8000  24000  51000  680  680  120  120  14000  14000    2-Dichorosthane  8000  10000  50000  6800  6800  6001  1200  740000  740000  740000  740000  740000  740000  740000  740000  740000  740000  740000  740000  740000  740000  740000  7400000  7400000  740000  74					6011	Sell	120	12U	1400U	1400U
1,2,2-Tridivale/rotethane  34000  70000  1000  68U  68U  12U  12U  12U  1400U  1400U    1,2-Tridivarsethane  22000  420000  10000  68U  68U  12U  12U  12U  1400U  1400U    1-Dichloresthane  570000  100000  68U  68U  12U  12U  12U  1400U  1400U    2-Dichloresthane  6000  24000  1000  68U  68U  12U  12U  1400U  1400U    2-Dichloresthane  6000  24000  1000  68U  68U  12U  12U  1400U  1400U    2-DichloresthaneTotall  107900  2000000  51000  68U  66U  12U  12U  1400U  1400U    2-DichloresthaneTotall  109000  430000  3000U  600U  60U  74000U  74000U  74000U    2-DichloresthaneTotall  1000000  1000000  50000  68U  68U  12U  12U  1400U  1400U    2-DichloresthaneTotal  1000000  1000000  50000	1,1-Trichloroethane	210000	1000000	50000	000	6811	120	120	1400U	1400U
1,2-Trichorosethane  22000  420000  1000  68U  68U  12U  12U  12U  1400U  1400U    1-Dichlorosethane  570000  100000  68U  68U  12U  12U  12U  12U  1400U  1400U    2-Dichlorosethane  6000  24000  10000  68U  68U  12U  12U  12U  1400U  1400U    2-Dichlorosethane  6000  24000  51000  68U  68U  68U  12U  12U  1400U  1400U    2-Dichlorosethane  6000  240000  51000  68U  68U  68U  12U  12U  1400U  1400U    2-Dichlorosethane  10000  43000   68U  68U  68U  60U  12U  12U  1400U  1400U  1400U    2-Dichlorosethane    3400U  3300UJ  600U  60U  74000U  1400U    2-Dichlorosethane  1000000  1000000  50000  68U  64U  12U  12U  1400U  1400U  1400U	1,2,2-Tetrachioroethane	34000	70000	1000	. 080	6411	120	120	14000	1400U
1-Dickhorsethane    570000    1000000    100000    68U    68U    12U    12U    1400U    1400U      1-Dickhorsethane    8000    150000    10000    68U    66U    12U    12U    1400U    130UJ    24U    24U    2900U    3000U      2-Dickhorsethane    6000    24000    10000    68U    66U    12U    12U    1400U    1400U      2-Dickhorsethane(Total)    1079000    2000000    51000    68U    66U    12U    12U    1400U    1400U      2-Dickhorsethane(Total)    1079000    43000    -    68U    66U    12U    12U    1400U    1400U      2-Dickhorsethane    -    -    -    3400U    330UU    600U    600U    74000U    74000U      Butanol    -    -    -    3400U    330UU    600U    74000U    74000U      Methyl-2-propanol    -    -    -    3400U    330UU    60UU    12U    12U	1,2-Trichloroethane	22000	420000	1000	680	860	120	120	1400U	1400U
1. Dicklorsethene    8000    150000    10000    880    680    120    14000	1-Dichloroethene	570000	1000000	10000	680	600	120	120	1400U	1400U
2-Dibromesthame       1400    13000    1200    120    120    14000    14000      2-Dichloreethame    6000    240000    10000    680    660    120    120    14000    14000      2-Dichloreethame    1079000    200000    51000    680    660    120    120    14000    14000      2-Dichloreethame    10000    43000    -    680    660    120    120    14000    14000      2-Dichloreethame    -    -    -    34000J    3300UJ    6000J    600U    74000U    74000U      Butanol    -    -    -    -    3400UJ    3300UJ    600UJ    600U    74000U    74000U      Metsnone    -    -    -    3400UJ    3300UJ    600UJ    600UJ    74000U    74000U      Propenol    -    -    -    3400UJ    3300UJ    600UJ    600UJ    74000UJ    1400UJ    1400UJ	1-Dichloroethene	8000	150000	10000	680	120111	240	240	2900U	30000
2-Dichloresthane    6000    24000    1000    680    680    120    120    14000    14000      2-Dichloresthane{Total    1079000    2000000    51000    680    680    120    120    14000    14000J      2-Dichloropropane    10000    43000    -    680    660    120    120    1400U    74000U    74000U<	2-Dibromoethane	<del></del>			1400	13000	120	120	1400U	1400U
2-Dicklorosthans(Total)    1079000    200000    51000    680    680    680    120    120    120    1400U    1400UJ      2-Dicklorostpane    10000    43000    -    -    3400UJ    3300UJ    600U    600U    74000U    74000U    74000U      Butanol    -    -    -    3400UJ    3300UJ    600U    600U    7400UJ    1400UJ      Butanol    -    -    -    -    3400U    3300UJ    60UJ    60UJ    7400UJ    1400UJ      Butanone    -    -    -    -    3400U    3300UJ    60UJ    60UJ    7400UJ    7400UJ    7400UJ      Math/-2-propinol    -    -    -    3400U    330UJ    60UJ    60UJ    12U    140UJ    140UJ    140UJ      Meth/-2-pentanone    1000000    1000000    100000    180UJ    180UJ    12U    12U    140UJ    140UJ    140UJ      rorazene    3000    100000 <td>2-Dichloroethane</td> <td>6000</td> <td>24000</td> <td>1000</td> <td>680</td> <td>000</td> <td>120</td> <td>120</td> <td>14000</td> <td>1400U</td>	2-Dichloroethane	6000	24000	1000	680	000	120	120	14000	1400U
2-Dichlorepropene    10000    43000    -    680    660    1200    1400U	2-Dichloroethene(Totel)	1079000	2000000	51000	680	000	120	120	1400U	1400UJ
Butanol    -    -    3400U    3300U    600U    600U    7400U    74000U    74000U    74000U    74000U    74000U    74000U    74000U    74000U    74000U    1400UJ    1400UJ <th< td=""><td>2-Dichloropropane</td><td>10000</td><td>43000</td><td>**</td><td>68U</td><td>000</td><td>600111</td><td>6000</td><td>74000UJ</td><td>74000U</td></th<>	2-Dichloropropane	10000	43000	**	68U	000	600111	6000	74000UJ	74000U
Butanol    -    -    3400U    3300U    6000    1000    1400U    1400U      Butanone    1000000    1000000    50000    68U    66U    12U    12U    1400U    1400U      Butanone    -    -    -    3400U    3300U    600U    600U    74000U    74000U      Methyl-2-propanol    -    -    -    3400U    3300U    600U    600U    74000U    74000U      Methyl-2-propanol    -    -    -    3400U    3300U    600U    600U    74000U    74000U      Methyl-2-pentanone    1000000    1000000    500000    68U    66U    12U    12U    1400U    1400U      Methyl-2-pentanone    1000000    1000000    100000    68U    66U    12U    12U    1400U    1400U      Methyl-2-pentanone    1000000    1000000    100000    68U    68U    61U    12U    12U    1400U    1400U      mondolhicomethane <td>Butanol</td> <td></td> <td></td> <td>-+</td> <td>3400UJ</td> <td>33000J</td> <td>80005</td> <td>600U</td> <td>740000</td> <td>74000U</td>	Butanol			-+	3400UJ	33000J	80005	600U	740000	74000U
Batterine    1000000    1000000    50000    68UJ    68UJ    12UJ    12UJ    12UJ    1400UJ    1400UJ      Metsnone    -    -    -    68U    68U    68U    12U    12U    12U    1400UJ    74000U      Methyl-2-propanol    -    -    -    3400U    3300UJ    600UJ    600U    74000U    74000U      Methyl-2-pentanone    1000000    100000    50000    68U    66U    12U    12U    1400UJ    1400UJ      setone    1000000    100000    50000    68U    66U    12U    12U    1400UJ    1400UJ      setone    1000000    100000    100000    180UJ    180UJ    12U    12U    1400U    1400U      setone    3000    13000    1000    68U    66U    12U    12U    1400U    1400U      setone feitrekinet    1000    46000    1000    68U    66U    12U    12U    1400U    1400U	Butanol			-	34000	330000	1000	12111	1400UJ	1400UJ
Hexenone    -    -    68U    68U    12U    1400UJ    74000U      Methyl-2-propanol    -    -    -    -    3400UJ    3300UJ    600UJ    600UJ    600UJ    1400UJ    1400U    140	Butanone	1000000	1000000	50000	68UJ	56UJ	1205	1200	1400UJ	1400UJ
Mathyl-2propenol    -    -    3400U    3300UJ    600UJ    600UJ    600UJ    74000UJ    74000UJ      Propenol    -    -    3400UJ    3300UJ    600UJ    600U    74000UJ    74000UJ      Methyl-2-pentanone    1000000    1000000    50000    180UJ    180UJ    24U    67U    1400UJ    1400UJ      methyl-2-pentanone    3000    13000    10000    68U    66U    12U    12U    1400U    1400U      methyl-2-pentanone    3000    13000    1000    68U    66U    12U    12U    1400U    1400U      mondichloromethane    11000    46000    1000    68U    66U    12U    12U    1400U    1400U      romodichloromethane    79000    100000    1000    68U    66U    12U    12U    1400U    1400U      romodichloromethane    79000    10000    68U    66U    12U    12U    1400U    1400U      romodichloromethane	Hexenone				68U	56U	120	60011	740000	74000U
Minimum Propendi    n    3400UJ    3300UJ    600UJ    1000UJ    1000UJ    1000UJ    100UJ    100UJ    1400UJ    1400U	Methvi-2-propanol				3400U	3300UJ	60003	6000	74000011	74000U
Notify  1000000  1000000  50000  68U  66U  12U  12U  1400U  1400U    Methyl-2-pentanone  1000000  1000000  100000  100000  180UJ  180UJ  180UJ  24U  67U  1400UJ  1400U  1400U    eatone  3000  13000  1000  68U  66U  12U  12U  12U  1400U  1400U    eatone  3000  13000  1000  68U  66U  12U  12U  1400U  1400U  1400U    eatone  3000  13000  1000  68U  66U  12U  12U  1400U  1400U  1400U    eatone  86000  370000  1000  68U  66U  12U  12U  1400U  1400U  1400U    eaton tetrachloride  2000  4000  1000  68U  66U  12U  12U  1400U  1400U  1400U    eaton tetrachloride  2000  4000  1000  68U  66U  12U  12U  1400U  1400U    hlorobarane  37000	Propensi				3400UJ	3300UJ	60000	1000	140000	14000
International    1000000    1000000    1000000    1000000    1000000    1000000    1000000    1000000    1000000    1000000    1000000    1000000    1000000    1000000    68U    66U    12U    12U    12U    1400U    1400U    1400U      romodichloromethene    11000    46000    1000    68U    66U    12U    12U    1400U    1400U    1400U      romodichloromethene    11000    46000    1000    68U    66U    12U    12U    1400U    1400U    1400U      romodichloromethene    79000    1000000    1000    68U    66U    12U    12U    1400U    1400U    1400U      arbon tetrachloride    2000    4000    1000    68U    66U    12U    12U    1400U    1400U    1400U      hlorobenzene    37000    680000    1000    68U    66U    12U    12U    140U    1400U      hlorobenzene    -    -    -    -	Methyl-2-nentanons	1000000	1000000	50000	68U	66U	120	470	140000	1400UJ
Solution    Solution    68U    66U    12U    12U    1400    1400U      sinzene    3000    13000    1000    68U    66U    12U    12U    1400U    1400U      somedichloromethane    11000    46000    1000    68U    66U    12U    12U    1400U    1400U      somedichloromethane    79000    1000000    1000    68U    66U    12U    12U    1400U    1400U      somedichloromethane    79000    1000000    1000    68U    66U    12U    12U    1400U    1400U      somedichloride    2000    4000    1000    68U    66U    12U    12U    1400U    1400U      store trachloride    2000    4000    1000    68U    66U    12U    12U    1400U    1400U      store trachloride    37000    680000    1000    68U    66U    12U    12U    1400U    1400U      hiorotethane    -    - <t< td=""><td>atone</td><td>1000000</td><td>1000000</td><td>100000</td><td>180UJ</td><td>180UJ</td><td>240</td><td>1.211</td><td>14000</td><td>1400U</td></t<>	atone	1000000	1000000	100000	180UJ	180UJ	240	1.211	14000	1400U
March1100046000100068U66U12U12U1400U1400Uromodichloromethane86000370000100068U66U12U12U1400U1400Uromodirm86000370000100068U66U12U12U1400U1400Uromodirm790001000000100068U66U12U12U1400U1400Uarbon disulfide68U66U12U12U1400U1400Uarbon tetrachloride20004000100068U66U12U12U1400U3500hlorobenzene37000680000100068U66U12U12U1400U1400Uhlorobenzene68U66U12U12U1400U1400Uhlorobenzene68U66U12U12U1400U1400Uhlorobenzene68U66U12U12U1400U1400Uhlorobenzene68U66U12U12U1400U1400Uhlorobenzene68U66U12U12U1400U1400Uhlorobenzene68U66U12U12U140UU1400Uhlorobenzene68U66U12U12U<	30(0)18	3000	13000	1000	68U	66U	120	120	14000	1400U
Consistent of the other state    Second 370000    1000    68U    66U    12U    12U    1400U    1400U <th< td=""><td>mediable comethene</td><td>11000</td><td>46000</td><td>1000</td><td>68U</td><td>66U</td><td>120</td><td>120</td><td>14000</td><td>1400U</td></th<>	mediable comethene	11000	46000	1000	68U	66U	120	120	14000	1400U
Normanitian    79000    1000000    1000    68U    68U    12UJ    12U    1400U    1400U      arbon disulfide      68U    66U    12U    12U    1400UJ    1400U      arbon disulfide      68U    66U    12U    12U    1400U    1400U      arbon disulfide    2000    4000    1000    68U    66U    12U    12U    1400U    1400U      arbon tetrachloride    2000    4000    1000    68U    66U    12UJ    12U    1400U    3500      ihlorobenzene    37000    680000    1000    68U    66U    12UJ    12U    1400U    1400U      ihloroform    19000    28000    1000    68U    66U    12UJ    12UJ    1400UJ    1400UJ      ihloroform    19000    28000    10000    68U    66UJ    12UJ    12UJ    1400UJ    1400U      ihloroform    110000    1000000    100	romodiciniorometrianio	86000	370000	1000	68U	66U	120	120	14000	1400U
arbon disulfide  -  -  -  -  68U  66U  12U  12U  1400U  1400U    arbon disulfide  2000  4000  1000  68U  66U  12U  12U  1400U  1400U  3500    arbon disulfide  2000  4000  1000  68U  66U  12U  12U  1400U  1400U  3500    ihlorobenzene  37000  680000  1000  68U  66U  12U  12U  1400U  1400U  1400U    ihlorobenzene  -  -  -  -  68U  66U  12U  12U  1400U  1400U  1400U    ihlorobenzene  -  -  -  -  68U  66U  12U  12U  1400U  1400U  1400U    ihlorobenzene  19000  28000  10000  68U  66U  12U  12U  1400U  1400U  1400U    ihlorobenzene  520000  1000000  10000  68U  66U  12U  12U  1400U  1400U    ihlorobenzene  1000000	romonomi	79000	1000000	1000	- 68U	66U	1200	120	14000	1400U
arbon distribution  2000  4000  1000  68U  66U  12U  12D  1400U  3500    arbon tetrachloride  37000  680000  1000  68U  66U  12U  12U  1400U  1400U  1400U    ihlorobenzene  37000  680000  1000  68U  66U  12UJ  12U  1400U  1400U  1400U    ihlorobenzene  -  -  -  68U  66U  12UJ  12U  1400U  1400U    ihlorobenzene  19000  28000  1000  68U  66U  12U  12U  1400U  1400U    ihlorobenzene  520000  100000  10000  68U  66U  12U  12U  1400U  1400U    ihlorobenzene  520000  1000000  10000  68U  66U  12U  12U  1400U  1400U    ihlorobenzene  110000  1000000  100000  68U  66U  12U  12U  1400U  1400U    ihlorobenzene  1000000  1000000  100000  68U  66U  1	romunietnane ashaa disulfide	••			68U	66U	120	120	140011	1400U
and off tetrationates  37000  680000  1000  68U  66U  12U  12U  14000  1400U    chlorobenzene  37000  680000  1000  68U  66U  12UJ  12U  1400U  1400U  1400U    chlorobenzene  -  -  -  68U  66U  12UJ  12U  1400U  1400U  1400U    chlorobenzene  19000  28000  1000  68U  66U  12U  12U  1400U  1400U    chlorobenzene  520000  1000000  10000  68U  66U  12U  12U  1400U  1400U    chloromethane  520000  1000000  10000  68U  66U  12U  12U  1400U  1400U    chloromethane  110000  1000000  100000  68U  66U  12U  12U  3100J  1400U    thylbenzene  1000000  1000000  350J  380J  24U  24U  3000J  10000J    lexane  -  -  -  140U  130UJ  24U  24U <t< td=""><td>arbon tetrachloride</td><td>2000</td><td>4000</td><td>1000</td><td>68U</td><td>66U</td><td>120</td><td>120</td><td>1400U</td><td>3500</td></t<>	arbon tetrachloride	2000	4000	1000	68U	66U	120	120	1400U	3500
Introduction  Image: Second		37000	680000	1000	68U	66U	120	120	14000	1400U
Increases  19000  28000  1000  68U  66U  12U  12U  14000  14000  14000    Increases  520000  1000000  10000  68U  66U  12U  12U  14000  14000J  1400UJ    Increases  520000  1000000  10000  68U  66U  12U  12U  1400U  1400U  1400U    Increases  110000  1000000  100000  68U  66U  12U  12U  1400U  1400U  1400U    Increases  110000  1000000  100000  68U  66U  12U  12U  12U  1400U  1400U    Intreases  1000000  1000000  1000000  68U  66U  12U  12U  12U  3100J  1400U    Interse	NordDenzene		••		68U	66U	12UJ	120	14000	14000
Interform    1200    1200    1200    1200    1200    1200    1200    1200    1200    1200    1200    1200    1200    14000 <td></td> <td>19000</td> <td>28000</td> <td>1000</td> <td>68U</td> <td>66U</td> <td>120</td> <td>120</td> <td>1400011</td> <td>140011</td>		19000	28000	1000	68U	66U	120	120	1400011	140011
Informethane    020000    100000    1000    68U    66U    12U    12U    1400U    1400U      ibromochloromethane    110000    1000000    100000    68U    66U    12U    12U    3100J    1400U      thylbenzene    1000000    1000000    100000    68U    66U    12U    12U    3100J    1400U      lexane	niororofm	. 520000	1000000	10000	68UJ	66UJ	12UJ	12UJ	140003	14000
ibromochlorometnane 110000 1000000 1000000 68U 66U 12U 12U 3100J 14000 thylbenzene 1000000 1000000 100000 68U 66U 24U 24U 3000J 10000J lexane 140U 130UJ 24U 24U 2900U 3000U	hioromethane	110000	1000000	1000	68U	66U	120	120	14000	14001
thylbenzene 1000000 1000000 100000 lexane	bromochloromethane	10000	1000000	100000	68U	66U	12U	120	3100J	14000
lexane 140U 130UJ 24U 24U 2900U 3000U	thylbenzene	1000000	100000		350J	380J	24U	240	3000J	100001
	lexane	••	-		1400	130UJ	24U	240	2900U	30000

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Table 5-2. Volatile Organic Compounde in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

	NJDI	P Soll Cleanup Crite	impact to	Sample ID: N3TFSB2 Depth: O6 Zone**: AP	N3TFSB2FR 06 AP	N3TF\$83 02 N3TF 10(12/84	N3TFSB4 02 N3TF 10/17/84	N3TFSB5 08 N3TF 10/19/94	N3TFSB6 02 N3TF 10/18/94
Analyte (ug/kg)	Residential	Non-Residential	Groundwater	Date: 10/19/94	10/19/94	10/13/34			
Methylene chloride n-Propylbenzens Styrene Tetrachloroethene Toluene Trichloroethene Vinyl chloride Xylenes (Total) cis-1,3-Dichloropropene trans-1,3-Dichloropropene	49000  23000 4000 1000000 23000 2000 410000 4000 4000	210000  97000 6000 1000000 54000 7000 1000000 5000 5000	1000 	120UJ 3500J 68U 68U 68U 68U 68UJ 68U 68U 68U 68U 68U	150UJ 1700J 66U 68U 66U 66U 66U 66U 66U	26U 24U 12U 12U 12U 12U 12U 12U 12U 12U	56U 24U 12U 1J 1J 12U 12U 12U 12U	1400U 8800J 1400U 1400U 1400U 1400U 3400J 1400U 1400U	1400U 1400U 1400U 1400U 1400U 1400U 1400U 1400U 1400U 1400U
Total Volatile Organic Compo	unds			3850	2080	0	1	18300	27500

See last page for footnotes.

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	NJDE	P Soli Cleanup Crite	eria •	Sample iD; N3TFSB7 Depth: 02	N3TFSB7 06	N3TFSB8 02	N3TFSB8 06	N3TFSB9 02	PN1SB2 04	PN1582 08
Analyte (ug/kg)	Residential	Non-Residential	Impact to Groundwater	Zone**: N3TF Date: 10/18/94	N3TF 10/18/94	N3TF 10/18/94	N3TF 10/18/94	N3TF 11/02/94	P1 11/02/94	P1 11/02/94
				200011	1.911	1400U	1500U	130	110	1 2U
1,1,1-Trichloroethane	210000	1000000	50000	30000	121	1400U	15000	130	110	12U
1,1,2,2-Tetrachioroethene	34000	70000	1000	30000	120	1400U	15000	130	110	12U
,1,2-Trichloroethane	22000	420000	1000	, 30000	120	14000	15000	130	110	12U
,1-Dichlorosthans	570000	1000000	10000	30000	120	14000	15000	130	110	12U
,1-Dichloroethene	8000	150000	10000	30000	120	280011	30000	250	220	24U
,2-Dibromoethane		••		60000	240	28000	15000	131)	110	12U
,2-Dichloroethane	6000	24000	1000	30000	120	14000	15000	1311	110	120
, 2-Dichloroethene(Totei)	1079000	2000000	51000	30000	120	14000	15000	130	110	120
2-Dichloropropane	10000	43000		30000	120	14000	70000	82011	58011	5900
-Butanol				150000UJ	600U	7000000	7800000	42011	5601	590U
2-Butanol				15000UJ	600U	7000000	7600003	401	41	39J
Butanone	1000000	1000000	50000	3000UJ	44J	1400UJ	150000	400	5111	120
		·		3000UJ	120	1400UJ	150000	130	FROIL	5900
-Methyl-2-propanol		-		150000UJ	600U	70000UJ	7600000	6300	5600	171
-Propend				150000UJ	600UJ	70000UJ	76000UJ	63003	1111	121
-Methyd-2-nentenone	1000000	1000000	50000	3000U	12U	1400U	15000	130	4401	10001
	1000000	1000000	100000	18000J	34U	1400UJ	1500UJ	ISUUJ	4405	1211
	3000	13000	1000	11000	26	4200	180J	130	110	120
senzene senzene	11000	46000	1000	30000	120	1400U	15000	130	110	120
Stomodicino on activity	86000	370000	1000	30000	12U	1400U	15000	130	110	120
Sromotorm	79000	1000000	1000	3000U	120	1400U	1500U	130	110	120
Stomorrie mene				3000U	12U	1400UJ	150000	130	110	120
	2000	4000	1000	3000U	120	1400U	1500U	130	110	120
Carbon tetrachioride	17000	680000	1000	790J	120	1400U	15000	130	110	120
Chlorobenzene	37000			' 3000U	12Ų	1 <b>400U</b>	15000	130	110	120
Chloroethene	19000	28000	1000	3000U	120	1400U	15000	13U	110	120
Chloroform	19000	100000	10000	3000U	12U	1400U	1500UJ	1 <b>3</b> U	110	120
Chioromethane	110000	1000000	1000	30000	12U	1400U	1500U	1 <b>3</b> U	110	120
Dibromochloromethane	10000	1000000	100000	36000	52	1400	420J	13U	110	120
Ethylbenzene	1000000	100000		1 20000J	45	5300	3000U	110J	5J	240
-iexane				6000U	24U	2800U	3000U	25U	22U	24U

See last page for footnotes.

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	NJDE	P Soil Cleanup Crite	oria *	Semple ID: N3TFS87 Depth: 02	N3TFSB7 06	N3TFSB8 02	N3TFSB8 06	N3TFSB9 02	PN1SB2 04	PN1SB2 08 P1
Analyte (ug/kg)	Residential	Non-Residential	Impact to Groundwater	Zone**: N3TF Dete: 10/18/94	N3TF 10/18/94	N3TF 10/18/94	N3TF 10/18/94	N31F 11/02/94	11/02/94	11/02/94
Methyiens chloride n-Propylbenzene Styrene Tetrachloroethene Trichloroethene Vinyl chloride Xylenes (Totel) cis-1,3-Dichloropropene trans-1,3-Dichloropropene	49000  23000 4000 1000000 23000 2000 410000 4000 4000	210000  97000 5000 1000000 54000 7000 1000000 5000 5000	1000 - 100000 1000 500000 1000 10000 1000 1	3000U 37000 3000U 430J 3000U 3000U 3000U 3000U 3000U 3000U	27U 460J 12U 2J 12U 12U 56 12U 12U	1400U 8800 1400U 1400U 190J 1400U 1400U 1400U 1400U 1400U	1500U 4800J 1500U 1500U 1500U 1500UJ 330J 1500U 1500U	14UJ 75J 13U 13U 13U 13U 13U 7J 13U 13U	38UJ 22U 11U 11U 21 11U 11U 11U 11U 11U	150J 25 120 120 120 120 120 2J 120 120
Total Volatile Organic Compe	unde			265220	685	21590	785730	240	30	83

Table 5-2. Volatile Organic Compounds in Soli Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Table 5-2.	Volatile Organic Compounds in Soil Samples C	Collected During the Phase	1A Remedial Investigation, Be	syonne Plant, Bayonne, New Jersey.

				Sample ID: PSSB1	PSSB1	SSB1	SSB3	SSB3	STFSB1	STFSB1	STFS82
	NJDE	P Soil Cleanup Crite	erie *	Depth: 02	06	16	08	10	02	06	08
			Impact to	Zone**: MB	мв	SS	SS	S5	STF	STF	STF
Analyte (ud/kd)	Residential	Non-Residential	Groundwater	Deto: 10/31/94	10/31/94	10/24/94	10/24/94	10/24/94	10/26/94	10/26/94	10/26/94
VIIBIATE (ABINAL			<del>_</del>								
1 1 1-Trichloroethene	210000	1000000	50000	1400U	1400U	12U	16U	13U	1400U	1600U	1500U
1 1 2 2 Tetrophoraethene	34000	70000	1000	, 1400U	1400U	12U	16U	13U	1400U	1600UJ	1500UJ
1 1 2 Trichloroethane	22000	420000	1000	1400U	1400U	12U	16U	13ป	1400U	1600U	1500U
1. 1. Dieblossethene	570000	1000000	10000	1400U	1400U	12U	16U	130	1400U	1600U	15000
1,1-Dichlereethere	8000	150000	10000	1400U	1400U	120	16U	13U	1400U	1600UJ	1500UJ
1. 2. Dik some sthene	-		-	2900U	2900U	24U	33U	26U	2800U	3300U	3200U
1,2-Dibromoethane	8000	24000	1000	1400UJ	1400U	12U	16U	13U	1400UJ	16000	1500U
	1079000	2000000	51000	1400U	1400U	120	16U	13U	1400U	1600U	15000
1,2-Dichloroethene(i otal)	1079000	43000		14000	1400U	12U	16U	13U	1400U	1600UJ	1500UJ
1,2-Dichloropropane	10000	43000		73000U	73000UJ	590U	820U	660U	700000	83000UJ	L100008
1-Butanol	· •	-		73000U	730000	590Ų	820U	660U	70000U	83000U	80000U
2-Butanol	1000000	1000000	50000	1400UJ	1400UJ	12UJ	16UJ	8J	1400U	1600UJ	1500UJ
2-Butanone	100000	1000000		1400UJ	1400UJ	12U	16U	130	1400UJ	1600UJ	1500UJ
2-Hexanone	-			73000U	73000U	590U	820U	660U	70000U	83000U	80000U
2-Methyl-2-propanol				73000U	730000	590UJ	820U.;	660UJ	700000	83000U	80000U
2-Propenol	-	100000	50000	1400U	1400U	12U	16U	13U	1400U	1600U	15000
4-Methyl-2-pentanone	1000000	1000000	100000	1400UJ	1400UJ	67U	16U	120U	1400UJ	1800UJ	1500UJ
Acetone	1000000	12000	1000	14000	1400U	120	16U	13U	290J	260J	15000
Benzene	3000	13000	1000	14000	1400U	120	160	13U	1400U	1600U	15000
Bromodichloromethene	11000	45000	1000	14000	1400U	120	16U	13U	1400U	16000	1500U
Bromoform	86000	370000	1000	14000	1400U	120	16U	13U	1400U	1600U	1500U
Bromomethane	79000	1000000	1000	14000	14000	120	16U	13U	1400UJ	1600UJ	1500UJ
Carbon disulfide				14000	1400U	120	16U	13U	1400U	16000	15000
Carbon tetrachloride	2000	4000	1000	14000	14000	1.1	16U	130	1400U	200J	15000
Chlorobenzene	37000	680000	1000	14000	14000	120	160	13U	1400UJ	1600U	1500U
Chloroethane				14000	14000	120	16U	130	1400U	1600U	1500U
Chloroform	19000	28000	1000	14000	14000	121	16U	13U	1400UJ	1600U	15000
Chloromethene	520000	1000000	10000	14000	14000	121	16U	130	1400U	1600U	1500U
Dibromochloromethane	110000	1000000	1000	14000	570.1	120	16U	13U	350J	480J	1 500U
Ethylbenzene	1000000	1000000	100000	14000	11001	51	7.1	26U	2800U	6100	3200U
Hexane			~=	23000	29000	10.1	330	26U	2800U	3300U	3200U
Methyl-t-butyl ether			••	23000	29000						

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See last page for footnotes.

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	ылр	P Soil Cleanup Crite	eria *	Sample ID: PSSB1 Depth: 02	PSSB1 06	SSB1 16	SSB3 06	SSB3 10	STFSB1 02	STFSB1 06	STFSB2 08 STF
Analyte (ug/kg)	Residential	Non-Residential	Impact to Groundwater	Zone**: MB Date: 10/31/94	MB 10/31/94	SS 10/24/94	\$\$ 10/24/94	SS 10/24/94	STF 10/26/94	51F 10/26/ <u>94</u>	51F 10/2 <del>6</del> /94
Methylene chloride n-Propylbenzene Styrene Tetrachloroethene Trichloroethene Vinyl chloride Xylenes (Total) cis-1,3-Dichloropropene	49000  23000 4000 1000000 23000 2000 410000 4000	210000  97000 5000 1000000 54000 7000 1000000 5000 5000	1000  100000 1000 500000 1000 10000 10000 1000	1400U 2900U 1400U 1400U 1400U 1400U 1400U 1400U 1400U 1400U 1400U	1400U 7300 1400U 1400U 1400U 1400U 1400U 1200J 1400U 1400U	45UJ 14J 12U 12U 12U 12U 12U 2J 12U 12U	350J 330 160 160 160 160 160 160 160	48UJ 1J 13U 13U 13U 13U 13U 13U 13U	1400U 16000 1400U 1400U 1400U 1400U 1400UJ 1400UJ 1400UJ 1400UJ 1400UJ	1600U 130000 1600U 1600U 1600U 1600U 1600U 1600U 1600U	1500U 860J 1500U 1500U 1500U 1500U 1500U 1500U 1500U
Total Volatile Organic Compo	unds			o	10170	18	7	8	16640	137040	850

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Table 5.1. Volatile Organic Compounds in Soil Semples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

				Sample ID: FBNA1-100594	FBNA5-101994	FBNA6-102094	FBNA7-102594	FBNA9-102894
	NJDE	P Soil Cleanup Crite	oria •	Depth:				
			impact to	Zone**:				
Analyte (ug/kg)	Residential	Non-Residential	Ground water	Date: 10/05/94	10/19/94	10/20/94	10/25/94	10/28/94
				4.014	1011	100	100	100
1,1,1-Trichlorosthane	210000	1000000	50000	100	100	100	100	100
1,1,2,2-Tetrachloroethane	34000	70000	1000	. 100	100	100	100	100
1,1,2-Trichloroethane	22000	420000	1000	100	100	100	100	100
1,1-Dichlorosthane	570000	1000000	10000	100	100	100	100	100
1,1-Dichloroethene	8000	150000	10000	100	100	2011	2011	20U
1,2-Dibromosthane			-•	200	200	1011	100	100
1,2-Dichloroethane	8000	24000	1000	100	100	100	100	100
1,2-Dichloroethene(Total)	1079000	2000000	51000	100	100	100	100	100
1,2-Dichioropropane	10000	43000		100	100	50011	5001	500U
1-Butanol		••		5000	5000	5000	5000	5000
2-Butanol				500U	500U	5000	100	100
2-Butanona	1000000	1000000	50000	100	100	100	100	100
2-Hexanone				100	100	100	50011	5000
2-Mathy-2-propanol		·		500U	500U	5000	5000	5000
2-Propenol				5000	500U	5000	5000	1011
A-Mathy-2-pentanone	1000000	1000000	50000	100	100	100	100	100
	1000000	1000000	100000	140J	100	100	100	100
Banzeze	3000	13000	1000	100	100	100	100	100
Bramadiablaromethene	11000	46000	1000	100	100	100	100	100
Bromotorm	86000	370000	1000	100	100	100	100	100
Bromoroin	79000	1000000	1000	10U	100	100	100	100
Bromomethane Carbon disulfide				100	100	100	100	100
Carbon distinct	2000	4000	1000	toU	100	100	100	101
	37000	680000	1000	100	100	100	100	100
Chieroperzana				100	100	100	100	100
Chioroemane	19000	28000	1000	100	100	10U .	100	100
Chiorotorm	520000	1000000	10000	100	100	10U	100	100
	110000	1000000	1000	100	10U	100	100	100
Dibromochlorometnane	1000000	1000000	100000	100	100	100	100	100
Ethylbenzeñe	100000			100	100	100	100	100
Hexane			••	200	200	20U	200	200
Methyl-t-butyl ather								

See last page for footnotes.

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

	BOLN	P Soil <u>Cleanup</u> Crit	eria *	Semple ID: FBNA1-100594 . Depth:	FBNA5-101994	FBNA6-102094	FBNA7-102594	FBNA3-102694
Analyte (ug/kg)	Residential	Non-Residential	Impact to Groundwater	Zone**: Date: 10/05/94	10/19/94	10/20/94	10/25/94	10/26/94
Methylene chloride n-Propylbenzene Styrene Tetrachloroethene Toluene Trichloroethene Vinyl chloride Xylenes (Total) cis-1,3-Dichloropropene trens-1,3-Dichloropropene	49000 - 23000 4000 1000000 23000 23000 2000 410000 4000	210000  97000 6000 1000000 54000 7000 1000000 5000 5000	1000  100000 1000 500000 10000 10000 10000 10000 1000	2J 20U 20U 10U 10U 10U 10U 10U 10U 10U	5J 20U 20U 10U 10U 10U 10U 10U 10U	10U 20U 20U 10U 10U 10U 10U 10U 10U	3J 20U 20U 10U 10U 10U 10U 10U 10U	10U 20U 20U 10U 10U 10U 10U 10U 10U
Total Volatile Organic Compou	nda			_ <b>o</b>	5	0	3	0

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See last page for footnotes.

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				Sample ID: FBNA11-102794	FBNA13-102894	FBNA14-102894	FBNA17-103194
	NJDE	P Soil Cleanup Crit	eria "	Depth:			
			Impact to	Zone**:	10/00/04	10/22/94	10/31/94
Analyta (ug/kg)	Residential	Non-Residential	Groundwater	Date: 10/27/94	10/28/94	10/28/34	
	*10000	100000	50000	250	100	100	10U
1, 1, 1-1 noniorosinane	210000	70000	1000	250	100	10U	100
1,1,2,2-letrachioroethane	34000	420000	1000	250	100	100	100
1, 1, 2- Inchlorostnans	22000 E70000	420000	10000	250	100	100	10U
1,1-Dichloroethane	570000	150000	10000	2511	100	100	100
1,1-Dichloroethene	8000	150000	10000	501	20U	20U	20U
1,2-Dibromoethane			1000	250	100	100	100
1,2-Dichloroethene	6000	24000	1000	250	100	100	100
1,2-Dichloroethens(Total)	1079000	2000000	51000	250	100	100	100
1,2-Dichloropropane	10000	43000		250	500U	5001	500U
1-Butanoi			**	12000	5000	5000	500U
2-Butanol				12000	100	100	100
2-Butanone	1000000	1000000	50000	250	100	100	100
2-Hexanone		-	-	250	5001	5000	5000
2-Methyl-2-propanol		-		12000	5000	5000	5000
2-Propanol				12000	5000	1011	104
4-Methyl-2-pentanone	1000000	1000000	50000	250	100	100	100
Acetone	1000000	1000000	100000	330	100	65	100
Benzene	3000	13000	1000	250	100	100	100
Bromodichloromethane	11000	46000	1000	250	100	100	100
Bromoform	86000	370000	1000	250	100	100	100
Bromomethane	79000	1000000	1000	250	100	100	100
Carbon disulfide			-+	250	100	100	100
Carbon tetrachloride	2000	4000	1000	250	100	100	100
Chlorobenzene	37000	680000	1000	250	100	100	100
Chloroethane				250	100	100	100
Chloroform	19000	28000	1000	250	100	100	100
Chloromethene	520000	1000000	10000	25U	100	100	100
Dibromochloromethane	1 10000	1000000	1000	250	100	100	101
Ethylbenzene	1000000	1000000	100000	25U	10U	100	
Hexane				250	10U	100	
Methyl-t-butyl ether	•• .	,		50U	200	200	200

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Table 5-2. Volstile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Table 5-2. Volatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

				Sample ID: FBNA11-102794	FBNA13-102894	FBNA14-102894	FBNA17-103194
	NJDE	P Soil Cleanup Crit	eria *	Depth:			
			impact to	Zone**:			
Analyte (ug/kg)	Residential	Non-Residential	Groundwater	Date: 10/27/94	10/28/94	10/28/94	10/31/94
Methylene chloride	49000	210000	1000	25U	3J	2J	IJ
n-Propylbenzene	••	-		50U	200	200	200
Styrene	23000	97000	100000	50U	20U	20U	200
Tetrachloroethene	4000	6000	1000	250	100	100	100
Toluene	1000000	1000000	. 500000	25U	100	100	100
Trichloroethene	23000	54000	1000	25U	100	100	100
Vinyl chloride	2000	7000	10000	25U	100	100	100
Xylenes (Total)	410000	1000000	10000	250	100	100	100
cis-1,3-Dichloropropane	4000	5000	1000	250	100	100	100
trans-1,3-Dichloropropene	4000	5000	1000	25U	100	100	100
Total Volatile Organic Compoun	de			0	3	8	1

Analyte concentrations and New Jersey Department of Environmental Protection (NJDEP) criteria in micrograms per kilogram (ug/kg) (equivalent to parts per billion (ppb)).

Analyses were performed by CompuChem Environmental Corporation, Research Triangle Park, North Caroline, using Contract Laboratory Program (CLP)

protocols contained in the Statement of Work (SOW) OLMO1.8.

Sample results exceeding the NJDEP impact to groundwater criteria are shown in bold. Sample results exceeding the NJDEP non-residential criteria are underlined.

Sample results exceeding both criteria are shown in bold and underlined.

- NJDEP New Jersey Department of Environmental Protection.
- FBNA Indicates a field blank associated with non-aqueous samples.
- FR Field replicate of previous sample.
- U The compound was analyzed for, but not detected at the specific detection limit.
- J Estimated result.

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-- No applicable criteria.

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- NJDEP Soil Cleanup Criteria, February 3, 1992; last revised February 3, 1994.
- Zones as defined in Table 3-2.

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<u></u>	NJD	EP Soil Cleanup C	riteria *	Semple ID: 3TFIRMB4	3TFIRMB4	AGTFSB1	AGTFSB1	AGTFSB2 04	AGTFSB3 02
			1	Depth: UZ	NATE	AGTE	AGTE	AGTE	AGTE
			impact to	Zone""; Noir	10/17/94	10/20/94	10/20/94	10/28/94	10/27/94
Analyte (ug/kg)	Residential	Non-Residentia	Groundwater	Date. 10/17/04					
		1 000000	100000	39011	7800U	8500U	13000UJ	100000	800U
1,2,4-Trichiorobenzene	68000	1200000	50000	240.1	78000	8500U	13000UJ	10000U	800U
1,2-Dichlorobenzene	5100000	10000000	10000	1401	78000	8500U	13000UJ	10000U	800U
1,3-Dichlorobenzene	5100000	10000000	100000	2001	78000	8500U	13000UJ	10000U	800U
1,4-Dichlorobenzene	570000	10000000	100000	2000	78000	8500U	13000UJ	10000U	800U
2,2'-oxybis(1-Chloropropane)	2300000	10000000	10000	3900	1900011	210000	32000UJ	26000U	19000
2,4,5-Trichlorophenol	5600000	1000000	50000	9500	79000	25000	1300000	100000	800U
2,4,6-Trichlorophenol	62000	270000	10000	3900	78000	85000	1300000	100000	800U
2,4-Dichloropheno	170000	3100000	10000	3900	78000	85000	1300000	100000	800U
2,4-Dimethylphenol	1100000	1000000	10000	3900	78000	2100011	3200000	2600011	1900UJ
2,4-Dinitrophenol	110000	2100000	10000	9500	190000	210000	1200000	100000	8000
2.4-Dinitrotoluene	1000	4000	10000	3900	78000	85000	1200011	10000U	800U
2.6-Dinitrotoluene	1000	4000	10000	3900	78000	85000	19001	100000	8000
2-Chioronaphthalene				3900	78000	85000	12000	1000000	8000
2-Chlorophenol	280000	5200000	10000	390U	78000	86000	450000	20000	120.1
2-Methylnaphthalana	••			46J	24000	9400	450003	100000	80011
2-Methylabenol	2800000	10000000		390U	78000	85000	1300000	100000	19000
2-Mitrospiline			••	9500	19000U	210000	3200000	200000	9000
2-Nitrophenol				390U	78000	85000	1300000	100000	8000
2.31-Dichlorobenzidine	2000	6000	100000	390U	7800UJ	850000	1300000	1000000	10000
			••	9500	190000	21000U	32000UJ	260000	19000
4.6 Divitre 2 methylaberol	••			950U	19000UJ	21000UJ	32000UJ	2600000	190003
4,8-Dimitro-2-methyphenoi			••	39QU	7800U	8500U	13000UJ	100000	8000
4-Bromophentyl phenyl ether	10000000	10000000	100000	390U	7800U	8500U	13000UJ	100000	8000
4-Chioro-s-metryphenol	230000	4200000		390U	7800U	8500U	13000UJ	100000	8000
4-Chiorosniune				390U	7800U	8500U	13000UJ	100000	8000
4-Chlorophenyi phenyi etner	2800000	10000000		390U	7800U	8500U	13000UJ	100000	8000
4-Methylphenol	2800000			950U	19000UJ	21000UJ	32000UJ	260000	19000
4-Nitrosniine				950U	19000UJ	21000UJ	32000UJ	250000	190000
4-Nitrophenol	2400000	1000000	100000	390U	7800U	8500U	13000UJ	10000U	88J
Acenaphthene	3400000	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		390U	7800U	8500U	13000UJ	100000	8000
Acenaphthylana	10000000	10000000	100000	390U	7800U	2100J	1400J	1800J	320J
Anthracene	1000000	4000	500000	410	1700J	2000J	2000J	<u>90001</u>	1600J
Benzo(a)anthracane	300	4000	100000	270J	1700J	<u>1500J</u>	13000UJ	12000	<u>2200J</u>
Benzo(s)pyrene	640	004	100000						

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Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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	NJDEP Soil Cleanup Criteria *			Sample ID:	3TFIRMB4	3TFIRMB4	AGTFSB1 02	AGTFSB1 08	AGTFSB2 04	AGTFSB3 02
			Impact to	Zope**:	NATE	NSTE	AGTE	AGTE	AGTE	AGTF
Analysia (ug/kg)	Residential	Non-Residential	Groundwater	Date:	10/17/94	10/17/94	10/20/94	10/20/94	10/28/94	10/27/94
Charyte (ug/cg/									•	
Benzo(b)fluorenthene	900	4000	50000		850J	1800J	1700J	13000UJ	<u>8400J</u>	1700J
Benzola, b.i)perviene					390UJ	940J	2100J	13000UJ	6900J	2800J
Benzoik)fkjorentbene	900	4000	500000		990J	1800J	1700J	13000UJ	<u>8700J</u>	1900J
Butyl benzyl phthalate	1100000	10000000	100000		390U	7800U	8500U	13000UJ	100000	800UJ
Cerbezole					390U	7800U	8500U	13000UJ	100000	8000
Chrysene	9000	40000	500000		1100	3200J	5000J	3300J	12000	2900J
Di-n-buttd nhthaiata	5700000	10000000	100000		390U	7800U	8500U	13000UJ	100000	87J
Disploand phthelete	1100000	10000000	100000		390UJ	7800U	8500U	13000UJ	1000000	800UJ
Oliversele blenthracene	660	660	100000		180J	7800U	8500U	13000UJ	<u>5400J</u>	800UJ
Olberzefikez					390U	78000	8500U	13000UJ	1600J	800U
	10000000	10000000	50000		390U	7800U	8500U	13000UJ	100000	800U
Directly: primarate	10000000	10000000	50000		390U	7800U	8500U	13000UJ	10000U	8000
Dimetry prinalate	2300000	10000000	100000		440	2200J	1500J	1400J	5000J	1200
Fluorananene	2300000	10000000	100000		390U	5700J	8500U	5000J	3900J	130J
Fluorene	2300000	2000	100000		390U	7800U	8500U	13000UJ	10000U	800U
Hexachiorobenzene	1000	21000	100000		3900	7800U	8500U	13000UJ	100000	8000
Hexachiorobutaciene	400000	7300000	100000		390U	7800U	8500U	13000UJ	100000	8000
Hexachiorocyclopentediene	400000	100000	100000		390U	7800U	8500U	13000UJ	100000	8000
Hexachloroethane	900	4000	500000		150J	850J	500J	13000UJ	<u>4600J</u>	960J
Indeno(1,2,3-cd)pyrene	1100000	10000000	50000		390U	7800U	8500U	13000UJ	10000U	800U
leophorone	660	860	10000		390U	7800U	8500U	13000UJ	10000U	800U
N-Nitroso-di-n-propylamine	140000	600000	100000		390U	7800U	8500U	13000UJ	100000	8000
N-Nitrosodiphenylamine	140000	4200000	100000		64J	7800U	8500U	13000UJ	10000U	800U
Naphthalene	230000	520000	10000		390U	7800U	8500U	13000UJ	100000	800U
Nitrobenzene	20000	24000	100000		950U	19000U	21000U	32000UJ	26000U	1900UJ
Pentachlorophenol	8000	24000			630	6400J	6800J	13000J	14000	1200
Phenanthrene	1000000	10000000	50000		390U	78000	8500U	13000UJ	10000U	8000
Phenol	17000000	10000000	100000		780	3000J	11000	8400J	8900J	3700J
Pyrene	1700000	1000000			390U	7800U	8500U	13000UJ	100000	8000
bis(2-Chloroethoxy)methane		2000	10000		390U	7800U	8500U	13000UJ	10000U	800U
bis(2-Chloroethyl)ether	000	110000	100000		390U	7800U	8500U	13000UJ	10000U	800UJ
bis{2-Ethylhexyl)phthelate	49000	210000	,00004							
Total Semivolatile Compounds					6490	53290	45300	81 400	122200	20905

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Table 5-3. Semivolatile Organic Compounds in Soil Semples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Dapth: 06    O2    02   <		NJD	EP Soil Cleanup Ci	riteria "	Semple ID:	AGTFSB3	AGTFSB4	AHTFSB1	AHTFSB2	AHTFSB4	AHTESB4
Anelyte (ig/kg)    Residential Non-Residential Groundwater    Date: 10/27/94    Non-Participant    Non-Participant      1,2.4.Trichlorobanzene    68000    1200000    1000000    24000U    3900U    7100U    3800U    3800U    3800U      1,2.5.Unbiorobanzene    5100000    1000000    500000    24000U    3900U    7100U    3800U    3800U<			· .		Depth:	06	02	VZ AUTE	ALITE	ANTE	AHTE
Analyte (ug/kg)    Residential    Non-Residential    Groundwater    Date:    10/2/794    10/10/04    10/1				Impact to	Zone"";	AGIP	AGTE 10/20/04	10/10/04	10/14/94	10/14/94	10/14/94
1.2.4-Trichlorobenzene    68000    120000    100000    24000U    3900U    7100U    3800U    3600U    3800U      1.2.Dichlorobenzene    510000    10000000    50000    24000U    3900U    7100U    3800U    3600U    3800U	Analyte (ug/kg)	Residential	Non-Residential	Groundwater	Date:	10/2//94	10/20/34	10/13/34	10/14/04		
1.2 Dickinobalitation    50000    50000    20000    3800U    3800U<		68000	1200000	100000		24000U	3900U	7100U	3800U	3600U	3800U
1.2 Dichlorbenzere    510000    10000000    24000U    3800U    7100U    3800U    3800	1,2,4- Meniorobanzana	5100000	10000000	50000		24000U	3900U	7100U	3800U	3600U	3800U
1.3-Diphonobarization    570000    1000000    24000U    3900U    7100U    3800U    38	1.2 Dichlorobenzene	5100000	10000000	100000		24000U	3900U	71000	3800U	3600U	3800U
1,4-Distribution    230000    1000000    10000    240000    39000    71000    38000    38000    230000      2,4-5. Trichlorophenol    5500000    10000000    50000    240000    39000    71000    38000	1.4 Dichlorobenzene	570000	10000000	100000		24000U	3900U	7100U	3800U	3600U	3800U
2.2 - Styckis 1 C-throphopane)    550000    10000000    50000    24000U    3500U    3500U    2200U      2.4,5 - Trichlorophenol    62000    270000    10000    24000U    3900U    7100U    3600U    3600U    3800U      2.4,6 - Trichlorophenol    170000    3100000    10000    24000U    3900U    7100U    3800U    3800U    3800U      2.4-Dichtorophenol    110000    10000000    10000    24000U    3900U    7100U    3800U    3800U    3800U      2.4-Dintrotolane    1000    4000    10000    24000U    3900U    7100U    3800U    3800U    3800U      2.6-Dintrotolane    1000    4000    10000    24000U    3900U    7100U    3800U    3800U    3800U      2.6-Dintrotolane    1000    4000    10000    24000U    3900U    7100U    3800U    3800U    3800U      2.6-Dintrotolane    1000    5200000    100000    -    24000U    3900U    7100U    3800U		2300000	10000000	10000		24000U	3900U	7100U	3800U	3600U	38000
2.4,6. Trichtorphenol    62000    77000    3800U    7100U    3800U    3600U    3800U      2.4,6. Trichtorphenol    170000    3100000    10000    24000U    3900U    7100U    3800U    3600U    3800U      2.4. Dinterbytphenol    110000    2100000    10000    24000U    3900U    7100U    3800U    3800U    3800U      2.4. Dinterbytphenol    110000    2100000    10000    24000U    3900U    7100U    3800U    3800U    3800U      2.4. Dinterbytphenol    1000    4000    10000    24000U    3900U    7100U    3800U    3800U    3800U      2.4. Dinterbutphenol    1000    4000    10000    24000U    3900U    7100U    3800U    3800U    3800U      2.4. Dinterbutphenol    280000    5200000    100000    -    24000U    3900U    7100U    3800U    3800U      2.Mitrophenol    2800000    1000000    -    24000U    3900U    7100U    3800U    3800U	2,2 • OXYDIS(1• Child/opropane)	5600000	10000000	50000		61000U	9500U	170000	9200U	8800U	9200U
2,4,5,116/httrophenol    10000    310000    10000    24000U    3800U    3800	2,4,6-Trichlorophenol	62000	270000	10000		24000U	3900U	7100U	3800U	3600U	38000
2,4-Dimetrophenol    110000    1000000    100000    100000    100000    100000    100000    100000    1000000    1000000    1000000    1000000    10000000    1000000000000000000000000000000000000	2,4,6-Trichlorophenol	170000	3100000	10000		24000U	3900U	7100U	3800U	3600U	3800U
2,4-Dimetryphenol    110000    2100000    10000    20000    10000    200000    20000    200000	2,4-Dichlorophenor	1100000	1000000	10000		24000U	3900U	7100U	38000	36000	3800U
2.4-Diritrophenol    10000    40000    10000    240000    3900U    7100U    3800U    3800U    3800U      2.4-Diritrotoluene    1000    4000    10000    24000U    3900U    7100U    3800U    3	2,4-Dimethylphenol	110000	2100000	10000		61000UJ	9500U	17000UJ	9200UJ	8800UJ	92000
2.4-Dinitrotoluene    1000    4000    10000    24000U    3900U    7100U    3800U    3600U    3800U      2.6-Dinitrotoluene    100    -    -    24000U    3900U    7100U    3800U    3800U    3800U      2.6-Dinitrotoluene    280000    5200000    10000    24000U    3900U    7100U    3800U    3800U    3800U      2.Chloronaphthelene    -    -    -    24000U    3900U    7100U    3800U    3800U    3800U      2.Methylphenol    2800000    10000000    -    24000U    3900U    7100U    3800U    3800U    3800U      2.Mitrophenol    -    -    -    24000U    3900U    7100U    3800U    3800U    3800U      3.4-Dichlorobenzidine    2000    6000    1000000    24000U    3900U    7100U    3800U    3800U    3800U      3.4-Dichlorobenzidine    -    -    -    -    24000U    3900U    7100U    3800U    3800U	2,4-Dinitrophenol	10000	2100000	10000		240000	3900U	7100U	3800U	3600U	3800U
2,6-Dinitrotoluse    10000    10000    10000    10000    10000    10000    10000    10000    10000    10000    100000    100000    100000    100000    100000    100000    100000    100000    100000    1000000    100000    100000	2,4-Dinitrotoluene	1000	4000	10000		24000U	3900U	7100U	3800U	3600U	3800U
2-Chloronsphthalene    n	2,6-Dinitrotoluene	1000	4000	10000		24000U	39000	7100U	3800U	3600U	3800U
2-Chlorophenol    280000    520000    -    240000    39000    12000    780.1    10000    25000      2-Methylnaphthelene    -    -    240000    39000    71000    38000	2-Chloronaphthalene					240000	39000	7100U	3800U	3600U	3800U
2-Methylnaphthelene    -	2-Chlorophenol	280000	5200000	10000		240000	39000	1200J	780J	10000	25000
2-Methylphenol    2800000    10000000    -    61000U    9500U    17000U    9200UJ    8800UJ    9200U      2-Nitroeniline    -    -    -    24000U    3900U    7100U    3800U	2-Methyinaphthalene	-				240000	39000	71000	3800U	3600U	3800U
2-Nitroaniline    -	2-Methylphenol	2800000	10000000			240000	95000	17000U	9200UJ	8800UJ	9200U
2-Nitrophenoi    -    -    -    -    240000    33000    7100UJ    3800U	2-Nitroaniline	••				810000	20000	71000	3800U	3600U	3800U
3,3'-Dichlorobenzidins  2000  6000  100000  80000  950000  170000  92000  880000  92000    3-Nitroeniline  -  -  -  -  610000  950000  170000  920000  880000  92000    4-B-Dinitro-2-methylphenol  -  -  -  610000  950000  170000  920000  38000  38000    4-Bromophenyl phenyl ether  -  -  -  -  240000  39000  71000  38000  38000  38000    4-Chloro-3-methylphenol  10000000  1000000  1000000  240000  39000  71000  38000  36000  38000    4-Chlorophenyl phenyl ether  -  -  -  240000  39000  71000  38000  36000  38000    4-Chlorophenyl phenyl ether  -  -  -  240000  39000  71000  38000  36000  38000    4-Methylphenol  2800000  10000000  -  6100000  950000  1700000  920000  88000  38000    4-Nitroeniline  -	2-Nitrophenoi		-			240000	39000	710011	3800U	3600U	3800U
3-Nitrosniline  -  -  -  -  610000  38000  170000  9200UJ  8800UJ  9200U    4,6-Dinitro-2-methylphenol  -  -  -  610000  9500UJ  17000U  3200U  3600U  3800U	3,3'-Dichlorobenzidine	2000	6000	100000		240000	950003	170000	92000	8800U	9200U
4,6-Dinitro-2-methylphenol    24000U  3900U  7100U  3800U  3800U  3800U    4-Bromophenyl phenyl ether    24000U  3900U  7100U  3800U  3600U  3800U    4-Chloro-3-methylphenol  10000000  10000000  1000000  24000U  3900U  7100U  3800U  3600U  3800U    4-Chloro-3-methylphenol  230000  4200000   24000U  3900U  7100U  3800U  3600U  3800U    4-Chloro-iline  230000  4200000   24000U  3900U  7100U  3800U  3600U  3800U    4-Chlorophenyl phenyl ether    24000U  3900U  7100U  3800U  3800U  3800U    4-Nitrophenol  2800000  10000000   24000U  3900U  7100U  3800U  3800U  3800U    4-Nitrophenol    61000U  9500UJ  17000U  9200UJ  8800U  3800U    4-Nitrophenol    24000U  3900U  7100U  3800U	3-Nitroaniline			••		610000	450000	170000	9200UJ	8800UJ	9200U
4-Bromophenyl phenyl ether  -	4,6-Dinitro-2-methylphenol			••		340000	390000	71000	3800U	3600U	3800U
4-Chloro-3-methylphenol  10000000  10000000  1000000  240000  35000  71000  38000  36000  38000    4-Chlorophenyl phenyl ether  -  240000  39000  71000  38000  36000  38000    4-Chlorophenyl phenyl ether  -  -  240000  39000  71000  38000  38000  38000    4-Methylphenol  2800000  10000000  -  240000  39000  71000  38000  38000  38000    4-Methylphenol  2800000  10000000  -  610000  95000J  170000J  9200U  8800U  9200U    4-Nitrophenol  -  -  61000U  9500UJ  17000UJ  9200UJ  8800U  9200U    4-Nitrophenol  -  -  61000U  9500UJ  17000UJ  9200UJ  3800U  3800U    Acenephthylene  3400000  10000000  1000000  24000U  3900U  7100U  3800U  3800U    Acenephthylene  -  -  -  24000U  3900U  7100U  3800U  3800U	4-Bromophenyl phenyl ether		••			240000	39000	71000	3800U	35000	38000
4-Chlorophenyl ether  230000  4200000   2400000  39000  71000  38000  38000  38000    4-Chlorophenyl ether   2400000  39000  71000  38000  38000  38000    4-Mathylphenol  2800000  10000000   240000  39000  71000  38000  38000  38000    4-Mathylphenol  2800000  10000000   610000  950000  1700000  92000  88000  92000    4-Nitrophenol   610000  950000  17000000  920000  38000  3	4-Chloro-3-methylphenol	10000000	10000000	100000		240000	39000	71000	3800U	3600U	3800U
4-Chlorophenyl ether  280000  1000000  240000  39000  71000  38000  38000  38000    4-Mathylphenol  280000  1000000  -  240000  39000  71000  38000  92000    4-Nitroaniline  -  -  610000  950000  1700000  920000  92000    4-Nitrophenol  -  -  610000  950000  17000000  920000  920000    4-Nitrophenol  -  -  610000  950000  710000  130000  380000    Acenephthylene  3400000  10000000  1000000  2400000  390000  710000  380000  380000    Acenephthylene  -  -  2400000  390000  710000  380000  380000    Anthracene  10000000  1000000  240000  390000  710000  380000  380000    Benzo(e)enthracene  900  4000  500000  40000  390000  710000  380000  360000  4100    Benzo(e)ebyrene  660  660  1000000  250000  1300000 </td <td>4-Chloroaniline</td> <td>230000</td> <td>4200000</td> <td></td> <td></td> <td>2400000</td> <td>39000</td> <td>71000</td> <td>3800U</td> <td>3600U</td> <td>3800U</td>	4-Chloroaniline	230000	4200000			2400000	39000	71000	3800U	3600U	3800U
4-Methylphenol    280000    10000000     240000    35000    17000U    9200U    8800U    9200U      4-Nitroaniline     61000U    9500UJ    17000UJ    9200UJ    8800UJ    9200U      4-Nitroaniline     61000U    9500UJ    17000UJ    9200UJ    8800UJ    9200U      4-Nitrophenol      61000U    9500UJ    17000UJ    9200UJ    8800UJ    9200U      Acenaphthene    3400000    1000000    100000    24000U    3900U    7100U    3800U    3800U      Acenaphthylene      24000U    3900U    7100U    3800U    3800U      Anthracene    10000000    1000000    24000U    3900U    7100U    3800U    3800U      Benzo(s)enthracene    900    4000    500000    4000J    3900U    7100U    3800U    3600U    410J      Benzo(s)enthracene    660    660    100000    2500J    1300J    7100U    3800U <td>4-Chlorophenyl phenyl ether</td> <td>••</td> <td></td> <td></td> <td></td> <td>240000</td> <td>39000</td> <td>71000</td> <td>38000</td> <td>3600U</td> <td>3800U</td>	4-Chlorophenyl phenyl ether	••				240000	39000	71000	38000	3600U	3800U
4-Nitrophenol  610000  930003  17000UJ  9200UJ  8800UJ  9200U    4-Nitrophenol  61000U  9500UJ  17000UJ  9200UJ  8800UJ  9200U    Acenephthene  3400000  10000000  1000000  24000U  3900U  7100U  3800U  3800U    Acenephthylene  24000U  3900U  7100U  3800U  3600U  3800U    Anthracene  10000000  1000000  100000  24000U  3900U  7100U  3800U  3600U  3800U    Benzo(s)anthracene  900  4000  500000  4000J  3900U  7100U  3800U  3600U  410J    Benzo(s)anthracene  660  660  100000  2500J  1300J  7100U  3800U  3600U	4-Methylphenol	2800000	10000000			240000	95000	170001	9200U	8800U	9200U
4-Nitrophenol    610000    350000    71000    1300J    3600U    3800U      Acenaphthene    3400000    10000000    100000    24000U    3900U    7100U    1300J    3600U    3800U      Acenaphthene    24000U    3900U    7100U    3800U    3600U    3800U      Acenaphthylene    10000000    1000000    24000U    3900U    7100U    3800U    3600U    3800U      Anthracene    10000000    1000000    4000U    3900U    7100U    3800U    3600U    410J      Benzo(s)anthracene    900    4000    500000    4000J    3900U    7100U    3800U    3600U    410J      Benzo(s)pyrene    660    660    100000    2500J    1300J    7100U    3800U    3600U    3800U	4-Nitroaniline			••		610000	950003	1700004	92000.0	8800UJ	9200U
Acenephthene    340000    1000000    100000    240000    35000    71000    38000    36000    38000      Acenephthylene    240000    39000    71000    38000    36000    38000    36000    410J    38000    36000    38000    38000    36000    38000	4-Nitrophenol					610000	390003	71000	1300J	3600U	3800U
Acensphthylene    240000    33000    71000    38000    36000    38000      Anthracene    10000000    1000000    240000    39000    71000    38000    36000    410J      Benzo(s)anthracene    900    4000    500000    4000J    3900U    7100U    3800U    3600U    410J      Benzo(s)anthracene    900    660    660    100000    2500J    1300J    7100U    3800U    3600U    3800U	Acenephthene	3400000	10000000	100000		240000	39000	71000	38000	3600U	3800U
Anthracene    10000000    1000000    100000    240000    35000    71000    36000    410J      Benzo(s)anthracene    900    4000    500000    4000J    3900U    7100U    3800U    3600U    410J      Benzo(s)anthracene    660    660    100000    2500J    1300J    7100U    3800U    3600U    3800U	Acenaphthylene	•-	-			240000	39000	71000	38000	3600U	3800U
Benzo(s)synthesis    900    4000    500000    4000    35000    71000    36000    36000      Benzo(s)pyrene    660    660    100000    2500J    1300J    7100U    3800U    3600U    3800U	Anthracene	10000000	10000000	100000		240000	39000	71000	38000	3600U	410J
Benzolejpyrene 660 660 100000 <u>25000 13000</u> 71000 38000 00000 00000	Benzo(a)anthracene	900	4000	500000		4000J	33000	71000	38000	3600U	3800U
	Banzo(a)pyrane	660	660	100000		25001	13000	/1000	40000		

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Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

	NJD	EP Soil Cleanup C	riteria *	Sample ID: AGT	\$B3	AGTFSB4	AHTFSB1	AHTFSB2	AHTFSB4	AHTFSB4
Analyte (ug/kg)	Residential	Non-Residential	Impact to Groundwater	Depth: 06 Zone**: AGTF Date: 10/2	: 7/94	02 AGTF 1 <u>0/20/94</u>	02 AHTF 10/19/94	02 AHTF 10/14/94	02 AHTF 10/14/94	08 AHTF 10/14/94
						1100	710011	380011	28000	38000
Benzo(b)fluoranthene	900	4000	50000	2400	00	11005	71000	38000	36000	38000
Benzo(g,h,i)perylene	-			2400	00	360J	71000	380000	380003	38000
Benzo(k)fluoranthene	900	4000	500000	2400	00	11005	71000	38000	30000	38001
Butyl benzyl phthelate	1100000	10000000	100000	2400	OU	39000	71000	38000	30000	38000
Carbazole				2400	00	39000	71000	38000	30000	38000
Chrysene	9000	40000	500000	, 7100	J	840J	71000	400J	12003	39001
Di-n-butyl phthalate	5700000	10000000	100000	2400	OU	3900U	71000	38000	36000	38000
Di-n-octyl phthelate	1100000	10000000	100000	2400	OU	3900U	71000	38000	36000	38000
Dibenzo(a,h)anthracene	660	660	100000	2400	OU	<u>760J</u>	71000	380000	360000	38000
Dibenzofuran				2400	οU	3900U	7100U	960J	36000	38000
Diethyl phthalate	10000000	10000000	50000	2400	00	3900U	71000	38000	36000	38000
Oimethyl nhthalate	10000000	10000000	50000	2400	00	3900U	71000	3800U	36000	38000
Eluoranthene	2300000	10000000	100000	2400	OU	3900U.	71000	38000	36000	38000
Finorene	2300000	10000000	100000	3900	J	3900U	71000	1900J	1000J	38000
Hevenhornhezzene	660	2000	100000	2400	UOU	3900U	7100U	3800U	36000	38000
Hexachiorobutadiana	1000	21000	100000	2400	UOU	3900U	7100U	3800U	36000	38000
Hexachlere evelopent diene	400000	7300000	100000	2400	OU	3900U	7100U	38000	3600U	3800U
Hexachiorocyclopentatione	6000	100000	100000	2400	UOU	3900U	7100U	3800U	3600U	3800U
	900	4000	500000	2400	iou	740J	71000	3800UJ	3600UJ	3800U
Indend(1,2,3+cu/pyrene	1100000	10000000	50000	2400	00	3900U	7100U	3800U	3600U	3800U
Isophorone	660	660	10000	2400	OU	3900U	71000	3800U	3600U	38000
N-Mitroso-di-n-propylatinite	140000	000000	100000	2400	NOUL	3900U	7100U	3800U	3600U	3800U
N-Nitrosodipnenylemine	220000	4200000	100000	2400	DOU	3900U	7100U	470J	550J	3800U
Naphthalene	230000	5200000	10000	2400	0U	3900U	7100U	3800U	3600U	3800U
Nitrobenzene	20000	24000	100000	6100	00U	9500U	17000UJ	9200U	8800U	9200U
Pentechlorophenol		24000		9200	5J	3900U	7100U	4400	2800J	3600J
Phenanthrene		10000000	50000	2400	NOU .	39000	7100U	3800U	3600U	3800U
Phenol	10000000	10000000	100000	1100	<b>10</b> .	690J	7100U	620J	1500J	420J
Pyrené	1700000	10000000		2400	000	3900U	7100U	3800U	3600U	3800U
bis(2-Chloroethoxy)methane			10000	2400	000	39000	71000	3800U	3600U	3800U
bis(2-Chloroethyl)ether	660	3000	10000	2400	000	3900U	7100U	3800U	3600U	3800U
bis(2-Ethylhexyl)phthalate	49000	210000	100000	2400						
Total Semivolatile Compounds				3770	00	7490	1200	10830	17050	30530

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Table 5-3. Semivolatile Organic Compounds in Soil Semples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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	NJD	EP Soil Cleanup C	riteria *	Semple ID:	APSB2	APSB3	APSB5	APSB5	APSB6	APSB6	DTSB3
				Depth: (	02	06	02	06	05		
			Impact to	Zone**:	AP	AP	AP 10/12/04	AP	AF 10/21/94	AF 10/21/94	10/27/94
Analyte (ug/kg)	Residential	Non-Residential	Groundwater	Date:	10/26/94	10/21/94	10/12/94	10/12/94	10/21/34	10/21/34	10/2/134
	89000	1200000	100000		110000	61000UJ	350U	4200U	22000UJ	24000UJ	37000U
	5100000	10000000	50000		110000	61000UJ	350U	4200U	22000UJ	24000UJ	37000U
	5100000	10000000	100000		11000U	61000UJ	350U	4200U	22000UJ	24000UJ	37000U
1,3-Dichlorobenzene	E70000	10000000	100000		11000U	17000J	350U	4200U	22000UJ	4000J	37000U
1,4-Dichlorobenzene	320000	10000000	10000		11000U	61000UJ	35000	4200U	22000UJ	24000UJ	37000U
Z, Z'-oxybis(1-Chioropropane)	2300000	10000000	50000	•	250000	150000UJ	840U	100000	56000UJ	59000UJ	91000U
2,4,5-Trichlorophenol	5600000	270000	10000		110000	61000UJ	3500	4200U	22000UJ	24000UĴ	37000U
2,4,6-Trichlorophenol	62000	270000	10000		110000	61000UJ	3500	4200U	22000UJ	24000UJ	37000U
2,4-Dichlorophenol	170000	3100000	10000		110000	6100000	3500	4200U	22000UJ	24000UJ	37000U
2,4-Dimethylphenol	1100000	10000000	10000		2800011	150000000	8400.1	10000U	56000UJ	59000UJ	91000UJ
2,4-Dinitrophenol	110000	2100000	10000		110000	A1000UU	3500	4200U	22000UJ	24000UJ	37000U
2,4-Dinitrotoluene	1000	4000	10000		110000	6100000	3500	42000	22000UJ	24000UJ	37000U
2,6-Dinitrotoluene	1000	4000	10000		110000	6100003	3500	42000	22000000	24000UJ	37000U
2-Chioronaphthalene		-+	••		110000	6100003	3500	42000	2200000	240000	370000
2-Chlorophenol	280000	5200000	10000		110000	8100000	3500	7500	23001	11000.J	37000U
2-Methyinaphthaiene		••	•-		110000	340000	3500	420011	22000111	2400000	37000U
2-Methylphenol	2800000	10000000	•-		110000	61000UJ	3500	42000	5600000	5900000	910000
2-Nitroaniline					260000	150000UJ	8400	420000	3200000	2400000	370000
2-Nitrophenol					110000	61000UJ	3500	42000	2200000	2400000	370001
3.3'-Dichlorobenzidine	2000	6000	100000		11000UJ	61000UJ	32001	42000	7200000	500000	\$1000U
3-Nitroaniline					26000U	150000UJ	8400	100000	5000000	5900000	910000
4.6-Dinitro-2-methylphenol					26000U	15000000	8400	100000	3000000	2400000	370000
4-Bromophenvi phenvi ether					110000	61000UJ	3500	42000	2200000	2400000	370000
4-Chloro-3-methylphenol	10000000	10000000	100000		110000	61000UJ	3500	42000	2200000	2400000	370000
4-Chloroaniline	230000	4200000			11000UJ	61000UJ	3500	42000	2200000	2400000	2700000
4-Chiorophenyl phanyl ether					110000	61000UJ	3500	42000	2200000	2400000	370000
4-Mathylphenol	2800000	10000000			11000U	61000UJ	3500	4200U	22000UJ	2400000	370000
4-Nitroaniline	••	••			26000U	150000UJ	840U	100000	50000UJ	5900000	010000
4-Nitronhenol			••		26000U	150000UJ	840UJ	100000	\$6000UJ	3300000	2700011
Acepenhthene	3400000	10000000	100000		11000U	61000UJ	3500	42000	4200J	2400000	270000
Agenephthylene					11000U	61000UJ	350U	4200U	22000UJ	2400000	570000
Asthrease	10000000	10000000	100000		110000	61000UJ	350U	3100J	2200000	2400000	370000
	900	4000	500000		11000U	61000UJ	140J	8300	26003	30000	370000
Benzo(a)pyrene	660	660	100000		11000U	61000UJ	R	5300	<u>60001</u>	2400000	370000

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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	NJD	NJDEP Soil Cleanup Criterie *			APS83	APSB5	APSB5	APS86	APSB6	DTSB3
			Import to	Depth: 02	06 AP	02 AP	06 AP	AP	AP	DT
Analyte (ug/kö)	Residential	Non-Residential	Groundwater	Date: 10/26/94	10/21/94	10/12/94	10/12/94	10/21/94	10/21/94	10/27/94
							21001	22001	24000111	370000
Benzo(b)fluoranthene	900	4000	50000	110000	61000UJ	ĸ	31005	22000	2400000	370000
Benzo(g,h,i)perylene				110000	61000UJ	R	21005	2200000	2400000	370000
Benzo(k)fluorenthene	900	4000	500000	110000	61000UJ	R	29003	22000	2400000	370000
Butyl benzyl phthalate	1100000	10000000	100000	110000	B1000UJ	35001	42000	2200000	2400000	18000.1
Carbazole			••	110000	61000UJ	3500	42000	2200003	540000	41001
Chrysene	9000	40000	500000	11000U	61000UJ	1905	13000	79005	24000111	370000
Di-n-butyl phthalate	5700000	10000000	100000	11000U	61000UJ	3500	42000	2200000	2400000	370000
Di-n-octyl phthalate	1100000	10000000	100000	11000U	61000UJ	R	42000	2200000	2400000	370000
Dibenzo(a,b)anthracene	660	660	100000	11000U	61000UJ	R	42000	2200003	2400003	370000
Dibenzofuran				11000U	61000UJ	3500	42000	4300J	2400000	370000
	10000000	10000000	50000	110000	61000UJ	350U	42000	22000UJ	2400000	370000
Directly pricialoco	10000000	10000000	50000	110000	61000UJ	350U	4200U	22000UJ	24000UJ	370000
Dimetryi primara o	2300000	10000000	100000	110000	61000UJ	160J	5800	3900J	24000UJ	48001
Fluoranchono	2300000	10000000	100000	11000U	61000UJ	350U	2900J	22000UJ	24000UJ	6300J
Fluorene	680	2000	100000	11000U	61000UJ	350U	4200U	22000UJ	24000UJ	370000
Hexechloropenzene	1000	21000	100000	11000U	61000UJ	350U	4200U	22000UJ	24000UJ	370000
Hexachiorodutaciene	400000	7300000	100000	11000U	61000UJ	350U	4200U	22000UJ	24000UJ	370000
Hexachlorocyclopentaciene	=0000	100000	100000	110000	61000UJ	350U	4200U	22000UJ	24000UJ	370000
Hexachioroethane	900	4000	500000	11000U	61000UJ	R	1800J	22000UJ	24000UJ	370000
Indeno(1,2,3-cd)pyrene	1100000	10000000	50000	11000U	61000UJ	350U	4200U	22000UJ	24000UJ	370000
Isophorone	640	860	10000	11000U	61000UJ	350U	4200U	22000UJ	24000UJ	370000
N-Nitroso-di-n-propylamine	140000	60000	100000	11000U	61000UJ	350U	42000	22000UJ	24000UJ	37000UJ
N-Nitrosodiphenylamine	140000	4200000	100000	11000U	10000J	350U	4200U	22000UJ	24000UJ	37000U
Naphthalene	230000	#200000 E20000	10000	11000U	61000UJ	350U	4200U	22000UJ	24000UJ	37000U
Nitrobenzene	28000	320000	100000	1400J	150000UJ	840UJ	10000U	56000UJ	59000UJ	91000U
Pentachlorophenol	6000	24000	100000	11000U	16000J	87J	16000	17000J	28000J	9000J
Phenanthrene			50000	11000U	61000UJ	350U	4200U	22000UJ	24000UJ	37000U
Phenol	10000000	10000000	100000	110000	10000J	620J	11000	1 2000 J	6900J	8000J
Pyrene	1700000	10000000	100000	110000	61000UJ	350U	4200U	22000UJ	24000UJ	37000U
bis(2-Chlorosthoxy)methene			10000	110000	61000UJ	350U	4200U	22000UJ	24000UJ	37000U
bis(2-Chlorosthyl)ether	660	3000	10000	110000	61000UJ	940J	4200U	22000UJ	24000UJ	37000U
bis(2-Ethylhexyl)phthalate	49000	210000	100000	1,0000						
Total Semivolatile Compounds				1400	87000	2137	82800	64800	58500	100200

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Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

10(9) Settivolatile Composide

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See last page for footnotes.

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|                              | DLN         | NJDEP Soil Cleanup Criteria * |                          |                         | SB3FR  | ECIRMB1       | ECIRMB3          | ECIRMB3          | ECPSB1           | ECPSB2           |
|------------------------------|-------------|-------------------------------|--------------------------|-------------------------|--------|---------------|------------------|------------------|------------------|------------------|
| Anelvte (ua/ka)              | Residential | Non-Residential               | impact to<br>Groundwater | Zone**: DT<br>Date: 10/ | /27/94 | U<br>10/24/94 | N3TF<br>10/19/94 | N3TF<br>10/19/94 | ECPS<br>10/20/94 | ECPS<br>10/20/94 |
|                              |             |                               |                          |                         |        |               |                  |                  | *****            |                  |
| 1,2,4-Trichlorobenzene       | 68000       | 1 200000                      | 100000                   | 370                     | 0000   | 7600U         | 37000            | 66000UJ          | 76000            | 1100000          |
| 1,2-Dichlorobenzene          | 5100000     | 10000000                      | 50000                    | 370                     | 000U   | 7600U         | 1600J            | 66000UJ          | 76000            | 1100000          |
| 1,3-Dichlorobenzene          | 5100000     | 10000000                      | 100000                   | 370                     | 0000   | 7600U         | 37000            | 66000UJ          | 76000            | 12000            |
| 1.4-Dichlorobenzene          | 570000      | 10000000                      | 100000                   | 370                     | 0000   | 7600U         | 530J             | 16000J           | 76000            | 38000            |
| 2,2'-oxybis(1-Chloropropane) | 2300000     | 10000000                      | 10000                    | 370                     | 0000   | 7600U         | 3700U            | 66000UJ          | 78000            | 1100000          |
| 2,4,5-Trichiorophenol        | 5600000     | 10000000                      | 50000                    | 910                     | 0000   | 18000U        | 90000            | 160000UJ         | 180000           | 2900003          |
| 2.4.6-Trichlorophenol        | 62000       | 270000                        | 10000                    | 370                     | 000U   | 7600U         | 3700U            | 66000UJ          | 76000            | 1100003          |
| 2.4-Dichlorophenoi           | 170000      | 3100000                       | 10000                    | 370                     | 0000   | 7600U         | 37000            | 66000UJ          | 76000            | 1100003          |
| 2.4-Dimethylphenol           | 1100000     | 10000000                      | 10000                    | 370                     | 0000   | 76000         | 3700U            | 66000UJ          | 76000            | 1100003          |
| 2.4-Dinitrophenol            | 110000      | 2100000                       | 10000                    | 910                     | 00001  | 180000        | 90000            | 160000UJ         | 180000           | 2900003          |
| 2.4-Dinitrotoluene           | 1000        | 4000                          | 10000                    | 370                     | 000U   | 76000         | 3700U            | 66000UJ          | 7600U            | 1100000          |
| 2 S-Dinitrotokuene           | 1000        | 4000                          | 10000                    | 370                     | 0000   | 7600U         | 3700U            | 66000UJ          | 76000            | 11000UJ          |
| 2.Chloronenbthelene          |             |                               |                          | 370                     | 000U   | 7600U         | 37000            | 66000UJ          | 7600U            | 11000UJ          |
| 2-Chloronbenol               | 280000      | 5200000                       | 10000                    | 370                     | 000U   | 7600U         | 3700U            | 66000UJ          | 76000            | 11000UJ          |
| 2 Mathidaeabtheleas          |             |                               |                          | 370                     | 0000   | 7600U         | 690J             | 59000J           | 930J             | 12000J           |
|                              | 2800000     | 10000000                      |                          | 370                     | 0000   | 7600U         | 3700U            | 56000UJ          | 76000            | 11000UJ          |
|                              | 2000000     |                               |                          | 910                     | 0000   | 18000U        | 9000U            | 160000UJ         | 18000U           | 29000UJ          |
| 2-Nitroannine                |             |                               |                          | 370                     | 0000   | 7600U         | 3700U            | 66000UJ          | 7600U            | 11000UJ          |
| 2-Nitrophenol                | 2000        | 6000                          | 100000                   | 370                     | 0000   | 7600UJ        | 3700UJ           | 66000UJ          | 7600UJ           | 11000UJ          |
| 3,3°-Dichlorobenzidine       | 2000        |                               |                          | 910                     | 0000   | 18000U        | 9000U            | 160000UJ         | 18000U           | 29000UJ          |
| 3-Nitroaninne                |             |                               |                          | 910                     | 0000   | 18000U        | 9000U            | 160000UJ         | 18000UJ          | 29000UJ          |
| 4,6-Dinitro-2-metnyiphenoi   |             |                               |                          | 370                     | 0000   | 7600U         | 3700U            | 66000UJ          | 7600U            | 11000UJ          |
| 4-Bromophenyi phenyi etner   | 10000000    | 10000000                      | 100000                   | 370                     | 0000   | 7600U         | 3700U            | 66000UJ          | 7600U            | 11000UJ          |
| 4-Chloro-3-metnyipmenoi      | 220000      | 4200000                       |                          | 370                     | 000UJ  | 7600UJ        | 3700U            | 66000UJ          | 7600U            | 11000UJ          |
| 4-Chloroaniline              | 230000      | 4400000                       |                          | 370                     | 0000   | 7600U         | 3700U            | 66000UJ          | 7600U            | 11000UJ          |
| 4-Chlorophenyl phenyl ether  | 1800000     | 10000000                      |                          | 370                     | 0000   | 7600U         | 37000            | 66000UJ          | 7600U            | 11000UJ          |
| 4-Methylphenol               | 2800000     | 1000000                       |                          | 910                     | 0000   | 18000U        | 9000UJ           | 160000UJ         | 18000UJ          | 29000UJ          |
| 4-Nitroaniline               | ••          |                               |                          | 910                     | 0000   | 18000U        | 9000UJ           | 160000UJ         | 18000UJ          | 29000UJ          |
| 4-Nitrophenol                |             | 10000000                      | 100000                   | 370                     | 0000   | 76000         | 580J             | LU00099          | 7600U            | 11000UJ          |
| Acenephthene                 | 3400000     | 10000000                      | 100000                   | 37                      | 0000   | 7600U         | 37000            | 66000UJ          | 7600U            | 110 <b>0</b> 0UJ |
| Acenephthylene               |             |                               | 100000                   | 27                      | 000.   | 76000         | 3700U            | 66000UJ          | 7600U            | 11000UJ          |
| Anthracene                   | 10000000    | 1000000                       | F00000                   | 27/                     | 0000   | 7600U         | 1500J            | 66000UJ          | 7600U            | 2900J            |
| Benzo(a)anthracene           | 900         | 4000                          | 500000                   | 37                      |        | 7701          | 2500J            | 66000UJ          | 7600U            | 11000UJ          |
| Benzo(a)pyrene               | 660         | 660                           | 100000                   | 37                      |        |               | <u>*****</u>     |                  |                  |                  |

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Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|---------------------------------------|-------------|--------------------|-------------|------------|----------|----------|----------|----------|----------------|-----------|
|                                       |             |                    |             | Depth:     | 04       | 02       | 02       | 06       | 02             | 06        |
|                                       |             |                    | Impact to   | Zone**:    | DT       | U        | N3TF     | N3TF     | ECPS           | ECPS      |
| Analyte (ug/kg)                       | Residential | Non-Residential    | Groundwater | Date:      | 10/27/94 | 10/24/94 | 10/19/94 | 10/19/94 | 10/20/94       | 10/20/94  |
|                                       | 900         | 4000               | 50000       |            | 37000U   | 1200J    | 2600J    | 66000UJ  | 7600U          | 1400J     |
| Benzo(D/IIUoranthene                  | 300         | -000               |             |            | 37000U   | 76000    | 2600J    | 66000UJ  | 76000          | 11000UJ   |
| senzolg,n,i)perviene                  | 900         | 4000               | 500000      |            | 37000U   | 1200J    | 2500J    | 66000UJ  | 7600UJ         | 1400J     |
| Benzo(k)nuorantnene                   | 1100000     | 1000000            | 100000      |            | 370000   | 76000    | 3700U    | 66000UJ  | 7600U          | 11000UJ   |
| Butyl cenzyl phthalate                | 1100000     |                    | 100000      |            | 7800.    | 76000    | 3700U    | 66000UJ  | 7600U          | 11000UJ   |
| Carbazole                             |             | -                  |             |            | 370000   | 1400 i   | 3000J    | 66000UJ  | 1300J          | 5600J     |
| Chrysene                              | 9000        | 40000              | 100000      |            | 370000   | 78001    | 37000    | 66000UJ  | 76000          | 11000UJ   |
| Di-n-butyl phthalate                  | - 5700000   | 10000000           | 100000      |            | 370000   | 76000    | 37000    | 66000UJ  | 7600U          | 11000UJ   |
| Di-n-octyl phthalate                  | 1100000     | 10000000           | 100000      |            | 270000   | 76000    | 2300.1   | 66000UJ  | 76000          | 1 1000UJ  |
| Dibenzo(a,h)anthracene                | <b>56</b> 0 | 660                | 100000      |            | 370000   | 76000    | 37000    | 660000   | 76000          | 11000UJ   |
| Dibenzofuran                          |             | ••                 |             |            | 370000   | 78000    | 27000    | 66000U   | 78000          | 11000UJ   |
| Diethyl phthalate                     | 10000000    | 1000000            | 50000       |            | 370000   | 76000    | 37000    | 8600000  | 76000          | 11000UJ   |
| Dimethyl phthalate                    | 10000000    | 1000000            | 50000       |            | 370000   | 78000    | 4001     | 6600000  | 76000          | 11000UJ   |
| Fluoranthene                          | 2300000     | 1000000            | 100000      |            | 370000   | 76000    | 370011   | 8800000  | 76000          | 2700 /    |
| Fluorene                              | 2300000     | 10000000           | 100000      |            | 4/003    | 76000    | 37000    | 8800000  | 7600U          | 1 1000UJ  |
| Hexachlorobenzene                     | 660         | 2000               | 100000      |            | 370000   | 76000    | 37000    | 6600000  | 7600U          | 11000UJ   |
| Hexechlorobutadiene                   | 1000        | 21000              | 100000      |            | 370000   | 76000    | 37000    | 6600011  | 76000          | 11000UJ   |
| Hexechlorocyclopentadiene             | 400000      | 7300000            | 100000      |            | 370000   | 76000    | 37000    | 6600000  | 76000          | 11000UJ   |
| Hexachloroethane                      | 6000        | 100000             | 100000      |            | 370000   | 76000    | 19001    | 8600011  | 76000          | 11000UJ   |
| Indeno(1,2,3-cd)pyrane                | 900         | 4000               | 500000      |            | 370000   | 76000    | 22001    | 48000111 | 76000          | 11000UJ   |
| Isophorone                            | 1100000     | 10000000           | 50000       |            | 370000   | 76000    | 37000    | 6600000  | 76000          | 11000UJ   |
| N-Nitroso-di-n-propylamina            | 660         | 660                | 10000       |            | 370000   | 76000    | 37000    | 6600011  | 76000          | 11000UJ   |
| N-Nitrosodiphenylamine                | 140000      | 600000             | 100000      |            | 37000UJ  | 760003   | 37000    | 170001   | 760011         | 7500.1    |
| Naphthalana                           | 230000      | 4200000            | 100000      |            | 37000U   | 76000    | 930J     | 17000J   | 76000          | 1 10001.1 |
| Nitrobenzene                          | 28000       | 520000             | 10000       |            | 370000   | 76000    | 37000    | 1600000  | 180001         | 290000.1  |
| Pentachlorophenol                     | 6000        | 24000              | 100000      |            | 91000U   | 180000   | 90000    | 1500000  | 15000          | 20000 i   |
| Phananthrene                          |             |                    | •• .        |            | 6800J    | 76000    | 37000    | 130000   | 76000          | 1100011   |
| Phanol                                | 10000000    | 10000000           | 50000       |            | 37000U   | 76000    | 37000    | 9900000  | 2000           | 27001     |
| Pyrepe                                | 1700000     | 10000000           | 100000      |            | 370000   | 1100J    | 960J     | 660000J  | 3/UJ<br>760011 | 11000111  |
| his (2-Chloroethoxy) methane          |             |                    |             |            | 37000U   | 7600U    | 3700U    | 660000J  | 76000          | 1100000   |
| hie(2-Chloroethy)ether                | 660         | 3000               | 10000       |            | 37000U   | 7600U    | 37000    | 86000UJ  | 76000          | 1100000   |
| bis(2-Ethylhexyl)phthalate            | 49000       | 210000             | 100000      |            | 37000U   | 7600U    | 890J     | 660000J  | / 6000         | 1100000   |
| Total Semivolatile Compounds          |             |                    |             |            | 46300    | 5670     | 25230    | 107000   | 4700           | 49000     |

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Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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See last page for footnotes.

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|                                 | NJDEP Soil Cleenup Criteria * |                   |             | Sample ID: ECPSB2 | ECPSB4   | ECPSB5             | GFSB1    | GTFIRMB1  | GTFIRMB2 |
|---------------------------------|-------------------------------|-------------------|-------------|-------------------|----------|--------------------|----------|-----------|----------|
|                                 |                               |                   |             | Depth: 12         | 08       | 02                 | 0Z       | 02<br>GTE | GTE      |
|                                 | <b>m</b>                      | al - Da - Maradal | Impact to   | 2018              | 10/19/84 | 10/19/94           | 315      | 11/18/94  | 10/17/94 |
| Anelyte (ug/kg)                 | Kesigential                   | Non-Kesidentia    | Groundwater | Uate: 10/20/94    | 10/13/34 | 10/13/34           | 10/12/34 | 11/10/04  |          |
| 1.2.4-Trichlorobenzene          | 68000                         | 1200000           | 100000      | 700000UJ          | 24000UJ  | 7 <del>6</del> 00U | 3800U    | 1600U     | 370U     |
| 1.2-Dichlorobenzene             | 5100000                       | 10000000          | 50000       | 4700000           | 24000UJ  | 7600U              | 3800U    | 1600U     | 370U     |
| 1.3-Dichlorobenzene             | 5100000                       | 10000000          | 100000      | 70000UJ           | 24000UJ  | 7600U              | 3800U    | 1600U     | 370U     |
| 1.4-Dichlorobenzene             | 570000                        | 10000000          | 100000      | 24000J            | 24000UJ  | 820J               | 3800U    | 1600U     | 370U     |
| 2.2'-oxybis(1-Chloropropane)    | 2300000                       | 10000000          | 10000       | 700000UJ          | 24000UJ  | 7600U              | 3800UJ   | 1600U     | 3700     |
| 2 4.5-Trichlorophenel           | 5600000                       | 10000000          | 50000       | 1800000UJ         | 60000UJ  | 18000U             | 9100U    | 3800U     | 9000     |
| 2 4.6-Trichlorophenol           | 62000                         | 270000            | 10000       | 700000UJ          | 24000UJ  | 76000              | 3800U    | 1600U     | 3700     |
| 2.4-Dichlorophenol              | 170000                        | 3100000           | 10000       | 700000UJ          | 24000UJ  | 7600U              | 3800U    | 1600U     | 3700     |
| 2.4-Dimathylphenol              | 1100000                       | 10000000          | 10000       | 70000UJ           | 24000UJ  | 7600U              | 3800U    | 16000     | 370U     |
| 2 4-Dinitrophenol               | 110000                        | 2100000           | 10000       | 1800000UJ         | 60000UJ  | 18000UJ            | 9100UJ   | 3800UJ    | 900U     |
| 2 4 Dipitrotoluene              | 1000                          | 4000              | 10000       | 70000UJ           | 24000UJ  | 7600U              | 3800U    | 16000     | 370U     |
| 2 6-Dipitrotoluene              | 1000                          | 4000              | 10000       | 700000UJ          | 24000UJ  | 7600U              | 3800U    | 16000     | 370U     |
| 2.Chloronenbthalane             |                               |                   |             | 700000UJ          | 24000UJ  | 7600U              | 3800U    | 1600U     | 370U     |
| 2-Chlorophengi                  | 280000                        | 5200000           | 10000       | 700000UJ          | 24000UJ  | 76000              | 3800U    | 1600U     | 3700     |
| 2-Methylapanhthalene            |                               |                   |             | 70000UJ           | 2500J    | 7600U              | 17000    | 240J      | 65J      |
| 2-Methylnephiliaiono            | 2800000                       | 10000000          |             | 700000UJ          | 24000UJ  | 76000              | 3800U    | 1600U     | 3700     |
| 2-Nitroppiline                  |                               |                   |             | 1800000UJ         | 60000UJ  | 18000U             | 9100U    | 38000     | 900U     |
| 2-Nitronhend                    |                               | ••                | ·           | .70000UJ          | 24000UJ  | 7600U              | 3800U    | 16000     | 3700     |
| 2 3'-Dichlorohenzidine          | 2000                          | 6000              | 100000      | 700000UJ          | 24000UJ  | 7600UJ             | 3800U    | 1600U     | 3700     |
| 2 Nitzaeniine                   |                               | ••                |             | 1800000UJ         | 60000UJ  | 18000U             | 9100U    | 3800U     | 9000     |
| 4.6-Dipitro-2-methylphenol      |                               |                   | ••          | 1800000UJ         | 60000UJ  | 18000UJ            | 9100U    | 3800U     | 9000     |
| 4.Bromonbenyl phenyl ether      |                               |                   |             | 700000UJ          | 24000UJ  | 7600U              | 38000    | 16000     | 3700     |
| 4-Chloro-3-methylohengi         | 10000000                      | 10000000          | 100000      | 700000UJ          | 24000UJ  | 7600U              | 3800U    | 16000     | 3700     |
| A-Chlorospiline                 | 230000                        | 4200000           |             | 700000UJ          | 24000UJ  | 7600U              | 3800U    | 1600U     | 3700     |
| 4-Chieronbend nhenyl athar      | **                            | ••                | <b>*</b> -  | 700000UJ          | 24000UJ  | 7500U              | 3800U    | 1600U     | 3700     |
| 4-Methylohenoi                  | 2800000                       | 10000000          |             | 70000UJ           | 24000UJ  | 76000              | 3800U    | 16000     | 3700     |
|                                 |                               |                   |             | 1800000UJ         | 60000UJ  | 18000U             | 9100U    | 3800U     | 3000     |
| 4-Nitronhengi                   |                               |                   |             | 1800000UJ         | 60000UJ  | 180000             | 9100UJ   | 38000     | 9000     |
| Asepentitiene                   | 3400000                       | 10000000          | 100000      | 70000UJ           | 24000UJ  | 7600U              | 38000    | 16000     | 3700     |
| Acenephthylene                  |                               |                   |             | 700000UJ          | 24000UJ  | 76000              | 3800U    | 16000     | 3700     |
|                                 | 10000000                      | 10000000          | 100000      | 700000UJ          | 24000UJ  | 7600U              | 3800U    | 16000     | 3700     |
| Annuagene<br>Bassa(alenthrotene | 900                           | 4000              | 500000      | 700000UJ          | 24000UJ  | <u>27000</u>       | 390J     | 550J      | 140J     |
| Benzo(a)pyrene                  | 660                           | 660               | 100000      | 700000UJ          | 24000UJ  | 33000              | 520J     | 650J      | 90J      |

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Table 5-3. Semivolatile Organic Compounds in Soil Semples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJD         | EP Soil Cleanup C | riteria *   | Sample ID: ECPSB2 | ECPSB4    | ECPSB5       | GFSB1    | GTFIRMB1 | GTFIRMB2  |
|------------------------------|-------------|-------------------|-------------|-------------------|-----------|--------------|----------|----------|-----------|
|                              |             |                   |             | Depth: 12         | 08        | 02           | 02       | 02       | 02<br>CTE |
|                              |             |                   | Impact to   | Zone**: ECPS      | ECPS      | ECPS         | SIF      |          | 10/17/84  |
| Analyte (ug/kg)              | Residential | Non-Residential   | Groundwater | Date: 10/20/94    | 10/19/94  | 10/19/94     | 10/12/94 | 11/10/34 | 10/17/34  |
|                              |             | 1000              | 50000       | 700000111         | 24000000  | 30000.1      | 690J     | 1 200 J  | 250J      |
| Benzo(b)fluoranthene         | 900         | 4000              | 50000       | 70000000          | 2400000   | 13000        | 38000    | 210J     | 370U      |
| Benzo(g,h,i)perylene         |             | -                 | 500000      | 70000003          | 2400000   | 29000.1      | 740.1    | 1200J    | 290J      |
| Benzo(k)fluoranthene         | 900         | 4000              | 500000      | 70000000          | 2400000   | 780011       | 3800U    | 220J     | 370U      |
| Butyl benzyl phthelate       | 1100000     | 10000000          | 100000      | 7000000           | 2400000   | 76000        | 38000    | 16001    | 370U      |
| Carbazole                    |             | **                |             | 7000000           | 2400000   | 20000        | 38000    | 9601     | 170.      |
| Chrysene                     | 9000        | 40000             | 500000      | 70000003          | 81000     | 29000        | 39000    | 16000    | 82.1      |
| Di-n-butyl phthalate         | 5700000     | 1000000           | 100000      | 700000UJ          | 24000UJ   | 76000        | 38000    | 1600111  | 37011     |
| Di-n-octyl phthelete         | 1100000     | 10000000          | 100000      | 70000UJ           | 24000UJ   | 76000        | 38000    | 180011   | 37011     |
| Dibenzo(a, h) anthracene     | 660         | 660               | 100000      | 70000UJ           | 24000UJ   | 21000        | 38000    | 160003   | 3700      |
| Dibenzofuran                 |             |                   |             | 700000UJ          | 24000UJ   | 75000        | 38000    | 18000    | 3700      |
| Diethvi phthalate            | 10000000    | 10000000          | 50000       | 700000UJ          | 24000UJ   | 76000        | 38000    | 10000    | 3700      |
| Dimethyl phthalate           | 10000000    | 10000000          | 50000       | 700000J           | 24000UJ   | 76000        | 38000    | 10000    | 1801      |
| Elucranthane                 | 2300000     | 10000000          | 100000      | 700000UJ          | 24000UJ   | 840J         | 600J     | 10000    | 1003      |
| Fluorene                     | 2300000     | 10000000          | 100000      | 700000UJ          | 24000UJ   | 76000        | 38000    | 16000    | 3700      |
| Hevechlorobanzene            | 660         | 2000              | 100000      | 70000UJ           | 24000UJ   | 76000        | 38000    | 16000    | 3700      |
| Hexachlorobutadiana          | 1000        | 21000             | 100000      | 700000UJ          | 24000UJ   | 7600U        | 38000    | 16000    | 3700      |
| Hexaphoropycionentediene     | 400000      | 7300000           | 100000      | 700000UJ          | 24000UJ   | 7800U        | 3800U    | 16000    | 3700      |
| Hexachiorocyclopentodiene    | 6000        | 100000            | 100000      | 700000UJ          | 24000UJ   | 7600U        | 3800U    | 1600U    | 3700      |
|                              | 900         | 4000              | 500000      | 700000UJ          | 24000UJ   | <u>13000</u> | 3800U    | 310J     | 3700      |
| Ingeno(1,2,3-cd)pyrene       | 1100000     | 10000000          | 50000       | 700000UJ          | 24000UJ   | 7600U        | 3800U    | 1600U    | 370U      |
| Isophorone                   | 660         | 660               | 10000       | 700000UJ          | 24000UJ   | 7600U        | 3800U    | 1600U    | 3700      |
| N-Nitroso-di-n-propysemine   | 140000      | 800000            | 100000      | 700000UJ          | 24000UJ   | 7600U        | 3800U    | 16000    | 370U      |
| N-Nitrosocipnenyiamine       | 230000      | 4200000           | 100000      | 24000J            | 24000UJ   | 76000        | 2500J    | 1600U    | 48J       |
| Naphthalene                  | 200000      | 520000            | 10000       | 700000UJ          | 24000UJ   | 7600U        | 3800U    | 1600U    | 3700      |
| Nitrobenzene                 | 20000       | 24000             | 100000      | 18000000          | 1 60000UJ | 18000U       | 9100UJ   | 3800UJ   | 900U      |
| Pentachlorophenol            | 0000        | 24000             |             | 700000UJ          | 4600J     | 990J         | 2000 J   | 270J     | 120J      |
| Phenenthrene                 | 1000000     | 10000000          | 50000       | 70000UJ           | 24000UJ   | 7600U        | 3800U    | 1600U    | 370U      |
| Phenol .                     | 17000000    | 10000000          | 100000      | 7000001           | 3800J     | 4300J        | 3200J    | 1800J    | 180J      |
| Pyrene                       | 1700000     | 1000000           | 100000      | 7000000           | 24000UJ   | 7600U        | 3800U    | 1600U    | 370U      |
| bis(2-Chloroethoxy)methene   |             |                   | 10000       | 7000000           | 24000UJ   | 7600U        | 3800U    | 1600U    | 370U      |
| bis(2-Chioroethyl)ether      | 660         | 3000              | 10000       | 70000011          | 24000UJ   | 7600U        | 490J     | 1600UJ   | 1200      |
| bis(2-Ethylhexyl)phthalate   | . 49000     | 210000            | 100000      | 1000000           | 240000    |              |          |          |           |
| Total Semivolatile Compounds |             |                   |             | 5180000           | 17000     | 201950       | 28130    | 8610     | 2775      |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                             | NJD         | EP Soil Cleanup C | riterla "   | Sample ID: GTFIRM | B3 GTFIRMB4 | GTFIRMB5     | GTFIRMB6    | GTFIRMB7<br>02 |
|---------------------------------------------|-------------|-------------------|-------------|-------------------|-------------|--------------|-------------|----------------|
|                                             |             |                   | I           | Depth: V2         | GTE         | GTF          | GTF         | GTF            |
| a ha funtia                                 | Residential | Non-Residential   | Groundwater | Date: 11/16/9     | 4 10/17/94  | 11/16/94     | 11/16/94    | 10/17/94       |
| Analyte (ug/kg)                             | Residential | HUIPRODUCTION     |             |                   |             |              |             |                |
| 1.2 A.Trichlorobenzene                      | 68000       | 1200000           | 100000      | 1900U             | 3900        | 4000U        | 4100U       | 3700           |
| 1.2.Dichlarohanzana                         | 5100000     | 10000000          | 50000       | 19000             | 390U        | 4000U        | 4100U       | 3700           |
| 1.2-Dichlorobenzene                         | 5100000     | 10000000          | 100000      | 1900U             | 390U        | 4000U        | 41000       | 3700           |
| 1 4-Dichlorobenzene                         | 570000      | 10000000          | 100000      | 1900U             | 390U        | 4000U        | 41000       | 3700           |
| 2.21 apphis/1-Chioronronane)                | 2300000     | 10000000          | 10000       | 2 1900Ų           | 390U        | 4000U        | 41000       | 3700           |
| 2.4 E Trishlerenhered                       | 5600000     | 10000000          | 50000       | 4500U             | 950U        | 9600U        | 100000      | 9000           |
| 2,4,5-Themotophenol                         | 82000       | 270000            | 10000       | 19000             | 390U        | 4000U        | 4100U       | 3700           |
| 2.4 Diablerenbenel                          | 170000      | 3100000           | 10000       | 1900U             | 390U        | 4000U        | 4100U       | 3700           |
| 2,4-Dimethidabengi                          | 1100000     | 10000000          | 10000       | 1900U             | 390U        | 4000U        | 41000       | 3700           |
| 2,4-Dimitrophenol                           | 110000      | 2100000           | 10000       | 4500UJ            | 950U        | 3600NN       | 10000UJ     | 9000           |
| 2,4-Dinitrophenoi                           | 1000        | 4000              | 10000       | 1900U             | 39ÔU        | 4000U        | 4100U       | 3700           |
|                                             | 1000        | 4000              | 10000       | 1900U             | 390U        | 4000U        | 41000       | 3700           |
| 2,5-Dimitrologene                           | -           |                   | ••          | 1900U             | 390U        | 4000U        | 4100U       | 3700           |
| 2-Chioronaphthalana                         | 280000      | 5200000           | 10000       | 1900U             | 390U        | 4000U        | 4100U       | 3700           |
| 2-Chiorophenoi                              |             |                   |             | 1900U             | 160J        | 4000U        | 26000       | 3700           |
|                                             | 2800000     | 10000000          |             | 1900U             | 39QU        | 4000U        | 4100U       | 3700           |
| 2-Methylphenol                              |             |                   |             | 4500U             | 950U        | 9600U        | 100000      | 9000           |
|                                             |             |                   |             | 19000             | 390U        | 4000U        | 41000       | 3700           |
| 2-Nitrophenol                               | 2000        | 6000              | 100000      | 1900U             | 390U        | 4000U        | 4100U       | 3700           |
| 3,3°-Dichigrobenzigine                      |             |                   |             | 4500U             | 950U        | 9600U        | 100000      | 9000           |
| 3-Mitroaniino<br>4.8. Distas 2-mathylohenol |             |                   |             | 4500U             | 950U        | 9600U        | 100000      | 9000           |
| 4,5-Dimero-2-metryphono                     |             |                   |             | 1900U             | 3900        | 4000U        | 4100U       | 3700           |
| 4-Bromophanyi phanyi ether                  | 10000000    | 10000000          | 100000      | 1900U             | 3900        | 4000U        | 41000       | 3700           |
| 4-Chioro-3-methylphenol                     | 230000      | 4200000           |             | 19000             | 390U        | 4000U        | 41000       | 3700           |
| 4-Chierenhamd shand ather                   |             |                   |             | 1900U             | 390U        | 4000U        | 41000       | 3700           |
| 4-Chlorophenyi phanyi ether                 | 2800000     | 10000000          |             | 19000             | 390U        | 4000U        | 4100U       | 3700           |
| 4-Metnyphenol                               |             |                   |             | 4500U             | 950V        | 9600UJ       | 100000      | 9000           |
|                                             |             |                   |             | 4500U             | 950U        | 9600U        | 100000      | 9000           |
|                                             | 3400000     | 10000000          | 100000      | 1900U             | 390U        | 4000U        | 4100U       | 3/00           |
|                                             |             |                   |             | 19000             | 390U        | 4000U        | 41000       | 3700           |
| Acenaphinylene                              | 1000000     | 10000000          | 100000      | 2500              | 1300        | 4000U        | 41000       | 50J            |
|                                             | 900         | 4000              | 500000      | 560J              | 210J        | 520J         | 850J        | 550            |
| Benzo(a)pyrene                              | 660         | 660               | 100000      | <u>720J</u>       | 190J        | <u>1100J</u> | <u>670J</u> | 430J           |

Teble 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | <u>NJD</u>  | EP Soil Cleanup C | riteria *                | Sample ID: GTFIRMB3                        | GTFIRMB4              | GTFIRMB5                      | GTFIRMB6              | GTFIRMB               |
|------------------------------|-------------|-------------------|--------------------------|--------------------------------------------|-----------------------|-------------------------------|-----------------------|-----------------------|
| Analyte (ug/kg)              | Residential | Non-Residential   | Impact to<br>Groundwater | Depth: 02<br>Zone**: GTF<br>Date: 11/16/94 | 02<br>GTF<br>10/17/94 | 06<br>GTF<br>11 <u>/16/94</u> | 04<br>GTF<br>11/16/94 | 02<br>GTF<br>10/17/94 |
| Benzo(h)(), orenthene        | 900         | 4000              | 50000                    | 690J                                       | 420J                  | 1100J                         | 2600J                 | 1 200 J               |
| Benzola h Brendere           | -           |                   |                          | 1900UJ                                     | 390UJ                 | 4000UJ                        | 4100UJ                | 370UJ                 |
| Benzolg,n, iperviene         | 900         | 4000              | 500000                   | 350J                                       | 480J                  | 1100J                         | 1900J                 | 1400J                 |
| Benzokhiuorantrene           | 1100000     | 10000000          | 100000                   | 1900U                                      | 390U                  | 4000UJ                        | 4100UJ                | 370U                  |
| Sutyi Denzyi phinejate       | 1100000     |                   |                          | 510J                                       | 270J                  | 4000U                         | 4100U                 | 370U                  |
| Carbazole                    | 9000        | 40000             | 500000                   | 970J                                       | 380J                  | 600J                          | 1500J                 | 510                   |
| Chrysens                     | 5000        | 1000000           | 100000                   | 19000                                      | 410                   | 4000U                         | 4100U                 | 93J                   |
| Di-n-butyl phthelete         | 1100000     | 10000000          | 100000                   | 1900UJ                                     | 390UJ                 | 4000UJ                        | 4100UJ                | 370UJ                 |
| Di-n-octyl phthalate         | 1100000     | 440               | 100000                   | 1900UJ                                     | 390UJ                 | 40000                         | 4100UJ                | 73J                   |
| Dibenzo(a,h)anthracene       | 000         | 000               | 100000                   | 1900U                                      | 47J                   | 4000U                         | 4100U                 | 370U                  |
| Dibenzofuran                 |             |                   | 50000                    | 19001                                      | 3900                  | 4000U                         | 4100U                 | 370U                  |
| Diethyl phthelete            | 10000000    | 10000000          | 50000                    | 19000                                      | 39011                 | 4000U                         | 4100U                 | 370U                  |
| Dimethyl phthalate           | 1000000     | 1000000           | 50000                    | 19000                                      | 3401                  | 420.1                         | 960J                  | 700                   |
| Fluoranthana                 | 2300000     | 1000000           | 100000                   | 8103                                       | 711                   | 40000                         | 41000                 | 370U                  |
| Fluorene                     | 2300000     | 1000000           | 100000                   | 19000                                      | 29011                 | 40000                         | 41000                 | 370U                  |
| Hexachlorobenzene            | 660         | 2000              | 100000                   | 19000                                      | 3900                  | 40000                         | 4100U                 | 370U                  |
| Hexachlorobutediene          | 1000        | 21000             | 100000                   | 19000                                      | 3900                  | 40000                         | 41000                 | 3700                  |
| Hexachlorocyclopentediene    | 400000      | 7300000           | 100000                   | 19000                                      | 3500                  | 40000                         | 41000                 | 3700                  |
| Hexachioroethane             | 6000        | 100000            | 100000                   | 19000                                      | 3900                  | 40000                         | 4100UU                | 190.1                 |
| Indeno(1,2,3-cd)pyrene       | 900         | 4000              | 500000                   | 190000                                     | 39005                 | 40000                         | 41000                 | 3700                  |
| Isophorone                   | 1100000     | 10000000          | 50000                    | 19000                                      | 3900                  | 40000                         | 41000                 | 3701                  |
| N-Nitroso-di-n-propylamine   | 660         | 660               | 10000                    | 19000                                      | 3900                  | 40000                         | 41000                 | 3700                  |
| N-Nitrosodiphenviamine       | 140000      | 600000            | 100000                   | 19000                                      | 3900                  | 40000                         | 9700                  | 451                   |
| Naphthalene                  | 230000      | 4200000           | 100000                   | 19000                                      | 92J                   | 40000                         | 4100U                 | 3700                  |
| Nitrohenzene                 | 28000       | 520000            | 10000                    | 19000                                      | 3900                  | 40000                         | 10000                 | 9000                  |
| Pentachlorophenol            | 6000        | 24000             | 100000                   | 4500U                                      | 9500                  | 300003                        | 15001                 | 230.1                 |
| Phananthrene                 |             | ••                |                          | 780J                                       | 350J                  | 200J                          | 41000                 | 3700                  |
| Phanol                       | 1000000     | 10000000          | 50000                    | 1900U                                      | 390U                  | 40000                         | 41000                 | 700                   |
| Pyrene                       | 1700000     | 10000000          | 100000                   | 880J                                       | 380J                  | 11003                         | 14005                 | 3700                  |
| his/2-Chloroethoxy)methane   |             |                   |                          | 1900U                                      | 390U                  | 40000                         | 41000                 | 3700                  |
| bis(2-Chloroethyliathar      | 660         | 3000              | 10000                    | 190 <b>0</b> U                             | 3900                  | 40000                         | 41000                 | 3200                  |
| bis(2-Ethylhexyl)phthalate   | 49000       | 210000            | 10,0000                  | 19000                                      | 540                   | 860J                          | 41000J                | 3203                  |
| Total Semivolatile Compounds |             |                   |                          | 8770                                       | 5640                  | 7360                          | 47080                 | 6491                  |

Table 5-3, Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                    |                 | EP Soil Cleanup C | riteria *   | Sample ID: GTFIRM88 | GTFIRMB8   | GTFIRMB9 | GTFSB1   | GTFSB1   | GTFSB2   |
|------------------------------------|-----------------|-------------------|-------------|---------------------|------------|----------|----------|----------|----------|
|                                    |                 |                   | 1           | Deptn: 02           | GTE        | GTE      | GTE      | GTE      | GTF      |
|                                    | Baratal and all | Non Residential   | Impact to   | Date: 10/18/94      | 10/18/94   | 11/16/94 | 11/16/94 | 10/10/94 | 10/13/94 |
| Analyte (ug/kg)                    | Kesidentiai     | NOU-Nesidensisi   | Groundwater | 0218. 10/10/04      | 10/10/04   |          |          |          |          |
| 1 2 4-Trichlorobenzene             | 68000           | 1200000           | 100000      | 370U                | 12000UJ    | R        | R        | 14000U   | 400U     |
| 1. 2-Dichlorobenzene               | 5100000         | 10000000          | 50000       | 370U                | 12000UJ    | R        | R        | 14000U   | 400U     |
| 1. 2-Dichlorobenzene               | 5100000         | 10000000          | 100000      | 3700                | 12000UJ    | R        | R        | 140000   | 400U     |
| 1 A Dichiorobenzene                | 570000          | 10000000          | 100000      | 370U                | 12000UJ    | R        | R        | 14000U   | 400U     |
| 2.2'-overlation (1-Chloron coneps) | 2300000         | 10000000          | 10000       | 370U                | 12000UJ    | R        | R        | 14000UJ  | 400UJ    |
| 2.4 E Triebterenhand               | 5600000         | 10000000          | 50000       | 910U                | 30000UJ    | R        | R        | 35000U   | 980U     |
| 2.4.8 Trickerenhanol               | 62000           | 270000            | 10000       | 370U                | 12000UJ    | R        | R        | 14000U   | 400U     |
| 2,4,0 Inchiorophenol               | 170000          | 3100000           | 10000       | 370U                | 12000UJ    | R        | R        | 14000U   | 400U     |
| 2,4-Dignorophenol                  | 1100000         | 10000000          | 10000       | 370U                | 12000UJ    | R        | R        | 14000U   | 400U     |
| 2,4-Dimetryphenol                  | 110000          | 2100000           | 10000       | 910U                | 30000UJ    | R        | R        | 35000UJ  | 980UJ    |
| 2,4-Dinitrophenol                  | 1000            | 4000              | 10000       | 370U                | 12000UJ    | R        | R        | 14000U   | 400U     |
| 2,4-Dinitrotoluana                 | 1000            | 4000              | 10000       | 370U                | 12000UJ    | R        | R        | 14000U   | 400U     |
|                                    |                 |                   |             | 370U                | 1 2000 UJ  | R        | R        | 14000U   | 400U     |
|                                    | 280000          | 5200000           | 10000       | 370U                | 1 2000UJ   | 8        | R        | 14000U   | 400U     |
| 2-Chiorophenoi                     | 100000          |                   |             | 370U                | 1 2000UJ   | R        | R        | 14000U   | 59J      |
| Z-Methyinaphtnarene                | 2800000         | 1000000           |             | 3700                | 12000UJ    | R        | R        | 14000U   | 400U     |
| 2-Methylphenol                     | 2800000         | 10000000          |             | 910U                | 30000UJ    | R        | R        | 35000U   | 980U     |
| 2-Nitroaniline                     |                 |                   |             | 370UJ               | 12000UJ    | R        | Ŕ        | 14000U   | 400U     |
| 2-Nitrophenol                      | 2000            | 6000              | 100000      | 3700.0              | 1 2000UJ   | R        | R        | 14000U   | 400UJ    |
| 3,3'-Dichlorobenzigine             | 2000            |                   |             | 910UJ               | 30000UJ    | R        | R        | 35000U   | 980U     |
| 3-Nitroaniline                     |                 |                   |             | 910UJ               | 30000UJ    | R        | R        | 35000U   | 9800     |
| 4,6-Dinitro-2-methylphenol         |                 |                   |             | 3700                | 1 2000UJ   | R        | R        | 14000U   | 400U     |
| 4-Bromophenyl phenyl etner         | 1000000         | 10000000          | 100000      | 3700                | 12000UJ    | R        | R        | 14000U   | 400U     |
| 4-Chloro-3-methylphenol            | 10000000        | 4200000           |             | 370UJ               | 12000UJ    | R        | R        | 14000U   | 400U     |
| 4-Chloroaniline                    | 230000          | 4200000           |             | 370U                | 12000UJ    | R        | Ř        | 14000U   | 400U     |
| 4-Chlorophanyi phenyi etner        | 1800000         | 1000000           |             | 3700                | 12000UJ    | R        | R        | 14000U   | 400U     |
| 4-Methylphenol                     | 2800000         | 1000000           |             | 910U                | 30000UJ    | R        | R        | 35000U   | 9800     |
| 4-Nitroaniline                     |                 |                   |             | 910U                | 1600J      | R        | R        | 35000UJ  | 980UJ    |
| 4-Nitrophenol                      | 2400000         | 10000000          | 100000      | 370U                | 12000UJ    | R        | R        | 140000   | 400U     |
| Acenaphthene                       | 3400000         | 10000000          |             | 370U                | 1 2000 U J | R        | R        | 14000U   | 400U     |
| Acenaphthylene                     | 10000000        | 10000000          | 100000      | 370U                | 1 2000UJ   | R        | R        | 14000U   | 400U     |
| Anthracene                         | 0000000         | 4000              | 500000      | 430J                | 12000UJ    | R        | R        | 1500J    | 300J     |
| Benzo(a)anthracene                 | 300             | 4000              | 100000      | 810J                | 12000UJ    | R        | R        | 14000UJ  | 3 20 J   |
| Benzo(e)pyrene                     | 000             | 000               | 100000      | <u> </u>            | _          |          |          | _        |          |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plent, Bayonne, New Jersey.

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|                              |             | EP Soil Cleanup C | riteria *                | Sample ID: GTFIRMB8                        | GTFIRMB8              | GTFIRM89              | GTFSB1                | GTFSB1                | GTFSB2                |
|------------------------------|-------------|-------------------|--------------------------|--------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Analyte (ug/kg)              | Residentiai | Non-Residential   | impact to<br>Groundwater | Depth: 02<br>Zone**: GTF<br>Date: 10/18/94 | 08<br>GTF<br>10/18/94 | 02<br>GTF<br>11/16/94 | 02<br>GTF<br>11/18/94 | 08<br>GTF<br>10/10/94 | 02<br>GTF<br>10/13/94 |
|                              |             |                   |                          | 700                                        | 10000111              |                       |                       | 1 4000111             |                       |
| Benzo(b)fluoranthene         | 900         | 4000              | 50000                    | 7901                                       | 1200000               | н                     | ĸ                     | 1400003               | 7303                  |
| Benzo(g,h,i)perylene         | **          |                   |                          | 420J                                       | 1200000               | R                     | ĸ                     | 140000J               | N                     |
| lenzo(k)fluoranthene         | 900         | 4000              | 500000                   | 910J                                       | 12000UJ               | н                     | к                     | 1400000               | 8403                  |
| kutyl benzyl phthelate       | 1100000     | 10000000          | 100000                   | 370UJ                                      | 12000UJ               | R                     | R                     | 140000                | 400UJ                 |
| arbezoie                     |             |                   |                          | 370U                                       | 12000UJ               | R                     | R                     | 140000                | 4000                  |
| Chrysone                     | 9000        | 40000             | 500000                   | 780J                                       | 12000UJ               | R                     | R                     | 2000                  | 320J                  |
| )i-n-butyl phthalate         | 5700000     | 10000000          | 100000                   | 3700                                       | 12000UJ               | R                     | R                     | 14000U                | 400U                  |
| )i-n-octyl phthalate         | 1100000     | 10000000          | 100000                   | 370UJ                                      | 12000UJ               | R                     | R                     | 14000UJ               | R                     |
| )ibenzo(a,h)anthracene       | 660         | 660               | . 100000                 | 340J                                       | 12000UJ               | R                     | R                     | 14000UJ               | R                     |
| libenzofuran                 |             |                   |                          | 370U                                       | 1 2000UJ              | R                     | R                     | 14000U                | 400U                  |
| iethyl phtheiate             | 10000000    | 10000000          | 50000                    | 370U                                       | 1 2000UJ              | R                     | R                     | 14000U                | 400U                  |
| imethyl phthalate            | 10000000    | 10000000          | 50000                    | 370U                                       | 12000UJ               | R                     | R                     | 14000U                | 400U                  |
| luoranthena                  | 2300000     | 10000000          | 100000                   | 210J                                       | 12000UJ               | R                     | R                     | 14000U                | 380J                  |
| luorene                      | 2300000     | 10000000          | 100000                   | 370UJ                                      | 1 2000 U J            | R                     | R                     | 14000U                | 400U                  |
| levechlorobenzene            | 650         | 2000              | 100000                   | 370U                                       | 12000UJ               | R                     | R                     | 14000U                | 400U                  |
| levesblorobutediene          | 1000        | 21000             | 100000                   | 370U                                       | 12000UJ               | R                     | R                     | 14000U                | 400U                  |
| leveebloroovalonentediane    | 400000      | 7300000           | 100000                   | 3700                                       | 12000UJ               | R                     | R                     | 14000U                | 400U                  |
| texaction ocyclopen addens   | 6000        | 100000            | 100000                   | 370U                                       | 12000UJ               | R                     | R                     | 14000U                | 400U                  |
| texachioroethene             | 9000        | 4000              | 500000                   | 270J                                       | 12000UJ               | R                     | R                     | 14000UJ               | 140J                  |
| ngeno(1,2,3-cd)pyrane        | 1100000     | 10000000          | 50000                    | 370U                                       | 12000UJ               | R                     | R                     | 140000                | 400U                  |
| sophorone                    | 660         | 660               | 10000                    | 3700                                       | 12000UJ               | R                     | R                     | 14000U                | 400U                  |
| I-NITIONO-OI-M-propylamine   | 140000      | 600000            | 100000                   | 360J                                       | 12000UJ               | R                     | R                     | 14000U                | 400U                  |
| Nitrosodipnenyiamine         | 140000      | 4200000           | 100000                   | 84.1                                       | 120000                | R                     | R                     | 14000U                | 77J                   |
| isphthelene                  | 230000      | #200000           | 10000                    | 3701                                       | 12000UJ               | R                     | R                     | 14000U                | 400U                  |
| litrobenzene                 | 28000       | 320000            | 100000                   | 9101                                       | 9200.1                | R                     | R                     | 35000UJ               | 980UJ                 |
| entechlorophenol             | 6000        | 24000             | 100000                   | 1907                                       | 12000111              | R                     | R                     | 14000U                | 190J                  |
| henanthrene                  |             |                   |                          | 1805                                       | 1200000               |                       | R                     | 14000U                | 400U                  |
| henol                        | 1000000     | 1000000           | 50000                    | 3700                                       | 1200000               | 3                     | R                     | 4200.1                | 650J                  |
| yrene                        | 1700000     | 10000000          | 100000                   | 700                                        | 1200003               |                       | 8                     | 14000U                | 400U                  |
| is(2-Chioroethoxy)methane    |             |                   |                          | 3700                                       | 1200003               | n<br>D                | R                     | 14000U                | 400U                  |
| ois(2-Chloroethyl)ether      | 660         | 3000              | 10000                    | 3/00                                       | 1200000               | n<br>D                | 8                     | 140000                | 250J                  |
| xis(2-Ethylhexyl)phthalate   | 49000       | 210000            | 100000                   | 510J                                       | 12000UJ               | п                     | n                     | 140000                | 2004                  |
| Total Semivolatile Compounds |             |                   |                          | 6644                                       | 10800                 | 0                     | 0                     | 7700                  | 4256                  |

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Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                | NJD         | NJDEP Soil Cleanup Criteria * |               |                | GTFSB4   | GTFSB5   | GTFSB6   | GTFSB7   | GTFS87   |
|--------------------------------|-------------|-------------------------------|---------------|----------------|----------|----------|----------|----------|----------|
|                                |             |                               | Imment to     | Deptn: 02      | GTE      | GTE      | GTE      | GTE      | GTF      |
| Apebde (volko)                 | Residential | Non-Residential               | Groundwater   | Date: 11/16/94 | 10/13/94 | 10/13/94 | 10/11/94 | 10/13/94 | 10/13/94 |
| Alleite (eg/cg/                | Hoaldollad  |                               | diodina nato. |                |          |          |          |          |          |
| 1,2,4-Trichlorobenzene         | 68000       | 1200000                       | 100000        | 11000          | 370U     | 350U     | 370U     | 1900U    | 4500U    |
| 1,2-Dichlorobenzene            | 5100000     | 10000000                      | 50000         | 1100U          | 370U     | 3500     | 370U     | 1900U    | 4500U    |
| 1,3-Dichlorobenzene            | 5100000     | 10000000                      | 100000        | 11000          | 370U     | 350U     | 370U     | 1900U    | 4500U    |
| 1,4-Dichlorobenzene            | 570000      | 10000000                      | 100000        | 1100U          | 370U     | 350U     | 370U     | 1900U    | 4500U    |
| 2,2'-oxybis(1-Chloropropane)   | 2300000     | 10000000                      | 10000         | 1100U          | 370UJ    | 350UJ    | 370UJ    | 1900UJ   | 4500UJ   |
| 2,4,5-Trichlorophenol          | 5600000     | 10000000                      | 50000         | 2600U          | 9000     | 860U     | 9000     | 4600U    | 110000   |
| 2.4.6-Trichlorophenol          | 62000       | 270000                        | 10000         | 11000          | 370U     | 350U     | 3700     | 19000    | 45000    |
| 2.4-Dichlorophenol             | 170000      | 3100000                       | 10000         | 11000          | 370U     | 3500     | 370U     | 19000    | 4500U    |
| 2.4-Dimethylphenol             | 1100000     | 10000000                      | 10000         | 1100U          | 370U     | 350U     | 3700     | 19000    | 4500U    |
| 2.4-Dinitrophenol              | 110000      | 2100000                       | 10000         | 2600UJ         | 900UJ    | 860UJ    | 900UJ    | 4600UJ   | 11000UJ  |
| 2 4-Dipitrotoluane             | 1000        | 4000                          | 10000         | 1100U          | 370U     | 350U     | 370U     | 1900U    | 4500U    |
| 2.6-Dipitrotoluene             | 1000        | 4000                          | 10000         | 1100U          | 370U     | 350U     | 370U     | 1900U    | 4500U    |
| 2.Chloronanhthaiana            |             | -                             |               | 1100U          | 370U     | 350U     | 370U     | 1900U    | 4500U    |
| 2-Chlorophenoi                 | 280000      | 5200000                       | 10000         | 1100U          | 370U     | 350U     | 370U     | 1900U    | 4500U    |
| 2-Methylophenor                |             |                               |               | 1100U          | 140J     | 350U     | 370U     | 200J     | 4500U    |
| 2 Mathiaprolation              | 2800000     | 10000000                      |               | 1100U          | 370U     | 350U     | 3700     | 1900U    | 4500U    |
|                                |             |                               | ••            | 2600U          | 9000     | 860U     | 900U     | 4600U    | 11000U   |
| 2-INITOBRIANO<br>2 Nitsenhanol |             |                               | -             | 11000          | 3700     | 350U     | 370U     | 1900U    | 4500U    |
| 2-Mitrophenol                  | 2000        | 6000                          | 100000        | 1100U          | 370UJ    | 350U     | 370UJ    | 1900U    | 4500UJ   |
| 2 Mitseeniline                 | 2000        |                               |               | 2600U          | 9000     | 860U     | 900U     | 4600U    | 110000   |
| 4.0 Divites 2 methylaborat     |             | ••                            | ••            | 2600U          | 900U     | 860U     | 900U     | 4600U    | 11000U   |
| 4,6-Diffitio-2-metryphenot     |             |                               |               | 1100U          | 370U     | 350U     | 3700     | 1900U    | 4500U    |
| 4 Chiero 2 methylabonal        | 10000000    | 10000000                      | 100000        | 1100U          | 370U     | 350U     | 370U     | 1900U    | 4500U    |
|                                | 230000      | 4200000                       |               | 1100U          | 370U     | 350U     | 3700     | 1900U    | 4500U    |
| 4-Chlorophenid sherif ether    |             |                               |               | 1100U          | 370U     | 3500     | 3700     | 1900U    | 4500U    |
| 4 Methodeband                  | 2800000     | 10000000                      |               | 1100U          | 370U     | 350U     | 370U     | 1900U    | 4500U    |
|                                | 200000-     |                               |               | 2600U          | 900U     | 860U     | 900U     | 4600U    | 110000   |
|                                |             |                               |               | 2600U          | 900UJ    | 860UJ    | 900UJ    | 4600UJ   | 11000UJ  |
|                                | 3400000     | 10000000                      | 100000        | 11000          | 370U     | 350U     | 370U     | 1900U    | 4500U    |
| Acenaphthene                   | 3400000     |                               |               | 11000          | 370U     | 350U     | 3700     | 1900U    | 4500U    |
| Acenaphinylene                 | 1000000     | 1000000                       | 100000        | 1100U          | 44J      | 350U     | 370U     | 1900U    | 1300J    |
| Anthracene                     | 1000000     | 4000                          | 500000        | 11000          | 230J     | 350U     | 430J     | 1900U    | 840J     |
| Benzo(a)anthracene             | 500         | -500<br>660                   | 100000        | 220J           | 240J     | 350U     | 160J     | 1900UJ   | 4500UJ   |
| Banzo(a)pyrane                 | 900         | 000                           | ,00000        |                |          |          | •        |          |          |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJO         | EP Soil Cleanup C | riteria *   | Sample ID: GTFSB3 | GTFSB4   | GTFSB5          | GTFSB6   | GTFSB7    | GTFSB7   |
|------------------------------|-------------|-------------------|-------------|-------------------|----------|-----------------|----------|-----------|----------|
|                              |             |                   |             | Depth: 02         | 02       | 02              | 02       | 02<br>GTE | GTE      |
|                              |             |                   | Impact to   | Zone**: GTF       | GIF      | GIP<br>10/12/04 | 10/11/94 | 10/13/94  | 10/13/94 |
| Analyte (ug/kg)              | Residential | Non-Residential   | Groundwater | Date: 11/16/94    | 10/13/94 | 10/13/34        | 10/11/34 | 10/10/04  | 10,10,01 |
| Banzolb)filiorenthene        | 900         | 4000              | 50000       | 810J              | 390J     | 88J             | 710J     | 1900UJ    | 4500UJ   |
| Benzola h ibendene           |             |                   | **          | 1100UJ            | R        | 350U            | 370UJ    | 1900UJ    | 4500UJ   |
| Benzolg,n,//perviene         | 900         | 4000              | 500000      | 800J              | 430J     | 99J             | 730J     | 1900UJ    | 4500UJ   |
| Benzokkingerantnene          | 1 100000    | 10000000          | 100000      | 1100UJ            | 370UJ    | 350U            | 370UJ    | 1900U     | 4500UJ   |
| Butyi benzyi prinalara       | 1100000     |                   |             | 1100U             | 370U     | 350Ų            | 370U     | 1900U     | 4500U    |
| Carbazole                    | 8000        | 40000             | 500000      | 450J              | 260J     | 350U            | 390J     | 1900U     | 2700J    |
| Chrysene                     | 5000        | 1000000           | 100000      | 1100U             | 370U     | 350U            | 370U     | 1900U     | 4500U    |
| Di-n-butyl phthalate         | 1100000     | 10000000          | 100000      | 1100UJ            | R        | 350U            | 370UJ    | 1900UJ    | 4500UJ   |
| Di-n-octyl phthalate         | 460         | 660               | 100000      | 1100UJ            | R        | 350U            | 370UJ    | 1900UJ    | 4500UJ   |
| Dibenzo(a,h)anthracene       | 000         |                   |             | 11000             | 370U     | 350U            | 370U     | 1900U     | 4500U    |
| Dibenzoturan                 | 1000000     | 10000000          | 50000       | 11000             | 370U     | 350U            | 370U     | 1900U     | 4500U    |
| Diethyl phthelate            | 10000000    | 10000000          | 50000       | 11000             | 370U     | 350U            | 370U     | 19000     | 4500U    |
| Dimethyl phthalate           | 10000000    | 10000000          | 100000      | 670J              | 250J .   | 350U            | 200J     | 280J      | 900J     |
| Fluoranthene                 | 2300000     | 10000000          | 100000      | 1100              | 370U     | 350U            | 3700     | 1900U     | 4500U    |
| Fluorene                     | 2300000     | 10000000          | 100000      | 11000             | 3700     | 350U            | 3700     | 1900U     | 4500U    |
| Hexachlorobenzene            | 660         | 2000              | 100000      | 11000             | 3700     | 350U            | 370U     | 19000     | 4500U    |
| Hexachlorobutadiane          | 1000        | 21000             | 100000      | 1100U             | 3700     | 350U            | 370U     | 19000     | 4500U    |
| Hexachlorocyclopentadiene    | 400000      | /300000           | 100000      | 11000             | 3700     | 350U            | 3700     | 19000     | 4500U    |
| Hexachioroethane             | 6000        | 100000            | 100000      | 11000             | 53.1     | 3500            | 87J      | 1900UJ    | 4500UJ   |
| Indeno(1,2,3-cd)pyrene       | 900         | 4000              | 500000      | 11000             | 3700     | 3500            | 3700     | 1900U     | 4500U    |
| Isophorone                   | 1100000     | 10000000          | 50000       | 11000             | 3700     | 3500            | 370U     | 1900U     | 4500U    |
| N-Nitroso-di-n-propylamine   | 660         | 660               | 10000       | 11000             | 3700     | 3500            | 3700     | 1900U     | 4500U    |
| N-Nitrosodiphenylamine       | 140000      | 600000            | 100000      | 11000             | 901      | 3500            | 3700     | 19000     | 4500U    |
| Naphthalene                  | 230000      | 4200000           | 100000      | 11000             | 37011    | 3500            | 3700     | 19000     | 4500U    |
| Nitrobenzene                 | 28000       | 520000            | 10000       | 11000             | 90011    | 8600.0          | 9000     | 4600UJ    | 11000UJ  |
| Pentachlorophenoi            | 6000        | 24000             | 100000      | 260003            | 2301     | 3500            | 69J      | 1900U     | 4100J    |
| Phenanthrene                 |             |                   |             | 2000              | 2300     | 3500            | 370U     | 1900U     | 4500U    |
| Phenol                       | 1000000     | 10000000          | 50000       | 7001              | 6101     | 54.1            | 470J     | 100J      | 3500J    |
| Pyrene                       | 1700000     | 10000000          | 100000      | 7903              | 3701     | 3500            | 3700     | 19000     | 4500U    |
| bis(2-Chloroethoxy)methane   | ••          |                   |             | 11000             | 3700     | 3500            | 3700     | 1900U     | 4500U    |
| bis(2-Chloroethyl)ether      | 660         | 3000              | 10000       | 11000             | 4301     | 120.            | 370UJ    | 720J      | 4500UJ   |
| bis(2-Ethylhexyl)phthalate   | 49000       | 210000            | 100000      | 2300J             | 4303     | . 200           | 0.000    | •         |          |
| Total Semivolatile Compounds |             |                   |             | 6290              | 3397     | 361             | 3246     | 1300      | 13340    |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJD         | EP Soil Cleanup Ci | riterie *   | Sample ID: GTFS88 | GTFSB8    | GTFSB9   | GTFSB9   | LAIRMB1  | LOSB1<br>04  |
|------------------------------|-------------|--------------------|-------------|-------------------|-----------|----------|----------|----------|--------------|
|                              |             |                    | Impact to   | Zope**: GTE       | GTE       | GTF      | GTF      | LO       | LO           |
| Apelyte (ud/kd)              | Residential | Non-Residential    | Groundwater | Date: 10/13/94    | 10/13/94  | 10/13/94 | 11/16/94 | 10/24/94 | 10/25/94     |
| Attaine (oging)              |             |                    |             |                   |           |          |          |          |              |
| 1,2,4-Trichlorobenzene       | 68000       | 1 200000           | 100000      | 3800U             | 12000UJ   | 350U     | 11000UJ  | 8700     | 76000        |
| 1.2-Dichlorobenzene          | 5100000     | 10000000           | 50000       | 3800U             | 12000UJ   | 350U     | 11000UJ  | 8700     | 76000        |
| 1.3-Dichlorobenzene          | 5100000     | 10000000           | 100000      | 3800U             | 12000UJ   | 350U     | 11000UJ  | 8700     | 76000        |
| 1.4-Dichlorobenzene          | 570000      | 1000000            | 100000      | 3800U             | 12000UJ   | 3500     | 11000UJ  | 8700     | 76000        |
| 2.2'-oxybis(1-Chloropropane) | 2300000     | 10000000           | 10000       | , 3800U           | 12000UJ   | 350U     | 11000UJ  | 8700     | 76000        |
| 2 4 5-Trichlorophenol        | 5600000     | 10000000           | 50000       | 9100U             | 29000UJ   | 860U     | 28000UJ  | 21000    | 180000       |
| 2.4.6-Trichlorophanoi        | 62000       | 270000             | 10000       | 3800U             | 12000UJ   | 350U     | 11000UJ  | 870U     | 76000        |
| 2.4-Dichloronhanol           | 170000      | 3100000            | 10000       | 3800U             | 12000UJ   | 350U     | 11000UJ  | 8700     | 76000        |
| 2.4-Dimethylohanol           | 1100000     | 1000000            | 10000       | 3800U             | 12000UJ   | 350U     | 11000UJ  | 870U     | 7600UJ       |
| 2.4-Dinitrophenoi            | 110000      | 2100000            | 10000       | 9100U             | 29000UJ   | 860U     | 28000UJ  | 21000    | 180000       |
| 2.4-Dipitrotoluene           | 1000        | 4000               | 10000       | 3800U             | 12000UJ   | 350U     | 11000UJ  | 8700     | 76000        |
| 2,4-Dinitrotoluene           | 1000        | 4000               | 10000       | 3800U             | 12000UJ   | 350U     | 11000UJ  | 870U     | 76000        |
| 2,0-Dimitrototoene           |             | ••                 |             | 3800U             | 1 2000UJ  | 350U     | 11000UJ  | 870U     | 76000        |
| 2-Chioronaphinaione          | 280000      | 5200000            | 10000       | 3800U             | 12000UJ   | 350U     | 11000UJ  | 870U     | 76000        |
| 2-Chiorophenol               | 200000      |                    | **          | 400J              | 110000J   | 150J     | 56000J   | 870U     | 2000J        |
| 2-Methyinephthalene          | 2800000     | 10000000           |             | 3800U             | 1 2000UJ  | 350U     | 11000UJ  | 870U     | 76000        |
| 2-Metnyiphenoi               | 2000000     |                    |             | 9100U             | 29000UJ   | 860U     | 28000UJ  | 2100U    | 18000UJ      |
| 2-Nitroaniine                |             |                    |             | 3800U             | 12000UJ   | 350U     | 11000UJ  | 870U     | 7600U        |
| 2-Nitrophenol                | 1000        | 6000               | 100000      | 3800U             | 12000UJ   | 350UJ    | 11000UJ  | 870UJ    | 7600UJ       |
| 3,3'-Dichlorobenzidine       | 2000        | 0000               | -           | 9100U             | 29000UJ   | 860U     | 28000UJ  | 2100U    | 18000U       |
| 3-Nitroaniline               |             |                    |             | 9100U             | 29000UJ   | 860U     | 28000UJ  | 2100U    | 180000       |
| 4,6-Dinitro-2-methylphenol   |             |                    |             | 3800U             | 1 2000UJ  | 350U     | 11000UJ  | 870U     | 7600U        |
| 4-Bromophenyl phenyl ether   | 1000000     | 10000000           | 100000      | 3800U             | 12000UJ   | 350U     | 11000UJ  | 870U     | 7600U        |
| 4-Chloro-3-methylphenol      | 10000000    | 42000000           |             | 38000             | 1 2000 UJ | 350U     | 11000UJ  | 870UJ    | 7600UJ       |
| 4-Chloroaniline              | 230000      | 4200000            |             | 38000             | 12000UJ   | 350U     | 11000UJ  | 870U     | 7600U        |
| 4-Chlorophenyl phenyl ether  |             | 1000000            |             | 38000             | 12000UJ   | 350U     | 11000UJ  | 870U     | 7600U        |
| 4-Methylphenol               | 2800000     | 1000000            |             | 91000             | 29000UJ   | 860U     | 28000UJ  | 2100U    | 180000       |
| 4-Nitroaniline               |             |                    |             | 91000             | 29000UJ   | 860U     | 28000UJ  | 21000    | 18000UJ      |
| 4-Nitrophenol                |             |                    | 100000      | 38000             | 11000J    | 350U     | 4500J    | 130J     | 7600U        |
| Acenaphthene                 | 3400000     | 10000000           | 100000      | 38000             | 1 2000UJ  | 350U     | 11000UJ  | 180J     | 7600U        |
| Acenaphthylene               |             |                    | 100000      | 38000             | 12000UJ   | 57J      | 11000UJ  | 150J     | 7600U        |
| Anthracene                   | 1000000     | 1000000            | 100000      | 280011            | 1500J     | 290J     | 1800J    | 1800     | <u>14000</u> |
| Benzo(a)anthracene           | 900         | 4000               | 500000      | 38000             | 120000.1  | 220J     | 11000UJ  | 1900     | 1400J        |
| Benzo(a)pyrene               | 660         | 66 <b>0</b>        | 100000      | 30000             |           |          |          |          |              |

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Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jerssy.

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|                              | DLN         | EP Soil Cleanup C | riteria *   | Sample ID: GTFSB8 | GTFS88   | GTFSB9   | GTFSB9   | LAIRMB1  | LOSB1        |
|------------------------------|-------------|-------------------|-------------|-------------------|----------|----------|----------|----------|--------------|
|                              |             |                   |             | Depth: 04         | 08       | 02       | 08       | 02       | 04           |
|                              | Residential | Non Residential   | Impact to   | 200611: GIF       | 10/12/94 | 10/12/94 | 11/18/94 | 10/24/94 | 10/25/94     |
| Analyte (ug/kg)              | Hasigantia  | Non-Nesidential   | Groundwater | Uate: 10/13/34    | 10/10/04 | 10/10/04 |          | 10/24/04 | 10/20/0      |
| Benzo(b)fluoranthene         | 900         | 4000              | 50000       | 3800U             | 2600J    | 240J     | 2700J    | 3300J    | <u>6400J</u> |
| Benzo(g,h,i)perviene         | •=          | ••                |             | 3800U             | 12000UJ  | R        | 11000UJ  | 390J     | 2300J        |
| Benzo(k)fluoranthene         | 900         | 4000              | 500000      | 380QU             | 2800J    | 420J     | 2800J    | 1400J    | <u>7000J</u> |
| Butyl benzyl phthalate       | 1100000     | 10000000          | 100000      | 3800U             | 12000UJ  | 350UJ    | 11000UJ  | 870U     | 7600U        |
| Carbazola                    |             |                   |             | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 76000        |
| Chrysens                     | 9000        | 40000             | 500000      | 1200J             | 6400J    | 510J     | 4800J    | 1900     | 22000        |
| Di-n-butvi phthalate         | 5700000     | 10000000          | 100000      | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 7600U        |
| Di-n-octvl phthalate         | 1100000     | 10000000          | 100000      | 3800U             | 12000UJ  | R        | 11000UJ  | 870U     | 7600U        |
| Dibenzo(a,h)anthracene       | 560         | 660               | 100000      | 3800U             | 12000UJ  | R        | 11000UJ  | 270J     | <u>1600J</u> |
| Dibenzafuren                 |             |                   |             | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 7600U        |
| Diethyl phthelate            | 10000000    | 10000000          | 50000       | 3800U             | 12000UJ  | 350U     | 11000UJ  | 87QU     | 76000        |
| Dimethyl phthelate           | 10000000    | 10000000          | 50000       | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 7600U        |
| Elugranthene                 | 2300000     | 10000000          | 100000      | 3800U             | 2300J    | 240J     | 2100J    | 2600     | 1800J        |
| Fluorene                     | 2300000     | 10000000          | 100000      | 3800U             | 17000J   | 350U     | 5800J    | 870U     | 7600U        |
| Haxachlorobenzene            | 660         | 2000              | 100000      | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 7600U        |
| Haxachlorobutadiana          | 1000        | 21000             | 100000      | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 7600U        |
| Hexechlorocyclopentarliana   | 400000      | 7300000           | 100000      | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 76000        |
| Hexechloroethene             | 6000        | 100000            | 100000      | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 7600U        |
| Indepo(1, 2, 3-cd)pyrana     | 900         | 4000              | 500000      | 3800U             | 1 2000UJ | R        | 11000UJ  | 690J     | 1300J        |
| isonholone                   | 1100000     | 10000000          | 50000       | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 7600U        |
| N-Nitroso-di-n-propylamine   | 660         | 660               | 10000       | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 76000        |
| N-Nitrosodiphenviamine       | 140000      | 600000            | 100000      | 38000             | 12000UJ  | 3500     | 11000UJ  | 870UJ    | 76000        |
| Naphthalana                  | 230000      | 4200000           | 100000      | 3800U             | 24000J   | 350U     | 13000J   | 870U     | 76000        |
| Nitrobenzene                 | 28000       | 520000            | 10000       | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 76000        |
| Pentechlorophenol            | 6000        | 24000             | 100000      | 9100U             | 29000UJ  | 86QU     | 28000UJ  | R        | 180000       |
| Phenenthrone                 |             |                   |             | 3800U             | 45000J   | 340J     | 9600J    | 430J     | 2400J        |
| Phenol                       | 10000000    | 10000000          | 50000       | 3800U             | 12000UJ  | 350U     | \$1000UJ | 870U     | 76000        |
| Pigene                       | 1700000     | 10000000          | 100000      | 38000             | 15000J   | 500J     | 5700J    | 2400     | 10000        |
| his/2-Chloroetboxy)methane   | ••          | **                |             | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 76000        |
| bis(2-Chioroethyl)ether      | 660         | 3000              | 10000       | 3800U             | 12000UJ  | 350U     | 11000UJ  | 870U     | 7600U        |
| bis(2-Ethylhexyl)phthalate   | 49000       | 210000            | 100000      | 3800U             | 12000UJ  | 200J     | 2300J    | 870U     | 7600U        |
| Total Semivolatile Compounds |             |                   | ·           | 1600              | 237600   | 3167     | 111100   | 17540    | 72200        |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJD         | EP Soil Cleenup C | riteria *   | Sample ID: LOSB1 | LOSB2    | LOSB2    | LOSB3    | LOSB4    | LOSB4    | LOSB8    |
|------------------------------|-------------|-------------------|-------------|------------------|----------|----------|----------|----------|----------|----------|
|                              |             |                   | Impact to   | Zone*** i O      | 10       |          | 10       | 10       | 10       | SS       |
| Analyte (ug/kg)              | Residential | Non-Residential   | Groundwater | Date: 10/25/94   | 11/16/94 | 10/14/94 | 10/24/94 | 10/24/94 | 10/24/94 | 10/24/94 |
|                              |             |                   |             |                  |          |          | •        |          |          |          |
| 1,2,4-Trichlorobenzene       | 68000       | 1 200000          | 100000      | 19000            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 1,2-Dichlorobenzene          | 5100000     | 10000000          | 50000       | 1900U            | 29000UJ  | 80000U   | 2000U    | 8200U    | 110000   | 58000U   |
| 1,3-Dichlorobenzene          | 5100000     | 10000000          | 100000      | 1900U            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 1,4-Dichlorobenzene          | 570000      | 10000000          | 100000      | 19000            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 2,2'-oxybis(1-Chloropropane) | 2300000     | 10000000          | 10000       | 1900U            | 29000UJ  | 80000UJ  | 2000U    | 8200U    | 11000U   | 58000U   |
| 2.4.5-Trichlorophenol        | 5600000     | 1000000           | 50000       | 450QU            | 71000UJ  | 150000U  | 4900U    | 20000U   | 27000U   | 150000U  |
| 2.4.6-Trichtorophanol        | 62000       | 270000            | 10000       | 1900U            | 29000UJ  | 50000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 2.4-Dichlorophenol           | 170000      | 3100000           | 10000       | 1900U            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 2.4-Dimethylphanol           | 1100000     | 10000000          | 10000       | 1900UJ           | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 2.4-Dinitrophenol            | 110000      | 2100000           | 10000       | 4500U            | 71000UJ  | 150000UJ | 4900U    | 20000UJ  | 27000UJ  | 150000UJ |
| 2 4-Dinitrotoluene           | 1000        | 4000              | 10000       | 19000            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 2 6-Dinitrotoluene           | 1000        | 4000              | 10000       | 19000            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 2-Chioronanhthaiene          | +•          |                   |             | 1900U            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 2-Chloronbanol               | 280000      | 5200000           | 10000       | 19000            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 2-Mathylnenhthalana          |             |                   |             | 8000             | 120000J  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 2-Methylabanal               | 2800000     | 10000000          |             | 1900U            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
|                              |             |                   |             | 4500UJ           | 71000UJ  | 150000U  | 4900U    | 20000U   | 27000U   | 1500000  |
| 2-Nitrophenol                |             |                   |             | 19000            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 2 31 Dicklessbenzidine       | 2000        | 6000              | 100000      | 1900UJ           | 29000UJ  | 60000U   | 2000UJ   | 8200U    | 11000U   | 58000U   |
|                              |             |                   |             | 4500U            | 71000UJ  | 150000U  | 4900U    | 20000U   | 27000U   | 150000U  |
| A & Dipitro 2 methylabanol   |             |                   |             | 4500UJ           | 71000UJ  | 150000U  | 4900U    | 20000U   | 27000U   | 150000U  |
| 4,9-Difficto-2-metryphenol   |             |                   |             | 1900UJ           | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 4-Bromophenyi phenyi olasi   | 10000000    | 10000000          | 100000      | 1900U            | 29000UJ  | 60000U   | 2000U    | 8200U    | 110000   | 58000U   |
| 4 Chiorospiline              | 230000      | 4200000           |             | 1900UJ           | 29000UJ  | 60000U   | 2000U    | 8200UJ   | 11000UJ  | 58000UJ  |
| A Chiesenhamid shanid ether  | 200000      |                   |             | 1900U            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| 4 Mathida hanal              | 2800000     | 10000000          |             | 210J             | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
|                              | 2000000     |                   |             | 4500U            | 71000UJ  | 150000U  | 4900U    | 20000U   | 27000U   | 1 50000U |
|                              |             |                   |             | 4500UJ           | 71000UJ  | 150000UJ | 4900U    | 20000UJ  | 27000UJ  | 150000UJ |
| 4-Nitrophenol                | 3400000     | 10000000          | 100000      | 720.J            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| Acenaphtnene                 | 3400000     | 1000000           |             | 19000            | 29000UJ  | 60000U   | 2000U    | 8200U    | 110000   | 58000U   |
| Acenaphthylene               | 10000000    | 1000000           | 100000      | 1300.            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| Anthracene                   | 1000000     | 4000              | 500000      | 15000.1          | 290000   | 52000J   | 2000U    | 8200U    | 11000U   | 58000U   |
| Benzo(a)anthracena           | 900         | 4000              | 100000      | 260001           | 3300J    | 37000J   | 2000U    | 8200U    | 11000U   | 58000U   |
| Benzo(a)pyrene               | 660         | 000               | 10000       | 200000           |          |          |          |          |          |          |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJD         | EP Soil Cleanup C | itoria *    | Sample ID: LOSB1 | LOSB2    | LOSB2    | LOSB3    | LOSB4    | LOSB4    | LOSBS    |
|------------------------------|-------------|-------------------|-------------|------------------|----------|----------|----------|----------|----------|----------|
|                              |             |                   |             | Depth: 08        | 04       | 08       | 02       | 02       | 10       | 10       |
|                              |             |                   | Impact to   | Zone**: LO       | LO       | LO .     |          |          | 10/24/94 | 10/24/94 |
| Analyte (ug/kg)              | Residential | Non-Residential   | Groundwater | Date: 10/25/94   | 11/16/94 | 10/14/94 | 10/24/94 | 10/24/34 | 10/24/34 | 10/24/34 |
|                              |             |                   |             | 4 4000 1         | 6000 I   | 260001   | 20001    | 82000    | 11000U   | 58000U   |
| Benzo(b)fluoranthene         | 900         | 4000              | 50000       | 14000J           | 88003    | 200001   | 20000    | 82000    | 1 1000U  | 58000U   |
| Benzo(g,h,i)perylene         |             | -                 |             | 10000J           | 2900000  | 270001   | 20000    | 82000    | 11000U   | 58000U   |
| Benzo(k)fluoranthene         | 900         | 4000              | 500000      | 14000J           | 88007    | 270003   | 20000    | 82000    | 11000U   | 58000U   |
| Butyi benzyi phthelate       | 1100000     | 10000000          | 100000      | 1900UJ           | 2900000  | 600000   | 20000    | 82000    | 110000   | 58000U   |
| Cerbazole                    | -           | ••                |             | 1900UJ           | 29000UJ  | 000000   | 20000    | 82000    | 110000   | 58000U   |
| Chrysene                     | 9000        | 40000             | 500000      | 23000J           | 15000J   | 97000    | 20000    | 82000    | 110000   | 58000U   |
| Di-n-butyl phthalate         | 5700000     | 10000000          | 100000      | 1900UJ           | 29000UJ  | 600000   | 20000    | 82000    | 1100000  | 5800000  |
| Di-n-octvi phthalate         | 1100000     | 10000000          | 100000      | 1900UJ           | 29000UJ  | 60000UJ  | 20000    | 820003   | 110000   | 5800000  |
| Dihanzo(a,h)anthracene       | 660         | 660               | 100000      | <u>10000J</u>    | 29000UJ  | 6000000  | 20000    | 82000    | 110000   | 5900000  |
| Dibanzofuran                 |             |                   |             | 1900U            | 29000UJ  | 60000U   | 20000    | 82000    | 110000   | 580000   |
| Diethyl phthalate            | 10000000    | 10000000          | 50000       | 1900U            | 29000UJ  | 60000U   | 20000    | 82000    | 110000   | 580000   |
| Dimethyl phthalata           | 10000000    | 10000000          | 50000       | 1900U            | 29000UJ  | 60000U   | 20000    | 82000    | 110000   | 500000   |
| Succepthene                  | 2300000     | 10000000          | 100000      | 1900J            | 29000UJ  | 9300J    | 20000    | 82000    | 110000   | 580000   |
| Fluorane                     | 2300000     | 10000000          | 100000      | 940J             | 29000UJ  | 60000U   | 20000    | 82000    | 110000   | 500000   |
| Heyechlorobenzene            | 660         | 2000              | 100000      | 1900UJ           | 29000UJ  | 60000U   | 20000    | 82000    | 110000   | 580000   |
| Hexachlorobutediene          | 1000        | 21000             | 100000      | 19000            | 29000UJ  | 60000U   | 20000    | 82000    | 110000   | 580000   |
| Hexachleropyclopentediepe    | 400000      | 7300000           | 100000      | 1900U            | 29000UJ  | 60000U   | 20000    | 82000    | 110000   | 580000   |
| Lawashieresthere             | 6000        | 100000            | 100000      | 19000            | 29000UJ  | 60000U   | 20000    | 82000    | 110000   | 580000   |
| Hexactionounane              | 900         | 4000              | 500000      | <u>7600J</u>     | 29000UJ  | 60000UJ  | 2000U    | 82000    | 110000   | 580000   |
| Indeno(1,2,3-00/pyrene       | 1100000     | 10000000          | 50000       | 1900U            | 29000UJ  | 60000U   | 2000U    | 8200U    | 110000   | 580000   |
| (sophorone                   | 660         | 660               | 10000       | 1900U            | 29000UJ  | 60000U   | 20000    | 82000    | 110000   | 580000   |
| N-Nitroso-di-In-propyranime  | 140000      | 600000            | 100000      | 1900UJ           | 29000UJ  | 60000U   | 20000    | 8200UJ   | 1100000  | 5800000  |
| N-NITOBOOIDINATIYIATININA    | 230000      | 4200000           | 100000      | 2100             | 25000J   | U0000a   | 2000U    | 8200U    | 110000   | 580000   |
| Naphthelene                  | 28000       | 520000            | 10000       | 19000            | 29000UJ  | 60000U   | 2000U    | 8200U    | 110000   | 580000   |
| Nitrobenzene                 | 8000        | 24000             | 100000      | 4500UJ           | 71000UJ  | 150000UJ | R        | 200000   | 270000   | 1500000  |
| Pentachlorophenol            |             |                   |             | 6200J            | 15000J   | 17000J   | 2000U    | 8200U    | 110000   | 580000   |
| Phenanthrene                 | 10000000    | 1000000           | 50000       | 1900U            | 29000UJ  | 80000U   | 2000U    | 8200U    | 11000U   | 580000   |
| Phenol                       | 17000000    | 10000000          | 100000      | - 9000J          | 8100J    | 69000    | 210J     | 8200U    | 11000U   | 6900J    |
| Pyrene                       | 1700000     |                   |             | 1900U            | 29000UJ  | 60000U   | 2000U    | 8200U    | 110000   | 58000U   |
| bis(2-Chloroethoxy)methane   |             | 3000              | 10000       | 1900U            | 29000UJ  | 60000U   | 2000U    | 8200U    | 11000U   | 58000U   |
| bis(2-Chloroethyl)ether      | 1000        | 210000            | 100000      | 1900UJ           | 29000UJ  | 00000U   | 2000U    | 8200U    | 110000   | 58000U   |
| bis{2-Ethylhexyl}phthalate   | 49000       | 210000            |             |                  |          |          |          |          |          |          |
| Total Semivolatile Compounds |             |                   |             | 149970           | 204000   | 334300   | 210      | 0        | 0        | 6900     |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJDEP Soll Cleanup Criteria * |                 |                   | Sample ID: LOSB8 | LOSB9    | LOSB9    | LOSB10   | LOSBIO       | LOSB11   | LOSB12      |
|------------------------------|-------------------------------|-----------------|-------------------|------------------|----------|----------|----------|--------------|----------|-------------|
|                              |                               |                 |                   | Depth: 08        | 02       | 06       | 04       | 08           | 10       | LO          |
| A                            | Peridential                   | Non-Residential | Groundwater       | Date: 10/24/94   | 10/25/94 | 10/25/94 | 10/28/94 | 10/28/94     | 10/25/94 | 10/25/94    |
| Analyte (ug/kg)              | NestGentia                    | HUITHOULDING    | <u>uround</u> and |                  |          |          |          |              |          |             |
| 1.2.4-Trichlombanzene        | 68000                         | 1200000         | 100000            | 7600U            | 6300U    | 22000U   | 11000U   | 21000U       | 2200U    | 2300U       |
| 1.2-Dichlorobenzene          | 5100000                       | 10000000        | 50000             | 76000            | 6300U    | 22000U   | 11000U   | 21000U       | 2200U    | 23000       |
| 1.3-Dichlorobenzene          | 5100000                       | 10000000        | 100000            | 7600U            | 6300U    | 22000U   | 110000   | 21000U       | 22000    | 23000       |
| 1.4-Diobiorobenzene          | 570000                        | 10000000        | 100000            | 7600U            | 6300U    | 22000U   | 11000U   | 21000U       | 22000    | 23000       |
| 2.2'-oxybis(1-Chloropropane) | 2300000                       | 10000000        | 10000             | 7600U            | 6300U    | 22000U   | 110000   | 21000U       | 22000    | 23000       |
| 2.4.5-Trichlorophenol        | 5600000                       | 10000000        | 50000             | 1 <b>800</b> 0U  | 15000U   | 56000U   | 280000   | 53000U       | 53000    | 56000       |
| 2 4 A-Trichlorophenol        | 62000                         | 270000          | 10000             | 7600U            | 6300U    | 22000U   | 110000   | 210000       | 22000    | 23000       |
| 2 4-Dichlorophanol           | 170000                        | 3100000         | 10000             | 76000            | 6300U    | 22000U   | 110000   | 210000       | 22000    | 23000       |
| 2 4 Dimethylphenol           | 1100000                       | 10000000        | 10000             | 7600U            | 6300UJ   | 22000U   | 110000   | 210000       | 220000   | 2503        |
| 2 A-Dipitrophenol            | 110000                        | 2100000         | 10000             | 18000U           | 15000U   | 56000UJ  | 28000UJ  | 53000UJ      | 53000    | 56000       |
| 2 A-Disitratoluene           | 1000                          | 4000            | 10000             | 7600U            | 6300U    | 22000U   | 110000   | 210000       | 22000    | 23000       |
| 2.4 Dinitrotokiene           | 1000                          | 4000            | 10000             | 76000            | 6300U    | 22000U   | 11000U   | 210000       | 22000    | 23000       |
|                              |                               |                 | -+                | 7600U            | 6300U    | 22000U   | 11000U   | 210000       | 22000    | 23000       |
| 2-Chiorophenoi               | 280000                        | 5200000         | 10000             | 7600U            | 6300U    | 22000U   | 11000U   | 210000       | 22000    | 23000       |
| 2-Children hthe lene         |                               |                 |                   | 4200J            | 6300U    | 22000U   | 5200J    | 4000J        | 520J     | 3305        |
| 2-Mathymaphiliaiono          | 2800000                       | 10000000        |                   | 7600U            | 6300U    | 22000U   | 11000U   | 210000       | 22000    | 23000       |
|                              |                               |                 |                   | 18000U           | 15000UJ  | 56000U   | 28000U   | 530000       | 5300UJ   | 56000       |
| 2-Mitroaranne                |                               |                 | ·                 | 7600U            | 6300U    | 22000U   | 11000U   | 210000       | 22000    | 23000       |
| 2-Narophenol                 | 2000                          | 6000            | 100000            | 7600UJ           | 6300UJ   | 22000U   | 11000UJ  | 21000UJ      | 2200UJ   | 23000       |
| 3,3 -Digmorobenzionie        |                               |                 |                   | 18000U           | 15000U   | 56000U   | 28000U   | 53000U       | 53000    | 56000       |
|                              |                               |                 |                   | 18000U           | 15000U   | 56000U   | 28000UJ  | 53000UJ      | 5300U    | 56000       |
| 4,6-Dinkro-2-methylphenot    |                               |                 |                   | 7600U            | 6300U    | 22000U   | 110000   | 210000       | 22000    | 23000       |
| 4-Bromophenyi pitenyi sulai  | 10000000                      | 10000000        | 100000            | 7600U            | 6300U    | 22000U   | 11000U   | 21000U       | 22000    | 23000       |
| 4-Choro-3-methyphenol        | 230000                        | 4200000         |                   | 7600UJ           | 6300UJ   | 22000UJ  | 11000U   | 210000       | 2200UJ   | 23000       |
| 4-Chioroaniine               |                               | +*              | ••                | 7600U            | 6300U    | 22000U   | 110000   | 210000       | 22000    | 23000       |
| 4-Chlorophenyi phenyi etter  | 2800000                       | 10000000        |                   | 7600U            | 6300U    | 22000U   | 11000U   | 210000       | 22000    | 23000       |
| 4-Methylphenol               | 2000000                       |                 |                   | 18000U           | 15000U   | 56000U   | 28000U   | 53000U       | 5300U    | 56000       |
| 4-Nitroaniine                |                               |                 |                   | 18000U           | 15000UJ  | 56000U   | 28000U   | 53000U       | 5300UJ   | 5600UJ      |
| 4-Nitrophenol                | 2400000                       | 10000000        | 100000            | 7600U            | 6300U    | 22000U   | 11000U   | 21000U       | 22000    | 23000       |
| Acenaphthene                 | 3400000                       |                 |                   | 76000            | 6300U    | 22000U   | 11000U   | 21000U       | 2200U    | 23000       |
| Acenaphthylene               | 1000000                       | 1000000         | 100000            | 7600U            | 6300U    | 22000U   | 11000U   | 21000U       | 2200U    | 23000       |
| Anthracene                   | 000000                        | 4000            | 500000            | 1 200J           | 2000J    | 22000U   | 1100J    | 2500J        | 340J     | 350J        |
| Benzo(a)anthracene           | 900                           | -500            | 100000            | 870J             | 6300U    | 22000U   | 11000U   | <u>2300J</u> | 270J     | <u>920J</u> |
| Benzo(a)pyrane               | 660                           | 000             | 100000            | <u></u>          |          |          |          | 100 B        |          |             |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.
|                              |             | EP Soil Cleanup Ci | iteria •                 | Sample ID: LOSB8                           | LOSB9 LOSB9 L        |                              | LOSB10         | LOSB10         | LOSB11                 | LOSB12<br>02   |
|------------------------------|-------------|--------------------|--------------------------|--------------------------------------------|----------------------|------------------------------|----------------|----------------|------------------------|----------------|
| Ansivte (ua/ka)              | Residential | Non-Residential    | Impact to<br>Groundwater | Depth: 08<br>Zone**: LO<br>Dete: 10/24/94_ | 02<br>LO<br>10/25/94 | 08<br>LO<br>10/2 <u>5/94</u> | LO<br>10/28/94 | LO<br>10/28/94 | LO<br>10/2 <u>5/94</u> | LO<br>10/25/94 |
|                              |             |                    |                          | 1000                                       | 8200U                | 1100011                      | 1400 1         | 2200.1         | 630.j                  | 890J           |
| Benzo(b)fluoranthene         | 900         | 4000               | 50000                    | 72000                                      | 63000                | 220000                       | 15001          | 25001          | 22000                  | 1800J          |
| Banzo(g,h,i)paryiene         | <b></b>     |                    |                          | 76000                                      | 63000                | 220000                       | 14001          | 23003          | 6201                   | 860.1          |
| Benzo(k)fluoranthene         | 900         | 4000               | 500000                   | 13000                                      | 83000                | 220000                       | 110001         | 210000         | 22000                  | 2300UJ         |
| Butyl benzyl phthelate       | 1100000     | 10000000           | 100000                   | 76000                                      | 63000                | 220000                       | 110000         | 210000         | 22000                  | 23000          |
| Carbazole                    |             | -                  | **                       | 76000                                      | 63000                | 220000                       | 110000         | 210000         | £2000                  | 1200.1         |
| Chrvsene                     | 9000        | 40000              | 500000                   | 2800J                                      | 2600J                | 5500J                        | 20000          | 58003          | 3300                   | 22000          |
| Di-n-butyl phthalate         | 5700000     | 10000000           | 100000                   | 7.6000                                     | 6300U                | 220000                       | 110000         | 210000         | 22000                  | 230000         |
| Di-n-octvi phthelate         | 1100000     | 10000000           | 100000                   | 76000                                      | 63000                | 22000UJ                      | 1100000        | 2100003        | 22000                  | 7501           |
| Dibenzo(a,h)anthracene       | 660         | 660                | 100000                   | 76000                                      | 6300U                | 220000                       | 1100000        | 2100000        | 22000                  | 220011         |
| Dibenzofuran                 |             |                    |                          | 7600U                                      | 6300U                | 220000                       | 110000         | 210000         | 22000                  | 23000          |
| Disthyl obthelate            | 10000000    | 10000000           | 50000                    | 76000                                      | 6300U                | 220000                       | 110000         | 210000         | 22000                  | 23000          |
| Dimethyl phthelate           | 10000000    | 10000000           | 50000                    | 7600U                                      | 6300U                | 22000U                       | 110000         | 210000         | 22000                  | 23000          |
| Elucrepthane                 | 2300000     | 10000000           | 100000                   | 76000                                      | 2500J                | 22000U                       | 11000U         | 210000         | 420J                   | 23000          |
| Figure                       | 2300000     | 10000000           | 100000                   | 1500J                                      | 6300U                | 22000U                       | 110000         | 210000         | 22000                  | 2503           |
|                              | 660         | 2000               | 100000                   | 7600U                                      | 6300U                | 22000U                       | 11000U         | 21000U         | 22000                  | 23000          |
| Hexachiorobenzene            | 1000        | 21000              | 100000                   | 76000                                      | 6300U                | 22000U                       | 11000U         | 21000U         | 22000                  | 23000          |
| Hexachioroputaciene          | 400000      | 7300000            | 100000                   | 7600U                                      | 6300U                | 22000U                       | 1 1000U        | 21000U         | 2200U                  | 2300UJ         |
| Hexachiorocyclopentaciona    | 6000        | 100000             | 100000                   | 7600U                                      | 6300U                | 22000U                       | 11000U         | 21000U         | 22000                  | 23000          |
| Hexachloroethane             | 9000        | 4000               | 500000                   | 7600U                                      | 6300U                | 22000U                       | 11000UJ        | 21000UJ        | 2200U                  | 570J           |
| Indeno(1,2,3-cd)pyrene       | 900         | 1000000            | 50000                    | 7600U                                      | 6300U '              | 22000U                       | 11000U         | 21000U         | 2200U                  | 23000          |
| laophorone                   | 1100000     | 460                | 10000                    | 7600U                                      | 6300U                | 22000U                       | 11000U         | 21000U         | 2200U                  | 23000          |
| N-Nitroso-di-n-propylamina   | 660         | 400000             | 100000                   | 7600UJ                                     | 6300U                | 22000UJ                      | 11000U         | 21000U         | 2200U                  | 2300U          |
| N-Nitrosodiphenylamine       | 140000      | 400000             | 100000                   | 7600U                                      | 6300U                | 22000U                       | 11000U         | 21000U         | 2200U                  | 300J           |
| Naphthalene                  | 230000      | 4200000            | 100000                   | 76000                                      | 6300U                | 22000U                       | 11000U         | 21000U         | 2200U                  | 2300U          |
| Nitrobenzene                 | 28000       | 520000             | 100000                   | · R                                        | 15000U               | 56000U                       | 28000U         | 53000U         | 5300U                  | 5600U          |
| Pentachlorophenol            | 6000        | 24000              | 100000                   | 4000.1                                     | 2600J                | 5800J                        | 1600J          | 1 2000 J       | 400J                   | 2300U          |
| Phenenthrene                 | ••          |                    | 50000                    | 76000                                      | 6300U                | 22000U                       | 1 1000U        | 21000U         | 2200U                  | 2300U          |
| Phenol                       | 10000000    | 10000000           | 50000                    | 16001                                      | 2000.1               | 2600J                        | 1800J          | 4300J          | 450J                   | 380J           |
| Pyrene                       | 1700000     | 10000000           | 100000                   | 74000                                      | 63000                | 220000                       | 11000U         | 21000U         | 2200U                  | 2300U          |
| bis(2-Chloroethoxy)methane   | ••          |                    |                          | 70000                                      | 63000                | 2 2000U                      | 11000U         | 21000U         | 2200U                  | 2300U          |
| bis(2-Chloroethyl)ether      | 660         | 3000               | 10000                    | 70000                                      | 63000                | 220001                       | 110000         | 21000U         | 2200U                  | 2300UJ         |
| bis(2-Ethylhexyl)phthalate   | 49000       | 210000             | 100000                   | /6000                                      | 00000                | 220000                       |                |                |                        |                |
| Total Semivolatile Compounds |             |                    |                          | 18670                                      | 11700                | 13900                        | 1 6000         | 37900          | 4230                   | 8850           |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJD         | EP Soil Cleanup C | riteria *   | Semple ID: LOSB12   | LOSB13   | LOSB13FR | LOSB13   | LOSB14   | LOSB15   | LOSB16          |
|------------------------------|-------------|-------------------|-------------|---------------------|----------|----------|----------|----------|----------|-----------------|
|                              |             |                   |             | Depth: 06           | 02       | 02       | 08       | 02       | 02       | 04              |
|                              |             |                   | Impact to   | Zone**: LO          | LO       | LO       | LO       |          | 10/24/04 | 10/25/94        |
| Analyte (ug/kg)              | Residential | Non-Residential   | Groundwater | Date: 10/25/94      | 10/31/94 | 10/31/94 | 10/31/94 | 10/25/94 | 10/24/34 | 10/25/94        |
| 1.2.4-Trichlorobenzene       | 68000       | 1200000           | 100000      | 130000              | 11000U   | 11000U   | 11000U   | 2200U    | 58000U   | 1 <b>700</b> 0U |
| 1 2-Dichlorohenzene          | 5100000     | 10000000          | 50000       | 13000U              | 110000   | 11000U   | 110000   | 2200U    | 58000U   | 170000          |
| 1.3-Dichlorobenzene          | 5100000     | 10000000          | 100000      | 130000              | 11000U   | 110000   | 11000U   | 2200U    | 58000U   | 17000U          |
| 1 4-Dichlorobenzene          | 570000      | 10000000          | 100000      | 13000U              | 11000U   | 11000U   | 11000U   | 2200U    | 58000U   | 17000U          |
| 2 2'-ovubis(1-Chioropropage) | 2300000     | 10000000          | 10000       | 2 13000U            | 11000U   | 11000U   | 110000   | 2200U    | 58000U   | 17000U          |
| 2 4 5-Trichlorophenoi        | 5600000     | 10000000          | 50000       | 32000U              | 29000U   | 28000U   | 28000U   | 5300U    | 150000U  | 43000U          |
| 2.4.6-Trichlorophanol        | 62000       | 270000            | 10000       | 13000U              | 11000U   | 11000U   | 11000U   | 2200U    | 58000U   | 17000U          |
| 2.4.Dichlorophenol           | 170000      | 3100000           | 10000       | 13000U              | 110000   | 11000U   | 11000U   | 2200U    | 58000U   | 17000U          |
| 2,4-Dimethylobenol           | 1100000     | 10000000          | 10000       | 1 3000U             | 110000   | 11000U   | 11000U   | 2200UJ   | 58000U   | 17000U          |
| 2, - Dinistronhenol          | 110000      | 2100000           | 10000       | 32000UJ             | 29000U   | 28000UJ  | 28000UJ  | 5300U    | 150000UJ | 43000UJ         |
| 2.4-Dinitrophonol            | 1000        | 4000              | 10000       | 13000U              | 11000U   | 11000U   | 11000U   | 2200U    | 58000U   | 170000          |
| 2.4-Dinitrotokene            | 1000        | 4000              | 10000       | 13000U              | 11000U   | 11000U   | 11000U   | 2200U    | 58000U   | 170000          |
| 2.Chloropenathelene          |             |                   | ••          | 1 3000U             | 11000U   | 11000U   | 11000U   | 2200U    | 58000U   | 170000          |
| 2-Chloronbenol               | 280000      | 5200000           | 10000       | 130000              | 1100QU   | 11000U   | 11000U   | 2200U    | 58000U   | 170000          |
| 2-Methylapathelene           |             | ••                |             | 13000U              | 1400J    | 1200J    | 3000J    | 300J     | 58000U   | 30000           |
| 2-Methylophonol              | 2800000     | 10000000          |             | 130000              | 11000U   | 11000U   | 110000   | 2200U    | 58000U   | 170000          |
| 2-Nitroeniline               | ••          |                   |             | 32000U              | 29000U   | 28000U   | 28000U   | 5300UJ   | 1500000  | 430000          |
| 2-Nitronhanol                | •-          |                   |             | 130000              | 11000U   | 11000U   | 11000U   | 22000    | 580000   | 170000          |
| 3.3'-Dicblorobenzidine       | 2000        | 6000              | 100000      | 130000              | 11000UJ  | 11000UJ  | 11000UJ  | 2200UJ   | 580000   | 1700000         |
| 3-Nitroaniline               |             |                   |             | 32000U              | 29000U   | 28000U   | 28000U   | 53000    | 1500000  | 430000          |
| 4.6-Dipitro-2-methyiphenol   | ·           |                   |             | 32000U              | 29000U   | 28000UJ  | 28000UJ  | 53000    | 1500000  | 4300000         |
| 4-Bromophanyl phenyl ether   |             |                   |             | 13000U              | 110000   | 11000U   | 110000   | 22000    | 580000   | 170000          |
| 4-Chioro-3-methylphenol      | 10000000    | 10000000          | 100000      | 13000U <sup>-</sup> | 110000   | 11000U   | 110000   | 22000    | 580000   | 1700000         |
| 4-Chloroaniline              | 230000      | 4200000           | •-          | 13000UJ             | 11000UJ  | 11000UJ  | 110000   | 220000   | 5800003  | 1700003         |
| 4-Chlorophanyl phanyl ether  |             |                   |             | 13000U              | 110000   | 11000U   | 110000   | 22000    | 580000   | 170000          |
| 4-Methylnhenol               | 2800000     | 10000000          |             | 130000              | 110000   | 11000U   | 110000   | 22000    | 580000   | 430000          |
| 4-Nitroaniling               | ••          |                   | ••          | 320000              | 29000U   | 280000   | 280000   | 53000    | 1500000  | 430000          |
| 4-Nitrophenol                |             | ••                | •-          | 32000U              | 29000U   | 28000UJ  | 280000   | 530000   | 1500000J | 170000          |
| Acenanhthana                 | 3400000     | 10000000          | 100000      | 13000U              | 110000   | 110000   | 110000   | 22000    | 580000   | 170000          |
| Acensphthyland               |             | ••                |             | 130000              | 11000U   | 110000   | 110000   | 22000    | 580000   | 170000          |
| Anthragene                   | 10000000    | 10000000          | 100000      | 13000U              | 110000   | 110000   | 110000   | 3701     | 580000   | 170000          |
| Renzole)enthracene           | 900         | 4000              | 500000      | 130000              | 110000   | 11000U   | 110000   | 870J     | 580000   | 170000          |
| Benzo(a)pyrene               | 660         | 660               | 100000      | <u>2100J</u>        | 11000U   | 110000   | 110000   | 22000    | 580000   | 170000          |

Table 5-3. Semivolatile Organic Compounds In Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                      | NJDEP Soil Cleanup Criteria * |                 |                | Sample ID: LOSB12 | LOSB13         | LOSB13FR       | LOSB13   | LOSB14   | LOSB15   | LOSB16<br>04 |
|--------------------------------------|-------------------------------|-----------------|----------------|-------------------|----------------|----------------|----------|----------|----------|--------------|
|                                      |                               |                 |                | Zenett: LO        | 10             | 10             | 10       | 10       | iõ       | LO           |
| A                                    | Residential                   | Non Residential | Groundwater    | Dete: 10/25/94    | 10/31/94       | 10/31/94       | 10/31/94 | 10/25/94 | 10/24/94 | 10/25/94     |
| Analyte (ug/kg)                      | Nasigettiai                   | HUIPINGAIGORIUG | QTO and trater |                   |                |                |          |          |          |              |
| Benzo(b)fluoranthene                 | 900                           | 4000            | 50000          | 2100J             | 1 300J         | 11000U         | 11000U   | 1200J    | 58000U   | 17000U       |
| Benzola, h.I) perviene               |                               | ·               | **             | 2500J             | 11000U         | 11000UJ        | 11000UJ  | 2200U    | 58000U   | 17000UJ      |
| Benzo(k)fluoranthene                 | 900                           | 4000            | 500000         | 2300J             | 1500J          | 110000         | 110000   | 1200J    | 58000U   | 170000       |
| Butyl banzyl phthalate               | 1100000                       | 10000000        | 100000         | 13000U            | 110000         | 11000U         | 110000   | 2200U    | 58000U   | 170000       |
| Carbazola                            |                               | ••              | **             | 13000U            | 11000U         | 11000U         | 11000U   | 280J     | 58000U   | 17000U       |
| Chrysepe                             | 9000                          | 40000           | 500000         | 3300J             | 1900J          | 1600J          | 2000J    | 1900J    | 58000U   | 170000       |
| Displayed obthalate                  | 5700000                       | 10000000        | 100000         | 130000            | 11000U         | 11000U         | 110000   | 2200U    | 58000U   | 170000       |
| Displored phtheiste                  | 1100000                       | 10000000        | 100000         | 13000U            | 11000U         | 11000UJ        | 11000UJ  | 2200U    | 58000UJ  | 17000UJ      |
| Dihentole hienthrecept               | 660                           | 660             | 100000         | 1600J             | 110000         | 11000UJ        | 11000UJ  | 2200U    | 58000U   | 17000UJ      |
| Dihanzoluran                         |                               |                 |                | 13000U            | 11000U         | 11000U         | 110000   | 2200U    | 58000U   | 170000       |
| Disting abthelate                    | 10000000                      | 10000000        | 50000          | 13000U            | 11000U         | 1100 <b>0U</b> | 11000U   | 2200U    | 58000U   | 170000       |
| Dimethid abthelete                   | 10000000                      | 10000000        | 50000          | 13000U            | 11000U         | 11000U         | 11000U   | 2200U    | 58000U   | 170000       |
| Summer printing of                   | 2300000                       | 10000000        | 100000         | 13000U            | 11000U         | 11000U         | 11000U   | 1300J    | 58000U   | 170000       |
| Fluorenciano -                       | 2300000                       | 10000000        | 100000         | 13000U            | 11000U         | 11000U         | 11000U   | 270J     | 58000U   | 17000U       |
|                                      | 660                           | 2000            | 100000         | 13000U            | 110000         | 11000U         | 11000U   | 2200U    | 58000U   | 17000U       |
| Hexachlorobenzene                    | 1000                          | 21000           | 100000         | 130000            | 110000         | 11000U         | 110000   | 2200U    | 58000U   | 170000       |
| Hexachiorobulationo                  | 400000                        | 7300000         | 100000         | 130000            | 11000U         | 11000U         | 11000U   | 2200U    | 58000U   | 170000       |
|                                      | 6000                          | 100000          | 100000         | 130000            | 11000U         | 11000U         | 11000U   | 2200U    | 58000U   | 17000U       |
|                                      | 900                           | 4000            | 500000         | 1400J             | 110 <b>00U</b> | 11000UJ        | 11000UJ  | 2200U    | 58000U   | 17000UJ      |
| Indeno(1,2,3°Cd/pytelle              | 1100000                       | 10000000        | 50000          | 130000            | 11000JU        | 11000U         | 11000U   | 2200U    | 58000U   | 170000       |
| N.Nitroso-di-n-propylemine           | 660                           | 660             | 10000          | 13000U            | 11000U         | 11000U         | 11000U   | 2200U    | 580000   | 170000       |
| N Mittoso-dinhandemine               | 140000                        | 600000          | 100000         | 13000UJ           | 11000UJ        | 11000UJ        | 11000U   | 2200U    | 58000UJ  | 17000UJ      |
| N-Millououphonyrannia                | 230000                        | 4200000         | 100000         | 13000U            | 11000U         | 110000         | 11000U   | 260J     | 580000   | 170000       |
| Naphtherene                          | 28000                         | 520000          | 10000          | 13000U            | 11000U         | 110000         | 11000U   | 2200U    | 58000U   | 170000       |
| Remerchanne                          | 6000                          | 24000           | 100000         | 32000U            | 29000U         | 28000U         | 28000U   | 5300U    | 1500000  | 430000       |
| Pentaciaoropheno                     |                               |                 |                | 1 3000U           | 11000U         | 11000U         | 2400J    | 1700J    | 58000U   | 170000       |
| Phenel                               | 10000000                      | 10000000        | 50000          | 13000U            | 11000U         | 11000U         | 11000U   | 22000    | 58000U   | 170000       |
| Phenol                               | 1700000                       | 10000000        | 100000         | 1400J             | 1600J          | 11000U         | 1700J    | 1400J    | 580000   | 170000       |
| Fyrene<br>his/2-Chloroethoyy)methene |                               |                 |                | 13000U            | 11000U         | 11000U         | 11000U   | 22000    | 580000   | 170000       |
| bis(2.Chioroethy)ather               | 660                           | 3000            | 10000          | 1 3000U           | 11000U         | 11000U         | 110000   | 22000    | 580000   | 170000       |
| bis(2-Ethylberyd)phtheiste           | 49000                         | 210000          | 100000         | 13000U            | 11000U         | 3500J          | 9300J    | 2200U    | 580000   | 170000       |
| Total Semivolatile Compounds         |                               |                 | а<br>1         | 16700             | 7700           | 6300           | 18400    | 11050    | 0        | 30000        |

Table 5-3. Semivolatile Organic Compounds in Soil Semples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                             | ЛЦИ         | EP Soil Cleanup C | riteria "   | Sample ID: LOSB17 | LOSB18   | LOSB18   | LOSB18FR         | MBSB1          | MBSB2    | MBSB3        |
|---------------------------------------------|-------------|-------------------|-------------|-------------------|----------|----------|------------------|----------------|----------|--------------|
|                                             |             |                   |             | Depth: 02         | 02       | 08       | 08               | 02             | 02       | 00           |
|                                             |             |                   | Impact to   | Zone**: LO        | LO       | LO       | LO               | MB             | MB       | 10/25/04     |
| Analyte (ug/kg)                             | Residential | Non-Residential   | Groundwater | Date: 10/24/94    | 10/24/94 | 10/24/94 | 10/24/94         | 10/25/94       | 10/21/94 | 10/25/94     |
|                                             |             |                   | 100000      | 2001              | 30011    | 610000   | 650000           | 19000          | 38000    | 9600U        |
| 1,2,4-Trichlarobenzene                      | 68000       | 1200000           | 100000      | 3900              | 3800     | 810000   | 650000           | 19000          | 780.1    | 96000        |
| 1,2-Dichlorobenzene                         | 5100000     | 10000000          | 50000       | 3900              | 3800     | 610000   | 650000           | 19000          | 38000    | 9600U        |
| 1,3-Dichlorobenzene                         | 5100000     | 1000000           | 100000      | 3900              | 3800     | 610000   | 850000           | 19000          | 380011   | 98000        |
| 1,4-Dichlorobenzene                         | 570000      | 1000000           | 100000      | 3900              | 3800     | 610000   | 650000<br>650000 | 19000          | 39000    | 96000        |
| 2, 2'-exybis(1-Chloropropane)               | 2300000     | 10000000          | 10000       | 3900              | 3800     | 610000   | 150000           | 47000          | 33000    | 230000       |
| 2, 4, 5-Trichlorophenol                     | 5600000     | 10000000          | 50000       | 950U              | 9100     | 1500000  | 100000           | 47000          | 38000    | 960000       |
| 2, 4, 6-Trichlorophenol                     | 62000       | 270000            | 10000       | 3900              | 3800     | 610000   | 850000           | 19000          | 30000    | 980000       |
| 2,4-Dichlorophenol                          | 170000      | 3100000           | 10000       | 390U              | 3800     | 610000   | 650000           | 19000          | 38000    | 96000        |
| 2.4-Dimethylphenol                          | 1100000     | 10000000          | 10000       | 390U              | 3800     | 610000   | 650000           | 13000          | 38000    | 320000       |
| 2.4-Dinitrophenol                           | 110000      | 2100000           | 10000       | 950U              | 91000    | 150000UJ | 16000000         | 47000          | 33000    | 230000       |
| 2.4-Dinitrotoluene                          | 1000        | 4000              | 10000       | 390U              | 380U     | 610000   | 650000           | 19000          | 38000    | n<br>0.00011 |
| 2.6-Dinitrotoluene                          | 1000        | 4000              | 10000       | 390U              | 380U     | 610000   | 650000           | 19000          | 38000    | 96000        |
| 2-Chloropephthelene                         |             |                   | ••          | 390U              | 380U     | 61000U   | 65000U           | 19000          | 38000    | 90000        |
| 2-Chloranhenol                              | 280000      | 5200000           | 10000       | 390U              | 380U     | 61000U   | 65000U           | 19000          | 38000    | 96000        |
| 2-Mathdoenhthalena                          |             |                   |             | 75J               | 77 J     | 61000U   | 65000U           | 730J           | 490J     | 1200J        |
| 2 Methylaphool                              | 2800000     | 10000000          | ·           | 390U              | 380U     | 61000U   | 65000U           | 1900U          | 3800U    | 96000        |
| 2-Methyphenol                               |             |                   |             | 950U              | 910U     | 150000U  | 160000U          | 4700U          | 9300U    | 230000       |
| 2-Microshanal                               |             |                   |             | 390U              | 380U     | 61000U   | 85000U           | 1900U          | 3800U    | 96000        |
| 2-Nicrophenol                               | 2000        | 6000              | 100000      | 390UJ             | 380U     | 61000U   | 65000U           | 19 <b>00</b> U | 3800UJ   | 96000        |
|                                             | 2000        |                   |             | 950U              | 910U     | 150000U  | 1 60000U         | 4700U          | 9300U    | 230000       |
| 3-Nitroaniine<br>4.5. Disiaa 2 methylabaral |             |                   |             | 950U              | 910U     | 150000U  | 1600000          | 4700U          | 9300UJ   | 230000       |
| 4,5-Dinitro-2-matryphenoi                   |             |                   |             | 390U              | 380U     | 61000U   | 65000U           | 1900U          | 38000    | 96000        |
| 4-Bromophenyi prienyi etner                 | 10000000    | 10000000          | 100000      | 390U              | 380U     | 61000U   | 65000U           | 1900U          | 3800U    | 96000        |
| 4-Chloro-3-metryiphenoi                     | 230000      | 4200000           |             | 390UJ             | 380UJ    | 61000UJ  | 65000UJ          | 1900U          | 3800U    | 96000        |
| 4-Chioroaniane                              | 230000      |                   | **          | 390U              | 380U     | 61000U   | 65000U           | 1900U          | 3800U    | 9600U        |
| 4-Chierophenyi phenyi eurer                 | 2800000     | 10000000          |             | 390U              | 380U     | 61000U   | 65000U           | 1900U          | 3800U    | 9600U        |
| 4-Methylphenol                              | 2800000     |                   | ••          | 9500              | 9100     | 1500000  | 1600000          | 4700U          | 9300UJ   | 230000       |
| 4-Nitroaniline                              |             |                   |             | 950U              | 910U     | 150000UJ | 160000UJ         | 4700U          | 9300UJ   | 23000U       |
| 4-Nitrophenol                               |             | 10000000          | 100000      | 390U              | 380U     | 61000U   | 65000U           | 1900U          | 3800U    | 9600U        |
| Acenaphthene                                | 3400000     | 1000000           | 100000      | 390U              | 380U     | 61000U   | 65000U           | 1900U          | 3800U    | 9600U        |
| Acenaphthylene                              |             | 1000000           | 100000      | 54.1              | 46J      | 81000U   | 65000U           | 1900U          | 3800U    | 9600U        |
| Anthrecene                                  | 10000000    | 1000000           | E00000      | 620               | 1100     | 61000U   | 65000U           | 390J           | 3800U    | 9600U        |
| Benzo(a)anthracene                          | 900         | 4000              | 100000      | 16001             | 1700     | 610001   | 65000U           | 370J           | 3800U    | 9600U        |
| Benzo(a)pyrene                              | 660         | 660               | 100000      | 10000             | 11.44    |          |                  |                |          |              |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJDEP Soil Cleanup Criteria_* |                 |             |                | LOSB18   | LOSB18   | LOSB18FR | MBSB1    | MBSB2    | MBSB3          |
|------------------------------|-------------------------------|-----------------|-------------|----------------|----------|----------|----------|----------|----------|----------------|
|                              |                               |                 |             | Depth: 02      | 0Z       | 08       | 08       | 02       | 02       | 08             |
|                              |                               |                 | impact to   | Zonerr: LO     | LO       |          |          | MB       | MB       | MD<br>10/25/94 |
| Ansiyte (ug/kg)              | Residential                   | Non-Residential | Groundwater | Date: 10/24/94 | 10/24/94 | 10/24/94 | 10/24/94 | 10/25/54 | 10/21/34 | 10/23/34       |
| Benzo(b)fluoranthene         | 900                           | 4000            | 50000       | 1200J          | 1000J    | 61000U   | 85000U   | 650J     | 3800U    | 9600U          |
| Benzo(g,h,i)perviene         | -                             |                 | ••          | 1500J          | 1300     | 61000U   | 65000U   | 350J     | 3800U    | 9600U          |
| Benzo(k)fluorenthene         | 900                           | 4000            | 500000      | 1 200 J        | 1200J    | 61000U   | 65000U   | 600J     | 3800UJ   | 9600U          |
| Butyl benzyl phthelete       | 1100000                       | 10000000        | 100000      | 390U           | 380U     | 61000U   | 65000U   | 1900UJ   | 3800U    | 9600UJ         |
| Carbazole                    | -                             | ••              |             | 390U           | 380U     | 61000U   | 65000U   | 1900U    | 3800U    | 9600U          |
| Chrysene                     | 9000                          | 40000           | 500000      | 930            | 1800     | 61000U   | 65000U   | 1100J    | 620J     | 9600U          |
| Di-n-butvi phthalate         | 5700000                       | 10000000        | 100000      | 3900           | 3800     | 61000U   | 65000U   | 1900UJ   | 3800U    | 9600UJ         |
| Di-n-octvi phthalate         | 1100000                       | 10000000        | 100000      | 390UJ          | 380U     | 61000UJ  | 65000UJ  | 1900UJ   | 3800U    | 9600UJ         |
| Dibenzo(a.h)anthracene       | 660                           | 660             | 100000      | <u>1100J</u>   | 570      | 61000U   | 65000U   | 220J     | 3800U    | 9600U          |
| Dibenzofuran                 |                               |                 |             | 390U           | 380U     | 61000U   | 65000U   | 1900U    | 3800U    | 9600U          |
| Diethyl phthalate            | 10000000                      | 10000000        | 50000       | 390U           | 380U     | 61000U   | 65000U   | 19000    | 3800U    | 9600U          |
| Dimethyl phthalate           | 10000000                      | 10000000        | 50000       | 39QU           | 380U     | 61000U   | 65000U   | 1900U    | 3800U    | 96000          |
| Fiuoranthene                 | 2300000                       | 10000000        | 100000      | - 170J         | 160J     | 61000U   | 65000U   | 480J     | 38000    | 96000          |
| Fluorene                     | 2300000                       | 10000000        | 100000      | 390U           | 380U     | 61000U   | 65000U   | 1900U    | 38000    | 960CU          |
| Hexachiorobenzene            | 660                           | 2000            | 100000      | 390U           | 380U     | 61000U   | 85000U   | 1900U    | 3800U    | 9600U          |
| Haxachlorobutadiena          | 1000                          | 21000           | 100000      | 390U           | 380U     | 61000U   | 85000U   | 1900U    | 38000    | 9600U          |
| Hexachlorocyclopentadiene    | 400000                        | 7300000         | 100000      | 390U           | 380U     | 61000U   | 65000U   | 1900UJ   | 3800U    | 9600UJ         |
| Haxachioroethane             | 6000                          | 100000          | 100000      | 390U           | 3800     | 61000U   | 65000U   | 1900U    | 3800U    | 9600U          |
| Indeno(1,2,3-cd)pyrene       | 900                           | 4000            | 500000      | 800J           | 530      | 61000U   | 65000U   | 230J     | 3800U    | 9600U          |
| isophorone                   | 1100000                       | 10000000        | 50000       | 390U           | 380U     | 61000U   | 65000U   | 1900U    | 3800U    | 96000          |
| N-Nitroso-dl-n-propylamina   | 660                           | 660             | 10000       | 390U           | 380U     | 61000U   | 65000U   | 1900U    | 38000    | R              |
| N-Nitrosodiphenvismine       | 140000                        | 600000          | 100000      | 390UJ          | 380NN    | 61000UJ  | 65000UJ  | 1900U    | 38000    | 96000          |
| Naphthalene                  | 230000                        | 4200000         | 100000      | 50J            | 72J      | 61000U   | 65000U   | 1900U    | 38000    | 9600U          |
| Nitrobenzene                 | 28000                         | 520000          | 10000       | 390U           | 380U     | 61000U   | 65000U   | 19000    | 38000    | 96000          |
| Pentachlorophenoi            | 6000                          | 24000           | 100000      | 75J            | R        | 150000U  | R        | R        | 9300U    | 23000UJ        |
| Phenanthrene                 | **                            |                 | ••          | 170J           | 220J     | 61000U   | 65000U   | 1500J    | 38000    | 96000          |
| Phenol                       | 10000000                      | 10000000        | 50000       | 390U           | 380U     | 610000   | 65000U   | 19000    | 38000    | 96000          |
| Pyrana                       | 1700000                       | 10000000        | 100000      | 390            | 550      | 61000U   | 65000U   | 1700J    | 38000    | 2000J          |
| his/2-Chloroethoxy)methene   |                               |                 |             | 390U           | 380U     | 61000U   | 65000U   | 19000    | 38000    | 98000          |
| bis(2-Chloroethyl)ether      | 660                           | 3000            | 10000       | 390U           | 380U     | 61000U   | 65000U   | 19000    | 38000    | 96000          |
| bis(2-Ethylhexyl)phthelate   | 49000                         | 210000          | 100000      | 670            | 740      | 61000U   | 65000U   | 1900UJ   | 2100J    | 96000J         |
| Total Semivolatile Compounds |                               |                 |             | 10604          | 11065    | 0        | 0        | 8320     | 3990     | 3200           |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJD         | EP Soil Cleanu <u>p C</u> i | riteria *   | Sample ID: M8SB | 3       | MBSB3FR          | MDCBSB2   | N2TFSB2    | N2TFSB4    | N2TFSB4    |
|------------------------------|-------------|-----------------------------|-------------|-----------------|---------|------------------|-----------|------------|------------|------------|
|                              |             |                             | lunn ant to | Depth: 10       |         | 10<br>MAD        | 03<br>MDC | 02<br>N2TE | OZ<br>N2TE | 06<br>N2TE |
| Analyte (ug/kg)              | Residential | Non-Residential             | Groundweter | Date: 10/25     | /94     | 10/ <u>25/94</u> | 10/11/94  | 10/19/94   | 10/28/94   | 10/28/94   |
|                              |             | 100000                      |             | 4200            |         | 8000011          | 38011     | 4100       | 8800011    | 1200011    |
| 1,2,4-I richloropenzene      | 68000       | 1200000                     | 50000       | 43000           |         | 890000           | 3600      | 4100       | 6600011    | 120000     |
| 1,2-Dichlorobenzene          | 5100000     | 10000000                    | 10000       | 43000           |         | 890000           | 3600      | 4100       | 660000     | 120000     |
| 1,3-DigNorobanzene           | 5100000     | 10000000                    | 100000      | 43000           |         | 690000           | 3600      | 4100       | 880000     | 120000     |
| 1,4-Dichlorobenzene          | 570000      | 10000000                    | 100000      | 43000           |         | 690000           | 3600      | 4100       | 860000     | 120000     |
| 2,2'-oxybis(1-Chloropropane) | 2300000     | 10000000                    | 10000       | 43000           |         | 17000011         | 30003     | 9800       | 1600000    | 310001     |
| 2,4,5-Trichlorophenol        | 5600000     | 10000000                    | 50000       | 11000           |         | 1700000          | 2001      | 4101       | 8800000    | 1200011    |
| 2, 4, 6-Trichlorophenol      | 62000       | 270000                      | 10000       | 43000           | JU      | 690000           | 3600      | 4100       | 880000     | 120000     |
| 2,4-Dichlorophenol           | 170000      | 3100000                     | 10000       | 43000           | 00      | 69000U           | 3600      | 4100       | 660000     | 120000     |
| 2,4-Dimethyiphanol           | 1100000     | 10000000                    | 10000       | 43000           | 00      | 69000U           | 3600      | 4100       | 660000     | 120000     |
| 2,4-Dinitrophenol            | 110000      | 2100000                     | 10000       | 11000           | xoni    | 17000000         | 870UJ     | 9800       | 1600000    | 3100000    |
| 2,4-Dinitrotoluene           | 1000        | 4000                        | 10000       | 43000           | 50      | 69000U           | 3600      | 4100       | 660000     | 120000     |
| 2,6-Dinitrotoluene           | 1000        | 4000                        | 10000       | 43000           | 50      | 69000U           | 360U      | 4100       | 66000U     | 120000     |
| 2-Chioronaphthalene          | ••          |                             |             | 43000           | DU      | 69000U           | 360U      | 4100       | 66000U     | 120000     |
| 2-Chlorophenol               | 280000      | 5200000                     | 10000       | 43000           | 50      | 69000U           | 360U      | 4100       | 66000U     | 120000     |
| 2-Methyinaphthalene          | -           |                             |             | 2700            | D.J     | 27000J           | 360U      | 510        | 31000J     | 110000     |
| 2-Methylphenol               | 2800000     | 10000000                    | ••          | 43000           | DU      | 69000U           | 360U      | 4100       | 66000U     | 120000     |
| 2-Nitroaniline               | •-          | •• ·                        |             | 11000           | DOU     | 170000U          | 870U      | 980U       | 1600000    | 310000     |
| 2-Nitrophenol                | <u></u>     |                             |             | 43000           | υ       | 69000U           | 360U      | 410UJ      | 66000U     | 120000     |
| 3.3'-Dichlorobenzidine       | 2000        | 6000                        | 100000      | 43000           | DU UC   | 69000U           | 360UJ     | 410UJ      | 66000U     | 12000UJ    |
| 3-Nitroaniline               |             |                             | -           | 11000           | DOC     | 170000U          | 870U      | 980UJ      | 160000U    | 310000     |
| 4. B-Dinitro-2-methylphenol  |             |                             | ••          | 1100            | DOC     | 170000U          | 870U      | 980UJ      | 160000U    | 31000UJ    |
| 4-Bromonbenvi phenvi ether   |             |                             |             | 4300            | JU      | 69000U           | 360U      | 410U       | 66000U     | 12000U     |
| 4-Chioro-3-methylphenol      | 10000000    | 10000000                    | 100000      | 4300            | υ       | 69000U           | 360U      | 410U       | 66000U     | 12000U     |
| 4-Chloroapiline              | 230000      | 4200000                     | ••          | 4300            | UUJ     | £U00069          | 360U      | 410UJ      | 66000UJ    | 120000     |
| 4-Chlorophenyl phenyl ether  |             |                             |             | 4300            | υu      | 69000U           | 360U      | 410U       | 65000U     | 12000U     |
| 4-Methylobenol               | 2800000     | 10000000                    |             | 4300            | 90      | 69000U           | 360U      | 410U       | 66000U     | 12000U     |
|                              |             |                             |             | 1100            | 000     | 170000U          | 870U      | 980U       | 1 50000U   | 31000U     |
|                              |             | -                           |             | 1100            | 000     | 170000U          | 870UJ     | 980U       | 180000U    | 31000U     |
|                              | 3400000     | 10000000                    | 100000      | 4300            | DU      | 69000U           | 360U      | 410U       | 66000U     | 12000U     |
| Acenaphthene                 | 3400000     |                             |             | 4300            | ou      | 69000U           | 360U      | 410U       | 66000U     | 1 2000U    |
| Acensprinylene               | 10000000    | 1000000                     | 100000      | 4300            | οŪ      | 69000U           | 360U      | 410Ų       | 86000U     | 12000U     |
|                              | 9000000     | 4000                        | 500000      | 4300            | DU      | 69000U           | 200J      | 100J       | 66000U     | 1 2000 U   |
| Benzo(a)enthracene           | 300         | 640                         | 100000      | 4300            | ou<br>U | 69000U           | 270J      | 45J        | 66000U     | 12000U     |
| Benzo(a)pyrene               | 000         | 000                         | 100000      | 1000            |         |                  |           | •          |            |            |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJD         | EP Soil Cleanup C | riteria *   | Sample ID: MBSB3 | MBSB3FR  | MDCBSB2        | N2TF5B2         | N2TFSB4          | N2TFSB4  |
|------------------------------|-------------|-------------------|-------------|------------------|----------|----------------|-----------------|------------------|----------|
|                              |             |                   | I           | Depth: 10        | 10       | 03             | 02              | 02               | 06       |
| Analysis (under)             | Ba-t-t-at-1 |                   | Impact to   | 2006"": MB       | MB       | MUC            | NZIF            | NZTF<br>10/08/04 | NZ1F     |
| Anaiyta (ug/kg)              | Nesigentia  | NON-Residential   | Groundwater | Uete: 10/25/94_  | 10/25/94 | 10/11/94       | 10/19/94        | 10/28/94         | 10/28/94 |
| Benzo(b)fluoranthene         | 900         | 4000              | 50000       | 43000U           | 69000U   | 510J           | 170J            | 66000U           | 1 2000U  |
| Senzo(g,h,i)perylene         |             |                   |             | 430000           | 69000U   | R              | 4100            | 66000U           | 12000UJ  |
| Benzo(k)fluoranthene         | 900         | 4000              | 500000      | 43000U           | 69000U   | 490J           | 190J            | 66000U           | 120000   |
| Butyl benzyl phthelate       | 1100000     | 10000000          | 100000      | 43000U           | 69000U   | 360UJ          | 410U            | 66000U           | 12000U   |
| Carbazole                    |             | **                |             | 43000U           | 69000U   | 360U           | 410U            | 66000U           | 120000   |
| Chrvsene                     | 9000        | 40000             | 500000      | 4900J            | 69000U   | 230J           | 290J            | 66000U           | 2300J    |
| Di-n-butyl phthalate         | 5700000     | 10000000          | 100000      | 43000U           | 690000   | 360U           | 410U            | 68000U           | 12000U   |
| Di-n-octvl phthalate         | 1100000     | 10000000          | 100000      | 43000UJ          | 69000UJ  | 47J            | 410U            | 66000U           | 12000UJ  |
| Dibenzo(a,h)anthracene       | 660         | 660               | 100000      | 430000           | 69000U   | R              | 53J             | 66000U           | 12000UJ  |
| Dibenzofuran                 |             | •-                | ~.          | 430000           | 69000U   | 360U           | 410U            | 66000U           | 3100J    |
| Diethyl phthalate            | 10000000    | 10000000          | 50000       | 43000U           | 69000U   | 360U           | 410U            | 66000U           | 120000   |
| Dimethyl phthalate           | 10000000    | 10000000          | 50000       | 43000U           | 69000U   | 360U           | 410U            | 66000U           | 12000U   |
| Fluorenthene                 | 2300000     | 10000000          | 100000      | 43000U           | 69000U   | 150J           | 62J             | 66000U           | 12000U   |
| Fluorene                     | 2300000     | 10000000          | 100000      | 430000           | 69000U   | 3600           | 410UJ           | 6700J            | 1 2000U  |
| HexachiorobenZepe            | 660         | 2000              | 100000      | 43000U           | 69000U   | 3600           | 410U            | 66000U           | 1 2000U  |
| Hexachlorobutadiene          | 1000        | 21000             | 100000      | 43000U           | 69000U   | 360U           | 410U            | 66000U           | 120000   |
| Havachlorocyclonantadiena    | 400000      | 7300000           | 100000      | 43000U           | 69000U   | 360U           | 410U            | 66000U           | 1200QU   |
| Hexachioroethane             | 6000        | 100000            | 100000      | 43000U           | 69000U   | 360U           | 410U            | 66000U           | 120000   |
| Indenn(1,2,3-od)ovrens       | 900         | 4000              | 500000      | 43000U           | 69000U   | R              | 410U            | 66000U           | 12000UJ  |
| Isonborone                   | 1100000     | 10000000          | 50000       | 43000U           | 69000U   | 360U           | 410U            | 66000U           | 12000U   |
| N-Nitroso-di-n-propylamine   | 660         | 660               | 10000       | 43000U           | 69000U   | 360U           | 410U            | 66000U           | 120000   |
| N-Nitrosodiphenvismine       | 140000      | 600000            | 100000      | 43000UJ          | 69000UJ  | 360U           | 410UJ           | 66000UJ          | 120000   |
| Nenhthalana                  | 230000      | 4200000           | 100000      | 43000U           | 69000U   | 64J            | 410U            | 7300J            | 39000    |
| Nitrobenzene                 | 28000       | 520000            | 10000       | 43000U           | 69000U   | 360U           | 410U            | 66000U           | 120000   |
| Pentachlorophenol            | 8000        | 24000             | 100000      | 1100000          | 170000U  | \$70UJ         | 980U            | 160000U          | 31000U   |
| Phenenthrene                 |             |                   |             | 23000J           | 38000J   | 150J           | 100J            | 9300J            | 19000    |
| Phenol                       | 10000000    | 10000000          | 50000       | 43000U           | 69000U   | 360U           | 410U            | 86000U           | 120000   |
| Purane                       | 1700000     | 10000000          | 100000      | 6400J            | 9800J    | 480J           | <del>6</del> 7J | 14000J           | 4400J    |
| bis(2-Chioroetboxy)methane   | ••          |                   |             | 43000U           | 69000U   | 360U           | 410U            | 66000U           | 120000   |
| bis(2-Chloroethyl)ether      | 660         | 3000              | 10000       | 43000U           | 69000U   | 360U           | 4100            | 68000U           | 120000   |
| bis(2-Ethylhexyl)phthelate   | 49000       | 210000            | 100000      | 43000U           | 69000U   | 1 <b>000</b> J | 220J            | 66000U           | 2000J    |
| Total Semivolatile Compounds |             |                   |             | 61300            | 74800    | 3591           | 1807            | 68300            | 179800   |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                               | NJD         | E <u>P Soil Cleanup C</u> | riteria *   | Sample ID: 1 | N2TFS85          | N2TFSB5  | N3TFSB1     | N3TFSB2     | N3TFSB2      | N3TFSB2FR      |
|-------------------------------|-------------|---------------------------|-------------|--------------|------------------|----------|-------------|-------------|--------------|----------------|
|                               |             |                           |             | Depth: (     | 02               | 06       | 02          | 02          | 06           | 06             |
|                               |             |                           | impact to   | Zone**: I    | N2TF             | N2TF     | N3TF        | AP          | AP           | Ar<br>10/19/94 |
| Analyte (ug/kg)               | Residential | Non-Residential           | Groundwater | Date:        | 10/1 <u>9/94</u> | 10/19/94 | 10/18/94    | 10/19/94    | 10/19/94     | 10/19/94       |
| 1 7 4 Trichlandhannana        | 69000       | 1200000                   | 100000      |              | 7400U            | 11000UJ  | 7400U       | 3700U       | 9000U        | 66000UJ        |
|                               | 5100000     | 10000000                  | 50000       | -            | 7400U            | 11000UJ  | 7400U       | 3700U       | 9000U        | 66000UJ        |
| 2,2-Dichlorobenzene           | 5100000     | 10000000                  | 100000      | -            | 7400U            | 11000UJ  | 7400U       | 3700U       | 9000U        | 86000UJ        |
| 1,3-Dichlorobenzene           | 570000      | 10000000                  | 100000      | -            | 7400U            | 11000UJ  | 7400U       | 3700U       | 9000U        | 66000UJ        |
| 1,4-Diomorobenzene            | 370000      | 10000000                  | 10000       | -            | 7400U            | 11000UJ  | 7400UJ      | 3700U       | 9000U        | 86000UJ        |
| 2,2'-oxybis(1-Critoropropane) | 2300000     | 10000000                  | 50000       | 4            | 180000           | 28000UJ  | 18000U      | 9100U       | 22000U       | 160000UJ       |
| 2,4,5-Trichlorophenol         | 500000      | 270000                    | 10000       |              | 74000            | 110000   | 7400U       | 3700U       | 9000U        | 66000UJ        |
| 2,4,6-Trichlorophanol         | 62000       | 270000                    | 10000       | •            | 74000            | 1100000  | 74000       | 3700U       | 9000U        | 66000UJ        |
| 2,4-Dichlorophenol            | 170000      | 3100000                   | 10000       | -            | 74000            | 11000000 | 74000       | 3700U       | 9000U        | 66000UJ        |
| 2,4-Dimethylphenol            | 1100000     | 10000000                  | 10000       |              | 1800011          | 2800000  | 18000UJ     | 9100U       | 22000U       | 160000UJ       |
| 2,4-Dinitrophenol             | 110000      | 2100000                   | 10000       |              | 74000            | 1100000  | 7400U       | 37000       | 9000U        | 66000UJ        |
| 2,4-Dinitrotoluene            | 1000        | 4000                      | 10000       |              | 74000            | 1100000  | 74001       | 3700U       | 9000U        | 65000UJ        |
| 2,6-Dinitrotoluene            | 1000        | 4000                      | 10000       |              | 74000            | 11000000 | 74000       | 3700U       | \$000U       | 66000UJ        |
| 2-Chloronephthalene           | •           |                           |             |              | 74000            | 11000000 | 74000       | 3700U       | 90000        | 66000UJ        |
| 2-Chlorophenol                | 280000      | 5200000                   | 10000       |              | 74000            | 92001    | 1200.0      | 37000       | 5500J        | 1 5000J        |
| 2-Methylnaphthalene           | ••          | ••                        |             |              | 74000            | 33003    | 74000       | 37000       | 9000U        | 66000UJ        |
| 2-Methylphenol                | 2800000     | . 10000000                |             |              | /4000            | 1100000  | 190000      | 91000       | 220000       | 160000UJ       |
| 2-Nitroaniline                |             |                           |             |              | 180000           | 2800000  | 74000       | 37000       | 90000        | 86000UJ        |
| 2-Nitrophenol                 |             |                           |             |              | 74000            | 1100000  | 74000       | 37000       | 9000011      | 66000UJ        |
| 3,3'-Dichlorobenzidine        | 2000        | 6000                      | 100000      |              | 7400UJ           | 11000UJ  | 74000       | 370003      | 220000       | 16000000       |
| 3-Nitroaniline                |             |                           | ••          |              | 180000           | 28000UJ  | 180000      | 91000       | 220000       | 16000000       |
| 4.8-Dinitro-2-methylphenol    |             |                           |             |              | 1800000          | 28000UJ  | 180000      | 37000       | 220000       | 68000111       |
| 4-Bromophenyl phenyl ether    |             |                           |             |              | 7400U            | 1100000  | 74000       | 37000       | 90000        | 6600000        |
| 4-Chloro-3-methylphenol       | 10000000    | 10000000                  | 100000      |              | 74000            | 1100003  | 74000       | 37000       | 90000        | 66000UJ        |
| 4-Chloroaniline               | 230000      | 4200000                   |             |              | 74000            | 1100000  | 74000       | 37000       | 90000        | 66000UJ        |
| 4-Chlorophenyl phenyl ether   |             |                           | ••          |              | 74000            | 1100000  | 74000       | 37000       | 90000        | 66000UJ        |
| 4-Methvinhenol                | 2800000     | 10000000                  |             |              | 74000            | 1100000  | 74000       | 81000       | 22000111     | 16000000       |
| 4-Nitroaniline                |             |                           |             |              | 18000UJ          | 2800000  | 180000      | 910003      | 2200000      | 1600000        |
| 4-Nitrophenol                 |             | ••                        |             |              | 18000UJ          | 28000UJ  | 1800000     | 370003      | 2200000      | 66000UJ        |
| Acepaphthene                  | 3400000     | 10000000                  | 100000      |              | 74000            | 11000UJ  | 74000       | 37000       | 31000        | 6600000        |
| Acenaphthylene                |             |                           | <del></del> |              | 7400U            | 11000UJ  | 74000       | 37000       | 30000        | 66000111       |
| Anthrepene                    | 10000000    | 1000000                   | 100000      |              | 7400U ·          | 11000UJ  | /4000       | 37000       | 3500         | 66000111       |
| Renze/elenthracene            | 900         | 4000                      | 500000      |              | 7400U            | 1800J    | 1500J       | 460J        | 31003        | 86000111       |
| Benzo(a)pyrene                | 660         | 660                       | 100000      |              | 7400U            | 11000UJ  | <u>840J</u> | <u>970J</u> | <u>4300J</u> | 660000         |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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| · · · · · · · · · · · · · · · · · · · |              | EP Soil Cleanup Ci | itoria *    | Sample ID: | N2TFSB5  | N2TFSB5  | N3TFSB1  | N3TF582  | N3TFSB2<br>06 | N3TFSB2FR<br>06 |
|---------------------------------------|--------------|--------------------|-------------|------------|----------|----------|----------|----------|---------------|-----------------|
|                                       |              |                    |             | Zope**:    | NOTE     | N2TF     | N3TF     | AP       | AP            | AP              |
|                                       | Residential  | Non-Residential    | Groundwater | Date:      | 10/19/94 | 10/19/94 | 10/18/94 | 10/19/94 | 10/19/94      | 10/19/94        |
|                                       | 110010011110 |                    |             |            |          |          |          |          |               |                 |
| Renzo(b)fiuorenthene                  | 900          | 4000               | 50000       |            | 7400U    | 11000UJ  | 980J     | 600J     | 2800J         | 6600000         |
| Benzolo h Boendene                    | -            |                    |             |            | 7400U    | 11000UJ  | 7400UJ   | 970J     | 1900J         | 66000000        |
| Benzolghiftuorenthene                 | 900          | 4000               | 500000      |            | 7400UJ   | 11000UJ  | 1100J    | 600J     | 2800J         | 6600000         |
| But d have d phthelete                | 1100000      | 10000000           | 100000      |            | 7400U    | 11000UJ  | 7400U    | 37000    | 90000         | 6600000         |
| Buty Ballzy provide                   |              | سم                 | ••          |            | 7400U    | 11000UJ  | 7400U    | 37000    | 90000         | 800000          |
|                                       | 9000         | 40000              | 500000      |            | 7400U    | 2100J    | 3000 J   | 710J     | 8200J         | 89000           |
| Chrysene<br>Die beschehelete          | 5700000      | 10000000           | 100000      |            | 7400U    | 11000UJ  | 7400U    | 3700U    | 90000         | 6600000         |
| Di-n-Dutyi prinalate                  | 1100000      | 10000000           | 100000      |            | 7400U    | 11000UJ  | 7400UJ   | 3700U    | 90000         | 660000J         |
| Di-n-octyr phinalete                  | 460          | 660                | 100000      |            | 7400U    | 11000UJ  | 7400UJ   | 360J     | <u>1100J</u>  | 66000UJ         |
| Dibenzo(a,h)anthracene                | 000          | -                  |             |            | 7400U    | 11000UJ  | 7400U    | 3700U    | 90000         | 66000UJ         |
| Dibenzofuran                          | 1000000      | 10000000           | 50000       |            | 7400U    | 11000UJ  | 7400U    | 3700U    | 90000         | 66000UJ         |
| Diethyl phtheiate                     | 10000000     | 10000000           | 50000       |            | 7400U    | 11000UJ  | 7400U    | 3700U    | 9000U         | 66000UJ         |
| Dimethyl phthelate                    | 10000000     | 10000000           | 100000      |            | 7400U    | 11000UJ  | 7400U    | 3700U    | 2300J         | 66000UJ         |
| Fluoranthene                          | 2300000      | 10000000           | 100000      |            | 7400U    | 1900J    | 7400U    | 3700U    | 9000U         | 66000UJ         |
| Fluorene                              | 2300000      | 2000000            | 100000      |            | 7400U    | 11000UJ  | 7400U    | 3700U    | 90000         | 66000UJ         |
| Hexachlorobenzene                     | 660          | 2000               | 100000      |            | 7400U    | 11000UJ  | 7400U    | 3700U    | 9000U         | 66000UJ         |
| Hexechlorobutadiene                   | 1000         | 21000              | 100000      |            | 74000    | 11000UJ  | 7400U    | 3700U    | 9000U         | 66000UJ         |
| Hexachlorocyclopentadiene             | 400000       | /300000            | 100000      |            | 74000    | 11000UJ  | 7400U    | 3700U    | 90000         | 66000UJ         |
| Hexachloroethane                      | 6000         | 100000             | 500000      |            | 74000    | 11000UJ  | 7400UJ   | 470J     | 930J          | 66000UJ         |
| Indeno(1,2,3-cd)pyrene                | 900          | 4000               | 50000       |            | 7400U    | 11000UJ  | 7400U    | 3700U    | 9000U         | 66000UJ         |
| Isophorona                            | 1100000      | 1000000            | 30000       |            | 74000    | 11000UJ  | 74000    | 3700U    | 9000U         | 66000UJ         |
| N-Nitroso-di-n-propylamine            | 660          | 660                | 10000       |            | 740011   | 11000UJ  | 7400U    | 3700U    | 9000U         | 66000UJ         |
| N-Nitrosodiphenylamine                | 140000       | 600000             | 100000      |            | 74000    | 2200.1   | 7400U    | 3700U    | 9000U         | 66000UJ         |
| Naphthalene                           | 230000       | 4200000            | 100000      |            | 74000    | 1100004  | 7400U    | 3700U    | 90000         | 66000UJ         |
| Nitrobenzene                          | 28000        | 520000             | 10000       |            | 18000    | 28000UJ  | 18000UJ  | 9100U    | 22000U        | 160000UJ        |
| Pentachlorophenol                     | 6000         | 24000              | 100000      |            | 2000 1   | 4500.1   | 1800J    | 3700U    | 3200J         | 7100J           |
| Phenanthrene                          |              |                    |             |            | 74000    | 1100000  | 7400U    | 3700U    | 9000U         | 66000UJ         |
| Phenol                                | 10000000     | 1000000            | 50000       |            | 15001    | 1500.1   | 2900J    | 500J     | 5400J         | 11000J          |
| Pyrene                                | 1700000      | 10000000           | 100000      |            | 74000    | 11000011 | 74000    | 37000    | 9000U         | 66000UJ         |
| bis(2-Chloroethoxy)methane            |              |                    |             |            | 74000    | 1100000  | 7400U    | 3700U    | 9000U         | 66000UJ         |
| bis(2-Chioroethyi)ether               | 660          | 3000               | 10000       |            | 74000    | 1100000  | 74000    | 590J     | 1900J         | 66000UJ         |
| bis(2-Ethylhexyl)phthalate            | 49000        | 210000             | 100000      |            | ∡400J    | 1100000  | 1-000    |          |               |                 |
| Total Semivolatile Compounds          |              |                    | ·           |            | 5900     | 23300    | 13320    | 6230     | 47520         | 42000           |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Piant, Bayonne, New Jersey.

See last page for footnotes.

|                                 | NJD         | EP Soil Cleanup C | ritoria •   | Semple ID: N3TFSB3 | N3TFSB4  | N3TFSB5    | N3TFSB6  | N3TFSB7  | N3TFSB7    |
|---------------------------------|-------------|-------------------|-------------|--------------------|----------|------------|----------|----------|------------|
|                                 |             |                   |             | Depth: 02          | 02       | 08         | 02       | 02       | U6<br>NOTE |
|                                 |             |                   | impact to   | Zone**: N3TF       | N3TF     | N3TF       | N31F     | N3   F   | N31F       |
| Anelyte (ug/kg)                 | Residential | Non-Residential   | Groundwater | Date: 10/13/94     | 10/17/94 | 10/19/94   | 10/18/94 | 10/18/34 | 10/10/34   |
|                                 | 68000       | 1200000           | 100000      | 390U               | 390U     | R          | 60000U   | 250000U  | 60000U     |
| 1,2,4 ( noniorobanzene          | 5100000     | 10000000          | 50000       | 390U               | 62J      | 7800U      | 60000U   | 250000U  | 50000U     |
| 1,2-Dichlorobenzene             | 5100000     | 10000000          | 100000      | 390U               | 390U     | 7800U      | 60000U   | 250000U  | 60000U     |
|                                 | 570000      | 10000000          | 100000      | 3900               | 60J      | R          | 60000U   | 250000U  | 60000U     |
| 3,4-Digitioropenzene            | 2200000     | 10000000          | 10000       | 3900.1             | 390U     | 7800U      | 60000UJ  | 250000UJ | 60000UJ    |
| 2,2'+oxypis(1-Chioropropane)    | 2300000     | 10000000          | 50000       | 950U               | 940U     | 19000U     | 150000U  | 620000U  | 150000U    |
| 2,4,5-1 neniorophenoi           | 500000      | 170000            | 10000       | 3900               | 3900     | 7800U      | 60000U   | 250000U  | 60000U     |
| 2,4,8-Trichlorophenol           | 02000       | 210000            | 10000       | 3900               | 390U     | 7800U      | 60000U   | 250000U  | 60000U     |
| 2,4-Dichlorophenol              | 170000      | 1000000           | 10000       | 3900               | 3900     | 7800U      | 60000U   | 250000U  | 60000U     |
| 2,4-Dimethylphenoi              | 1100000     | 1000000           | 10000       | 950UJ              | 940U     | 19000U     | 150000U  | 820000U  | 150000U    |
| 2,4-Dinitrophenoi               | 10000       | 2100000           | 10000       | 3900               | 3900     | R          | 60000U   | 250000U  | 60000U     |
| 2,4-Dinitrotoluene              | 1000        | 4000              | 10000       | 3900               | 390U     | 78000      | 60000U   | 250000U  | 50000U     |
| 2,6-Dinitrotoluane              | 1000        | 4000              | 10000       | 39011              | 3900     | 7800U      | 60000U   | 250000U  | 60000U     |
| 2-Chloronaphthalene             |             |                   | 10000       | 2900               | 3900     | R          | 50000U   | 250000U  | 60000U     |
| 2-Chiorophenol                  | 280000      | 5200000           | 10000       | 3000               | 3801     | 5500.1     | 25000J   | 310000   | 66000      |
| 2-Methylnephthalene             |             |                   |             | 3300               | 3900     | 78000      | 60000U   | 250000U  | 60000U     |
| 2-Methylphenol                  | 2800000     | 10000000          |             | 3500               | 940U     | 190000     | 150000U  | 620000U  | 150000U    |
| 2-Nitroeniline                  |             |                   |             | 3000               | 3901     | 78000      | 60000U   | 250000U  | 60000U     |
| 2-Nitrophenol                   | ••          | ••                |             | 3900               | 20011    | 7800111    | 60000U   | 250000U  | 600000     |
| 3,3'-Dichlorobenzidine          | 2000        | 6000              | 100000      | 3900               | 94011    | 190000     | 1500000  | 620000U  | 150000U    |
| 3-Nitroeniline                  |             | +•                |             | 9500               | 9400     | 190000     | 150000U  | 620000U  | 150000U    |
| 4,6-Dinitro-2-methylphenol      |             | ••                | ••          | 8500               | 3400     | 78000      | 60000U   | 250000U  | 60000U     |
| 4-Bromophanyl phanyl ether      |             |                   |             | 3900               | 3900     | 73000<br>B | 60000U   | 250000U  | 60000U     |
| 4-Chioro-3-methylphenol         | 10000000    | 10000000          | 100000      | 3900               | 3900     | 70001      | 8000000  | 250000UJ | 60000UJ    |
| 4-Chloroaniline                 | 230000      | 4200000           | -           | 3900               | 3900     | 70000      | 6000000  | 250000U  | 60000U     |
| 4-Chlorophanyl phenyl ether     |             |                   |             | 3900               | 3900     | 78000      | 6000011  | 2500000  | 60000U     |
| 4-Methylnhenol                  | 2800000     | 10000000          | ••          | 3900               | 3900     | 10000      | 1500000  | 82000001 | 1500000    |
| 4-Nitroenilint                  | ••          | ••                |             | 950U               | 9400     | 1900000    | 1500000  | 620000U  | 1500000    |
| 4-Nitrophanol                   |             |                   |             | 950UJ              | 9400     | R          | 1500000  | 2500000  | 600001     |
| Acepenhthene                    | 3400000     | 10000000          | 100000      | 390U               | 40J      | 78000      | 800000   | 2500000  | 50000U     |
| Acenanthylana                   |             |                   | ••          | 390U               | 390U     | 78000      | 800000   | 2500000  | 600000     |
|                                 | 10000000    | 10000000          | 100000      | 48J                | 130J     | 78000      | 600000   | 2500000  | 800000     |
| Anunesene<br>Bestelelenthrecene | 900         | 4000              | 500000      | 350J               | 200J     | 1000J      | 800000   | 2500000  | 8000011    |
| Banzo(a)pyrene                  | 660         | 660               | 100000      | 330J               | 130J     | 78000      | 600000   | 2500000  | 00000      |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Beyonne Plant, Beyonne, New Jersey.

See last page for footnotes.

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|                              | NJD         | EP Soil Cleanup C | riteria *   | Sample ID: N3TFSB3 | N3TFSB4          | N3TFSB5  | N3TFSB6  | N3TFSB7    | N3TFSB7    |
|------------------------------|-------------|-------------------|-------------|--------------------|------------------|----------|----------|------------|------------|
|                              |             |                   |             | Depth: 02          | 02<br>NOTE       | 08       | 02       | 02<br>Nate | V6<br>N3TE |
|                              |             | No. Buildenstat   | Impact to   | Zonerr: N31F       | N31F<br>10/17/94 | 10/19/94 | 10/18/94 | 10/18/94   | 10/18/94   |
| Analyte (ug/kg)              | Residential | Non-Residential   | Groundwater | DE(9: 10/13/34     | 10/17/34         | 10/13/34 | 10/10/04 |            |            |
| D-use (b) fiverenthese       | 900         | 4000              | 50000       | 890J               | 370J             | 7800U    | 60000U   | 250000U    | 60000U     |
| Benzolo h Drandana           |             |                   |             | 390UJ              | 390UJ            | 7800U    | 60000UJ  | 250000UJ   | 60000UJ    |
| Denzol(g)(i)))pervice        | 900         | 4000              | 500000      | 850J               | 420J             | 7800UJ   | 60000U   | 250000U    | 60000U     |
| Benzokkindorantilene         | 1 100000    | 10000000          | 100000      | 390U               | 390U             | 7600U    | 60000U   | 250000U    | 60000U     |
| Butyl benzyl primalete       |             |                   |             | 51J                | 390U             | 7800U    | 60000U   | 250000U    | 60000U     |
|                              | 9000        | 40000             | 500000      | 410                | 350J             | 1500J    | 60000U   | 250000U    | 60000U     |
| Chrysene                     | 5000        | 1000000           | 100000      | 3900               | 150J             | 7800U    | 60000U   | 2500000    | 60000U     |
| Di-n-butyl phtnalate         | 1100000     | 10000000          | 100000      | 390UJ              | 390UJ            | 7800U    | 60000U   | 250000U    | 60000U     |
| Di-n-octyl phthalate         | 1100000     | 640               | 100000      | 390UJ              | 110J             | 7800U    | 60000UJ  | 250000UJ   | 60000UJ    |
| Dibenzo(a,h)anthracene       | 660         | 000               | 100000      | 390U               | 390U             | 7800U    | 80000U   | 250000U    | 60000U     |
| Dibenzofuran                 |             | 1000000           | 50000       | 3900               | 390U             | 7800U    | 60000U   | 250000U    | 60000U     |
| Diethyl phthalate            | 10000000    | 10000000          | 50000       | 3900               | 390U             | 7800U    | 60000U   | 250000U    | 60000U     |
| Dimethyl phthalate           | 10000000    | 10000000          | 100000      | 710                | 240.1            | 7800U    | 60000U   | 250000U    | 60000U     |
| Fluoranthene                 | 2300000     | 1000000           | 100000      | 3901/              | 3900             | 78000    | U0000a   | 250000U    | 60000U     |
| Fluorena                     | 2300000     | 10000000          | 100000      | 3300               | 3900             | 7800U    | 60000U   | 250000U    | 60000U     |
| Hexachlorobenzene            | 660         | 2000              | 100000      | 3900               | 29011            | 78000    | 60000U   | 250000U    | 60000U     |
| Hexachlorobutadiene          | 1000        | 21000             | 100000      | 3900               | 2001             | 78000    | 600000   | 250000U    | 60000U     |
| Hexachlorocyclopentadiene    | 400000      | 7300000           | 100000      | 3900               | 3900             | 79000    | 60000U   | 250000U    | 60000U     |
| Hexachloroethane             | 6000        | 100000            | 100000      | 3900               | 3900             | 78000    | 60000000 | 25000000   | 60000UJ    |
| Indeno(1,2,3-cd)pyrene       | 900         | 4000              | 500000      | 1503               | 20011            | 78000    | 800000   | 250000U    | 60000U     |
| Isophorone                   | 1100000     | 10000000          | 50000       | 3900               | 3900             | 78000    | 600000   | 250000U    | 60000U     |
| N-Nitroso-di-n-propylamine   | 660         | 660               | 10000       | 3900               | 3900             | 780011   | 800000   | 150000J    | 60000UJ    |
| N-Nitrosodiphenylamine       | 140000      | 600000            | 100000      | 3900               | 3900             | 78000    | 600000   | 91000J     | 11000J     |
| Naphthalens                  | 230000      | 4200000           | 100000      | 3900               | 313              | 78000    | 600000   | 250000U    | 60000U     |
| Nitrobenzene                 | 28000       | 520000            | 10000       | 3900               | 3900             | 100001   | 1500000  | 6200000    | 150000U    |
| Pentechlorophenol            | 6000        | 24000             | 100000      | 95000              | 3400             | 11001    | 12000.1  | 94000J     | 7500J      |
| Phonenthrene                 |             | ••                | ••          | 3100               | 3403             | 780011   | 600000   | 250000U    | 60000U     |
| Phanoi                       | 10000000    | 10000000          | 50000       | 3900               | 3900             | 1 2000   | 600000   | 2500000    | 60000U     |
| Pyrene                       | 1700000     | 10000000          | 100000      | 700                | 340J             | 78000    | 600000   | 250000U    | 60000U     |
| bis(2-Chioroethoxy)methane   |             |                   | •-          | 3900               | 3900             | 78000    | 800000   | 2500000    | 60000U     |
| bis(2-Chloroethyl)ether      | 660         | 3000              | 10000       | 390U               | 3900             | 78000    | 800001   | 2500000    | 60000U     |
| bis(2-Ethylhexyi)phthelate   | 49000       | 210000            | 100000      | 1 <b>1</b> 0J      | 320J             | /8000    | 00000    | 2300000    |            |
| Total Samivolatile Compounds |             |                   |             | 4909               | 3822             | 10300    | 37000    | 645000     | 84500      |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

|                                | DLN         | EP Soil Cleanup C | riterie *                | Sample ID: N3TFSB8                          | N3TFSB8                | N3TFSB9                | PN1SB2                      | PN1SB2               | PSSB1                |
|--------------------------------|-------------|-------------------|--------------------------|---------------------------------------------|------------------------|------------------------|-----------------------------|----------------------|----------------------|
| Analyte (ug/kg)                | Residential | Non-Residential   | Impact to<br>Groundwater | Depth: 02<br>Zone**; N3TF<br>Date; 10/18/94 | 06<br>N3TF<br>10/18/94 | 02<br>N3TF<br>11/02/94 | 04<br>P1<br><u>11/02/94</u> | 08<br>P1<br>11/02/94 | 02<br>MB<br>10/31/94 |
|                                |             |                   |                          |                                             |                        | 1200011                | 370013                      | 77001                | 230000               |
| 1,2,4-Trichlorobenzene         | 68000       | 1200000           | 100000                   | 120000                                      | 800000                 | 130000                 | 37000                       | 77000                | 23000U               |
| 1,2-Dichlorobenzene            | 5100000     | 10000000          | 50000                    | 120000                                      | 800000                 | 130000                 | 37000                       | 77000                | 230000               |
| 1,3-Dichlorobenzene            | 5100000     | 10000000          | 100000                   | 120000                                      | 800003                 | 130000                 | 37000                       | 77000                | 230000               |
| 1,4-Dichlorobenzene            | 570000      | 10000000          | 100000                   | 120000                                      | 8000UJ                 | 130000                 | 37000                       | 77000                | 230000               |
| 2, 2'-oxybis(1-Chloropropane)  | 2300000     | 10000000          | 10000                    | 120000                                      | 8000UJ                 | 130000                 | 37000                       | 10000                | 580000               |
| 2,4,5-Trichlorophenol          | 5600000     | 10000000          | 50000                    | 290000                                      | 20000UJ                | 320000                 | 89000                       | 790000               | 110000               |
| 2.4.6-Trichlorophenol          | 62000       | 270000            | 10000                    | 1 2000U                                     | 8000UJ                 | 130000                 | 37000                       | 77000                | 230000               |
| 2.4-Dichlorophenol             | 170000      | 3100000           | 10000                    | 120000                                      | 8000UJ                 | 130000                 | 37000                       | 77000                | 230000               |
| 2.4-Dimethviphenol             | 1100000     | 10000000          | 10000                    | 1 2000U                                     | 8000UJ                 | 130000                 | 37000                       | 77000                | 230000               |
| 2.4-Dinitrophenol              | 110000      | 2100000           | 10000                    | 29000UJ                                     | 20000UJ                | 32000UJ                | 89000                       | 190000               | 5000000              |
| 2 4-Dinitratoluene             | 1000        | 4000              | 10000                    | 1 2000U                                     | 8000UJ                 | 13000U                 | 37000                       | 77000                | 230000               |
| 2 8-Dipitrotojuene             | 1000        | 4000              | 10000                    | 12000U                                      | 8000UJ                 | 13000U                 | 37000                       | 77000                | 230000               |
| 2-Chloropeobthaispa            | **          | ••                |                          | 120000                                      | 8000UJ                 | 13000U                 | 37000                       | 77000                | 230000               |
| 2-Chlorophenol                 | 280000      | 5200000           | 10000                    | 1 2000 U                                    | 8000UJ                 | 130000                 | 3700U                       | 7700U                | 230000               |
| 2-Mathidnenhthelene            |             |                   |                          | 1 3000                                      | 82000J                 | 3300J                  | 37000                       | 77000                | 46000                |
|                                | 2800000     | 10000000          |                          | 120000                                      | 8000UJ                 | 130000                 | 3700U                       | 77000                | 230000               |
|                                |             | ••                | ·                        | 29000UJ                                     | 20000UJ                | 32000U                 | 8900UJ                      | 19000UJ              | 56000U               |
| 2-Nitroaniune<br>2 Nitroahanal |             | **                |                          | 12000U                                      | 8000UJ                 | 130000                 | 3700U                       | 77000                | 230000               |
|                                | 2000        | 6000              | 100000                   | 12000U                                      | 8000UJ                 | 13000UJ                | 3700U                       | 77000                | 23000UJ              |
| 3,3"-Dichlorobenzigine         | 2000        |                   |                          | 290000                                      | 20000UJ                | 32000U                 | 89000                       | 190000               | 56000U               |
| 3-Nitroeniline                 |             |                   |                          | 29000UJ                                     | 20000UJ                | 32000UJ                | 8900U                       | 19000U               | 56000UJ              |
| 4,6-Dinitro-2-methylphenol     |             |                   |                          | 12000U                                      | 8000UJ                 | 13000U                 | 3700U                       | 7700U                | 230000               |
| 4-Bromophenyl phenyl ether     | 1000000     | 10000000          | 100000                   | 12000U                                      | 8000UJ                 | 130000                 | 3700U                       | 7700U                | 23000U               |
| 4-Chloro-3-methylphenol        | 10000000    | 4200000           |                          | 12000U                                      | 8000UJ                 | 130000                 | 3700U                       | 77000                | 23000UJ              |
| 4-Chloroaniline                | 230000      | 4200000           |                          | 12000U                                      | 8000UJ                 | 130000                 | 3700U                       | 7700U                | 23000U               |
| 4-Chlorophenyl phenyl ether    |             |                   |                          | 120001                                      | 8000UJ                 | 130000                 | 3700U                       | 7700U                | 23000U               |
| 4-Methylphenol                 | 2800000     | 10000000          |                          | 290000                                      | 20000UJ                | 320000                 | 8900U                       | 19000U               | 56000U               |
| 4-Nitroaniline                 | *           |                   |                          | 290001.1                                    | 2000011                | 32000U                 | 8900U                       | 19000U               | 56000UJ              |
| 4-Nitrophenol                  |             |                   | 100000                   | 1900.1                                      | 2100                   | 130000                 | 3700U                       | 7700U                | 23000U               |
| Acenaphthene                   | 3400000     | 10000000          | 100000                   | 12000                                       | 8000UJ                 | 13000U                 | 3700U                       | 7700U                | 23000U               |
| Acenaphthylene                 |             |                   | 100000                   | 120000                                      | 8000UJ                 | 13000U                 | 3700U                       | 1 200J               | 23000U               |
| Anthracene                     | 1000000     | 1000000           | F00000                   | 120000                                      | 8000U.J                | 130000                 | 3700U                       | <u>5800J</u>         | 23000U               |
| Benzo(a)anthracene             | 900         | 4000              | 100000                   | 1 200011                                    | 80000.0                | 130000                 | 1200J                       | 4400J                | 23000U               |
| Benzo(a)pyrene                 | 660         | 660               | 100000                   | 120000                                      |                        |                        | <u></u>                     |                      |                      |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Beyonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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| · ·                          | NJDI        | EP Soil Cleanup C | ritoria •                | Sample ID:<br>Depth: | N3TFSB8<br>02    | N3TFSB8<br>06    | N3TFSB9<br>02    | PN1SB2<br>04   | PN1 582<br>08  | PSSB1<br>02    |
|------------------------------|-------------|-------------------|--------------------------|----------------------|------------------|------------------|------------------|----------------|----------------|----------------|
| Anelyte (uaika)              | Residential | Non-Residential   | Impact to<br>Groundwater | Zone**:<br>Date:     | N3TF<br>10/18/94 | N3TF<br>10/18/94 | N3TF<br>11/02/94 | P1<br>11/02/94 | P1<br>11/02/94 | мв<br>10/31/94 |
|                              |             |                   |                          |                      |                  |                  |                  | 1 400 1        | 47001          | 2200011        |
| Benzo(b)fluoranthene         | 900         | 4000              | 50000                    |                      | 120000           | LU0008           | 130000           | 14000          | 47003          | 2300000        |
| Benzola,h.i)perviene         | -           |                   | •-                       |                      | 12000UJ          | 8000UJ           | 1300000          | 15000          | 28003          | 2300000        |
| Senzolk)fluoranthene         | 900         | 4000              | 500000                   |                      | 12000U           | 100008           | 130000           | 14000          | 770011         | 230000         |
| Butvi benzvi ohthalate       | 1100000     | 10000000          | 100000                   |                      | 12000U           | 8000UJ           | 130000           | 370000         | 770003         | 230000         |
| Carbezole                    |             |                   |                          |                      | 120000           | 8000UJ           | 130000           | 37000          | 77000          | 230000         |
| Chorana                      | 9000        | 40000             | 500000                   |                      | 12000U           | 8000UJ           | 130000           | 980J           | 3400           | 230000         |
| Dischund obthelate           | 5700000     | 10000000          | 100000                   |                      | 12000U           | 8000UJ           | 130000           | 37000          | 77000          | 230000         |
| Dimoctal obtaints            | 1100000     | 10000000          | 100000                   |                      | 12000U           | 8000UJ           | 1300003          | 3700UJ         | 770003         | 2300000        |
| Diversola blanthracena       | 660         | 660               | 100000                   |                      | 12000UJ          | 8000UJ           | 13000ÚJ          | <u>740J</u>    | 20005          | 2300003        |
| Dibenzofuren                 |             |                   |                          |                      | 12000U           | 8000UJ           | 130000           | 37000          | 77000          | 230000         |
|                              | 10000000    | 10000000          | 50000                    |                      | 120000           | 8000UJ           | 130000           | 37000          | 77000          | 230000         |
| Directly philiplate          | 10000000    | 10000000          | 50000                    |                      | 12000U           | 8000UJ           | 130000           | 37000          | 77000          | 230000         |
| Dimetry principle            | 2300000     | 10000000          | 100000                   |                      | 12000U           | F0008            | 130000           | 930J           | 4000J          | 230000         |
| Filioranthene                | 2300000     | 10000000          | 100000                   |                      | 2600J            | 3200J            | 13000U           | 3700U          | 1500J          | 230000         |
| Fluorane                     | 660         | 2000              | 100000                   |                      | 12000U           | 8000UJ           | 130000           | 3700U          | 77000          | 230000         |
| Hexachiorobanzene            | 1000        | 21000             | 100000                   |                      | 12000U           | 8000UJ           | 13000U           | 3700U          | 77000          | 230000         |
| Hexechloroputagiene          | 400000      | 7300000           | 100000                   |                      | 12000U           | 8000UJ           | 13000U           | 37000          | 77000          | 230000         |
| Hexachlorocyclopentediene    | 6000        | 100000            | 100000                   |                      | 12000U           | 8000UJ           | 13000U           | 3700U          | 77000          | 230000         |
| Hexachloroethane             | 8000        | 4000              | 500000                   |                      | 12000UJ          | 8000UJ           | 13000UJ          | 790J           | 2000J          | 2300000        |
| Indeno(1,2,3-cd)pyrane       | 1100000     | 10000000          | 50000                    |                      | 12000U           | 8000UJ           | 13000U           | 37000          | 7700U          | 230000         |
| leophorone                   | 860         | 660               | 10000                    |                      | 12000U           | LU0008           | 13000U           | 3700U          | 77000          | 230000         |
| N-Nitroso-di-n-propylamine   | 140000      | 600000            | 100000                   |                      | 12000U           | 8000UJ           | 130000           | 3700U          | 77000          | 23000UJ        |
| N-Nitrosodiphenylamine       | 140000      | 4200000           | 100000                   |                      | 4000J            | 8300J            | 13000U           | 3700U          | 77000          | 230000         |
| Nephthelene                  | 230000      | F200000           | 10000                    |                      | 12000U           | 8000UJ           | 13000U           | 3700U          | 77000          | 230000         |
| Nitrobenzene                 | 28000       | 320000            | 100000                   |                      | 29000U           | 20000UJ          | 32000U           | 8900U          | 19000U         | 560000         |
| Pentachlorophenol            | 8000        | 24000             |                          |                      | 6300J            | 4200J            | 13000U           | 590J           | 6900J          | 2900J          |
| Phenanthrene                 |             | 1000000           | 50000                    |                      | 120000           | 8000UJ           | 13000U           | 3700U          | 7700U          | 23000U         |
| Phenoi                       | 10000000    | 1000000           | 100000                   |                      | 12000U           | 8000UJ           | 13000U           | 710J           | 4700J          | 23000U         |
| Pyrene                       | 1700000     | 1000000           |                          |                      | 12000U           | 8000UJ           | 13000U           | 3700U          | 7700U          | 23000U         |
| bis(2-Chlorosthoxy)methane   |             |                   | 10000                    |                      | 12000U           | 8000UJ           | 13000U           | 3700U          | 7700U          | 23000U         |
| bis(2-Chlorosthyl)ether      | 660         | 3000              | 10000                    |                      | 12000U           | 8000UJ           | 13000U           | 3700UJ         | 7700UJ         | 2800J          |
| bis(2-Ethylhexyl)phthalate   | 49000       | 210000            | 100000                   |                      |                  |                  |                  |                |                |                |
| Total Semivolatile Compounds |             |                   |                          |                      | 27800            | 99800            | 3300             | 10240          | 53000          | 51700          |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJD         | EP Soil Cleanup Ci | iterio *    | Sample ID: PSSB1 | SSB1       | SSB3            | SSB3     | STFSB1   | STFSB1   | STFSB2       |
|------------------------------|-------------|--------------------|-------------|------------------|------------|-----------------|----------|----------|----------|--------------|
|                              |             |                    |             | Depth: 06        | 16         | 06              | 10       | 02       | 05       | UB<br>CTE    |
|                              |             | ,                  | Impact to   | Zone**: MB       | SS         | 55              | 55       | 517      | 51F      | 315          |
| Analyte (ug/kg)              | Residential | Non-Residential    | Groundwater | Dete: 10/31/94   | 10/24/94   | 10/24/94        | 10/24/94 | 10/20/34 | 10/20/34 | 10/20/34     |
| 1.2.4-Trichlorobenzene       | 68000       | 1 200000           | 100000      | 12000U           | 12000UJ    | 5400UJ          | 4300UJ   | 1 2000 U | 67000U   | 26000U       |
| 1 2-Dichlorobenzene          | 5100000     | 10000000           | 50000       | 120000           | 12000UJ    | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 26000U       |
| 1.3-Dichlorobenzene          | 5100000     | 10000000           | 100000      | 120000           | 12000UJ    | 5400UJ          | 4300UJ   | 1 2000 U | 67000U   | 26000U       |
| 1.4-Dichlorobenzene          | 570000      | 10000000           | 100000      | 12000U           | 1 2000 U J | 5400UJ          | 4300UJ   | 120000   | 67000U   | 26000U       |
| 2.2'-ovybis(1-Chloropropane) | 2300000     | 10000000           | 10000       | 2 120000         | 1 2000UJ   | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 26000U       |
| 2 4 5-Trichleronhenel        | 5600000     | 10000000           | 50000       | 290000           | 29000UJ    | 13000UJ         | 11000UJ  | 29000U   | 170000U  | 64000U       |
| 2 A 8-Trioblorophenol        | 62000       | 270000             | 10000       | 120000           | 12000UJ    | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 260000       |
| 2 4-Dichlorophanol           | 170000      | 3100000            | 10000       | 1 2000 U         | 1 2000 U J | 5400UJ          | 4300UJ   | 120000   | 67000U   | 28000U       |
| 2.4-Dimethylohanol           | 1100000     | 10000000           | 10000       | 120000           | 12000UJ    | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 26000U       |
| 2 A Disitrophenol            | 110000      | 2100000            | 10000       | 29000UJ          | 29000UJ    | 13000UJ         | 11000UJ  | 29000U   | 170000UJ | 64000UJ      |
| 2.4. Disitrateluene          | 1000        | 4000               | 10000       | 120000           | 12000UJ    | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 26000U       |
| 2.4 Dinitrotoluone           | 1000        | 4000               | 10000       | 120000           | 12000UJ    | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 260000       |
| 2. Chierananhthelene         |             |                    |             | 120000           | 1 2000UJ   | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 250000       |
| 2-Critoronaphrinaiana        | 280000      | 5200000            | 10000       | 120000           | 12000UJ    | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 260000       |
| 2-Uniorophenoi               |             |                    | ••          | 14000            | 1500J      | 5400UJ          | 490J     | 12000    | 180000   | 92000        |
| 2-Methylnephthalene          | 2800000     | 10000000           |             | 12000U           | 1 2000UJ   | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 26000U       |
|                              | 200000      |                    |             | 29000U           | 29000UJ    | 13000UJ         | 11000UJ  | 290000   | 1700000  | 64000U       |
| 2-Nitroannine                |             |                    |             | 120000           | 12000UJ    | 5400UJ          | 4300UJ   | 1 2000U  | 67000U   | 26000U       |
| 2-Nitrophenol                | 2000        | 8000               | 100000      | 12000UJ          | 1 2000UJ   | 5400UJ          | 4300UJ   | 12000UJ  | 67000UJ  | 26000UJ      |
| 3,3'-Dichlorogenzigine       | 2000        |                    |             | 29000U           | 29000UJ    | 13000UJ         | 11000UJ  | 29000U   | 170000U  | 64000U       |
| 3-Nitroaniline               |             |                    |             | 29000UJ          | 29000UJ    | 13000UJ         | 11000UJ  | 29000U   | 170000UJ | 64000UJ      |
| 4,6-Dinitro-2-methylphenol   |             |                    |             | 12000U           | 12000UJ    | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 26000U       |
| 4-Bromophenyi phenyi ether   | 10000000    | 10000000           | 100000      | 12000U           | 12000UJ    | 5400UJ          | 4300UJ   | 120000   | 67000U   | 26000U       |
| 4-Chloro-3-methylphenol      | 130000      | 4200000            |             | 12000U           | 12000UJ    | 5400UJ          | 4300UJ   | 12000UJ  | 67000U   | 260000       |
| 4-Chloroaniine               | 200000      |                    |             | 12000U           | 12000UJ    | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 26000U       |
| 4-Chiorophanyi phanyi athar  | 2200000     | 10000000           |             | 12000U           | 12000UJ    | 5400UJ          | 4300UJ   | 12000U   | 67000U   | 26000U       |
| 4-Methylphenol               | 2800000     | ,0000000           |             | 29000U           | 29000UJ    | 13000UJ         | 11000UJ  | 29000U   | 1700000  | 64000U       |
| 4-Nitroaniline               |             | _                  |             | 29000U           | 29000UJ    | 13000UJ         | 11000UJ  | 29000U   | 1700000  | 64000U       |
| 4-Nitrophenol                |             | 10000000           | 100000      | 12000U           | 12000UJ    | 2300J           | 4300UJ   | 1400J    | 67000U   | 6000J        |
| Acenephthene                 | 3400000     | 10000000           |             | 120000           | 12000UJ    | 1100J           | 480J     | 12000U   | 67000U   | 25000U       |
| Acenephthylene               |             | 10000000           | 100000      | 120000           | 1700J      | 16000J          | 440J     | 11000J   | 11000J   | 2700J        |
| Anthracene                   | 1000000     | 4000               | 500000      | 7200.1           | 7200J      | 6400 <u>0</u> J | 6500J    | 1400J    | 67000U   | 3400J        |
| Benzo(e)enthracene           | 300         | 4000               | 100000      | 6100.1           | 2200J      | 36000J          | 5900J    | 12000U   | 67000U   | <u>2600J</u> |
| Benzo(a)pyrene               | 000         | 000                | 100000      |                  | <u></u>    |                 |          |          |          |              |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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GERAGHTY & MILLER, INC.

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|                              | NJD         | EP Soll Cleanup Cr | iteria "    | Sample ID: PSSB1 | SSB1     | SSB3          | SSB3         | STFSB1          | STFSB1    | STFSB2          |
|------------------------------|-------------|--------------------|-------------|------------------|----------|---------------|--------------|-----------------|-----------|-----------------|
|                              |             |                    | <b>.</b> .  | Depth: 06        | 16       | 06            | 10           | OZ<br>CTC       | 00<br>STE | oa<br>ett       |
|                              |             |                    | Impect to   | Zone"": MB       | 55       | 55            | 33           | 31F<br>10/08/04 | 317       | 31F<br>10/28/94 |
| Analyte (ug/kg)              | Residential | Non-Residential    | Groundwater | Uate: 10/31/94   | 10/24/94 | 10/24/84      | 10/24/34     | 10/20/34        | 10/20/34  | 10/20/34        |
| Benzo(b)fluoranthene         | 900         | 4000               | 50000       | 3700J            | 2600J    | <u>95000J</u> | <u>8400J</u> | 1400J           | 67000U    | 26000U          |
| Benzola hilberdene           |             | **                 | ••          | 6300J            | 1400J    | 14000J        | 2500J        | 12000U          | 67000UJ   | 26000UJ         |
| Benzo(k)fluorenthene         | 900         | 4000               | 500000      | 3800J            | 2700J    | 95000J        | <u>8400J</u> | 1400J           | 67000U    | 26000U          |
| Butyl benzyl obthalate       | 1100000     | 10000000           | 100000      | 12000U           | 12000UJ  | 5400UJ        | 4300UJ       | 12000U          | 67000U    | 26000U          |
| Carbazole                    |             | -                  |             | 12000U           | 12000UJ  | 3600J         | 4300UJ       | 4200J           | 67000U    | 26000U          |
| Choirean                     | 9000        | 40000              | 500000      | 12000            | 14000J   | <u>81000J</u> | 4900J        | 2600J           | 67000U    | 5700J           |
| Di a bund abthalate          | 5700000     | 10000000           | 100000      | 1 2000U          | 12000UJ  | 5400UJ        | 4300UJ       | 12000U          | 67000U    | 26000U          |
| Di-n-outy primate            | 1100000     | 10000000           | 100000      | 12000UJ          | 12000UJ  | 5400UJ        | 4300UJ       | 12000U          | 67000UJ   | 26000UJ         |
| Disersola blanthracene       | 660         | 660                | 100000      | 3300J            | 1 2000UJ | 4600J         | <u>900J</u>  | 12000U          | 67000UJ   | 26000UJ         |
| Diberzofurzo                 |             | -                  | ••          | 12000U           | 12000UJ  | 3300J         | 4300UJ       | 12000U          | 67000U    | 26000U          |
|                              | 10000000    | 10000000           | 50000       | 1 2000U          | 12000UJ  | 5400UJ        | 4300UJ       | 1 2000U         | 67000U    | 28000U          |
| Directly pricialize          | 10000000    | 10000000           | 50000       | 12000U           | 12000UJ  | 5400UJ        | 4300UJ       | 12000U          | 67000U    | 26000U          |
| Charactere                   | 2300000     | 10000000           | 100000      | 12000U           | 4000J    | 1200J         | 5500J        | 2400J           | 67000U    | 260000          |
| Fluorancione                 | 2300000     | 10000000           | 100000      | 12000U           | 3400J    | 5800J         | 4300UJ       | 1800J           | 67000U    | 260000          |
| Fluorene                     | 860         | 2000               | 100000      | 12000U           | 12000UJ  | 5400UJ        | 4300UJ       | 1 2000U         | 67000U    | 260000          |
| Hexachiorobenzene            | 1000        | 21000              | 100000      | 12000U           | 1 2000UJ | 5400UJ        | 4300UJ       | 1 2000 U        | 67000U    | 26000U          |
| Hexachioroputatione          | 400000      | 7300000            | 100000      | 120000           | 12000UJ  | 5400UJ        | 4300UJ       | 12000U          | \$7000U   | 26000U          |
| Hexachiorocyclopentatiene    | 8000        | 100000             | 100000      | 12000U           | 12000UJ  | 5400UJ        | 4300UJ       | 12000U          | 67000U    | 260000          |
| Mexaculoroemana              | 900         | 4000               | 500000      | 2300J            | 12000UJ  | <u>14000J</u> | 2400J        | 12000U          | 67000UJ   | 26000UJ         |
| Indeno(1,2,3-cd)pyrene       | 1100000     | 10000000           | 50000       | 120000           | 1 2000UJ | 5400UJ        | 4300UJ       | 12000U          | 67000U    | 26000U          |
| Isophorone                   | 660         | 660                | 10000       | 12000U           | 1 2000UJ | 5400UJ        | 4300UJ       | 12000U          | 87000U    | 26000U          |
| N-Nitroso-di-h-propylamine   | 140000      | 600000             | 100000      | 12000U           | 12000UJ  | 5400UJ        | 4300UJ       | 12000U          | 67000U    | 26000U          |
| N-Nitrosocipnenyiemine       | 230000      | 4200000            | 100000      | 1 2000U          | 1 2000UJ | 5400UJ        | 2000J        | 120000          | 130000    | 26000U          |
| Naprinalene                  | 28000       | 520000             | 10000       | 12000U           | 1 2000UJ | 5400UJ        | 4300UJ       | 12000U          | 67000U    | 260000          |
| Nitropenzene                 | 6000        | 24000              | 100000      | 29000U           | 29000UJ  | 13000UJ       | 11000UJ      | 96001           | 1700000   | 64000U          |
| Pentachiorophenol            |             |                    |             | 3000J            | 7500J    | 84000J        | 1000J        | 6400J           | 11000J    | 22000J          |
|                              | 10000000    | 10000000           | 50000       | 12000U           | 12000UJ  | 5400UJ        | 4300UJ       | 12000U          | 67000U    | 260000          |
| Phenol                       | 1700000     | 10000000           | 100000      | 9800J            | 5400J    | 120000J       | 10000J       | 3100J           | 67000U    | 14000J          |
| Pyrene                       |             |                    |             | 120000           | 12000UJ  | 5400UJ        | 4300UJ       | 120000          | 67000U    | 26000U          |
| Dist2-Uniorosthubsther       | 660         | 3000               | 10000       | 12000U           | 1 2000UJ | 5400UJ        | 4300UJ       | 120000          | 67000U    | 26000U          |
| Dist2-Chioroethylether       | 49000       | 210000             | 100000      | 2500J            | 1 2000UJ | 5400UJ        | 4300UJ       | 120000          | 67000U    | 260000          |
| DIB(2-CITIVINGXVI)philianalo |             |                    |             |                  |          |               |              |                 |           |                 |
| Total Semivolatile Compounds |             |                    |             | 74000            | 53600    | 620900        | 59810        | 58700           | 332000    | 148400          |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                              |             | EP Soil Cleanup C | riteria *                | Sample ID: FBNA1-100594   | FBNA5-101994 | FBNA6-102094 | FBNA7-102594 |
|------------------------------|-------------|-------------------|--------------------------|---------------------------|--------------|--------------|--------------|
| Analyta (ug/kg)              | Residential | Non-Residential   | Impact to<br>Groundwater | Zone**:<br>Date: 10/05/94 | 10/19/94     | 10/20/94     | 10/25/94     |
|                              |             |                   |                          |                           |              |              |              |
| 1,2,4-Trichlorobenzene       | 68000       | 1200000           | 100000                   | 100                       | 100          | 100          | 100          |
| 1,2-Dichiorobenzene          | 5100000     | 10000000          | 50000                    | 100                       | 100          | 100          | 100          |
| 1.3-Dichlorobenzene          | 5100000     | 10000000          | 100000                   | 100                       | 100          | 100          | 100          |
| 1.4-Dichlorobenzene          | 570000      | 10000000          | 100000                   | 100                       | 100          | 100          | TOU          |
| 2.2'-oxybis(1-Chloropropane) | 2300000     | 10000000          | 10000                    | 100                       | 10U          | 100          | 100          |
| 2.4.5-Trichiorophenol        | 5600000     | 10000000          | 50000                    | 25U                       | 25U          | 250          | 250          |
| 2.4.8-Trichlorophanol        | 62000       | 270000            | 10000                    | 100                       | 100          | 100          | 100          |
| 2 4-Dichiorophenol           | 170000      | 3100000           | 10000                    | 100                       | 10U          | 100          | 100          |
| 2 4-Dimethylohenol           | 1100000     | 10000000          | 10000                    | 10Ų                       | 100          | 10U          | 100          |
| 2 4 Dinitronhenol            | 110000      | 2100000           | 10000                    | 250                       | 25U          | 25U          | 250          |
| 2.4-Dinitrophone             | 1000        | 4000              | 10000                    | 100                       | 10U          | 10U          | 100          |
| 2 6-Dinitrotoluene           | 1000        | 4000              | 10000                    | 100                       | 100          | 10U          | 10U          |
|                              |             |                   | -                        | 100                       | 100          | 10U          | 10U          |
| 2-Chloronaphinalene          | 280000      | 5200000           | 10000                    | 100                       | 10U          | 10U          | 100          |
| 2-Chlorophenol               | 200000      |                   |                          | 100                       | 100          | 100          | 10U          |
| 2-Mathyinaphtnaiene          | 3800000     | 1000000           |                          | 100                       | 100          | 10U          | 10U          |
| 2-Methylphenol               | 2800000     | 1000000           |                          | 250                       | 250          | 25U          | 25U          |
| 2-Nitroaniline               |             | -                 |                          | 100                       | 100          | 10U          | 100          |
| 2-Nitrophenol                |             | =                 | 100000                   | 100                       | 100          | 100          | 100          |
| 3,3'-Dichlorobenzidine       | 2000        | 0000              |                          | 250                       | 25U          | 25U          | 25U          |
| 3-Nitroaniune                |             |                   |                          | 250                       | 25U          | 25U          | 25U          |
| 4,6-Dinitro-2-methylphenol   | ••          |                   |                          | 100                       | 100          | 10U          | 10U          |
| 4-Bromophanyl phonyl ether   | 1000000     | 10000000          | 100000                   | 100                       | 10U          | 10U          | 10U          |
| 4-Chloro-3-methylphenol      | 1000000     | 42000000          |                          | 100                       | 100          | 10U          | 100          |
| 4-Chloroaniline              | 230000      | 4200000           |                          | 100                       | 100          | 100          | 100          |
| 4-Chlorophenyl phenyl ether  | ******      | 10000000          |                          | 100                       | 10U          | 10U          | 10U          |
| 4-Methylphenol               | 2800000     | 1000000           |                          | 250                       | 25U          | 25U          | 25U          |
| 4-Nitroaniline               |             | ••                |                          | 250                       | 250          | 250          | 25U          |
| 4-Nitrophenol                | -           |                   | 100000                   | 101                       | 100          | 100          | 10U          |
| Acenaphthene                 | 3400000     | 10000000          | 100000                   | 100                       | 101          | 100          | 10U          |
| Acenaphthylene               |             |                   | 100000                   | 100                       | 100          | 100          | 100          |
| Anthracene                   | 1000000     | 10000000          | 500000                   | 100                       | 100          | 100          | 100          |
| Benzo(a)anthracene           | 900         | 4000              | 500000                   | 100                       | 100          | 100          | 10U          |
| Benzo(a)pyrene               | 660         | 660               | 100000                   | 100                       |              |              |              |

Teble 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

|                              | NJD         | EP Soil Cleanup Cl | riteria "                | Sample ID: FBNA1-100594               | FBNA5-101994 | FBNA6-102094 | FBNA7-102594 |
|------------------------------|-------------|--------------------|--------------------------|---------------------------------------|--------------|--------------|--------------|
| e - to en to effect          | Pesidential | Non-Residential    | impact to<br>Groundwater | Depth:<br>Zone * *:<br>Date: 10/05/94 | 10/19/94     | 10/20/94     | 10/25/94     |
| Analyte (ug/kg)              | Uggidauros: | Horrigaldantia     | dioditalia               |                                       |              |              |              |
| Repro/b)fluorenthene         | 900         | 4000               | 50000                    | 100                                   | 10U          | 10U          | 10U          |
|                              | -           |                    | -                        | 100                                   | 10U          | 100          | 100          |
| Serve (k) fillesenthene      | 900         | 4000               | 500000                   | 100                                   | 100          | 100          | 100          |
|                              | 1100000     | 10000000           | 100000                   | 100                                   | 100          | 100          | 100          |
|                              |             | -                  |                          | 100                                   | 10U          | 100          | 100          |
| ATD82019                     | 9000        | 40000              | 500000                   | 100                                   | 100          | 10U          | 100          |
| hrysene                      | 5700000     | 1000000            | 100000                   | 1J                                    | 3J           | 2J           | 2J           |
| I-n-DUTYI phinalate          | 1100000     | 10000000           | 100000                   | 100                                   | 10U          | 10U          | 10U          |
| h-n-ootyi phihalate          | 660         | 660                | 100000                   | 100                                   | 10U          | 100          | 10U          |
| Hibenzola, h) anthracens     | 660         | 000                |                          | 100                                   | 10U          | 10U          | 10U          |
| libenzofuran                 | -           | 1000000            | 50000                    | 100                                   | 1 <b>9</b> U | 10U          | 100          |
| iethyl phthalate             | 10000000    | 10000000           | 50000                    | 100                                   | 100          | 10U          | 10U          |
| imethyl phthalate            | 10000000    | 10000000           | 100000                   | 100                                   | 100          | 10U          | 10U          |
| luoranthene                  | 2300000     | 10000000           | 100000                   | 100                                   | 100          | 100          | 10U          |
| luorene                      | 2300000     | 1000000            | 100000                   | 100                                   | 100          | 10U          | 10U          |
| lexachlorobenzene            | 560         | 2000               | 100000                   | 100                                   | 10U          | 100          | 10U          |
| lexachlorobutadiene          | 1000        | 21000              | 100000                   | 100                                   | 100          | 10U          | 10U -        |
| lexachlorocyclopentadiene    | 400000      | 7300000            | 100000                   | 100                                   | 100          | 100          | 10U          |
| lexachloroathane             | 6000        | 100000             | 100000                   | 100                                   | 100          | 100          | 10U          |
| ndeno(1,2,3-cd)pyrene        | 900         | 4000               | 500000                   | 100                                   | 100          | 100          | 10U          |
| sophorone                    | 1100000     | 10000000           | 50000                    | 100                                   | 100          | 100          | 10U          |
| I-Nitroso-di-n-propytamine   | 660         | 660                | 10000                    | 100                                   | 100          | 100          | 100          |
| -Nitrosodiphenviamine        | 140900      | 600000             | 100000                   | 100                                   | 100          | 100          | 100          |
| laphthalene                  | 230000      | 4200000            | 100000                   | 100                                   | 100          | 100          | 10U          |
| Jitrobenzene                 | 28000       | 520000             | 10000                    | 100                                   | 2511         | 250          | 25U          |
| Pentachlorophenol            | 6000        | 24000              | 100000                   | 250                                   | 100          | 100          | 10U          |
| Phenanthrane                 |             | ••                 |                          | 100                                   | 100          | 100          | 100          |
| Phenol                       | 1000000     | 10000000           | 50000                    | 100                                   | 100          | 100          | 100          |
| Pyrana                       | 1700000     | 10000000           | 100000                   | 100                                   | 100          | 100          | 100          |
| sis(2-Chlorosthoxy)methane   |             |                    |                          | 100                                   | 100          | 100          | 100          |
| his (2-Chloroethyl)ether     | 660         | 3000               | 10000                    | 100                                   | 100          | 100          | 10U          |
| his(2-Ethylhexyl)phthalate   | 49000       | 210000             | 100000                   | 100                                   | IJ           |              |              |
|                              |             |                    |                          | 1                                     | 4            | 2            | 2            |
| Total Semivolatile Compounds |             |                    |                          | ·                                     |              |              |              |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | DLN         | EP Soli Cleanup C | riteria *   | Sample ID: FBNA9-102694 | FBNA11-102794 | FBNA13-102894 | FBNA14-102894 |
|------------------------------|-------------|-------------------|-------------|-------------------------|---------------|---------------|---------------|
|                              |             |                   | impact to   | Zone**:                 |               |               |               |
| Ansivte (uo/kd)              | Residential | Non-Residential   | Groundwater | Date: 10/26/94          | 10/27/94      | 10/28/94      | 10/28/94      |
|                              | ,           |                   |             |                         |               | 10/1          | 1011          |
| 1,2,4-Trichlorobenzene       | 68000       | 1200000           | 100000      | 100                     | 100           | 100           | 100           |
| 1,2-Dichlorobenzene          | 5100000     | 10000000          | 50000       | 100                     | 100           | 100           | 100           |
| 1,3-Dichlorobenzene          | 5100000     | 10000000          | 100000      | 100                     | 100           | 100           | 100           |
| 1,4-Dichlorobenzene          | 570000      | 10000000          | 100000      | 100                     | 100           | 100           | 100           |
| 2.2'-oxybia(1-Chloropropane) | 2300000     | 10000000          | 10000       | 100                     | 100           | 100           | 251           |
| 2.4.5-Trichlorophenol        | 5600000     | 10000000          | 50000       | 25U                     | 250           | 250           | 200           |
| 2.4.6-Trichlorophenol        | 62000       | 270000            | 10000       | 100                     | 100           | 100           | 100           |
| 2.4-Dichlorophanol           | 170000      | 3100000           | 10000       | 100                     | 100           | 100           | 100           |
| 2 4-Dimethylphenol           | 1100000     | 10000000          | 10000       | 10U                     | 10U           | 100           | 100           |
| 2 4 Dinitronhenol            | 110000      | 2100000           | 10000       | 25U                     | 250           | 250           | 250           |
| 2 4 Dinitrotoluene           | 1000        | 4000              | 10000       | 100                     | 100           | 100           | 100           |
| 2. A.Dinitrotoluone          | 1000        | 4000              | 10000       | 100                     | 100           | 100           | 100           |
|                              |             |                   |             | 10U                     | 100           | 100           | 100           |
| 2-Chieronhonel               | 280000      | 5200000           | 10000       | 100                     | 100           | 100           | 100           |
| 2-Chierophenoi               |             |                   |             | 100                     | 100           | 100           | 100           |
| 2-Methymaphtnetere           | 2800000     | 10000000          |             | 100                     | 100           | 100           | 100           |
|                              | 2000000     |                   |             | 25U                     | 25U           | 250           | 250           |
| 2-Nitroaniime                |             | +•                | ·           | 100                     | 10U           | 100           | 100           |
| 2-Nitrophenol                | 2000        | 8000              | 100000      | 100                     | 10U           | 100           | 100           |
| 3,3'-Dichlorobenzidine       | 2000        |                   |             | 250                     | 25U           | 25U           | 250           |
| 3-Nitroaniline               |             |                   |             | 250                     | 250           | 250           | 250           |
| 4,6-Dinitro-Z-methylphenol   |             |                   |             | 100                     | 100           | 100           | 100           |
| 4-Bromophenyl phenyl ether   |             | 10000000          | 100000      | 100                     | 100           | 100           | 100           |
| 4-Chloro-3-methylphenol      | 10000000    | 4000000           |             | 100                     | 10U           | 10U.          | 100           |
| 4-Chloroanilina              | 230000      | 4200000           |             | 100                     | 100           | 10U           | 100           |
| 4-Chlorophenyl phenyl ether  |             |                   |             | 100                     | 100           | 10U           | 100           |
| 4-Methylphenol               | 2800000     | 10000000          |             | 2511                    | 25U           | 25U           | 25U           |
| 4-Nitroaniline               |             |                   |             | 250                     | 250           | 250           | 25U           |
| 4-Nitrophenol                |             |                   | 100000      | 100                     | 100           | 100           | 100           |
| Acenaphthene                 | 3400000     | 1000000           | 100000      | 100                     | 100           | 100           | 100           |
| Acensphthylene               |             |                   |             | 1011                    | 100           | 100           | 10U           |
| Anthracene                   | 1000000     | 1000000           | 100000      | 100                     | 100           | · 10U         | 10U           |
| Benzo(a)anthracena           | 900         | 4000              | 500000      | 100                     | 100           | 100           | 100           |
| Benzo(a)pyrene               | 660         | 660               | 100000      | 100                     |               |               |               |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                     | NJD         | EP Soil Cleanup C | riteria *                | Sample ID: FBNA9-102694<br>Depth: | FBNA11-102794 | FBNA13-102894 | FBNA14-102894 |
|-------------------------------------|-------------|-------------------|--------------------------|-----------------------------------|---------------|---------------|---------------|
| Analyte (ug/kg)                     | Residential | Non-Residential   | Impact to<br>Groundwater | Zone**:<br>Date: 10/26/94         | 10/27/94      | 10/28/94      | 10/28/94      |
|                                     |             | 4000              | 50000                    | 1011                              | 1011          | 100           | 100           |
| Benzo(b)fluoranthene                | 900         | 4000              | 50000                    | 100                               | 100           | 100           | 10U           |
| Benzo(g,h,i)perylane                |             |                   |                          | 100                               | 100           | 100           | 10U           |
| Benzo(k)fluoranthene                | 900         | 4000              | 100000                   | 100                               | 100           | 100           | 100           |
| Butyl benzyl phthalate              | 1100000     | 10000000          | 100000                   | 100                               | 100           | 100           | 100           |
| Carbazole                           |             |                   |                          | 100                               | 100           | 100           | 100           |
| Chrysene                            | 9000        | 40000             | 500000                   | 100                               | 11            | 2.1           | 100           |
| Di-n-butyi phthalate                | 5700000     | 10000000          | 100000                   | 100                               | 1011          | 100           | 100           |
| Di-n-octyl phthalate                | 1100000     | 10000000          | 100000                   | 100                               | 100           | 100           | 100           |
| Dibenzo(a,h)anthracene              | 660         | 660               | 100000                   | 100                               | 100           | 100           | 100           |
| Dibenzofuren                        | ••          | ••                |                          | 100                               | 100           | 100           | 100           |
| Diethyl phthaiate                   | 10000000    | 1000000           | 50000                    | 100                               | 100           | 100           | 100           |
| Dimethyl phthalate                  | 10000000    | 10000000          | 50000                    | 100                               | 100           | 100           | 100           |
| Fluoranthene                        | 2300000     | 10000000          | 100000                   | 100                               | 100           | 100           | 100           |
| Fluorene                            | 2300000     | 10000000          | 100000                   | 100                               | 100           | 100           | 100           |
| Hexachlorobenzene                   | 660         | 2000              | 100000                   | 100                               | 100           | 100           | 100           |
| Hexechlorobutadiana                 | 1000        | 21000             | 100000                   | 100                               | 100           | 100           | 100           |
| Hexachiorocyclopentediene           | 400000      | 7300000           | 100000                   | 100                               | 100           | 100           | 100           |
| Heyeobloroethene                    | 6000        | 100000            | 100000                   | 100                               | 100           | 100           | 100           |
| Indepo(1, 2, 3-od)nv(ene            | 900         | 4000              | 500000                   | 100                               | 100           | 100           | 100           |
| Ingeno(1,2,0-00) from               | 1100000     | 10000000          | 50000                    | 100                               | 100           | 100           | 100           |
| N-Nitroso-di-p-propylemine          | 660         | 660               | 10000                    | 100                               | 100           | 100           | 100           |
| N hitrasodinhandamina               | 140000      | 600000            | 100000                   | 100                               | 100           | 100           | 100           |
| Newthelene                          | 230000      | 4200000           | 100000                   | 100                               | 100           | 100           | 100           |
| Naprilleono                         | 28000       | 520000            | 10000                    | 100                               | 100           | 100           | 100           |
| Nitroperizene<br>Rente ablasarbanol | 6000        | 24000             | 100000                   | 25U                               | 250           | 250           | 250           |
| Pentachiorophanio                   |             |                   |                          | 100                               | 100           | 100           | 100           |
| Phananthrama                        | 1000000     | 10000000          | 50000                    | 100                               | 100           | 100           | 100           |
| Phenol                              | 1700000     | 10000000          | 100000                   | 100                               | TOU           | <b>10</b> U   | 100           |
| Pyrens                              | 1700000     |                   |                          | 100                               | 10U           | 100           | 100           |
| bis(2-Chloroethoxy)methene          | 860         | 3000              | 10000                    | 1 <b>0</b> U                      | 100           | 100           | TOU           |
| bis(2-Chloroethyl)ether             | 40000       | 210000            | 100000                   | 100                               | 10U           | 100           | 3J            |
| bis{2-Ethylhexyl)phthalate          | . 49000     | 210000            | 100000                   |                                   |               | •             | 3             |
| Total Semivolatile Compounds        |             |                   |                          | o                                 | τ             | ٤             | v             |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                                     | DLN         | EP Soil Cleanup Ci | iteria *                 | Sample ID: FBNA17-103194            |           |
|-------------------------------------|-------------|--------------------|--------------------------|-------------------------------------|-----------|
| Analyte (ug/kg)                     | Residential | Non-Residential    | Impact to<br>Groundwater | Depth:<br>Zone**:<br>Date: 10/31/94 | · · · · · |
| 1.2.4-Trichlorobenzene              | 68000       | 1 200000           | 100000                   | 100                                 |           |
| 1.2-Dichlorobenzene                 | 5100000     | 10000000           | 50000                    | 100                                 |           |
| 1.3-Dichlorobenzene                 | 5100000     | 10000000           | 100000                   | 100                                 |           |
| 1 4-Dichlorobenzene                 | 570000      | 10000000           | 100000                   | 100                                 |           |
| 2.2'-ovobis(1-Chloropropana)        | 2300000     | 10000000           | 10000                    | ₂ 10U                               |           |
| 2 A 5-Trichioronhend                | 5600000     | 10000000           | 50000                    | 25U                                 |           |
| 2,4,8 Trichlorophend                | 62000       | 270000             | 10000                    | 100                                 |           |
| 2.4. Dishistophenoi                 | 170000      | 3100000            | 10000                    | 100                                 |           |
| 2.4-Dichlorophenol                  | 1100000     | 10000000           | 10000                    | 100                                 |           |
| 2.4 Dinitronhand                    | 110000      | 2100000            | 10000                    | 250                                 |           |
| 2,4-Dinitrophenol                   | 1000        | 4000               | 10000                    | 100                                 |           |
| 2.4 Disitratoluene                  | 1000        | 4000               | 10000                    | 10U                                 |           |
|                                     |             |                    | <b></b>                  | 10U                                 |           |
| 2 Chlorophenol                      | 280000      | 5200000            | 10000                    | 100                                 |           |
| 2 Mathulaenhthelene                 |             |                    |                          | 10U                                 |           |
| 2-Methylaboool                      | 2800000     | 10000000           |                          | 100                                 | *         |
|                                     |             |                    |                          | 250                                 |           |
| 2. Nitroshanal                      |             |                    |                          | 100                                 |           |
| 2-Minophenol                        | 2000        | 6000               | 100000                   | 1J                                  |           |
| 3,3-Dichiorobenziume                |             |                    |                          | 1J                                  |           |
| 4.4. Disitra-2-methylabetol         |             |                    |                          | 250                                 |           |
| 4. Bromenhand phend ether           |             |                    |                          | 100                                 |           |
| 4 Chlore 2 methylohenol             | 10000000    | 10000000           | 100000                   | 100                                 |           |
| 4 Chlorospiline                     | 230000      | 4200000            |                          | 4J                                  |           |
| 4 Chlorophend phenyl ether          |             | ••                 |                          | 100                                 |           |
| 4 Meshidohanol                      | 2800000     | 10000000           |                          | 100                                 |           |
|                                     |             |                    |                          | 250                                 |           |
|                                     |             |                    |                          | 250                                 |           |
|                                     | 3400000     | 10000000           | 100000                   | 100                                 |           |
| Acenaphinana                        |             |                    |                          | 100                                 |           |
| Aceteptore                          | 10000000    | 1000000            | 100000                   | 100                                 |           |
| Antinacene<br>Reseate) - estarecene | 900         | 4000               | 500000                   | 100                                 |           |
| Benzo(a)DVf6Ne                      | 660         | 660                | 100000                   | 100                                 |           |

Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJDEP Soil Cleanup Criteria * |                 |                          | Sample ID: FBNA17-103194  |   |
|------------------------------|-------------------------------|-----------------|--------------------------|---------------------------|---|
| Anelyte (ug/kg)              | Residential                   | Non-Residential | impect to<br>Groundwater | Zone**:<br>Date: 10/31/94 |   |
| Benzo(b)fluoranthene         | 900                           | 4000            | 50000                    | 100                       |   |
| Benzo(a,h,i)perviene         | ••                            |                 |                          | 100                       |   |
| Benzo(k)fluoranthene         | 900                           | 4000            | 500000                   | 10U                       |   |
| Butvi benzvi phthalate       | 1100000                       | 10000000        | 100000                   | 10U                       |   |
| Carbazola                    |                               |                 | -                        | 100                       |   |
| Chrysens                     | 9000                          | 40000           | 500000                   | 100                       |   |
| Di-n-butvi phthalate         | 5700000                       | 10000000        | 100000                   | 2J                        | • |
| Di-n-octvi phthalate         | 1100000                       | 10000000        | 100000                   | 100                       |   |
| Dibenzo(a,h)anthracene       | 660                           | 660             | 100000                   | 100                       |   |
| Dibenzofuran                 |                               |                 |                          | 100                       |   |
| Diethyl phthalate            | 10000000                      | 10000000        | 50000                    | 100                       |   |
| Dimethyl phthelate           | 10000000                      | 10000000        | 50000                    | 100                       |   |
| Fluorenthene                 | 2300000                       | 10000000        | 100000                   | 10U                       |   |
| ikorene                      | 2300000                       | 10000000        | 100000                   | 100                       |   |
| levechosobenzent             | 860                           | 2000            | 100000                   | 100                       |   |
| ievechiorobutediene          | 1000                          | 21000           | 100000                   | 100                       |   |
| levechlorocyclopentediene    | 400000                        | 7300000         | 100000                   | 10U                       |   |
| leveshioroethese             | 6000                          | 100000          | 100000                   | 100                       |   |
| ndeno(1,2,3-cd)pytapa        | 900                           | 4000            | 500000                   | 100                       |   |
| sonhorane                    | 1100000                       | 1000000         | 50000                    | 100                       |   |
| i-Nitroso-di-n-propylamine   | 660                           | 660             | 10000                    | 100                       |   |
| N-Nitrosodiphenylemine       | 140000                        | 600000          | 100000                   | 100                       |   |
| Naphthalene                  | 230000                        | 4200000         | 100000                   | 100                       |   |
| litrobenzene                 | 28000                         | 520000          | 10000                    | 100                       |   |
| Pentechlorophenol            | 6000                          | 24000           | 100000                   | 250                       |   |
| Phenanthrene                 |                               |                 |                          | 100                       |   |
| henol                        | 10000000                      | 10000000        | 50000                    | 100                       |   |
|                              | 1700000                       | 10000000        | 100000                   | 100                       |   |
| sis{2-Chloroethoxy}methane   |                               | ••              |                          | 100                       |   |
| bis(2-Chloroethyl)ether      | 660                           | 3000            | 10000                    | 100                       |   |
| bis(2-Ethylhexyl)phthalate   | 49000                         | 210000          | 100000                   | 100                       |   |
| Total Semivolatile Compounds |                               |                 |                          | 8                         |   |

Table 5-3. Semivolatile Organic Compounds in Soil Samplas Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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Table 5-3. Semivolatile Organic Compounds in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Analyte concentrations and New Jersey Department of Environmental Protection (NJDEP) criteria in micrograms per kilogram (ug/kg) (equivalent to parts per billion (ppb)). Analyses were performed by CompuChem Environmental Corporation, Research Triangle Park, North Carolina, using Contract Laboratory Program (CLP) protocols contained in the Statement of Work (SOW) OLMO1.8.

Sample results exceeding the NJDEP impact to groundwater criteria are shown in bold. Sample results exceeding the NJDEP non-residential criteria are underlined. Sample results exceeding both criteria are shown in bold and underlined.

FBNA Indicates a field blank associated with non-aqueous samples.

- Field replicate of previous sample. FR
- The compound was analyzed for, but not detected at the specific detection limit. U
- J Estimated result.
- Rejected result. R
- No applicable criteria. ••
- NJDEP Soll Cleanup Criteria, February 3, 1992; last revised February 3, 1994. .
- .... Zone as defined in Table 3-2.

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|                     |             | EP Soil Cleanup Cr | iteria *    | Semple ID: 3TFIRMB4<br>Depth: 02 | STFIRMB4   | AGTFSB1<br>02 | AGTFSB1<br>06<br>AGTE | AGTFSB2<br>04<br>AGTE | AGTFS83<br>O2<br>Agtf |
|---------------------|-------------|--------------------|-------------|----------------------------------|------------|---------------|-----------------------|-----------------------|-----------------------|
| Analyte (ug/kg)     | Residential | Non-Residential    | Groundwater | Date: 10/17/94                   | 10/17/94   | 10/20/94      | 10/20/94              | 10/28/94              | 10/27/94              |
|                     |             | 11000              | E0000       | 1 01/                            | 3.81.1     | 4.3UJ         | 21 UJ                 | 19U                   | R                     |
| 4,4'-DDD            | 3000        | 12000              | 50000       | 3.30                             | 0.000<br>P | 14.1          | 21111                 | 190                   | 20U                   |
| 4,4'-DDE            | 2000        | 9000               | 50000       | 84                               | 3.9111     | R             | 210.1                 | 190                   | R                     |
| 4,4'-DDT            | 2000        | 9000               | 500000      | n<br>101                         | 2111       | 2 2111        | 17.J                  | 9.6U                  | 10U                   |
| Aldrin              | 40          | 170                | 50000       | 185                              | 200        | 43(1)         | 2100.1                | 1900                  | 2000                  |
| Arector-1016        | 490         | 2000               | 50000       | 390                              | 70111      | 97111         | 4400.1                | 380U                  | 400U                  |
| Arcolor-1221        | 490         | 2000               | 50000       | 790                              | 2011       | 43111         | 21011                 | 1900                  | 2000                  |
| Aroclor-1232        | 490         | 2000               | 50000       | 390                              | 3000       | 4300          | 2100.                 | 1900                  | 200U                  |
| Aroclor-1242        | 490         | 2000               | 50000       | 390                              | 3805       | 4305          | 21000                 | 190U                  | 2000                  |
| Aroclor-1248        | 490         | 2000               | 50000       | 390                              | 3000       | 43111         | 210UJ                 | 1900                  | 200U                  |
| Aroclor-1254        | 490         | 2000               | 50000       | 390                              | 3003       | 4300          | 21000                 | 1900                  | 200U                  |
| Arocior-1260        | 490         | 2000               | 50000       | 390                              | 3000       | 4305<br>4 301 | 210.0                 | 190                   | 200                   |
| Dieldrin            | 42          | 180                | 50000       | 3.90                             | 3.805      | 9,303         | 1111                  | 9.60                  | 100                   |
| Endosulfan İ        |             | **                 |             | 20                               | 200        | A 201         | 2111                  | 190                   | 200                   |
| Endosulfan II       |             | ••                 |             | 3.90                             | 3.803      | 4.305         | 210.                  | 190                   | 200                   |
| Endosulfan sulfate  |             |                    |             | к                                | 3,805      | 4.303         | 2103                  | 190                   | 20UJ                  |
| Endrin              | 17000       | 310000             | 50000       | 7.35                             | 3.800      | 21            | 2100                  | 190                   | 200                   |
| Endrin aldehyde     |             | ••                 |             | 3,90                             | 3.800      | 4 3111        | 2102                  | 190                   | 20U                   |
| Endrin ketone       |             |                    |             | 11 .                             | 3,803      | 2 211 1       | 1100                  | 9.6U                  | 10U                   |
| Heptachlor          | 150         | 650                | 50000       | 20                               | 203        | 2.200         | 1100                  | 9.6U                  | 100                   |
| Heptachlor epoxide  |             | ••                 |             | 20                               | 200        | 1701          | 1100                  | 96U                   | 1000                  |
| Methoxychlor        | 280000      | 5200000            | 50000       | 200                              | 2100       | 22011         | 110000                | 960U                  | 1000U                 |
| Toxaphene           | 100         | 200                | 50000       | 2000                             | 20003      | 2 2111        | 110.                  | 9.6U                  | 10U                   |
| alpha-BHC           | ••          |                    | -•          | 20                               | 5.00       | 2.200<br>E i  | 110.1                 | 9.60                  | 10U                   |
| alpha-Chlordane     |             |                    |             | 11                               | 2,33       | 2 2111        | 1100                  | 9.6U                  | 100                   |
| bete-BHC            |             |                    | ••          | 20                               | 20J        | 2.200         | 1100                  | 9.60                  | 100                   |
| delta-BHC           |             | ••                 | ••          | 20                               | 205        | 2.200         | 1111                  | 9.60                  | 100                   |
| gamma-BHC (Lindane) | 520         | 2200               | 50000       | 20                               | R          | 2.200         | 1100                  | 9.6U                  | 100                   |
| gamma-Chlordane     |             |                    |             | 13J                              | 203        | ~             | ,,                    |                       |                       |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Semples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                                        |                                         | EP Soli Cleanup Cr | iteria •                 | Sample ID: AGTFSB4<br>Depth: 02 | AHTFSB1           | AHTFSB2<br>02    | AHTFSB4  | AHTFSB4<br>08 | APSB2<br>02 |
|----------------------------------------|-----------------------------------------|--------------------|--------------------------|---------------------------------|-------------------|------------------|----------|---------------|-------------|
| Analyte (ug/kg)                        | Residential                             | Non-Residential    | Impect to<br>Groundwater | Zone**: AGTF<br>Date: 10/20/94  | AH 1F<br>10/19/94 | AHIF<br>10/14/94 | 10/14/94 | 10/14/94      | 10/26/94    |
| 4.4'-000                               | 3000                                    | 12000              | 50000                    | 3.9UJ                           | 6.9J              | 19U              | 21       | 190           | R           |
| 4 4'-DDE                               | 2000                                    | 9000               | 50000                    | 3.9UJ                           | 3.6UJ             | 19U              | 18U      | 19U           | 34          |
| 4.4'-DDT                               | 2000                                    | 9000               | 500000                   | 6.9J                            | 4.9J              | 19U              | 18U      | 19U           | 120         |
| Aldrin                                 | 40                                      | 170                | 50000                    | 2UJ                             | 1.8UJ             | 9.80             | 9.4U     | 9.8U          | 20          |
| Araclar-1016                           | 490                                     | 2000               | 50000                    | 39UJ                            | 36UJ              | 190U             | 180U     | 190U          | 38U         |
| Aroclor-1221                           | 490                                     | 2000               | 50000                    | 79UJ                            | 73UJ              | 390U             | 370U     | 390U          | 770         |
| Araclar-1232                           | 490                                     | 2000               | 50000                    | 39UJ                            | 36UJ              | 190U             | 180U     | 190U          | 38U         |
| Araclar-1242                           | 490                                     | 2000               | 50000                    | 39UJ                            | 36UJ -            | 190U             | 180U     | 190U          | 380         |
| Aroclor-1248                           | 490                                     | 2000               | 50000                    | 39UJ                            | 36UJ              | 190U             | 180U     | 190U          | 38U         |
| Aroclor:1254                           | 490                                     | 2000               | 50000                    | 39UJ                            | 36UJ              | 190U             | 180U     | 190U          | 38U         |
| Arocio: 1260                           | 490                                     | 2000               | 50000                    | 39UJ                            | 36UJ              | 1 <b>90U</b>     | 180U     | 190U          | 38U         |
| Dialdrin                               | 42                                      | 180                | 50000                    | 3.9UJ                           | 3,6UJ             | 190              | 18U      | 19U           | 17          |
| Endoculfon !                           |                                         |                    |                          | 3.4J                            | 1.8UJ             | 9,8U             | 9.4U     | 9,8U          | 20          |
| Endogulfen li                          |                                         | ••                 | ~*                       | 3.9UJ                           | 3.6UJ             | 19U              | 18U      | 19U           | 3,8U        |
|                                        |                                         |                    |                          | R                               | 3.6UJ             | 19U -            | 18U      | 19U           | 3.8U        |
|                                        | 17000                                   | 310000             | 50000                    | 3.9UJ                           | 3.6UJ             | 190              | 18U      | 190           | 3.8U        |
| Engria<br>Endria sidaburia             | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |                    |                          | 3.9UJ                           | 3,6UJ             | 19U              | 18U      | 19U           | 3.8U        |
| Englin algenyde                        |                                         |                    | ••                       | 3.9.1                           | 3.6UJ             | 19U              | 18U      | 190           | 3.7J        |
| Engrin Ketone                          | 150                                     | 650                | 50000                    | 201                             | 1,8UJ             | 9.8U             | 9.4U     | 9,8U          | 20          |
| Heptachior                             |                                         |                    |                          | 2UJ                             | 1.8UJ             | 9.8U             | 9,4U     | 9,80          | 2U          |
| Heptachior epoxice                     | 280000                                  | 5200000            | 50000                    | 20UJ                            | 18UJ              | 98U              | 94U      | 98U           | 200         |
| Tevenhene                              | 100                                     | 200                | 50000                    | 200UJ                           | 180UJ             | 980U             | 940U     | 980U          | 200U        |
| i oxapnene<br>olaba BHC                |                                         |                    |                          | 2UJ                             | 1.8UJ             | 9,8U             | 9.4U     | 9.8U          | 20          |
| alpha-Bric                             | _                                       | -                  |                          | 2UJ                             | 1,8UJ             | 9.8U             | 9.4U     | 9.8U          | 20          |
| alpha-Unioruane                        |                                         |                    |                          | 2UJ                             | 1.8UJ             | 9.8U             | 9.40     | 9.8U          | 20          |
|                                        |                                         |                    |                          | 200                             | 1,8UJ             | 9.8U             | 9,4U 🕔   | 9.8U          | 20          |
| Gene-onu                               | 520                                     | 2200               | 50000                    | 20J                             | 1.8UJ             | 9.8U             | 9.4U     | 9,80          | 20          |
| gamma-BHC (Lindane)<br>gamma-Chlordane |                                         |                    |                          | 2UJ                             | 1.8UJ             | 9,8U             | 9.40     | 9.80          | 20          |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                     | IDLN        | EP Soil Cleanup Cr | iteria *                 | Sample ID: APSB5<br>Depth: 02 | APS85<br>06            | APSB6<br>06    | APSB6<br>10    | DTSB3<br>04    | DTSB3FR<br>04  |
|---------------------|-------------|--------------------|--------------------------|-------------------------------|------------------------|----------------|----------------|----------------|----------------|
| Analyte (ug/kg)     | Residential | Non-Residential    | Impact to<br>Groundwater | Zone**: AP<br>Date: 10/12/94  | AP<br>10/1 <u>2/94</u> | AP<br>10/21/94 | AP<br>10/21/94 | DT<br>10/27/94 | DT<br>10/27/94 |
| 4.4'-DDD            | 3000        | 12000              | 50000                    | 3.5U                          | 21U                    | 18UJ           | 21UJ           | 81J            | 19J            |
| 4,4-000             | 2000        | 9000               | 50000                    | 16J                           | 21U                    | 18UJ           | 21UJ           | 20UJ           | 20UJ           |
|                     | 2000        | 9000               | 500000                   | 81J                           | 210                    | 18UJ           | 58J            | 20UJ           | 20UJ           |
|                     | 40          | 170                | 50000                    | 1.80                          | 110                    | 9.4UJ          | 11UJ           | 10UJ           | 10UJ           |
| Agenter 1018        | 490         | 2000               | 50000                    | 350                           | 210U                   | 180UJ          | 210UJ          | 200UJ          | 200UJ          |
| Aroclar 1971        | 490         | 2000               | 50000                    | 710                           | 430U                   | 370UJ          | 430UJ          | 410UJ          | 410UJ          |
|                     | 490         | 2000               | 50000                    | 350                           | 210U                   | 180UJ          | 210UJ          | 200UJ          | 200UJ          |
| Arocior-1232        | 490         | 2000               | 50000                    | 350                           | 210U                   | 180UJ          | 210UJ          | 200UJ          | 200UJ          |
| Arocior-1244        | 490         | 2000               | 50000                    | 350                           | 210U                   | 180UJ          | 210UJ          | 200UJ          | 200UJ          |
| Arocior-1246        | 430         | 2000               | 50000                    | 350                           | 2100                   | 18011          | 210UJ          | 200UJ          | 200UJ          |
| Arocior-1254        | 490         | 2000               | 50000                    | 77                            | 2100                   | 180UJ          | 210UJ          | 200UJ          | 200UJ          |
| Arocior-1260        | 450         | 2000               | 50000                    | 831                           | 210                    | 18UJ           | 21UJ           | 20UJ           | 20UJ           |
| Dieldrin            | 42          | 160                | 80000                    | 1 811                         | 110                    | 9.40.1         | 1101           | 1003           | 10UJ           |
| Endosulfan          |             |                    |                          | 2 611                         | 2111                   | 180.1          | 2101           | 20UJ           | 20UJ           |
| Endosulfan li       |             | -                  |                          | 3.50                          | 210                    | 19111          | 210.1          | 2011           | 20UJ           |
| Endosulfan sulfate  |             |                    |                          | 3.50                          | 210                    | 1911           | 2107           | 2001           | 20UJ           |
| Endrin              | 17000       | 310000             | 50000                    | 3,50                          | 210                    | 1000           | 21111          | 2011           | 2011           |
| Endrin aldehyde     |             | -                  | **                       | 3.50                          | 86J<br>20              | 1011           | 2103           | 101            | 2003           |
| Endrin ketone       |             |                    |                          | 3.50                          | 30                     | 0.4111         | 11111          | 1011           | 1000           |
| Heptachlor          | 150         | 650                | 50000                    | R                             | 110                    | 9.400          | 1103           | 1003           | 1000           |
| Heptachlor epoxide  | -           |                    |                          | 1.80                          | 110                    | 9.403          | EE I           | 100111         | 1000           |
| Methoxychlor        | 280000      | 5200000            | 50000                    | 180                           | 2703                   | 9403           | 1100111        | 10000          | 100000         |
| Toxaphene           | 100         | 200                | 50000                    | 1800                          | 11000                  | 94003          | 1111           | 100003         | 10000          |
| alpha-BHC           |             |                    |                          | 1.80                          | 110                    | 9.400          | 11UJ<br>911    | 1000           | 1011           |
| alpha-Chlordans     |             |                    |                          | 7                             | 391                    | 9.400          | 213            | 1000           | 10111          |
| beta-BHC            |             |                    |                          | 1.80                          | 110                    | 9,401          | 1111           | 1000           | 1000           |
| delta-BHC           |             | ••                 |                          | 1.8U                          | 110                    | 9,4UJ          | 1100           | 1000           | 1000           |
| Sector BUG (Dedama) | 520         | 2200               | 50000                    | 1.80                          | 110                    | 9.4UJ          | 1100           | 1005           | 1000           |

7.4J

11U

Table 5-4: Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

gemma-BHC (Lindane)

gamma-Chlordane

2200

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520

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50000

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10UJ

11UJ

9,4UJ

12J

TIERRA-B-000838

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|                     | NJD         | EP Soil Cleanup Cri | terie *                  | Sample ID: ECIRMB1<br>Depth: 02 | ECIRMB3<br>02    | ECIRMB3<br>06    | ECPSB1<br>02    | ECPSB2          | ECP582<br>12    |
|---------------------|-------------|---------------------|--------------------------|---------------------------------|------------------|------------------|-----------------|-----------------|-----------------|
| Analyte (ug/kg)     | Residential | Non-Residential     | Impact to<br>Groundwater | Zone**: U<br>Date: 10/24/94     | N3TF<br>10/19/94 | N3TF<br>10/19/94 | ECP<br>10/20/94 | ECP<br>10/20/94 | ECP<br>10/20/94 |
| 4.4' DDD            | 2000        | 12000               | 50000                    | 62                              | 4.6.)            | 22UJ             | 3.8UJ           | 19UJ            | R               |
|                     | 2000        | 9000                | 50000                    | 8.9.1                           | 4.7              | 2201             | 8.7J            | 19UJ            | 23UJ            |
|                     | 2000        | 9000                | 500000                   | 200                             | 17,1             | 22UJ             | R               | 19UJ            | 23UJ            |
|                     | 2000        | 170                 | 50000                    | 20                              | 1.90             | 11UJ             | 1.9UJ           | 9.8UJ           | 12UJ            |
|                     | 490         | 2000                | 50000                    | 380                             | 370              | 220UJ            | 38UJ            | 190UJ           | 230UJ           |
|                     | 490         | 2000                | 50000                    | 78U                             | 750              | 440UJ            | 77UJ            | 390UJ           | 470UJ           |
| Arocior-1221        | 400         | 2000                | 50000                    | 3802                            | 370              | 220UJ            | 38UJ            | 190UJ           | 230UJ           |
| Arocior-1232        | 490         | 2000                | 50000                    | 381                             | 370              | 220UJ            | 38UJ            | 190UJ -         | 230UJ           |
| Aroclor-1242        | 490         | 2000                | 50000                    | 3811                            | 370              | 220UJ            | 38UJ            | 190UJ           | 230UJ           |
| Arocior-1248        | 490         | 2000                | 50000                    | 380                             | 370              | 220UJ            | 38UJ            | 190UJ           | 230UJ           |
| Arocior-1254        | 490         | 2000                | 50000                    | 380                             | 370              | 220UJ            | 38UJ            | 190UJ           | 230UJ           |
| Aroclor-1260        | 490         | 2000                | 50000                    | 27                              | 2.2.1            | 22UJ             | 3.8UJ           | 19UJ            | R               |
| Dieldrin            | 42          | 180                 | 30000                    | 211                             | 1.90             | 1103             | 1.9UJ           | 9.8UJ           | 12UJ            |
| Endosultan          |             | -                   |                          | 1 Ril                           | 3.70             | 22UJ             | 3.8UJ           | 19UJ            | 23UJ            |
| Endosultan II       | **          | -                   |                          | 3.80                            | 3 70             | 22UJ             | 3.8UJ           | 19UJ            | 23UJ            |
| Endosulfan sulfate  |             | -                   | 50000                    | 3.80                            | 3.70             | 22UJ             | 3.8UJ           | 19UJ            | 23UJ            |
| Endrin              | 17000       | 310000              | 30000                    | 8.00                            | 3 70             | 22UJ             | 3.8UJ           | 19UJ            | 23UJ            |
| Endrin aldehyde     |             | <del>~</del>        |                          | 7 BU                            | 3.70             | 2201             | 1.7J            | 19UJ            | 23UJ            |
| Endrin ketone       |             | -                   |                          | 3.60                            | 1 91             | 110              | 1.9UJ           | 9.8UJ           | 12UJ            |
| Heptechior          | 150         | 650                 | 50000                    | 20                              | 5 911            | 1103             | 1.9UJ           | 9.8UJ           | 1 2UJ           |
| Heptechior epoxide  |             |                     |                          | 130                             | 1911             | 1100.0           | 91J             | 98UJ            | 120UJ           |
| Methoxychior        | 280000      | 5200000             | 50000                    | 130                             | 1901             | 11000            | 1900            | 980UJ           | 1200UJ          |
| Toxaphene           | 100         | 200                 | 50000                    | 2000                            | P                | 1103             | R               | 9.8UJ           | 12UJ            |
| alpha-BHC           | ••          | -                   |                          | 20                              | * 5 T            | 11111            | 1.903           | 9.8UJ           | 12UJ            |
| alpha-Chlordane     |             |                     |                          | 3,80                            | 1.911            | 1100             | 1.90J           | 9,8UJ           | 12UJ            |
| beta-BHC            | ••          | -                   |                          | 20                              | 1.90             | 1101             | 1.9UJ           | 9.8UJ           | 12UJ            |
| delte-BHC           |             |                     |                          | 20                              | 1.00             | 1101             | 1.9UJ           | 9.8UJ           | 12UJ            |
| gamma-BHC (Lindana) | 520         | 2200                | 50000                    | 20                              | 1.90             | 1103             | 1.9UJ           | 9.8UJ           | 12UJ            |
| gamma-Chiordane     |             |                     |                          | n                               | 1.30             |                  |                 |                 |                 |

Table 5-4, Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

|                                        | NJD         | NJDEP Soil Cleanup Criteria * |                          |                   | ECPSB4<br>08    | ECPSB5<br>02    | GFSB1<br>02     | GTFIRMB1<br>02 | GTFIRMB2<br>02<br>GTE | GTFIRMB3<br>02<br>GTF |
|----------------------------------------|-------------|-------------------------------|--------------------------|-------------------|-----------------|-----------------|-----------------|----------------|-----------------------|-----------------------|
| Ansiyte (ug/kg)                        | Residential | Non-Residential               | Impact to<br>Groundwater | Zone : t<br>Date: | ECP<br>10/19/94 | ECP<br>10/19/94 | 51F<br>10/12/94 | 10/6/94        | 10/17/94              | 11/16/94              |
| 4.41.000                               | 2000        | 12000                         | 50000                    |                   | 20UJ            | R               | 72J             | R              | R                     | 190                   |
| 4,4'-000                               | 3000        | 9000                          | 50000                    |                   | 4R.J            | 5.3J            | 3.8UJ           | 8.5J           | 32J                   | 38                    |
| 4,4'-DDE                               | 2000        | 9000                          | 50000                    |                   | 2011            | 3.80.1          | 75J             | 58J            | 84J                   | 98J                   |
| 4,4'-DDT                               | 2000        | 9000                          | 500000                   |                   | 1101            | 211.1           | 1.9UJ           | 1.9UJ          | 1,9UJ                 | 9.3U                  |
| Aldrin                                 | 40          | 170                           | 50000                    |                   | 20001           | 3811.1          | 3801            | 37UJ           | 37UJ                  | 180U                  |
| Arcolor-1016                           | 490         | 2000                          | 50000                    |                   | 40000           | 78111           | 76UJ            | 74UJ           | 76UJ                  | 370U                  |
| Aroclor-1221                           | 490         | 2000                          | 50000                    |                   | 200111          | 3801            | 381.1           | 370.1          | 37UJ                  | 180U                  |
| Aroclor-1232                           | 490         | 2000                          | 50000                    |                   | 20003           | 39111           | 380.1           | 37UJ           | 37UJ                  | 1800                  |
| Aroclor-1242                           | 490         | 2000                          | 50000                    |                   | 20003           | 2011            | 38111           | 370.0          | 37UJ                  | 1800                  |
| Arcolor-1248                           | 490         | 2000                          | 50000                    |                   | 20003           | 3003            | 38111           | 3711.1         | 37UJ                  | 180U                  |
| Aroclor-1254                           | 490         | 2000                          | 50000                    |                   | 20005           | 3803            | 30111           | 37111          | 37UJ                  | 180U                  |
| Aroclor-1260                           | 490         | 2000                          | 50000                    |                   | 200UJ           | 3803            | 3003            | 41             | 10.1                  | 21                    |
| Dieldrin                               | 42          | 180                           | 50000                    |                   | 20UJ            | 3.8UJ           | 3,0UJ           | 10111          | 1.90.1                | 9.30                  |
| Endosulfan I                           |             |                               | •••                      |                   | 35J             | 20J             | 1.903           | 1.303          | 3 7111                | 180                   |
| Endosulfan il                          | **          |                               |                          |                   | 20UJ            | 3.8UJ           | 3.8UJ           | 3.703          | 3.705                 | 180                   |
| Endosulfan sulfate                     |             |                               | ••                       |                   | 20UJ            | 3.8UJ           | 3.8UJ           | 3.703          | 3,705                 | 180                   |
| Fodrio                                 | 17000       | 310000                        | 50000                    |                   | 20UJ            | 3.8UJ           | 3.8UJ           | 3.703          | 3.703                 | 180                   |
| Endrin eldebyde                        |             | •-                            | ••                       |                   | 20UJ            | 3.8UJ           | 3.8UJ           | 3,703          | 3,703                 | 180                   |
| Endrin ketone                          |             |                               |                          |                   | 20UJ            | 15J             | 6,4J            | 3.7UJ          | 3.703                 | 9.30                  |
| Lentechlor                             | 150         | 650                           | 50000                    |                   | 10UJ            | 2UJ             | 1.9UJ           | 1.901          | 1.901                 | 9,30                  |
| Heptechlot enovide                     |             |                               |                          |                   | 10UJ            | 201             | 1,9UJ           | 1.900          | 1.305                 | 100                   |
|                                        | 280000      | 5200000                       | 50000                    |                   | 100UJ           | 20UJ            | 19UJ            | 190J           | 190171                | 92011                 |
| Taxanhana                              | 100         | 200                           | 50000                    |                   | 1000UJ          | 200UJ           | 190UJ           | 1900J          | 19003                 | 9300                  |
|                                        |             |                               |                          |                   | 10UJ            | 2UJ             | 1,9UJ           | 1.9UJ          | 1.903                 | 5.30                  |
| alpha-BHC                              |             |                               |                          |                   | 39J             | R               | R               | 1.9UJ          | 1,903                 | 9.30                  |
| alpha-Chlordane                        |             |                               | <b></b>                  |                   | 10UJ            | ZUJ             | 1.9UJ           | 1.9UJ          | 1.9UJ                 | 9,30                  |
| beta-BHC                               | -           |                               |                          |                   | 10UJ            | 2UJ             | 1.9UJ           | 1.9UJ          | 1.9UJ                 | 9,30                  |
| deita-BHC                              |             |                               | 50000                    |                   | 1000            | 2UJ             | 1,9UJ           | 1,9UJ          | 1,9UJ                 | 9,30                  |
| gamma-BHC (Lindane)<br>gamma-Chlordane | 520         |                               |                          |                   | 63J             | 2UJ             | 1.9UJ           | 7.3J           | 1.9UJ                 | 75                    |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                      | NJDI        | EP Soil Cleanup Cri | toria *                  | Sample ID: GTFiRM84<br>Depth: 02 | GTFIRM85<br>02  | GTFIRMB5FR<br>02 | GTFIRM85<br>08<br>CTF | GTFIRMB6<br>04<br>GTF |
|----------------------|-------------|---------------------|--------------------------|----------------------------------|-----------------|------------------|-----------------------|-----------------------|
| Analyte (ug/kg)      | Residential | Non-Residential     | Impact to<br>Groundwater | Zone**: GTF<br>Date: 10/17/94    | G1F<br>10/05/94 | 10/05/94         | 11/16/94              | 11/16/94              |
| 4 A'-DDD             | 3000        | 12000               | 50000                    | 22J                              | 4.1U            | 4.2U             | 12J                   | R                     |
|                      | 2000        | 9000                | 50000                    | <b>23</b> J                      | 4.8J            | 6.3J             | 4.3UJ                 | 240                   |
| 4,4 'DDE<br>4 4'-DDT | 2000        | 9000                | 500000                   | 6.9J                             | R               | R                | 4.3UJ                 | 240                   |
| 4,4 ·001             | 40          | 170                 | 50000                    | 2UJ                              | R               | 2.7J             | 2,2UJ                 | 12U                   |
|                      | 490         | 2000                | 50000                    | 3900                             | 41U             | 42U              | 43UJ                  | 240U                  |
|                      | 490         | 2000                | 50000                    | 80UJ                             | 83U             | 85U              | 88UJ                  | 490U                  |
| Arocior-1221         | 490         | 2000                | 50000                    | 39UJ                             | 41U             | 42U              | 43UJ                  | 240U                  |
| Arocior-1232         | 490         | 2000                | 50000                    | 390.1                            | 41U             | 42U              | 43UJ                  | 240U                  |
| Araclor-1242         | 490         | 2000                | 50000                    | 39111                            | 410             | 42U              | 43UJ                  | 240U                  |
| Aroclor-1248         | 490         | 2000                | 50000                    | 39111                            | 410             | 420              | 43UJ                  | 2400                  |
| rocior-1254          | 490         | 2000                | 50000                    | 39111                            | 41U             | 42U              | 43UJ                  | 240U                  |
| Arocior-1260         | 490         | 2000                | 50000                    | 3 9(1)                           | 9.3             | 9.8              | 4.3UJ                 | 32J                   |
| Dieldrin             | 42          | 180                 | 50000                    | 2111                             | 54              | 2.10             | 2.2UJ                 | 12U                   |
| indosulfan l         |             | ••                  |                          | 200                              | 4 111           | 4.20             | 4.3UJ                 | 24U                   |
| indosulfan II        |             |                     | **                       | 3,503                            | 4.10            | 4 211            | 4.3UJ                 | 24U                   |
| indosulfan sulfate   | ••          | ••                  |                          | 3,500                            | 4.10            | 4 211            | 4.3UJ                 | R                     |
| indrin               | 17000       | 310000              | 50000                    | 3,75                             | 9,10            | 4 201            | 4.4.1                 | 240                   |
| indrin aldehyde      |             | ••                  |                          | 3,900                            | 3.03            | 4.711            | 4.3UJ                 | 24U                   |
| indrin ketone        |             | · ••                |                          | 3,900                            | 4.10            | 2 111            | 2.201                 | 12U                   |
| laptachior           | 150         | 650                 | 50000                    | ZUJ                              | 2.10            | 51               | 2.203                 | 12J                   |
| leptachlor epoxide   | *           |                     |                          | 203                              | N 1101          | 921              | 22111                 | 210                   |
| Vethoxychlor         | 280000      | 5200000             | 50000                    | 20UJ                             | 1100            | 71011            | 22001                 | 12000                 |
| Toxaphene            | 100         | 200                 | 50000                    | 200UJ                            | 2100            | 2100             | 2.200                 | 120                   |
| Ipha-BHC             |             |                     | ÷-                       | 2UJ                              | 2,10            | 2.10             | 2 2 1 1               | 120                   |
| Ipha-Chiordane       |             |                     |                          | 2UJ                              | 2.10            | 2.10             | 2 2111                | 120                   |
| eta-BHC              |             |                     |                          | 2UJ                              | 2.10            | 2,10             | 2.200                 | 120                   |
| delta-BHC            |             |                     |                          | 2UJ                              | 2.10            | 2.10             | 2.200                 | 120                   |
| gamma-BHC (Lindane)  | 520         | 2200                | 50000                    | 2UJ                              | 2.10            | 2,10             | 2,200                 | R                     |
| gemma-Chlordane      |             | · ••                | **                       | 3.6J                             | 23              | 23               | n                     | n                     |

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Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Beyonne Plant, Beyonne, New Jersey.

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|                                        | NJDEP Soil Cleanup Criteria * |                 |                          | Sample ID: GTFIRM87<br>Depth: 02 | GTFIRMB8<br>02  | GTFIRMB8<br>08  | GTFIRMB9<br>02  | GTFSB1<br>02    |
|----------------------------------------|-------------------------------|-----------------|--------------------------|----------------------------------|-----------------|-----------------|-----------------|-----------------|
| Analyte (ug/kg)                        | Residential                   | Non-Residential | Impact to<br>Groundwater | Zone**: GTF<br>Date: 10/17/94    | GTF<br>10/18/94 | GTF<br>10/18/94 | GTF<br>10/05/94 | GTF<br>10/10/94 |
|                                        | 1000                          | 12000           | 50000                    | 3 70                             | 8.2.1           | 4.3UJ           | 7.8J            | 18J             |
| 4,4-000                                | 3000                          | 9000            | 50000                    | 3.71                             | 3.80.0          | 4.3UJ           | 7.3             | 4UJ             |
| 4,4 -DDE                               | 2000                          | 8000            | 50000                    | 13.1                             | 3.801           | 11J             | 35              | 4,6J            |
| 4,4-001                                | 2000                          | \$000           | 500000                   | 1 911                            | 2111            | 2.201           | 2.1U            | 2UJ             |
| Aldrin                                 | 40                            | 170             | 50000                    | 2711                             | 38111           | 4311.1          | 41U             | 40UJ            |
| Arocior-1016                           | 490                           | 2000            | 50000                    | 7411                             | 77111           | 87111           | 830             | 81UJ            |
| Aroclor-1221                           | 490                           | 2000            | 50000                    | 760                              | 29111           | 43111           | 410             | 40UJ            |
| Aroclor-1232                           | 490                           | 2000            | 50000                    | 370                              | 3803            | 43117           | 410             | 40UJ            |
| Aroclor-1242                           | 490                           | 2000            | 50000                    | 3/0                              | 3803            | 4303            | 410             | 4003            |
| Aroclor-1248                           | 490                           | 2000            | 50000                    | 370                              | 3803            | 4303            | 410             | 4000            |
| Aroclor-1254                           | 490                           | 2000            | 50000                    | 370                              | 3803            | 4305            | 410             | 400.1           |
| Aroclor-1260                           | 490                           | 2000            | 50000                    | 370                              | 3801            | 4305            | 410             | 4111            |
| Dieldrin                               | 42                            | 180             | 50000                    | 4.4                              | 3.80J           | 113             | 2 111           | 2111            |
| Endosulfen I                           |                               |                 |                          | 1.90                             | 2UJ             | 2.203           | 4 111           | 4111            |
| Endosulfan II                          |                               |                 |                          | 3.70                             | 3.8UJ           | 4.3UJ           | 4.10            | 400<br>B        |
| Endosulfan sulfate                     |                               |                 |                          | 3.70                             | 3.8UJ           | 4,300           | 4.10            | AU11            |
| Fodrin                                 | 17000                         | 310000          | 50000                    | 3.70                             | 3.8UJ           | 4.3UJ           | 4.10            | 405             |
| Endrin sidebyde                        |                               |                 |                          | 3.7U                             | ,79J            | 4.3UJ           | 4.10            | л<br>АЦЦ        |
| Endrin ketone                          |                               |                 | ••                       | 3.70                             | 3.8UJ           | 4,3UJ           | 4.10            | 400             |
| Hestechlor                             | 150                           | 650             | 50000                    | 1.90                             | 2UJ             | 2.2UJ           | 2.10            | 203             |
| Hentechlor enovide                     |                               | ••              |                          | 5.3J                             | 2UJ             | 2.2UJ           | 24              | 203             |
| Neptechior epoxico                     | 280000                        | 5200000         | 50000                    | 190                              | 20UJ            | 22UJ            | 210             | K               |
| Taughtere                              | 100                           | 200             | 50000                    | 190U                             | 200UJ           | 220UJ           | 2100            | 20003           |
| I Oxephene                             |                               |                 |                          | 1,9U                             | 2UJ             | 2.2UJ           | 2.10            | 200             |
| appa-one                               |                               | **              |                          | 1.90                             | 1.5J            | R               | 2,10            | 203             |
| alpha-Chiordana                        | -                             |                 |                          | 1,9U                             | 2UJ             | 2.2UJ           | 2.10            | ZUJ             |
| beta-BHC                               | -                             |                 |                          | 1.90                             | 2UJ             | 2.2UJ           | 2,10            | 20,1            |
| delta-BHC                              |                               | 2200            | 50000                    | 1.9U                             | 2UJ             | 2.2UJ           | 2.1U            | 203             |
| gamma-BHC (Lindane)<br>gamma-Chlordane | 520                           |                 |                          | 1 <b>2</b> J                     | 3.3J            | 6.8J            | 35              | 2.5J            |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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| NJDE        | P Soil Cleanup Cri                                                                               | teria *                                                                                                                                                                                                                                                                                                        | Sample ID: GTF\$B1<br>Depth: 08                                                                                                                                                                                                                                                                                                                                                            | GTFSB2<br>02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | GTFSB3<br>02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | GTFSB4<br>02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | GTFSB5<br>02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | GTFSB6<br>02                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Residential | Non-Residential                                                                                  | Impact to<br>Groundwater                                                                                                                                                                                                                                                                                       | Zone**: GTF<br>Date: 10/10/94                                                                                                                                                                                                                                                                                                                                                              | GTF<br>10/13/94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GTF<br>10/10/94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | GTF<br>10/13/94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | GTF<br>10/13/94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 10/11/94                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|             | 10000                                                                                            | E0000                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                            | 2011                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3.90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3.5UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 14                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3000        | 12000                                                                                            | 50000                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                            | 2011                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3.5UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 18                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2000        | 9000                                                                                             | 50000                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                            | 1001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 360                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3.5UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 120                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2000        | 9000                                                                                             | 500000                                                                                                                                                                                                                                                                                                         | n<br>B                                                                                                                                                                                                                                                                                                                                                                                     | 1000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3J                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1.8UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.90                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 40          | 170                                                                                              | 50000                                                                                                                                                                                                                                                                                                          | n<br>B                                                                                                                                                                                                                                                                                                                                                                                     | 2000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3911                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 371/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 35UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 37U                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 490         | 2000                                                                                             | 50000                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                            | 4100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 791                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 750                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 72UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 76U                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 490         | 2000                                                                                             | 50000                                                                                                                                                                                                                                                                                                          | R                                                                                                                                                                                                                                                                                                                                                                                          | 4100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2011                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3712                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 350.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 37U                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 490         | 2000                                                                                             | 50000                                                                                                                                                                                                                                                                                                          | н                                                                                                                                                                                                                                                                                                                                                                                          | 2000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 330                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3711                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 35111                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 370                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 490         | 2000                                                                                             | 50000                                                                                                                                                                                                                                                                                                          | R                                                                                                                                                                                                                                                                                                                                                                                          | 2000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 390                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 370                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 36111                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 370                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 490         | 2000                                                                                             | 50000                                                                                                                                                                                                                                                                                                          | R                                                                                                                                                                                                                                                                                                                                                                                          | 2000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 390                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 370                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 25111                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 370                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 490         | 2000                                                                                             | 50000                                                                                                                                                                                                                                                                                                          | R                                                                                                                                                                                                                                                                                                                                                                                          | 2000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 390                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 370                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3505                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 370                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 490         | 2000                                                                                             | 50000                                                                                                                                                                                                                                                                                                          | R                                                                                                                                                                                                                                                                                                                                                                                          | 2000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 390                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 370                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3503                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 8 A                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 42          | 180                                                                                              | 50000                                                                                                                                                                                                                                                                                                          | R                                                                                                                                                                                                                                                                                                                                                                                          | 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3,90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 101                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|             |                                                                                                  |                                                                                                                                                                                                                                                                                                                | R                                                                                                                                                                                                                                                                                                                                                                                          | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1,90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.803                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2 71                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|             |                                                                                                  |                                                                                                                                                                                                                                                                                                                | R                                                                                                                                                                                                                                                                                                                                                                                          | 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3,503                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3,70                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| ••          |                                                                                                  |                                                                                                                                                                                                                                                                                                                | R                                                                                                                                                                                                                                                                                                                                                                                          | 20U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3,9U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3,70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3,70                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 17000       | 310000                                                                                           | 50000                                                                                                                                                                                                                                                                                                          | R                                                                                                                                                                                                                                                                                                                                                                                          | 20U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3,5UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.70                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|             |                                                                                                  |                                                                                                                                                                                                                                                                                                                | R                                                                                                                                                                                                                                                                                                                                                                                          | 20U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3,9U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3.5UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.70                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|             |                                                                                                  |                                                                                                                                                                                                                                                                                                                | R                                                                                                                                                                                                                                                                                                                                                                                          | 20U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3,5UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 94                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 150         | 650                                                                                              | 50000                                                                                                                                                                                                                                                                                                          | R                                                                                                                                                                                                                                                                                                                                                                                          | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.9U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.8UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.90                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 150         |                                                                                                  |                                                                                                                                                                                                                                                                                                                | R                                                                                                                                                                                                                                                                                                                                                                                          | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1.8UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.9U                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|             | E200000                                                                                          | 50000                                                                                                                                                                                                                                                                                                          | R                                                                                                                                                                                                                                                                                                                                                                                          | 100U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 19U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 18UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 190                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 280000      | 3200000                                                                                          | 50000                                                                                                                                                                                                                                                                                                          | B                                                                                                                                                                                                                                                                                                                                                                                          | 10000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1900                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1800J                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1900                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 100         | 200                                                                                              | 50000                                                                                                                                                                                                                                                                                                          | R                                                                                                                                                                                                                                                                                                                                                                                          | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1. <del>9</del> U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1.8UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.90                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|             |                                                                                                  |                                                                                                                                                                                                                                                                                                                | R                                                                                                                                                                                                                                                                                                                                                                                          | 10U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 9.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1,8UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 9.6                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| ••          |                                                                                                  | -                                                                                                                                                                                                                                                                                                              | R                                                                                                                                                                                                                                                                                                                                                                                          | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.9U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.8UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.90                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|             |                                                                                                  |                                                                                                                                                                                                                                                                                                                | R                                                                                                                                                                                                                                                                                                                                                                                          | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1,90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1,8UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.90                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|             |                                                                                                  |                                                                                                                                                                                                                                                                                                                | D                                                                                                                                                                                                                                                                                                                                                                                          | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.9U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.8UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1,9U                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 520         | 2200                                                                                             | 50000                                                                                                                                                                                                                                                                                                          | R                                                                                                                                                                                                                                                                                                                                                                                          | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 27J                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.8UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2.2J                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|             | NJDE<br>Residential<br>3000<br>2000<br>2000<br>40<br>490<br>490<br>490<br>490<br>490<br>490<br>4 | NJDEP Soil Cleanup Cri    Residential  Non-Residential    3000  12000    2000  9000    2000  9000    40  170    490  2000    490  2000    490  2000    490  2000    490  2000    490  2000    490  2000    490  2000    490  2000    490  2000    490  2000    490  2000    490  2000    490  2000    150  650 | NJDEP Soil Cleanup Criteria *  Impact to<br>Groundwater    Residential  Non-Residential  Groundwater    3000  12000  50000    2000  9000  50000    2000  9000  50000    40  170  50000    490  2000  50000    490  2000  50000    490  2000  50000    490  2000  50000    490  2000  50000    490  2000  50000    490  2000  50000    490  2000  50000    42  180  50000    42  180  50000 | NJDEP Soil Cleanup Criterie *  Depth: 08    Residential  Non-Residential  Groundwater  Depth: 08    3000  12000  50000  R    2000  9000  50000  R    2000  9000  50000  R    40  170  50000  R    490  2000  50000  R    17000  310000  50000  R    150  650  50000  R    100  200  50000  R    100  200  50000  R    100  2 | NJDEP Soll Cleanup Criterie *  Depth: 08  02    Residential  Non-Residential  Groundwater  Date: 10/10/94  10/13/94    3000  12000  50000  R  20U    2000  9000  50000  R  20U    2000  9000  50000  R  20U    2000  9000  50000  R  100J    40  170  50000  R  100J    490  2000  50000  R  200U    490  2000  50000  R  20U    490  2000  50000  R  20U    490  2000  50000  R  20U    100  1000  50000  R  20U | NJDEP Soil Cleanup Criteria *  Depth: 08  02  02    Residential  Non-Residential  Groundwater  Depth: 08  02  02    3000  12000  50000  R  20U  3.9U    2000  9000  50000  R  20U  6.1    2000  9000  50000  R  10U  2U    40  170  50000  R  10U  2U    490  2000  50000  R  10U  2U    490  2000  50000  R  200U  39U    490  2000  50000  R  200U  3.9U    17000  310000  50000  R  20U | NJDEP Soil Cleanup Criterie *  Depth: 08  02  02  02  02  02    Residentiel  Non-Residentiel  Groudwater  Depth: 08  02  01/10/94  10/10/94  10/13/94    3000  12000  50000  R  20U  3.9U  81    2000  9000  50000  R  20U  3.9U  81    2000  9000  50000  R  100J  20  360    40  170  50000  R  100J  2U  3J    490  2000  50000  R  200U  39U  37U    490  2000  50000  R  20 | NJDEP Soll Cleanup Criteria *  Depth: 08  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  02  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03  03 |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                     | NJDEP Soil Cleanup Criteria |                 |                          | Sample ID: GTFSB7<br>Depth: 02 | GTFSB7<br>08    | GTFSB8<br>04    | GTFSB8<br>08    | GTFSB9<br>02    | GTFSB9<br>08    |
|---------------------|-----------------------------|-----------------|--------------------------|--------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Analyte (ug/kg)     | Residential                 | Non-Residential | Impact to<br>Groundwater | Zone**: GTF<br>Date: 10/11/94  | GTF<br>10/13/94 | GTF<br>10/13/94 | GTF<br>10/13/94 | GTF<br>10/13/94 | GTF<br>11/16/94 |
| A A'-DDD            | 3000                        | 12000           | 50000                    | 15                             | 22U             | 190             | 220             | 17J             | 19U             |
|                     | 2000                        | 9000            | 50000                    | 3.80                           | 22U             | 19U             | 22U             | 12              | 19U             |
|                     | 2000                        | 9000            | 500000                   | 3.80                           | 22U             | 190             | 22U             | 19              | 190             |
|                     | 2000                        | 170             | 50000                    | 20                             | 120             | 9.80            | 110             | 3.9             | 9.9U            |
|                     | 490                         | 2000            | 50000                    | 381                            | 220U            | 1900            | 220U            | 36U             | 1900            |
| Arocior-1016        | 400                         | 2000            | 50000                    | 774                            | 460U            | 3900            | 450U            | 73U             | 3900            |
|                     | 480                         | 2000            | 50000                    | 380                            | 2200            | 190U            | 220U            | 36U             | 1900            |
| Arocior-1232        | 450                         | 2000            | 50000                    | 380                            | 2200            | 190U            | 220U            | 36U             | 190U            |
| Aroclor-1242        | 490                         | 2000            | 50000                    | 380                            | 2200            | 1900            | 220U            | 36U             | 190U            |
| Arocior-1248        | 490                         | 2000            | 50000                    | 280                            | 22011           | 1900            | 220U            | 36U             | 190U            |
| Aroclor-1254        | 490                         | 2000            | 50000                    | 1911                           | 2200            | 1900            | 220U            | 38U             | 190U            |
| Aroclor-1260        | 490                         | 2000            | 50000                    | 2 011                          | 2200            | 191             | 220             | 3.6U            | 19U             |
| Dieldrin            | 42                          | 180             | 50000                    | 3,80                           | 120             | 9 80            | 110             | 1.8U            | 9,9U            |
| Endosulfan I        |                             |                 |                          | 20                             | 221             | 1911            | 2211            | 3.6U            | 190             |
| Endosulfan II       |                             |                 |                          | 3.80                           | 220             | 100             | 220             | 3.60            | 190             |
| Endosulfan sulfate  |                             |                 |                          | 3.80                           | 220             | 190             | 2211            | 3.60            | 190             |
| Endrin              | 17000                       | 310000          | 50000                    | 3.80                           | 220             | 190             | 220             | 3 60            | 26.             |
| Endrin aldehyde     |                             |                 |                          | 3.80                           | 220             | 190             | 220             | 3.811           | 190             |
| Endrin ketone       |                             |                 |                          | 3.80                           | 220             | 190             | 111             | 1 90            | 9.911           |
| Heptechlor          | 150                         | 650             | 50000                    | 20                             | 120             | 9,8U            | 110             | 1 811           | 9.911           |
| Heptschlor spoxide  | '                           |                 |                          | 20                             | 120             | 9.80            | 110             | 1.00            | 9,90<br>9911    |
| Methoxychior        | 280000                      | 5200000         | 50000                    | 200                            | 1200            | 980             | 1100            | 180             | 990             |
| Toxaphene           | 100                         | 200             | 50000                    | 200U                           | 12000           | 9800            | 11000           | 1 911           | 9300            |
| alpha-BHC           |                             |                 | -                        | 20                             | 120             | 9.80            | 110             | 1.00            | 9.90            |
| alpha-Chiordane     |                             | -               | ••                       | 2.4                            | 120             | 9.80            | 110             | 1.00            | 9.90            |
| beta-BHC            | <b></b>                     |                 |                          | 20                             | 120             | 9.80            | 110             | 1.00            | 9 911           |
| delte-BHC           |                             |                 |                          | 2U                             | 120             | 9.80            | 110             | 1.80            | 3.30<br>9.90    |
| camma-BHC (Lindane) | 520                         | 2200            | 50000                    | 20                             | 120             | 9.8U            | 110             | 1,80            | 7,70<br>0 911   |
| gamma-Chlordane     | -                           | -               |                          | 20                             | 120             | 9.8U            | 12J             | 1.80            | 3.30            |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

|                     | NJDI           | P Soil Cleanup Cr | iteria *                 | Sample ID: LAIF<br>Depth: 02 | RMB1        | LOSB1<br>04    | LOSB1<br>08 | LOSB2<br>04      | LOSB2<br>08 | LOSB3<br>02<br>LO |
|---------------------|----------------|-------------------|--------------------------|------------------------------|-------------|----------------|-------------|------------------|-------------|-------------------|
| Analyte (ug/kg)     | Residential    | Non-Residential   | Impact to<br>Groundwater | Zone**: LO<br>Dste: 10/2     | 24/94       | LO<br>10/25/94 | 10/25/94    | 10/1 <u>4/94</u> | 10/14/94    | 10/24/94          |
|                     |                | 12000             | 50000                    | 850                          | 000         | 19UJ           | 19U         | 43               | 31U         | 4U                |
| 4,4'-000            | 3000           | 12000             | 50000                    | R                            |             | 19UJ           | 19U         | 23U              | 31U         | 4U                |
| 4,4'-DDE            | 2000           | 9000              | 500000                   | 460                          | 000         | 19UJ           | 190         | 23U              | 130         | 4U                |
| 4,4'-DD1            | 2000           | 3000              | 50000                    | 450                          | <u></u>     | 32J            | 9.8V        | 12U              | 16U         | 2.1U              |
| Aldrin              | 40             | 170               | 50000                    | 880                          |             | 1900.0         | 190U        | 230U             | 310U        | 40U               |
| Aroclor-1016        | 490            | 2000              | 50000                    | 180                          | 000         | 390UJ          | 390U        | 470U             | 620U        | 82U               |
| Aroclor-1221        | 490            | 2000              | 50000                    | 880                          | nou         | 1900.0         | 190U        | 230U             | 310U        | 40U               |
| Aroclor-1232        | 490            | 2000              | 50000                    | 890                          |             | 1900           | 190U        | 230U             | 310U        | 40U               |
| Araclor-1242        | 490            | 2000              | 50000                    | 280                          |             | 1901           | 190U        | 230U             | 310U        | 40U               |
| Arocior-1248        | 490            | 2000              | 50000                    | 880                          |             | 1900.0         | 1900        | 230U             | 310U        | 40U               |
| Aroclor-1254        | 490            | 2000              | 50000                    | 990                          |             | 1900.0         | 190U        | 230U             | 310U        | 40U               |
| Aroclor-1260        | 490            | 2000              | 50000                    | 500                          |             | 190.0          | 190         | 23U              | 310         | 4U                |
| Dieldrin            | 42             | 180               | 50000                    | 450                          |             | 9 9111         | 9.80        | 120              | 16U         | 2.1U              |
| Endosulfan i        |                | ••                | ••                       | 450                          |             | 19111          | 190         | 230              | 31U         | 4U                |
| Endosulfan II       | ••             |                   | **                       | 000                          |             | 19111          | 190         | 23U              | 310         | 4U                |
| Endosulfan sulfate  | ••             |                   |                          | 600                          |             | 1911           | 190         | 23U              | 31U         | 4U                |
| Endrin              | 17000          | 310000            | 50000                    | 800                          |             | P              | 190         | 23U              | R           | 4U                |
| Endrin aldehyde     |                |                   | ••                       | 880                          |             | 19111          | 190         | 23U              | 74J         | 4U                |
| Endrin ketone       |                |                   |                          | R 450                        | 011         | 1903           | 9 80        | 120              | 1.6U        | 2.1U              |
| Heptachlor          | 150            | 650               | 50000                    | 450                          |             | 0.900          | 9.80        | 120              | 160         | 2.10              |
| Heptechlor epoxide  |                |                   |                          | 450                          |             | 9,905          | 9811        | 1200             | 1600        | 21U               |
| Methoxychlor        | 280000         | 5200000           | 50000                    | 450                          |             | 9900           | 9800        | 12000            | 1600U       | 210U              |
| Toxaphena           | 100            | 200               | 50000                    | 400                          | 0000        | 9 9111         | 9.80        | 12U              | 16U         | 2.1U              |
| alpha-BHC           | ••             | ••                |                          | 450                          | 00          | 9.905          | 121         | 120              | 160         | 2.1U              |
| alpha-Chlordane     | <del>.</del> - |                   |                          | R                            | <b>0</b> 11 | 3:J<br>6 6111  | 9.80        | 120              | 16U         | 2.1U              |
| beta-BHC            |                |                   | -+                       | 450                          |             | 9,903          | 9.80        | 120              | 16U         | 2.1U              |
| deita-BHC           |                |                   |                          | 450                          | 00          | 3,303          | 9.80        | 120              | 16U         | 2.1U              |
| gamme-BHC (Lindane) | 520            | 2200              | 50000                    | 450                          | 00          | 3.300          | 9 811       | 120              | 16U         | 2.1U              |
| gamma-Chlordane     |                |                   |                          | 180                          | 00          | ~~~            | 0.00        |                  |             |                   |

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Table 5-4. Pasticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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| Analyte (ug/kg)                        | NJDI<br>Residential | EP Soil Cleanup Cri<br>Non-Residential | iteria *<br>Impact to<br>Groundwater | Sample ID: LOSB4<br>Depth: 02<br>Zone**: L0<br>Date: 10/24/94 | LOSB4<br>06<br>LO<br>10/24/94 | LOSB8<br>02<br>SS<br>10/24/94 | LOS <b>B9</b><br>02<br>LO<br>10/25/94 | LOS <b>B9</b><br>0 <del>6</del><br>LO<br>10/25/94 | LOSB10<br>04<br>L0<br>10/28/94 | LOSB10<br>08<br>LO<br>10/28/94 | LOS811<br>02<br>LO<br>10/25/94 |
|----------------------------------------|---------------------|----------------------------------------|--------------------------------------|---------------------------------------------------------------|-------------------------------|-------------------------------|---------------------------------------|---------------------------------------------------|--------------------------------|--------------------------------|--------------------------------|
|                                        |                     |                                        |                                      |                                                               | 10111                         | 3 9111                        | 21111                                 | 180.0                                             | 76J                            | 190                            | 230                            |
| 4,4'-000                               | 3000                | 12000                                  | 50000                                | 54                                                            | 10111                         | 3,803                         | 2100                                  | 1803                                              | 18U                            | 19U                            | 31J                            |
| 4,4'-DDE                               | 2000                | 9000                                   | 50000                                | 3,4J<br>3 EU                                                  | 18111                         | 3 8111                        | 210.0                                 | 1803                                              | 18U                            | 190                            | 22U                            |
| 4,4'-DDT                               | 2000                | 9000                                   | 500000                               | 3.50                                                          | 0111                          | 2111                          | 110.3                                 | 9 4111                                            | 9.5U                           | 9.9U                           | 110                            |
| Aldrin                                 | 40                  | 170                                    | 50000                                | 1.80                                                          | 303                           | 200                           | 210111                                | 1800.0                                            | 1800                           | 190U                           | 220U                           |
| Aroclor-1016                           | 490                 | 2000                                   | 50000                                | 350                                                           | 18000                         | 3803                          | 43000                                 | 37011                                             | 3700                           | 390U                           | 440U                           |
| Aroclor-1221                           | 490                 | 2000                                   | 50000                                | 710                                                           | 36000                         | 2011                          | 21011                                 | 1800.0                                            | 1800                           | 190U                           | 220U                           |
| Aroclar-1232                           | 490                 | 2000                                   | 50000                                | 350                                                           | 18003                         | 3803                          | 21003                                 | 18000                                             | 1800                           | 1900                           | 220U                           |
| Aroclor-1242                           | 490                 | 2000                                   | 50000                                | 350                                                           | 18003                         | 3003                          | 21005                                 | 18000                                             | 1800                           | 190U                           | 220U                           |
| Aroclor-1248                           | 490                 | 2000                                   | 50000                                | 350                                                           | 18000                         | 3803                          | 21003                                 | 18003                                             | 1800                           | 190U                           | 220U                           |
| Aroclor-1254                           | 490                 | 2000                                   | 50000                                | 350                                                           | 18003                         | 3803                          | 21000                                 | 18003                                             | 1800                           | 1900                           | 220U                           |
| Aroctor-1260                           | 490                 | 2000                                   | 50000                                | 350                                                           | 18000                         | 38UJ                          | 21003                                 | 10111                                             | 180                            | 190                            | 22U                            |
| Dieldrin                               | 42                  | 180                                    | 50000                                | 3.8                                                           | 18UJ                          | 14J                           | 2105                                  | 9 4111                                            | 9.50                           | 9.90                           | 110                            |
| Endosulfan i                           |                     |                                        | ••                                   | 1.8U                                                          | 900                           | 203                           | 2111                                  | 1911                                              | 1811                           | 190                            | 22U                            |
| Endouilfan II                          |                     |                                        |                                      | 3.5U                                                          | 18UJ                          | 3,805                         | 2103                                  | 1000                                              | 181                            | 190                            | 22U                            |
| Endosulfan sulfata                     |                     |                                        |                                      | 3.50                                                          | 18UJ                          | 3,8UJ                         | 2105                                  | 1000                                              | 1911                           | 190                            | 22U                            |
| Endrin                                 | 17000               | 310000                                 | 50000                                | 3.50                                                          | 18UJ                          | 3,800                         | 2103                                  | 1003                                              | 1911                           | 190                            | 220                            |
| Endrin eldebyde                        | -                   |                                        |                                      | R                                                             | 18UJ                          | R                             | 2103                                  | 1800                                              | 1911                           | 1911                           | 220                            |
| Endrin ketone                          |                     |                                        |                                      | 3.5U                                                          | 18UJ                          | 3.801                         | 2103                                  |                                                   | 9 51                           | 9.90                           | 110                            |
| Hentechior                             | 150                 | 650                                    | 50000                                | 1.8U                                                          | 9UJ                           | 20J                           | 1103                                  | 5.405                                             | 9.50                           | 9.90                           | 110                            |
| Hentechlot enoxide                     |                     |                                        |                                      | 1.8U                                                          | 9UJ                           | 8,6J                          | 1105                                  | 9,405                                             | 9,00                           | 9911                           | 1100                           |
| Methoryabler                           | 280000              | 5200000                                | 50000                                | 18U                                                           | 90UJ                          | 20UJ                          | 11005                                 | 9403                                              | 950                            | 99011                          | 1100U                          |
| Tevenhene                              | 100                 | 200                                    | 50000                                | 180U                                                          | 900W                          | 200UJ                         | 110003                                | 94003                                             | 9500                           | 9.90                           | 110                            |
|                                        |                     |                                        |                                      | 1,8U                                                          | 9UJ                           | 2UJ                           | - 310J                                | 9,400                                             | 9.50                           | 9.90                           | 110                            |
| alpha-ono                              | **                  | ••                                     | ••                                   | 1.8U                                                          | 9UJ                           | 2UJ                           | 1103                                  | 9,403                                             | 9,50                           | 0.01                           | 110                            |
| alpha-Chioroane                        |                     |                                        |                                      | 1,8U                                                          | 9UJ                           | 2UJ                           | 110J                                  | 3,4UJ                                             | 9.50                           | 9.90                           | 110                            |
|                                        |                     |                                        |                                      | 1.8U                                                          | ann                           | 2UJ                           | 1105                                  | 9.40J                                             | 9.50<br>6 El i                 | 9.90                           | 110                            |
| Gene-Bric                              | 520                 | 2200                                   | 50000                                | 1.8U                                                          | LUE                           | 2UJ                           | 1103                                  | 9.4UJ                                             | 8.50                           | 9.90<br>9.91                   | 110                            |
| gamma-SHC (cindana)<br>gamma-Chlordana |                     |                                        |                                      | 1.8U                                                          | 9UJ                           | 4J                            | 1105                                  | 9,4UJ                                             | 9,50                           |                                |                                |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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| <u></u>                   | NJDEP Soil Cleanup Criteria * |                 |                          | Sample ID:<br>Depth: | LOSB12 LOSB12<br>02 06 |          | LOSB13<br>02 | LOSB13FR<br>02 | LOSB13<br>08<br>1.0 | LOSB14<br>02<br>LO |
|---------------------------|-------------------------------|-----------------|--------------------------|----------------------|------------------------|----------|--------------|----------------|---------------------|--------------------|
| Analyte (ug/kg)           | Residential                   | Non-Residential | impact to<br>Groundwater | Zone**:<br>Date:     | 10/25/94               | 10/25/94 | 10/31/94     | 10/31/94       | 10/31/94            | 10/25/94           |
|                           |                               | 1 2000          | 50000                    |                      | 4 6U.I                 | 26J      | 19U          | 19U ·          | 19U                 | 4,4UJ              |
| 1,4'-DDD                  | 3000                          | 12000           | 50000                    |                      | 4 6111                 | 2103     | 21           | 20             | 19U                 | 4.4UJ              |
| ,4'-DDE                   | 2000                          | 9000            | 50000                    |                      | 4.600                  | 2101     | 190          | 190            | 19U                 | R                  |
| ,4'-DDT                   | 2000                          | 9000            | 500000                   |                      | 2 4111                 | 1101     | 9.8U         | 9,8U           | 9.6U                | 2.3UJ              |
| ldrin                     | 40                            | 170             | 50000                    |                      | 2.403                  | 21000    | 1900         | 1900           | 190U                | 44U.J              |
| roclor-1016               | 490                           | 2000            | 50000                    | •                    | 9005                   | 430111   | 3900         | 390U           | 380U                | 90UJ               |
| roclor-1221               | 490                           | 2000            | 50000                    |                      | 3403                   | 21001    | 1900         | 1900           | 190U                | 44UJ               |
| roclor-1232               | 490                           | 2000            | 50000                    |                      | 4603                   | 21003    | 1900         | 1900           | 190U                | 44UJ               |
| roclor-1242               | 490                           | 2000            | 50000                    |                      | 4600                   | 21003    | 1900         | 1900           | 190U                | 44UJ               |
| roclor-1248               | 490                           | 2000            | 50000                    |                      | 4603                   | 21000    | 1900         | 1900           | 190U                | 44UJ               |
| rocior-1254               | 490                           | 2000            | 50000                    |                      | 46UJ                   | 21003    | 1900         | 1900           | 190U                | 44UJ               |
| roclor-1260               | 490                           | 2000            | 50000                    |                      | 46UJ                   | 21000    | 1900         | 1911           | 190                 | 4.4UJ              |
| eldrin                    | 42                            | 180             | 50000                    |                      | 4.6UJ                  | 210J     | 190          | 0.011          | 9.60                | 2.3UJ              |
| ndosulfan i               |                               |                 | ••                       |                      | 2.4UJ                  | 1105     | 9,80         | 3,00           | 1911                | 4.4UJ              |
| docultan I                | -                             |                 |                          |                      | 4.6UJ                  | 21UJ     | 190          | 190            | 190                 | 4.40.1             |
| ndoeulfen sulfsta         |                               | ••              |                          |                      | 4.6UJ                  | 21UJ     | 190          | 190            | 190                 | 4.400              |
| ndüsulleri edilare        | 17000                         | 310000          | 50000                    |                      | 4.6UJ                  | 21UJ     | 190          | 190            | 190                 | 4,403<br>B         |
| narin<br>I dala aldaharda |                               |                 | -                        |                      | 4.9J                   | 21UJ     | 19U          | 190            | 190                 | A 4111             |
| Allu sigenyde             |                               |                 |                          |                      | R                      | 21UJ     | 190          | 190            | 190                 | 4.400              |
| ndrin Ketone              | 150                           | 850             | 50000                    |                      | 2.4UJ                  | 11UJ     | 9.8U         | 9.8U           | 9.60                | 2,305              |
| eptachior                 | 150                           |                 |                          |                      | R                      | 11UJ     | 9.8U         | 9.80           | 9,60                | 2.305              |
| eptachlor epoxide         |                               | E200000         | 50000                    |                      | 24UJ                   | 110UJ    | 98U          | 9 <b>8</b> U   | 960                 | 930                |
| ethoxychlor               | 280000                        | 3200000         | 50000                    |                      | 240UJ                  | 1100UJ   | 98QU         | 980U           | 9600                | 2300J              |
| oxaphene                  | 100                           | 200             |                          |                      | 2.4UJ                  | 11UJ     | 9.8U         | 9.8U           | 9.60                | 2.305              |
| pha-BHC                   | ••                            | ••              |                          |                      | 2.4UJ                  | 11UJ     | 9.8U         | 9.8U           | 9.6U                | Z,3UJ              |
| pha-Chlordane             | **                            |                 |                          |                      | 2.4UJ                  | 1103     | 9.8U         | 9.8U           | 9,6U                | 2.3UJ              |
| sta-BHC                   |                               |                 |                          |                      | 2.40.1                 | 11UJ     | 9.8U         | 9.8U           | 9,6U                | 2,3UJ              |
| elta-BHC                  | **                            |                 | 50000                    |                      | 2 411.1                | 110J     | 9.8U         | 9.8U           | 9.6U                | 2.3UJ              |
| amma-BHC (Lindane)        | 520                           | 2200            |                          |                      | 2.4UJ                  | 11UJ     | 9.8U         | 9.8U           | 9,6U                | 2.3UJ              |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                                        |             | EP Soil Cleanup Cr | iteria *    | Sample ID: LOSB15<br>Depth: 02 | LOSB16<br>04 | LOSB17<br>02 | LOSB18<br>02  | LOSB18<br>08<br>LO | LOSB18FR<br>OB<br>LO | MBSB1<br>02<br>M6 |
|----------------------------------------|-------------|--------------------|-------------|--------------------------------|--------------|--------------|---------------|--------------------|----------------------|-------------------|
| Analyte (ug/kg)                        | Residential | Non-Residential    | Groundwater | Date: 10/24/94                 | 10/25/94     | 10/24/94     | 10/24/94      | 10/24/94           | 10/24/94             | 10/25/94          |
|                                        |             |                    | E0000       |                                | 1911         | 3 911        | 4.1           | 22UJ               | 4.2UJ                | 19UJ              |
| 4,4'-DDD                               | 3000        | 12000              | 50000       | 210                            | 1911         | 3 911        | 3.8U          | 22UJ               | 4.2UJ                | 19UJ              |
| 4,4'-DDE                               | 2000        | 9000               | 50000       | 2 IJ<br>17 ALL                 | 1911         | 3.911        | 3.80          | 22UJ               | R                    | 19UJ              |
| 4,4'-DDT                               | 2000        | 9000               | 500000      | 7.60                           | 0.411        | 211          | 1.90          | 1100               | 2.2UJ                | 9,7UJ             |
| Aldrin                                 | 40          | 170                | 50000       | 3.90                           | 3,40         | 2011         | 381           | 2200.1             | 42UJ                 | 190UJ             |
| Aroclor-1018                           | 490         | 2000               | 50000       | 760                            | 1800         | 330          | 761           | 440UJ              | 860J                 | 380UJ             |
| Aroclor-1221                           | 490         | 2000               | 50000       | 1600                           | 3700         | 790          | 3911          | 2200.1             | 42UJ                 | 190UJ             |
| Arocior-1232                           | 490         | 2000               | 50000       | 760                            | 1800         | 390          | 2011          | 22000              | 421.1                | 190UJ             |
| Aroclor-1242                           | 490         | 2000               | 50000       | 760                            | 1800         | 390          | 300           | 22000              | 420.                 | 190UJ             |
| Aroclor-1248                           | 490         | 2000               | 50000       | 76U                            | 1800         | 390          | 300           | 22000              | 4200                 | 190UJ             |
| Aroclor-1254                           | 490         | 2000               | 50000       | 760                            | 1800         | 390          | 300           | 22000              | 4200                 | 190UJ             |
| Aroclor-1260                           | 490         | 2000               | 50000       | 760                            | 1800         | 390          | 360           | 22003              | 4 2111               | 19UJ              |
| Dieldrin                               | 42          | 180                | 50000       | 24                             | 180          | 3.90         | 3,80          | 1111               | 2 2111               | 9.7UJ             |
| Endosulfan i                           |             | ••                 | -           | 3.9U                           | 9.4U         | 20           | 1.90          | 1105               | -4.200               | 1903              |
| Endosulfan li                          | • .         | ••                 |             | 7.6U                           | 180          | 3.90         | 3.80          | 2200               | 4.200                | 1903              |
| Endosulfan sulfate                     |             | ••                 |             | 7.6U                           | 18U          | 3,90         | 3.80          | 2203               | 4.200                | 1911              |
| Endrin                                 | 17000       | 310000             | 50000       | 7.6U                           | 18U          | 3.90         | 3.80          | 2203               | 7,200                | 19111             |
| Endin aldabuda                         |             | ••                 |             | 9.3                            | 18U          | 3.90         | 3.80          | 2203               | n<br>8 E I           | 1911              |
|                                        |             | **                 |             | 11J                            | 18U          | 3,90         | 3.80          | 220J               | 0.55                 | 9.7111            |
| Engrin Kerone                          | 150         | 650                | 50000       | 3,90                           | 9.4U         | 20           | 1,90          | 1103               | 2.203                | 9.700             |
| Heptachior                             | 150         |                    |             | 3,90                           | 9.4U         | 20           | 1.90          | 1103               | 2.203                | 0711              |
| Heptachior epoxice                     | 180000      | 5200000            | 50000       | 390                            | 94U          | 20U          | 190           | 110UJ              | 220J                 | 9705              |
| Methoxychlor                           | 280000      | 200                | 50000       | 3900                           | 940U         | 200U         | 190U          | 1100UJ             | 22003                | 97005             |
| Toxaphene                              | 100         | 200                | -           | R                              | 9.4U         | 2U           | 1,9U          | 1100               | 2.2UJ                | 9.703             |
| aipha-BHC                              |             |                    | _           | 3.90                           | 9.4U         | 20           | 1.9U          | 11W                | 2.2UJ                | 9,703             |
| alpha-Chiordane                        |             | -                  |             | 3.90                           | 9.4U         | 2U           | 1 <b>.</b> 9U | 11UJ               | 2.2UJ                | 8.101             |
| beta-BHC                               |             | **                 |             | 3.9U                           | 9.4U         | 20           | 1.9U          | 11UJ               | 2.2UJ                | 9./UJ             |
| delta-BHC                              |             |                    | 50000       | 3.9U                           | 9.4U         | 2U           | 1.9U          | 11UJ               | 2.2UJ                | 9.7UJ             |
| gamma-BHC (Lindane)<br>gamma-Chiordane | 520         |                    |             | 3.90                           | 9.4U         | 20           | 1.9U          | 11UJ               | 2.2UJ                | 9,7UJ             |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                                        | NJDI        | EP Soil Cleanup Cri | Sample ID: MBSB2<br>Depth: 02 | MBSB3<br>06    | MBSB3<br>10 | MBSB3FR<br>10<br>MB | MDCBSB2<br>03<br>MDC | N2TFSB2<br>O2<br>N2TF |               |
|----------------------------------------|-------------|---------------------|-------------------------------|----------------|-------------|---------------------|----------------------|-----------------------|---------------|
| Analyte (ug/kg)                        | Residential | Non-Residential     | Impact to<br>Groundwater      | Date: 10/21/94 | 10/25/94    | 10/25/94            | 10/25/94             | 10/11/94              | 10/19/94      |
|                                        |             | 1 2000              | 50000                         | 791            | 240.1       | 23U                 | 23UJ                 | 3.6U                  | 4,1U          |
| 4,4'-000                               | 3000        | 12000               | 50000                         | 3.811          | 240         | 230                 | 23UJ                 | 3. <del>6</del> U     | 48            |
| 4,4'-DDE                               | 2000        | 9000                | 50000                         | 3 811          | R           | 230                 | 23UJ                 | 3.6U                  | 54            |
| 1,4'-DDT                               | 2000        | 9000                | 50000                         | 2111           | R           | 120                 | 12UJ                 | 1.80                  | 2.5J          |
| Aldrin                                 | 40          | 170                 | 50000                         | 38(1)          | 2401.1      | 2300                | 230UJ                | 36U                   | 41U           |
| vrocior-1016                           | 490         | 2000                | 50000                         | 77111          | 4900.0      | 470U                | 460UJ                | 73U                   | 83U           |
| Aroclor-1221                           | 490         | 2000                | 50000                         | 2011           | 24001       | 2300                | 230UJ                | 36U                   | 41U           |
| Aroclor-1232                           | 490         | 2000                | 50000                         | 3805           | 24000       | 2300                | 230UJ                | 36U                   | 41U           |
| Aroclor-1242                           | 490         | 2000                | 50000                         | 3805           | 24011       | 2300                | 2300.1               | 360                   | 410           |
| toolor-1248                            | 490         | 2000                | 50000                         | 3803           | 24000       | 2300                | 230UJ                | 36U                   | 41U           |
| Aroclor-1254                           | 490         | 2000                | 50000                         | 3803           | 24000       | 23011               | 2301.1               | 360                   | 41U           |
| rocior-1260                            | 490         | 2000                | 50000                         | 3805           | 24003       | 7311                | 2311.1               | 3.6U                  | 4.1U          |
| Dieldrin                               | 42          | 180                 | 50000                         | 3.805          | 10111       | 1211                | 120.0                | 1.80                  | 2.1U          |
| indosulfan i                           |             |                     |                               | 203            | 1200        | 2211                | 2311.1               | 3.60                  | 4.1U          |
| indosulfan II                          |             | ••                  |                               | 3.8UJ          | 2403        | 230                 | 23121                | 3.6U                  | 4.1U          |
| ndosulfan sulfate                      | ••          |                     |                               | 3,8UJ          | 2403        | 230                 | 2300                 | 3.60                  | 4.1U          |
| indrin                                 | 17000       | 310000              | 50000                         | 3.8UJ          | ĸ           | 230                 | 2300                 | 3.60                  | 4.1U          |
| ndrin aldehvde                         |             | ••                  |                               | 3.8UJ          | 24UJ        | 230                 | 2303                 | 3.60                  | 4.1U          |
| odrin ketone                           |             |                     | ••                            | 3.8UJ          | 24UJ        | 230                 | 1001                 | 1 81                  | 2.10          |
| lentachior                             | 150         | 650                 | 50000                         | 2UJ            | R           | 120                 | 1203                 | 1 911                 | 2.10          |
| ientachlor enoxide                     |             |                     |                               | 2UJ            | 12UJ        | 120                 | 1200                 | 191                   | 210           |
| Aethorychiar                           | 280000      | 5200000             | 50000                         | 20UJ           | 120UJ       | 1200                | 200                  | 1901                  | 2100          |
| ovenhene                               | 100         | 200                 | 50000                         | 200UJ          | 1200UJ      | 12000               | 120003               | 1 211                 | 2 10          |
| Inhe-BHC                               |             |                     |                               | 2UJ            | 12UJ        | 120                 | 1203                 | 1.00                  | 2.10          |
| inhe-Chiordane                         |             |                     | **                            | 2UJ            | 12UJ        | 13J                 | 1203                 | 1.00                  | 2 10          |
|                                        |             |                     |                               | 2UJ            | 57J         | 120                 | 1200                 | 1.00                  | 2 10          |
|                                        |             |                     |                               | 20,1           | 12UJ        | 12U                 | 1203                 | . 1.00                | 2 10          |
| neurono BUC (Lindene)                  | 520         | 2200                | 50000                         | 2UJ            | R           | 120                 | 12UJ                 | 1.00                  | 2.10          |
| gamma-ono (unioana)<br>gamma-Chiordana |             |                     |                               | 2UJ            | 12UJ        | 120                 | 12UJ                 | 1.80                  | <u>~, i U</u> |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                     | IDLN        | EP Soil Cleanup Cr | iteria *                 | Semple ID:<br>Depth: | N2TFSB4<br>02    | N2TFSB4<br>06    | N2TFSB5<br>02    | N2TFS85           | N3TFSB1<br>02    | N3TFSB2<br>02  |
|---------------------|-------------|--------------------|--------------------------|----------------------|------------------|------------------|------------------|-------------------|------------------|----------------|
| Analyte (ug/kg)     | Residential | Non-Residential    | Impact to<br>Groundwater | Zone**:<br>Date:     | N2TF<br>10/28/94 | N2TF<br>10/28/94 | N2TF<br>10/19/94 | N2TF<br>10/19/94  | N3TF<br>10/18/94 | AP<br>10/19/94 |
|                     | 2000        | 1 2000             | E0000                    |                      | 0                | 2111             | 3 711/           | 3.70              | 260              | 130            |
| 4,4'-000            | 3000        | 12000              | 50000                    |                      | 1011             | 210              | 3 7111           | 7.7.1             | 39               | 3.7UJ          |
| 4,4 -DDE            | 2000        | 9000               | 50000                    |                      | 2211             | 2111             | 3.701            | 3.70              | R                | R              |
| 4,4'-DDT            | 2000        | 9000               | 500000                   |                      | 111              | 110              | 1 9111           | 1.90              | 1.9U             | 1.9UJ          |
| Aldrin              | . 40        | 170                | 50000                    |                      | 110              | 2100             | 37111            | 3711              | 370              | 37UJ           |
| Aroclor-1016        | 490         | 2000               | 50000                    |                      | 2200             | 2100             | 78111            | 7411              | 7511             | 76UJ           |
| Aroclor-1221        | 490         | 2000               | 50000                    |                      | 4400             | 4200             | 700J             | 370               | 3711             | 3701           |
| Aroclor-1232        | 490         | 2000               | 50000                    |                      | 2200             | 2100             | 3703             | 2711              | 370              | 37111          |
| Arocior-1242        | 490         | 2000               | 50000                    |                      | 2200             | 2100             | 3703             | 370               | 370              | 37111          |
| Aroclor-1248        | 490         | 2000               | 50000                    |                      | 2200             | 2100             | 3700             | 370               | 370              | 451            |
| Aroclor-1254        | 490         | 2000               | 50000                    |                      | 2200             | 2100             | 3703             | 370               | 370              | 37111          |
| Aroclor-1280        | 490         | 2000               | 50000                    |                      | 220U             | 2100             | 3703             | 3/0               | 3/0              | 5705           |
| Dieldrin            | 42          | 180                | 50000                    |                      | 22U              | 210              | 3.70J            | 3.70              | R                | 1 0111         |
| Endosulfan i        | -           |                    |                          |                      | 110              | 110              | 1.9UJ            | 1,90              | 1,90             | 1.905          |
| Endosulfan il       |             |                    |                          |                      | 22U              | 21U              | 3.7UJ            | 3,70              | 3.70             | 3,703          |
| Endosultan sultate  |             |                    |                          |                      | 24               | 21U              | R                | 3.7U              | 3,70             | 3.70J          |
| Endrin              | 17000       | 310000             | 50000                    |                      | 220              | 21U              | 3.7UJ            | 3.70              | R                | 3.703          |
| Eodrin aldehyde     |             |                    |                          |                      | R                | 21U              | 3.7UJ            | 3.70              | 10J              | 3.7UJ          |
| Endrin katone       |             |                    |                          |                      | 22U              | 21U              | 3.7UJ            | 3.7U              | 3.70             | 3.7UJ          |
| Hentechlor          | 150         | 650                | 50000                    |                      | 110              | 110              | 1.9UJ            | 1.9U              | 1.90             | 1.9UJ          |
| Hentechlor encyide  |             |                    | ••                       |                      | 110              | 110              | R                | 1.9U              | 1.9Ų             | 1.9UJ          |
|                     | 280000      | 5200000            | 50000                    |                      | 1100             | 1100             | 19UJ             | 120J              | 230J             | 19UJ           |
| Texenhere           | 100         | 200                | 50000                    |                      | 1100U            | 11000            | 190UJ            | 1900              | 190U             | 190UJ          |
| Ioxaphene           | 100         | 200                |                          |                      | 110              | 110              | 1.9UJ            | 1.9U              | R                | 1.9UJ          |
| alpha-BHC           |             |                    |                          |                      | R                | 110              | 1.9UJ            | 3J                | 2.8J             | 1.9UJ          |
| alpha-Chiordana     |             |                    |                          |                      | 110              | 110              | 1.9UJ            | 5.1J              | 4.2J             | 1.9UJ          |
| Deta-BHC            |             | ••                 |                          |                      | 110              | 110              | 1.9UJ            | 1.90              | 1.9U             | 1.9UJ          |
| deita-BHC           |             |                    | 50000                    |                      | 1117             | 110              | 1.9UJ            | 1.9U              | 1.9U             | 1.9UJ          |
| gamma-BHC (Lindane) | 520         | 2200               | 50000                    |                      | R                | 110              | 1.9UJ            | 1. <del>9</del> U | 5J               | 1.9UJ          |
| gamma-Chlordane     | **          |                    |                          |                      |                  |                  |                  |                   |                  |                |

Table 5-4. Pesticide and Polychlorinated Biphanyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                                                                                                                                                      | IDLN                                                  | EP Soil Cleanup Cr                                            | iteria •                                                                      | Sample ID: N3TFSB2<br>Depth: 06                                                     | N3TFSB2FR<br>06                                                        | N3TFSB3<br>02<br>N3TE                                               | N3TFSB4<br>02<br>N3TF                                                  | N3TFSB5<br>08<br>N3TF                                                | N3TFSB6<br>02<br>N3TF                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------|
| Ansivta (ua/ka)                                                                                                                                                      | Residential                                           | Non-Residential                                               | Impact to<br>Groundwater                                                      | Zone**: AP<br>Date: 10/19/94                                                        | 10/19/94                                                               | 10/13/94                                                            | 10/17/94                                                               | 10/19/94                                                             | 10/18/94                                                                |
| 4,4'-DDD<br>4,4'-DDE<br>4,4'-DDT<br>Aldrin<br>Arocior-1018<br>Arocior-1221<br>Arocior-1232<br>Arocior-1242<br>Arocior-1248                                           | 3000<br>2000<br>40<br>490<br>490<br>490<br>490<br>490 | 1 2000<br>9000<br>170<br>2000<br>2000<br>2000<br>2000<br>2000 | 50000<br>50000<br>50000<br>50000<br>50000<br>50000<br>50000<br>50000<br>50000 | 4.5UJ<br>4.5U<br>2.3U<br>45U<br>91U<br>45U<br>45U<br>45U<br>45U                     | 47J<br>21U<br>21U<br>21U<br>210U<br>210U<br>210U<br>210U<br>210U<br>21 | R<br>39<br>57J<br>2.1<br>40U<br>81U<br>40U<br>40U<br>40U<br>40U     | 3.9U<br>21J<br>24J<br>2U<br>39U<br>39U<br>39U<br>39U<br>39U<br>39U     | 3.9U<br>3.9U<br>2UJ<br>39U<br>79U<br>39U<br>39U<br>39U<br>39U<br>39U | 99<br>54<br>20U<br>200U<br>200U<br>200U<br>200U<br>200U<br>200U<br>200U |
| Arocior-1254<br>Arocior-1260<br>Dieldrin<br>Endosulfan I<br>Endosulfan II<br>Endosulfan sulfate<br>Endrin<br>Endrin eldehyde                                         | 490<br>490<br>42<br><br><br>17000<br><br>             | 2000<br>2000<br>180<br><br><br>310000<br>                     | 50000<br>50000<br>                                                            | 450<br>4.50<br>2.30<br>20<br>4.50<br>4.50<br>4.50<br>8.8J                           | 210U<br>21U<br>11U<br>21U<br>21U<br>21U<br>21U<br>21U<br>21U           | 40U<br>9,1<br>2U<br>4U<br>4U<br>4U<br>4U<br>4U<br>2U                | 39U<br>3.9U<br>2U<br>3.9U<br>3.9U<br>3.9U<br>3.9U<br>3.9U<br>3.9U<br>8 | 39U<br>3.9U<br>2U<br>3.9U<br>3.9U<br>3.9U<br>3.9U<br>3.9U<br>2U      | 2000<br>2007<br>2000<br>2000<br>2000<br>2000<br>2000<br>2000            |
| Heptachlor<br>Heptachlor epoxide<br>Methoxychlor<br>Toxephene<br>sipha-BHC<br>alpha-Chlordene<br>beta-BHC<br>delta-BHC<br>gamma-BHC (Lindane)<br>gamma-BHC (Lindane) | 150<br><br>280000<br>100<br><br><br>520<br>           | 650<br><br>5200000<br><br><br><br>2200<br>                    | 50000<br><br>50000<br><br><br><br>50000<br><br><br><br><br><br>               | 2.30<br>2.3U<br>230U<br>2.3U<br>2.3U<br>2.3U<br>2.3U<br>2.3U<br>2.3U<br>2.3U<br>2.3 | 110<br>1100<br>1100<br>1100<br>110<br>110<br>110<br>110<br>110         | 20<br>200<br>2000<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>7.9J | 2U<br>20U<br>200U<br>2U<br>R<br>2U<br>2U<br>2U<br>2U<br>2U             | 2U<br>20U<br>200U<br>2V<br>R<br>2U<br>2U<br>2U<br>2U<br>2U           | 10U<br>100U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U            |

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Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                          | IOLN        | P Soil Cleanup Cri | teria *                  | Semple ID: N3TFSB7<br>Depth: 02 | N3TFSB8<br>02    | N3TFSB8<br>06    | N3TFSB9<br>02    | PN1SB2<br>04   | PN1582<br>08 |
|--------------------------|-------------|--------------------|--------------------------|---------------------------------|------------------|------------------|------------------|----------------|--------------|
| Analyte (ug/kg)          | Residential | Non-Residential    | Impact to<br>Groundwater | Zone**: N3TF<br>Date: 10/18/94  | N3TF<br>10/18/94 | N3TF<br>10/18/94 | N3TF<br>11/02/94 | P1<br>11/02/94 | 11/02/94     |
|                          | 2000        | 12000              | 50000                    | 35.1                            | 190              | 4UJ              | 240J             | 26             | 19U          |
| 4,4-000                  | 3000        | 12000              | 50000                    | 62.1                            | 22               | 4.3J             | 260              | 18U            | 19U          |
| 4,4'-DDE                 | 2000        | 9000               | 50000                    | 4 10                            | 190              | 4UJ              | 290J             | 18U            | 19U          |
| 4,4'-DDT                 | 2000        | 9000               | 500000                   | 411                             | tou              | 2.1UJ            | 110              | 9,5U           | 9.9U         |
| Aldrin                   | 40          | 170                | 50000                    | 2111                            | 1900             | 40UJ             | 210U             | 180U           | 190U         |
| Aroclor-101 <del>6</del> | 490         | 2000               | 50000                    |                                 | 3901/            | 811.1            | 420U             | 370U           | 390U         |
| Aroclor-1221             | 490         | 2000               | 50000                    | 630                             | 1001             | 40111            | 2100             | 180U           | 1900         |
| Aroclor-1232             | 490         | 2000               | 50000                    | 410                             | 1900             | 4000             | 2100             | 180U           | 190U         |
| Aroclor-1242             | 490         | 2000               | 50000                    | 410                             | 1900             | 4003             | 2100             | 1800           | 190U         |
| Aroclor-1248             | 490         | 2000               | 50000                    | 410                             | 1900             | 4003             | 2100             | 1800           | 190U         |
| Araclar-1254             | 490         | 2000               | 50000                    | 410                             | 1900             | 4000             | 2100             | 1800           | 190U         |
| Aroclor-1260             | 490         | 2000               | 50000                    | 410                             | 1900             | 4003             | 2100             | 12()           | 190          |
| Dieldrin                 | 42          | 180                | 50000                    | 4.1U                            | 190              | 400              | 111              | 9.50           | 9.90         |
| Endosulfan 1             |             |                    | <b>*</b> -               | 2.10                            | 100              | 2.105            | 110<br>0111 ·    | 1911           | 190          |
| Endosulfan II            |             |                    |                          | 4.1U                            | 190              | 4UJ              | 210              | 1911           | 190          |
| Endoculten sulfate       |             |                    |                          | 4.1U                            | 19U              | 403              | 210              | 100            | 1911         |
| Endrin                   | 17000       | 310000             | 50000                    | 4.1U                            | 19U              | 4UJ              | 210              | 203            | 190          |
| Endin eidebude           |             |                    |                          | 4.1U                            | 190              | 4UJ              | 210              | 180            | 190          |
| Endrin ketone            |             |                    |                          | R                               | 190              | 4UJ              | 210              |                | 190          |
|                          | 150         | 650                | 50000                    | 2.10                            | 100              | 2.1UJ            | 110              | 9.50           | 9.90         |
| neptecnior               |             |                    | -                        | 2,10                            | 100              | 2.1UJ            | 110              | 9.50           | 9,90         |
| Meptacraor epoxice       | 280000      | 5200000            | 50000                    | 210                             | 1000             | 21UJ             | 1100             | 950            | 330          |
| Methoxychior             | 100         | 200                | 50000                    | 210U                            | 1000U            | 210UJ            | 11000            | 9500           | 9900         |
| Ioxaphene                | 100         |                    |                          | 2.10                            | 10U              | 2.1UJ            | 110              | 9.50           | 9,90         |
| alpha-BHU                |             |                    |                          | R                               | 100              | 3,1J             | 110              | 9.50           | 9,30         |
| sipns-Chiordana          |             |                    |                          | R .                             | 100              | 2.1UJ            | 110              | 9,5U           | 9,90         |
| beta-BHC                 |             |                    |                          | R                               | 10U              | 2.1UJ            | 110              | 9,50           | 9.90         |
| deite-BHC                |             | 2200               | 50000                    | 2.10                            | 100              | 2.1UJ            | 11U              | 9,50           | 9.90         |
| gamma-BHC (Lindane)      | 520         |                    |                          | 23J                             | 10U              | 2.1UJ            | 110              | 9.50           | 9,90         |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soll Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                      | NJD         | EP Soil Cleanup Cr | iteria *                 | Sample ID; PSSB1<br>Depth: 02 | PSSB1<br>06    | SSB1<br>16             | SSB3<br>06     | SS83<br>10     | STFSB1<br>02    | STFSB1<br>06    |
|----------------------|-------------|--------------------|--------------------------|-------------------------------|----------------|------------------------|----------------|----------------|-----------------|-----------------|
| Analyte (ug/kg)      | Residential | Non-Residential    | Impact to<br>Groundwater | Zone**: MB<br>Date: 10/31/94  | MB<br>10/31/94 | SS<br>10/ <u>24/94</u> | SS<br>10/24/94 | SS<br>10/24/94 | STF<br>10/26/94 | STF<br>10/26/94 |
|                      | 1000        | 12000              | 50000                    | 7.2                           | 19U            | 3.8UJ                  | 27UJ           | 4.3UJ          | 3.8UJ           | 22U             |
| 4,4-000              | 2000        | 9000               | 50000                    | 3.8U                          | 190            | R                      | 27UJ           | 4.3UJ          | 3.8UJ           | 22U             |
| 4,4°-00E             | 2000        | 9000               | 500000                   | 3.8U                          | 190            | 3.8UJ                  | 27UJ           | 4,3UJ          | 3,8UJ           | 22U             |
| 4,4'-001             | 2000        | 170                | 50000                    | 20                            | 9.90           | 2UJ                    | 14UJ           | 2.2UJ          | 1.9UJ           | 110             |
| Aldrin               | 40          | 170                | 50000                    | 3811                          | 1901           | 380.1                  | 270UJ          | 43UJ           | 38UJ            | 220U            |
| Aroolor-1016         | 490         | 2000               | 50000                    | 7811                          | 1000           | 781.1                  | 550UJ          | 88UJ           | 77UJ            | 450U            |
| Aroclor-1221         | 490         | 2000               | 50000                    | 201                           | 1900           | 381.1                  | 270UJ          | 43UJ           | 38UJ            | 220U            |
| Aroclor-1232         | 490         | 2000               | 50000                    | 2011                          | 1900           | 380.1                  | 27001          | 43UJ           | 38UJ            | 220U            |
| Arocior-1242         | 490         | 2000               | 50000                    | 300                           | 1900           | 3801                   | 2700.1         | 43UJ           | 38UJ            | 2200            |
| Arocior-1248         | 490         | 2000               | 50000                    | 380                           | 1900           | 38(1)                  | 2700.1         | 43UJ           | 38UJ            | 2200            |
| Arocior-1254         | 490         | 2000               | 50000                    | 380                           | 1900           | 3800                   | 27011          | 430.1          | 3803            | 220U            |
| Araclor-1260         | 490         | 2000               | 50000                    | 380                           | 1900           | 161                    | 27000          | 4 3111         | 3 8111          | 220             |
| Dieldrin             | 42          | 180                | 50000                    | 3.80                          | 190            | 197                    | 14113          | 2 2111         | 18.1            | 110             |
| Endosulfan I         | +           |                    |                          | 20                            | 9.90           | N                      | 1403           | 4 2111         | 3 8111          | 2211            |
| Endosulfan II        |             |                    |                          | 3.8U                          | 190            | 3.803                  | 2703           | 4.300          | 3.803           | 220             |
| Endosulfan sulfate   |             |                    |                          | 3.8U                          | 190            | 3.8UJ                  | 2703           | 4.305          | 101             | 220             |
| Endrin               | 17000       | 310000             | 50000                    | 3.8U                          | 190            | 3.8UJ                  | 13J            | 4.303          |                 | 220             |
| Fodrin aldehvde      | ·           |                    |                          | 3.8U                          | 190            | 3,8UJ                  | <b>a</b> 1     | 4,300          | 3.803           | 220             |
| Endrin ketone        |             | ••                 |                          | 3.8U                          | 19U            | 3.8UJ                  | 69J            | R              | 7,49            | 220             |
| Hentechlor           | 150         | 650                | 50000                    | 20                            | 9.9U           | 2UJ                    | 14UJ           | 2.2UJ          | 1.900           | 110             |
| Hentechlor enoxide   | **          | ••                 |                          | 20                            | 9.9U           | 2UJ                    | 14UJ           | 16J            | 1.900           | 110             |
| Methorychlor         | 280000      | 5200000            | 50000                    | 200                           | 99U            | 20UJ                   | 1500J          | 22UJ           | 19UJ            | 1100            |
| Toyenhene            | 100         | 200                | 50000                    | 200U                          | 990U           | 200UJ                  | 1400UJ         | 220UJ          | 19000           | 11000           |
| alaba-BHC            |             | ••                 |                          | 20                            | 9.9U           | 2UJ                    | 14UJ           | 2.205          | 1.903           | 110             |
| alpha Chlordene      |             |                    |                          | 2U                            | 9.9U           | 2UJ                    | 14UJ           | 2.2UJ          | 1,9UJ           | 110             |
|                      | **          |                    |                          | 2U                            | 9.9U           | 2UJ                    | 14UJ           | 2.2UJ          | 1.9UJ           | 110             |
|                      |             |                    |                          | 20                            | 9.9U           | 2UJ                    | 14UJ           | 2.2UJ          | 1.9UJ           | 110             |
| Gente-Bric (Lindere) | 520         | 2200               | 50000                    | 2U                            | 9.90           | 2UJ                    | 14UJ           | 2.2UJ          | 1.9W            | 110             |
| gamma-Chlordane      |             |                    |                          | 20                            | 9.90           | 2UJ                    | 14UJ           | R              | 1.9UJ           | 110             |

Table 5-4. Pesticide and Polychlorinated Biphenyl Compounds in Soli Semples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                                        | NJD         | EP Soil Cleenup Cri | teria *                  | Sample ID: STFSB2<br>Depth: 08 | FBNA1-100594 | FBNA5-101994 | FBNA6-102094 | FBNA7-102594 |
|----------------------------------------|-------------|---------------------|--------------------------|--------------------------------|--------------|--------------|--------------|--------------|
| Analyte (ug/kg)                        | Residential | Non-Residential     | Impact to<br>Groundwater | Zone**: STF<br>Date: 10/26/94  | 10/05/94     | 10/19/94     | 10/20/94     | 10/25/94     |
|                                        |             | 1 4 9 9 9           | 50000                    | 2111                           | 0.111        | 0.10         | 0.10         | 0.10         |
| 4,4'-DDD                               | 3000        | 12000               | 50000                    | 210                            | 0.10         | 0.10         | 0.10         | 0,10         |
| 4,4'-DDE                               | 2000        | 9000                | 50000                    | 210                            | 0.10         | 0.10         | 0.10         | 0.10         |
| 4,4'-DDT                               | 2000        | 9000                | 500000                   | 111                            | 0.10         | 0.050        | 0.050        | 0.05U        |
| Aldrin                                 | 40          | 170                 | 50000                    | 110                            | 111          | 111          | 111          | 10           |
| Aroclor-1018                           | 490         | 2000                | 50000                    | 2100                           |              | 20           | 211          | 20           |
| Aroclor-1221                           | 490         | 2000                | 50000                    | 4300                           | 20           | 111          | 10           | 10           |
| Aroclor-1232                           | 490         | 2000                | 50000                    | 2100                           | 10           | 10           | 111          | 10           |
| Aroclor-1242                           | 490         | 2000                | 50000                    | 2100                           | 10           | 10           | 111          | 10           |
| Aroclor-1248                           | 490         | 2000                | 50000                    | 2100                           | 10           | 10           | 10           | 10           |
| Aroclor-1254                           | 490         | 2000                | 50000                    | 2100                           | 10           | 10           | 10           | 10           |
| Aroclor-1280                           | 490         | 2000                | 50000                    | 2100                           | 10           |              | 0.10         | 0.11         |
| Dieldrin                               | 42          | 180                 | 50000                    | 210                            | 0.10         | 0.10         | 0,10         | 0.050        |
| Endosulfan i                           |             |                     |                          | 110                            | 0.05U        | 0,050        | 0.050        | 0.111        |
| Endosulfan il                          | •-          |                     |                          | 210                            | 0.10         | 0.10         | 0.10         | 0.10         |
| Endosulfan suifate                     |             |                     |                          | .21U                           | 0.10         | 0.10         | 0.10         | 0.10         |
| Endrin                                 | 17000       | 3 10000             | 50000                    | 210                            | 0.10         | 0,10         | 0.10         | 0.10         |
| Endrin eidehyde                        |             |                     |                          | 22                             | 0.10         | 0.10         | 0.10         | 0.10         |
| Endrin ketone                          |             |                     | ••                       | 210                            | 0,10         | 0.10         | 0.10         | 0.10         |
| Hesteblor                              | 150         | 650                 | 50000                    | 110                            | 0.05U        | 0.05U        | 0.050        | 0.050        |
| Heptachion energide                    |             |                     |                          | 110                            | 0.05U        | 0.05U        | 0,050        | 0.060        |
|                                        | 280000      | 5200000             | 50000                    | 1100                           | 0.50         | 0.5U         | 0.5U         | 0.50         |
| Methoxychior                           | 100         | 200                 | 50000                    | 11000                          | 5U           | 50           | 50           | 50           |
| I oxapnene                             |             |                     |                          | 110                            | 0.05U        | 0,05U        | 0.05U        | 0.050        |
| elpha-BHC                              |             |                     |                          | 301                            | 0.050        | 0.05U        | 0.050        | 0,050        |
| aipna-Chiordane                        |             |                     |                          | 110                            | 0.0081J      | 0.05U        | 0.05U        | 0.050        |
| Deta-BHC                               |             |                     |                          | 110                            | 0.05U        | 0.05U        | 0.05U        | 0.050        |
| deita-8HC                              | E 10        | 2200                | 50000                    | 110                            | 0.050        | 0.05U        | 0.05U        | 0.050        |
| gamma-BHC (Lindane)<br>gamma-Chlordane |             |                     |                          | 110                            | 0.05U        | 0.050        | 0.050        | 0.05U        |

Table 5-4. Pesticide and Polyohionnated Biphanyl Compounds in Soll Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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| <u> </u>                              | NJD         | EP Soil Cleanup Cri | teria *                  | Sample ID: FBNA9-102694   | FBNA11-102794 | FBNA13-102894 | FBNA14-102894 | FBNA17-103194 |
|---------------------------------------|-------------|---------------------|--------------------------|---------------------------|---------------|---------------|---------------|---------------|
| Analyte (ug/kg)                       | Residential | Non-Residential     | Impact to<br>Groundwater | Zone**:<br>Date: 10/26/94 | 10/27/94      | 10/28/94      | 10/28/94      | 10/31/94      |
|                                       | 2000        | 1 2000              | 50000                    | 0.10                      | 0.10          | 0.10          | 0.1U          | 0.1U          |
| 4,4'-DDD                              | 3000        | 12000               | 50000                    | 0.10                      | 0.11          | 0.10          | 0.10          | 0.10          |
| 4,4'-DDE                              | 2000        | 9000                | 50000                    | 0.10                      | 0.10          | 0.10          | 0.1U          | 0.10          |
| 4,4'-DDT                              | 2000        | 3000                | 500000                   | 0.05                      | 0.050         | 0.050         | 0.05U         | 0.05U         |
| Aldrin                                | 40          | 170                 | 50000                    | 111                       | 10            | 10            | 10            | 10            |
| Arocior-1016                          | 490         | 2000                | 50000                    | 211                       | 211           | 20            | 2U            | 2U            |
| Aroclor-1221                          | 490         | 2000                | 50000                    | 20                        | 10            | 10            | 10            | 1U            |
| Aroclor-1232                          | 490         | 2000                | 50000                    | 10                        | 10            | 10            | 10            | 10            |
| Aroclor-1242                          | 490         | 2000                | 50000                    | 10                        | 10            | 10            | 10            | 10            |
| Aroclor-1248                          | 490         | 2000                | 50000                    | 10                        | 10            | 10            | 10            | 10            |
| Arocior-1254                          | 490         | 2000                | 50000                    | 10                        | 10            | 111           | 10            | 10            |
| Aracior-1260                          | 490         | 2000                | 50000                    | 10                        |               | 0.11          | 0.10          | 0.10          |
| Dieldrin                              | 42          | 180                 | 50000                    | 0.10                      | 0.10          | 0.10          | 0.050         | 0.050         |
| Endosulfan I                          | •-          |                     |                          | 0.050                     | 0.050         | 0.050         | 0.000         | 0.10          |
| Endosulfan li                         | **          |                     | -                        | 0.10                      | 0.10          | 0.10          | 0.10          | 0.10          |
| Endosulfan sulfate                    |             |                     |                          | 0.10                      | 0.10          | 0.10          | 0.10          | 0.10          |
| Endrin                                | 17000       | 310000              | 50000                    | 0.10                      | 0.10          | 0.10          | 0.10          | 0.10          |
| Endrin aldehvde                       |             |                     | ••                       | 0.10                      | 0.10          | 0,10          | 0.10          | 0.10          |
| Endrin ketone                         |             |                     | · •••                    | 0.10                      | 0.10          | 0.10          | 0.10          | 0.050         |
| Hentechior                            | 150         | 650                 | 50000                    | 0.050                     | 0.050         | 0,050         | 0.050         | 0.050         |
| Hentechint epoxide                    |             |                     |                          | 0.050                     | 0.05U         | 0.050         | 0.050         | 0.000         |
| Methoxychlor                          | 280000      | 5200000             | 50000                    | 0.50                      | 0,5U          | 0.50          | 0.50          | 5.50          |
| Tovenhene                             | 100         | 200                 | 50000                    | 5V                        | 5U            | 50            | 50            | 0.050         |
| alpha.BHC                             |             |                     |                          | 0,050                     | 0.050         | 0,050         | 0.050         | 0.050         |
| ainha Chiordena                       |             |                     |                          | 0.05U                     | 0.05U         | 0.050         | 0.050         | 0.050         |
|                                       |             |                     |                          | 0,05U                     | 0,05U         | 0.05U         | 0.050         | 0.050         |
|                                       |             |                     | **                       | 0.05U                     | 0.05U         | 0.050         | 0,050         | 0.050         |
| della-bric                            | 520         | 2200                | 50000                    | 0.05U                     | 0.05U         | 0.05U         | 0.050         | 0.050         |
| gamma-BHC (Uncane)<br>gamma-Chlordane |             |                     |                          | 0.050                     | 0.05U         | 0.05U         | 0.05U         | 0.050         |

Table 5-4, Pesticide and Polychlorinated Biphenyl Compounds in Soli Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Analyte concentrations and New Jersey Department of Environmental Protection (NJDEP) criteria in micrograms per kilogram (ug/kg) (equivalent to parts per billion [ppb]). Analyses were performed by CompuChem Environmental Corporation, Research Triangle Park, North Carolina, using Contract Laboratory Program (CLP)

protocols contained in the Statement of Work (SOW) OLMO1.8 and New Jersey modified 418.1 for total petroleum hydrocarbon (TPH).

Sample results exceeding the NJDEP impact to groundwater criteria are shown in bold. Sample results exceeding the NJDEP non-residential criteria are underlined.

Sample results exceeding both criteria are shown in bold and underlined.

New Jersey Department of Environmental Protection.

NJDEP Indicates a field blank associated with non-aqueous samples.

FBNA Field replicate of previous sample. FR

The compound was analyzed for, but not detected at the specific detection limit. U

Estimated result. J

Rejected result.

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R No applicable criteria.

NJDEP Soil Cleanup Criteria, Februrery 3, 1992; last revised February 3, 1994. .

Zones as defined in Table 3-2. ..

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## GERAGHTY & MILLER, INC.

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|                  | NJDEP Soil C | leanup Criteria * | Sample ID: 3TFIRMB4<br>Depth: 02<br>Zone**: N3TF | 3TFIRMB4<br>06<br>N3TF | AGTFSB1<br>02<br>AGTF | AGTFSB1<br>06<br>AGTF | AGTFSB2<br>04<br>AGTF | AGTFSB3<br>02<br>AGTF | AGTFSB4<br>02<br>AGTF |
|------------------|--------------|-------------------|--------------------------------------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Analyte (mg/kg)  | Residential  | Non-Residential   | Date: 10/17/94                                   | 10/17/94               | 10/20/94              | 10/20/94              | 10/28/94              | 10/27/94              | 10/20/94              |
|                  |              |                   | 12100                                            | 1710                   | 3290J                 | 1810J                 | 4750                  | 7500                  | 3030                  |
| Aluminum         |              |                   | 17.41                                            | 451                    | 2.4UJ                 | 59.7J                 | 0.32UJ                | 7,9J                  | 2.7J                  |
| Antimony         | 14           | 340               | 17.45                                            | 37.3                   | 12.2                  | 237                   | 5J                    | 27.9J                 | <u>27</u>             |
| Arsenia          | 20           | 20                | 10.7                                             | 3/.3                   | 3871                  | 49.1                  | 34.1J                 | 75.5                  | 67.9                  |
| Berium           | 700          | 47000             | 59.5                                             | 0.0211                 | 031                   | 0.050                 | 0.64J                 | 2                     | 1.4                   |
| Beryllium        | 1            | 1                 | 0.27J                                            | 0.230                  | 0.35                  | 0.080                 | 0.48.1                | 8                     | R                     |
| Cadmium          | 1            | 100               | R                                                | 0.250                  | 0.355                 | 4781                  | 2050                  | 19100                 | 3370J                 |
| Calcium          |              |                   | 40700J                                           | 18301                  | 24003                 | 4/65                  | 14 5                  | 28.9                  | 18.3                  |
| Cobalt           |              |                   | 54                                               | 35.8                   | 6.5J                  | 4.5J                  | 14.3                  | 1581                  | 354                   |
| Copper           | 600          | 600               | 63.3J                                            | <u>712</u>             | 84J                   | 264.)                 | 1753                  | 0.61                  | 0.60                  |
| Cyanida          | 1100         | 21000             | 0.6U                                             | 0.59U                  | 0,650                 | 0,650                 | 0.570                 | 46600                 | 25000                 |
| Iron             |              |                   | 36700                                            | 8190                   | 12800                 | 13100                 | 18900                 | 48800                 | 473                   |
| Lead             | 400          | 600               | 158                                              | 55.8                   | 293J                  | <u>792)</u>           | 170                   | <u>5150</u><br>7450   | 4/3                   |
| Magnesium        |              |                   | 19700                                            | 710J                   | 1210J                 | 269J                  | 1680                  | 7150                  | 255                   |
| Manganese        |              |                   | 322                                              | 43                     | 59.1J                 | 12.1J                 | 132                   | 309                   | <u>1</u> 00           |
| Mercuity         | 14           | 270               | 0.55                                             | 0.17                   | 0.89                  | Q,99                  | 0.17J                 | 0.535                 | 0.35                  |
| Nickel           | 250          | 2400              | 263                                              | 2650                   | 32.1J                 | 15.5J                 | 111                   | 140                   | 34.7                  |
| Potessium        |              |                   | 798J                                             | 240J                   | 507J                  | 500J                  | 8931                  | 751J                  | 4//J                  |
| Selenium         | 63           | 3100              | 0.77UJ                                           | 3.2                    | 1.3                   | 4,3                   | 1.2                   | 0.82UJ                |                       |
| Silver           | 110          | 4100              | 0. <b>54</b> U                                   | 0.81J                  | 0.13U                 | 0.53J                 | 0.110                 | 0.28J                 | 0.560                 |
| Suver<br>Suver   |              |                   | R                                                | 1510                   | 362U                  | 685U                  | 283U                  | 3450                  | 549UJ                 |
| 300IUM           | 2            | 2                 | 1 UJ                                             | 1UJ                    | 0.78U                 | <u>3,4</u>            | 0.68U                 | 0.72UJ                | 103                   |
|                  | 270          | 7100              | 288                                              | 14.8                   | 46.1J                 | 10.5J                 | 33.5                  | 171                   | 62.3J                 |
| Venedium<br>Zinc | 1500         | 1500              | 131                                              | 93.5                   | 145J                  | 158J                  | 333J                  | 373J                  | 933                   |

Table 5-5. Metals and Cyanide in Soli Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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| ·               |              |                   |                    |          |              |             |          |            |          |              |
|-----------------|--------------|-------------------|--------------------|----------|--------------|-------------|----------|------------|----------|--------------|
|                 |              |                   | Sample ID: AHTFSB1 | AHTFSB2  | AHTFSB4      | AHTFSB4     | APSB2    | APS85      | APS85    | APSB6        |
|                 | NJDEP Soil C | leanup Criteria * | Depth: 02          | 02       | 02           | 08          | 02       | 02         | 06       | 06           |
|                 |              | ·····             | Zone**: AHTF       | AHTF     | AHTF         | AHTE        | AP       | AP         | AP       | AP           |
| Analyte (mg/kg) | Residential  | Non-Residential   | Date: 10/19/94     | 10/14/94 | 10/14/94     | 10/14/94    | 10/26/94 | 10/12/94   | 10/12/94 | 10/21/94     |
|                 |              |                   | 2730               | 4820     | 4190         | 6710        | 4000J    | 9840       | 1910     | 2550J        |
| Aluminum        | ••           |                   | 0.08111            | 0.611    | 0.41.1       | 2.7.1       | 1.6J     | 4.1J       | 0.64J    | 0.77J        |
| Antimony        | 14           | 340               | 0.2003             | 12.0     | 22 2         | 88.8        | 18.4J    | 7.7        | 13.5     | <u>35,1J</u> |
| Arsenic         | 20           | 20                | 9                  | 12.9     | 23.3         | <u>00.0</u> | 74       | 96.5       | 41.4J    | 103          |
| Barium          | 700          | 47000             | 39.7J              | 63.8     | 32.05        | 05.0        | 0.241    | 0 36 1     | 0 21.1   | 0.17J        |
| Beryllium       | 1            | 1                 | 0.42J              | 0.34J    | 0.215        | 0.285       | 0.240    | 0,000      | 0.151    | R            |
| Cadmium         | 1            | 100               | 0.170              | R        | 0.07UJ       | 0,12J       | 0.0703   | n<br>11400 | 12401    | 30701        |
| Celcium         |              |                   | 469J               | 618J     | 1450J        | 1040J       | 5310J    | 21400      | 7.01     | 30700        |
| Cobalt          |              |                   | 4.6J               | 4.9J     | 5.4 <u>J</u> | 6,5J        | 75       | 24.1       | 7.95     | 1011         |
| Copper          | 600          | 600               | 100                | 445J     | 60.1J        | 89J         | 234J     | 84.Z       | 85.1J    | 401J         |
| Cvanide         | 1100         | 21000             | 0,54U              | 0.58U    | 0.560        | 0.570       | 0.580    | 0.530      | 0.640    | 0.560        |
| Iron            |              |                   | 15800              | 23400    | 20200        | 13600       | 15400    | 23000      | 19200    | 38000        |
| Lead            | 400          | 600               | 260                | 512      | 93.6         | 156         | 197J     | 184        | 116      | 416J         |
| Magnesium       |              |                   | 784J               | 1020J    | 1150         | 1950        | 1350J    | 6150       | 611J     | 4360J        |
| Manganasa       |              |                   | 54,5               | 94.3     | 81.5         | 64.2        | 266      | 250J       | 63.2     | 161          |
| Marguni         | 14           | 270               | 0.12               | 0.55     | 0.11U        | 0.75        | 0.29     | 0.29J      | 1        | 1.7          |
| Allokat         | 250          | 2400              | 17.9               | 18.7     | 13.7         | 54.2        | 34.9J    | 87.1       | 51.3     | 62.7J        |
| Pata asium      |              |                   | 675J               | 581J     | 540J         | 1110J       | 568J     | 882J       | 263J     | 585J         |
| Colorium        | EA           | 3100              | 1J                 | 0.78UJ   | 0.76UJ       | 0.78UJ      | 0.79U    | 0.59UJ     | 1.5J     | 1.5J         |
| Selenium        | 110          | 4100              | 0.52U              | 0.55U    | 0.53U        | 0.55U       | 0.12J    | 0.19J      | 0.61U    | 0.17J        |
| Silver          |              |                   | 203U               | R        | 258U         | 425U        | 225U     | 1210J      | 456U     | 780J         |
| Sodium          |              |                   | 0.9700             | 103      | 10           | 10          | 0.7U     | 0.63UJ     | 1,10     | 0.67UJ       |
| Thellium        | 2            | 2                 | 0.0700             | 221      | 23.2         | 25.2        | 41J      | 112        | 102      | 95.1J        |
| Vanadium        | 370          | 7100              | 20                 | · 223    | 43           | 874         | 48.2     | 159        | 124      | 562          |
| Zinc            | 1500         | 1500              | 89                 | 224      | 40           | ¥4.7        |          |            |          |              |

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Table 5-5. Matals and Cyanide in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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| Analyte (mg/kg)  | NJDEP Soil C | leanup Criteria *<br>Non-Residential | Semple ID: APSB6<br>Depth: 10<br>Zone**: AP<br>Date: 10/21/94 | DTSB3<br>04<br>DT<br>10/27/94 | DTSB3FR<br>04<br>DT<br>10/27/94 | ECIRMB1<br>02<br>U<br>10/24/94 | ECIRMB3<br>02<br>N3TF<br>10/19/94 | ECIRMB3<br>06<br>N3TF<br>10/19/94 | ECPSB1<br>02<br>ECP<br>10/20/94 | ECPSB2<br>06<br>ECP<br>10/20/94 |
|------------------|--------------|--------------------------------------|---------------------------------------------------------------|-------------------------------|---------------------------------|--------------------------------|-----------------------------------|-----------------------------------|---------------------------------|---------------------------------|
|                  |              | -                                    | 1320J                                                         | 5310J                         | 3800J                           | 787J                           | 6500                              | 608J                              | 2110J                           | 649J                            |
| Aluminum         |              | 340                                  | 2.7J                                                          | 0.72J                         | R                               | 0,28UJ                         | 4.7J                              | 4.9J                              | 2.7UJ                           | 3UJ                             |
| Antimony         | 14           | 20                                   | 63.3J                                                         | 16.5J                         | 7J                              | 4.3                            | 48.2                              | <u>92,9</u>                       | <u>39.5</u>                     | <u>71,5</u>                     |
| Arsenic          | 20           | 47000                                | 56.1                                                          | 76.7J                         | 45.5J                           | 9.4J                           | 85.2                              | 25.2J                             | 60.4                            | 6J                              |
| Berlum           | 700          | 4/000                                | 0.14J                                                         | 0.36J                         | Q,22J                           | 0.47J                          | 0.45J                             | 0.03U                             | 0.19J                           | 0.08U                           |
| Beryllium        | 1            | 100                                  | 0.08UJ                                                        | 0.28J                         | 0.07UJ                          | 0.07U                          | 8                                 | 0.08U                             | 0.36J                           | 0.07U                           |
| Cadmium          | I            | 100                                  | 883J                                                          | 1480J                         | 1620J                           | 254J                           | 5100J                             | 656J                              | 1880J                           | 307J                            |
| Calcium          |              |                                      | 6.5J                                                          | 29.3J                         | 77.5J                           | 2.1J                           | 16.1                              | 8.2J                              | 4.4J                            | 5J                              |
| Cobelt           | -            | 600                                  | 1 <b>59</b> J                                                 | 472J                          | 1220J                           | 17.7J                          | 153                               | 332J                              | <u>1490J</u>                    | 193J                            |
| Copper           | 800          | 21000                                | 0.650                                                         | 0.81UJ                        | 0.61UJ                          | 0.580                          | 0.56U                             | 0.66U                             | 0.58U                           | 0,58U                           |
| Cyanida          | 1100         | 21000                                | 5460                                                          | 15200J                        | 7850J                           | 2940                           | 27100                             | 21200                             | 12700                           | 9580                            |
| Iron             |              | e00                                  | 532.                                                          | 129J                          | 59.4J                           | 122J                           | 525                               | 25.3J                             | 380J                            | 25.6J                           |
| Lead             | 400          | 800                                  | 318                                                           | 2800J                         | 1090J                           | 106J                           | 3660                              | 129J                              | 545J                            | 53.9J                           |
| Magnesium        |              | -                                    | 75 9                                                          | 352J                          | 187J                            | 1 <b>4.7</b> J                 | 219                               | 113J                              | 97.6J                           | 48J                             |
| Manganese        |              |                                      | 0.56                                                          | 0.81J                         | 0.34J                           | 0.12U                          | 1.7                               | 0.13U                             | 0.92                            | 0.24                            |
| Mercury          | 14           | 270                                  | 92 81                                                         | 197J                          | 520J                            | 19.4J                          | 79.7                              | 62.3J                             | 30.9J                           | 34.6J                           |
| Nickel           | 250          | 2400                                 | 2001                                                          | 1120.1                        | 895J                            | 136UJ                          | 1130J                             | 286J                              | 439J                            | 159UJ                           |
| Potessium        |              |                                      | 2800                                                          | 1.3.1                         | 2.3J                            | 0.79U                          | 1.1J                              | 0.88U                             | 1.4                             | 0.77U                           |
| Selenium         | 63           | 3100                                 | 0161                                                          | 0 44 1                        | 0.5J                            | 0.12U                          | 0.53U                             | 0.17J                             | 0.47J                           | 0.11U                           |
| Silver           | 110          | 4100                                 | 46411                                                         | 1510.                         | 4340J                           | 202U                           | R                                 | 330U                              | 638U                            | 287U                            |
| Şodium           |              |                                      | 4040                                                          | 0 73111                       | 0.73UJ                          | 0.7U                           | 1 U J                             | 0.78U                             | 0.68U                           | 0.68U                           |
| Thaliium         | 2            | 2                                    | 19 41                                                         | 62.8.1                        | 35.6J                           | 51.1J                          | 157                               | 11.7J                             | 24.4J                           | 10.1J                           |
| Venedium<br>Zinc | 370<br>1500  | 7100<br>1500                         | 71.4                                                          | 549J                          | 58J                             | 27.1J                          | 421                               | 45.4J                             | 116J                            | 475J                            |

Table 5-5. Metals and Cyanide in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                 | NJDEP Soil Cl | eanup Criteria * | Sample ID:<br>Dapth:<br>Zone**: | ECPSB2<br>12<br>ECP | ECPSB4<br>08<br>ECP | ECPSB5<br>02<br>ECP | GFSB1<br>02<br>STF | GTFIRMB1<br>02<br>GTF<br>10/05/94 | GTFIRMB1<br>08<br>GTF<br>10/06/94 | GTFIRMB2<br>02<br>GTF<br>10/17/94 |
|-----------------|---------------|------------------|---------------------------------|---------------------|---------------------|---------------------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Analyta (mg/kg) | Residential   | Non-Residential  | Dete:                           | 10/20/94            | 10/19/94            | 10/19/94            | 10/12/34           | 10/00/04                          | 10/00/01                          |                                   |
|                 |               |                  |                                 | 2430J               | 3870J               | 3560                | 23300              | 7900                              | 19 <b>000</b>                     | 5470                              |
| Aluminum        | 1.4           | 340              |                                 | 42.5J               | 0.2900              | 1.8J                | 4.1J               | 1.6J                              | 0.29UJ                            | 2.3J                              |
| Antimony        | 14            | 10               |                                 | 207J                | 11                  | 38.3                | 46.7               | 8.5                               | 1.8J                              | 8.1                               |
| Arsenic         | 20            | 47000            |                                 | 93                  | 54.9                | 99.8                | 170                | 108                               | 105~                              | 121                               |
| 3arium          | /00           | 47000            |                                 | 07.1                | 0.23J               | 0.22U               | 0.91J              | 0.34J                             | 0.69J                             | 0.36J                             |
| Beryllium       | 1             |                  |                                 | 09111               | 0.070               | R                   | R                  | 0.46J                             | 0.07UJ                            | 0.81J                             |
| Cadmium         | 1             | 100              |                                 | 4711                | 20300.1             | 4520.1              | 6930               | 6820                              | 6270                              | 19400J                            |
| Calcium         |               |                  |                                 | 4/1J<br>6 21        | 4 6 1               | 881                 | 397                | 37.5                              | 642                               | 10.9J                             |
| Cobalt          | -+            | ••               |                                 | 0.00                | 4.05                | 110                 | 1330               | 170                               | 1510                              | 74.3J                             |
| Соррег          | 600           | 600              |                                 | 284J                | 2145                | 0.66                | 0.570              | 0.550                             | 0.620                             | 0.570                             |
| Cyanide         | 1100          | 21000            |                                 | ./0                 | 0.590               | 24600               | 30900              | 18400                             | 22300                             | 20900                             |
| ron             |               |                  |                                 | 12200               | 10100               | 24000               | 324                | 153                               | 11                                | 241                               |
| Lead            | 400           | 600              |                                 | 256J                | /8.83               | 2/3                 | 6320               | 4290                              | 4440                              | 4290                              |
| Magnesium       | ••            |                  |                                 | 392J                | 30601               | 2470                | 2911               | 237.1                             | 312J                              | 45 <b>4</b>                       |
| Manganese       |               |                  |                                 | 16.Z                | 71.4J               | 0.5                 | 1 2 1              | 0.451                             | 0.11U                             | 0.87                              |
| Mercury         | 14            | 270              |                                 | 2                   | 0.120               | 0,5                 | 0.00               | 153                               | 1520                              | 74.9                              |
| Nickel          | 250           | 2400             |                                 | 21.2J               | 70,9J               | 43                  | 503                | 1330                              | 4120                              | 983J                              |
| Potassium       |               | • ••             |                                 | 712J                | 1630J               | 649J                | 5030               | 0.6111                            | 1.91                              | 0.76UJ                            |
| Selenium        | 63            | 3100             |                                 | 2.8                 | 0.93J               | 1.3J                | 2.4J               | 0.0105                            | 0.411                             | 0.53U                             |
| Silver          | 110           | 4100             |                                 | .39J                | 0.16J               | 0.54U               | 0.56J              | 0.24J                             | 254001                            | 5350                              |
| Sodium          |               |                  |                                 | 769J                | 6800                | 250UJ               | 36300J             | 41000                             | 0 72111                           | 10                                |
| Thalijum        | 2             | 2                |                                 | <u>2.7J</u>         | 0.71U               | 1UJ                 | 0.67UJ             | 0.65UJ                            | 0.7303                            | 159                               |
| Venedium        | 370           | 7100             |                                 | 1 <b>4.8</b> J      | 368J                | 62.9                | 93.6               | 55.8                              | 30.2                              | 170                               |
| Zine            | 1500          | 1500             |                                 | 113                 | 41.7J               | 133                 | 167                | 179                               | 47,4J                             | 173                               |

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Table 5-5. Metals and Cyanide in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey,

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|                     |              |                 | Sample ID: GTFIRMB2 | GTFIRMB3  | GTFIRMB3    | GTFIRMB4 | GTFIRMB4 | GTFIRMB5<br>02 |
|---------------------|--------------|-----------------|---------------------|-----------|-------------|----------|----------|----------------|
|                     | NJDEP Soil C | leanup Criteria | Depth: US           | OZ<br>GTE | GTE         | GTE      | GTF      | GTF            |
|                     | m til och t  | No. Desidendal  | 2006**: GIF         | 10/05/94  | 10/05/94    | 10/17/94 | 10/17/94 | 10/05/94       |
| Analyte (mg/kg)     | Residential  | Non-Kesidential |                     | 10/03/34  | 10/05/04    |          |          |                |
| Aluminum            |              |                 | 1490                | 9100      | 2180        | 9200     | 3510     | 6190           |
| Antimony            | 14           | 340             | 0.32UJ              | 4 2.1J    | 0.32UJ      | 9.5J     | 0.28UJ   | 4.6J           |
| Arrenio             | 20           | 20              | <u>33,9</u>         | 15.5      | <u>28.2</u> | 10.1     | 5.2J     | 11.8           |
| An eerine<br>Berium | 700          | 47000           | 39.9J               | 145       | 42J         | 50.6     | 24.5J    | 297            |
| Dendlium            | 1            | 1               | 0.270               | 0.48J     | 0.13J       | 0.22     | 0.18U    | 0.43J          |
| Cedmium             | ,<br>1       | 100             | 0.08U               | 0.66J     | LU80.0      | R        | 0.16U    | 1.4            |
| Calaium             |              |                 | 1160J               | 4560      | 1280J       | 27700J   | 936J     | 5830J          |
| Calcium             |              | ••              | 3J                  | 82.3      | 8.3J        | 51,9     | 28.5     | 7.8J           |
| Codelt              | 600          | 600             | 49.1                | 343       | 47.8        | 99,8J    | 265      | 250            |
| Copper              | 1100         | 21000           | 0.68U               | 0.55U     | 0.68U       | 0.6U     | 0.6U     | 0.67           |
| Cyanice             | 1100         |                 | 7370                | 19800     | 26700       | 29600    | 7950     | 19600          |
| iron                | 400          | 600             | 14.9                | 437       | 88.1        | 117      | 54.7     | <u>1180</u>    |
|                     |              | -               | 334J                | 2990      | 485J        | 13600    | 993J     | 2320           |
| Magnesium           |              |                 | 45.2                | 189J      | 53.9J       | 311      | 65       | 226J           |
| Manganese           | 14           | 270             | 0.27                | 0.82J     | 0,13U       | 0.25     | 0.16     | 1.5J           |
| Mercury             | 250          | 2400            | 15                  | 256       | 33.7        | 200      | 421      | 49.9           |
| NICKO               | 250          | _ /••           | 3001                | 1740      | 490J        | 803J     | 707J     | 1120J          |
| Potassium           | 83           | 3100            | 0.9U                | 0.74J     | 1.4J        | 0.82UJ   | 0.8U     | 1.5J           |
| Selenium            | 110          | 4100            | 0.64U               | 0,28J     | 0.11U       | 0.58U    | 0.56U    | 1.2J           |
| Silver              |              |                 | 3570                | 6920J     | 728UJ       | 3030J    | 3120     | 783UJ          |
| Sodium              |              | 2               | 1.2UJ               | 0,66UJ    | 0.81UJ      | 1.1UJ    | 1.1UJ    | 0.74UJ         |
| Thaliium            | 2            | 7100            | 12.3.               | 193       | 45.3        | 223      | 14.8     | 80.9           |
| Vanadium            | 370          | 1500            | 17.9.               | 268       | 30.4J       | 126      | 93.9     | 535            |
| Zinc                | 1500         | 1500            |                     |           |             | •        |          |                |

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Table 5-5. Metals and Cyanide in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                 | NJDEP Soil C | leenup Criteria * | Sample ID: GTFIRMB5FR<br>Depth: 02 | GTFIRMB5<br>06<br>CTE | GTFIRMB8<br>04<br>GT5 | GTFIRMB6<br>08<br>GTE | GTFIRMB7<br>02<br>GTF | GTFIRMB7<br>08<br>GTF |
|-----------------|--------------|-------------------|------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Analyte (mg/kg) | Residential  | Non-Residential   | Date: 10/05/94                     | 10/05/94              | 10/05/94              | 10/05/94              | 10/17/94              | 10/17/94              |
|                 |              |                   |                                    |                       |                       | 6740                  | 4780                  | 3770                  |
| Aluminum        |              |                   | 5670                               | 3840                  | 8890                  | 41                    | 451                   | 9.81                  |
| Antimony        | 14           | 340               | 2.6J                               | 1.6J                  | 1.13                  | 4J                    | 4,55                  | 12                    |
| Arsenic         | 20           | 20                | 11.3                               | 4.6J                  | 10.3                  | 22.5                  | 12.5                  | 417                   |
| Barium          | 700          | 47000             | 279                                | 138                   | 232                   | 5290                  | 324                   | 417                   |
| Beryliium       | 1            | 1                 | 0.41J                              | 0.15J                 | 0.35J                 | 0.580                 | 0.32J                 | 0.465                 |
| Cadmium         | 1            | 100               | 1.4                                | 0.96J                 | 1. <b>1</b> J         | 4,7                   | K                     | 1.13                  |
| Calcium         |              |                   | 10900J                             | 6000                  | 9710                  | 5340                  | 46703                 | 146000                |
| Cobelt          |              |                   | 8.2J                               | 5.2J                  | 5.8J                  | 15.2                  | 8.5J                  | 4.6J                  |
| Copper          | 600          | 600               | 244                                | 69                    | 186                   | 281                   | 221J                  | 542                   |
| Cvanide         | 1100         | 21000             | .66                                | 0.66U                 | 0.85                  | 1,9                   | 0.87                  | 1.7                   |
| iron            |              |                   | 19600                              | 11900                 | 25100                 | 24500                 | 29800                 | 12100                 |
| Leed            | 400          | 600               | 904                                | 311                   | <u>5110</u>           | <u>7590</u>           | <u>1040</u>           | <u>1730</u>           |
| Magnasium       |              |                   | 1920                               | 1510                  | 1940                  | 1830                  | 1760                  | 1000J                 |
| Magnesian       |              |                   | 179J                               | 80.6J                 | 220J                  | 295J                  | 263                   | 98                    |
| Manganasa       | 14           | 270               | 2.3J                               | 0.69J                 | 0.73J                 | 3.4J                  | 1,9                   | 1.1                   |
| Mercury         | 250          | 2400              | 38.2                               | 22.7                  | 38                    | 104                   | 28.3                  | 19.3                  |
| NICKO           | 230          |                   | 966J                               | 539J                  | 912J                  | 1040                  | 567J                  | 604J                  |
| Potessium       | 67           | 3100              | 1.5J                               | 2.2J                  | 2J                    | 9.3J                  | 1.8J                  | 3.8                   |
| Selenium        | 110          | 4100              | 1,1                                | 0.41J                 | 0.73J                 | 1.3J                  | 1.3J                  | 2.1J                  |
| Silver          | 110          | 4100              | 885J                               | 853UJ                 | 1240J                 | 1510J                 | R                     | 587U                  |
| Sodium          |              |                   | 0.760.J                            | 0.79UJ                | 0.86UJ                | 0.82UJ                | 1UJ                   | 1,1UJ                 |
| Thellium        | 2            | 4                 | 89.1                               | 48.6                  | 30.8                  | 42. <del>5</del>      | 44.4J                 | 22.9                  |
| Vanadium        | 370          | 7100              | 501                                | 334                   | 360                   | 3210                  | 618                   | 429                   |
| Zinc            | 1500         | 1500              | 30,1                               |                       | •••                   |                       |                       |                       |

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|                 |             | Innerus Criteria * | Sample ID: GTFIRMB8 | GTFIRM88 | GTFIRMB9<br>02 | GTFIRMB9<br>06 | GTFSB1<br>02 | GTFSB1<br>08  | GTFSB2<br>02 |
|-----------------|-------------|--------------------|---------------------|----------|----------------|----------------|--------------|---------------|--------------|
|                 | NJDEF 301 C | ieanup ontena      | Zone**: GTF         | GTF      | GTF            | GTF            | GTF          | GTF           | GTF          |
| Analyte (mg/kg) | Residential | Non-Residential    | Date: 10/18/94      | 10/18/94 | 10/05/94       | 10/05/94       | 10/10/94     | 10/10/94      | 10/13/94     |
| Alexanderen     | _           | -                  | 3350                | 3840     | 4830           | 4330           | 4620         | 4060          | 3790         |
| Antimony        | 14          | 340                | 11.7J               | 239J     | 12.6J          | 14J            | 3.6J         | 1.2J          | 4.9J         |
| Antenony        | 20          | 20                 | 30.7                | 24.5     | 42.2           | <u>37.5</u>    | 10.6         | 11.6          | 10.9         |
| Reduc           | 700         | 47000              | 501                 | 259      | 899            | 593            | 297          | 290           | 277          |
| Denum           | 1           | 1                  | 0.39J               | 0.36J    | 0.43J          | 0.39J          | 0.42J        | 0,44J         | 0.5J         |
| Germum          | 1           | 100                | 6.1                 | 3.1      | R              | 18.4J          | R            | 0.43J         | 1.2J         |
| Calairm         | -           |                    | 4080J               | 2940J    | 6910           | 9150           | 3510         | 4580          | 2420J        |
| Calcium         |             | _                  | 9.5J                | 7.7J     | <b>9</b> J     | 13.7J          | 9,9J         | 8.4J          | 7.6J         |
| Cooner          | 600         | 800                | 421                 | 483J     | 588            | 511            | 662          | 135           | 237J         |
| Copper          | 1100        | 21000              | 0.91                | 0.65U    | 0.62U          | 0.84U          | 0.64         | 0.78          | 0.62U        |
| Cyanide         |             |                    | 104000              | 24000    | 45500          | 58300          | 34000        | 23400         | 19700        |
| Iron            | 400         | 600                | 1360                | 2410     | 2710           | <u>2410</u>    | <u>787</u>   | 544           | <u>790</u>   |
| Lead            | +00         |                    | 736J                | 859J     | 2290           | 1200J          | 2970         | 470J          | 1900         |
| Magnesium       | ••          |                    | 293                 | 145      | 474J           | 422J           | 214J         | 127J          | 123          |
| Manganese       | 14          | 270                | 1.8                 | 2.9      | 6J             | 5.1J           | 1.3J         | 0.54J         | 3            |
| Mercury         | 14          | 270                | 48.8                | 43.1     | 54             | 162            | 59.5         | 27.3          | 48.8         |
| Nickel          | 250         | 2400               | 0.07                | 635.1    | 802.1          | 786J           | 789J         | 542J          | 795J         |
| Potassium       |             | 2100               | 5.41                | 3.1      | 3.J            | 5J             | 1.8J         | 7.9J          | 1.6J         |
| Selenium        | 63          | 3100               | 3.45                | 4.5      | 3              | 2.5J           | 0.95J        | 1. <b>3</b> J | 0.93J        |
| Silver          | 110         | 4100               | 2.70                | 4.3      | B              | 1450.1         | R            | 505UJ         | 1720         |
| Sodium          | -           |                    | 6120                | 4230     | 0.74111        | 1111           | 0.720.1      | 0.860J        | 1.10         |
| Thallium        | 2           | 2                  | 503                 | 1.10     | 0.7405         | 400            | 47.91        | 30.1          | 42.3         |
| Vanadium        | 370         | 7100               | 30.1J               | 48.8     | 92.3J          |                | 274          | 631           | 561          |
| Zinc            | 1500        | 1500               | 1400                | 1010     | <u>1510</u>    | 0000           | 0/4          |               | 50.          |

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| Analysa (mafea)  | NJDEP Soil C | leanup Criteria * | Sample ID: GTFSB3<br>Depth: 02<br>Zone**: GTF<br>Date: 10/10/94 | GTFSB4<br>02<br>GTF<br>10/13/94 | GTF585<br>02<br>GTF<br>10/13/94 | GTFSB6<br>02<br>GTF<br>10/11/94 | GTFS87<br>02<br>GTF<br>10/13/94 | GTFSB7<br>08<br>GTF<br>10/13/94 | GTFSB8<br>04<br>GTF<br>10/13/94 | GTFS88<br>08<br>GTF<br>10/13/94 |
|------------------|--------------|-------------------|-----------------------------------------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Analyte (highes) | i estadinida |                   |                                                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| Aluminum         |              | -                 | 3080                                                            | 8150                            | 10300                           | 2600                            | 5440                            | 3110                            | 3260                            | 7380                            |
| Antimony         | 14           | 340               | 1.5J                                                            | 2.6J                            | 0.27J                           | 1,7J                            | 2.1J                            | 1.4J                            | 0,31J                           | 0.32UJ                          |
| Arsenic          | 20           | 20                | 6.9                                                             | 13,9                            | 9                               | 7.2                             | 7.9                             | 4,2                             | 10.2                            | 3.1                             |
| Barium           | 700          | 47000             | 123                                                             | 247                             | 56.8                            | 158                             | 207                             | 345                             | 30,9J                           | 32.4J                           |
| Berylium         | 1            | 1                 | 0.27J                                                           | 0.46J                           | 0.54J                           | 0.27J                           | <u>1,3</u>                      | 0.29J                           | 0.22J                           | 0.47J                           |
| Cadmium          | 1            | 100               | 0.35J                                                           | R                               | R                               | 0.44J                           | R                               | LE.0                            | R                               | 0.08UJ                          |
| Calcium          |              |                   | 2230                                                            | 4150                            | 3610                            | 2990                            | 4950J                           | 12700J                          | 862J                            | 1250J                           |
| Cobelt           |              |                   | 7.4J                                                            | 45                              | 21.1                            | 6.5J                            | 16.3                            | 5.2J                            | 20.5                            | 66.3                            |
| Copper           | 600          | 600               | 74                                                              | 340                             | 29.4                            | 115                             | 197J                            | 399J                            | 67,5J                           | 138J                            |
| Cvanida          | 1100         | 21000             | 0.83                                                            | 1.2                             | 0.54U                           | 2.2                             | 0.57U                           | 0.68U                           | 0.57U                           | 0.67U                           |
| lron ·           |              | +-                | 17000                                                           | 23700                           | 38800                           | 11800                           | 26000                           | 18400                           | 39100                           | 14700                           |
| lead             | 400          | 600               | 333                                                             | <u>714</u>                      | 34.3                            | 392                             | 404                             | 492                             | 69.1                            | 64.9                            |
| Magnesium        |              |                   | 449J                                                            | 8960                            | 28100                           | 547J                            | 3030                            | 846J                            | 964J                            | 2360                            |
| Manganasa        |              |                   | 79.6J                                                           | 419J                            | 390J                            | 79.3J                           | 237                             | 83.8                            | 212                             | 129                             |
| Mercury          | 14           | 270               | 0,44J                                                           | 1.9J                            | 0.14J                           | 1.1J                            | 3                               | 2,4                             | 0.10                            | Q.13U                           |
| Nickel           | 250          | 2400              | 35.3                                                            | 181                             | 312                             | 24.2                            | 75.1                            | 18.5                            | 50.7                            | 104                             |
| Potessium        |              | -                 | 703J                                                            | 1460                            | 6100                            | 495J                            | 449J                            | 527J                            | 689J                            | 1800J                           |
| Selenium         | 63           | 3100              | 1.1J                                                            | 0.83J                           | 0.6UJ                           | 1.4J                            | 1.2J                            | 1.7J                            | 0.78UJ                          | 0.91UJ                          |
| Silver           | 110          | 4100              | 0.39J                                                           | 1.1J                            | 0.090                           | 0.6J                            | 1.5J                            | 0.65U                           | 0.550                           | Q.65U                           |
| Sodium           |              |                   | 209UJ                                                           | 4490J                           | R                               | 295UJ                           | R                               | 643U                            | 648UJ                           | 3350                            |
| Thellium         | 2            | 2                 | 0.71UJ                                                          | 0.68UJ                          | 0.65UJ                          | 0.68UJ                          | 1UJ                             | 1.2U                            | 1UJ                             | 1.2U                            |
| Venedium         | 370          | 7100              | 44.9                                                            | 101                             | 60.6J                           | 62.4                            | 42.8J                           | 35.7                            | 50.9J                           | 31.5                            |
| Zinc             | 1500         | 1500              | 274                                                             | 398                             | 99.1                            | 196                             | 545                             | 288                             | 117                             | 52.7                            |

Table 5-5. Metals and Cyanide in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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| NJDEP Soil Cleanup Criteria |             | Sample ID: GTFSB9<br>Depth: 02 | GTFSB9<br>08  | LAIRMB1<br>02     | LOSB1<br>04<br>LO | LOSB1<br>08    | LOSB2<br>04    | LOS62          | LOSB3<br>02    |                |
|-----------------------------|-------------|--------------------------------|---------------|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|
| A                           | Desidential | Non Qosidential                | Zone**: GTF   | GTF               | LO<br>10/24/94    | LQ<br>10/25/94 | LO<br>10/25/94 | LO<br>10/14/94 | LO<br>10/14/94 | LO<br>10/24/94 |
| Analyte (mg/kg)             | Kesigenua   | NOR-NORDIER NON                | 0818, 10/10/0 | 10,10,04          |                   |                |                |                |                |                |
| Aluminum                    |             |                                | 5380          | 1070              | 4710J             | 652            | 335U           | 19000          | 5980           | 3740J          |
| Antimony                    | 14          | 340                            | 2J            | 3.4J              | 3.8J              | 1.2UJ          | 0.27UJ         | 4.8J           | 8.1J           | 0.98UJ         |
| Arsenia                     | 20          | 20                             | 5.1           | 5.1               | 52.3              | 12.7J          | 12.9J          | <u>54.8</u>    | <u>138</u>     | <u>49.9</u>    |
| Barium                      | 700         | 47000                          | 62.2          | 35J               | 259               | 26J            | 29.1J          | 302            | 141            | 63.4           |
| Baryllium                   | 1           | 1                              | 0,22          | 0.15J             | 0.35J             | 0.020          | 0.02U          | 0,98J          | 0.17J          | 0.23J          |
| Cadmium                     | 1           | 100                            | 0.08J         | 0.070J            | R                 | 0.07U          | 0.07U          | 16.6           | 0.2J           | 0.78J          |
| Calcium                     | -+          |                                | 8140J         | 1190J             | 2250J             | 780J           | 343U           | 4890J          | 21500J         | 1180J          |
| Cobait                      |             |                                | 81.9          | 12                | 10.9J             | 1,2J           | 3J             | 15.9           | 10.7J          | 7.7J           |
| Copper                      | 600         | 600                            | 272J          | 476J              | 256J              | 23.7J          | 70.2J          | 322J           | 78.2J          | 106J           |
| Cvenide                     | 1100        | 21000                          | 0.55U         | 0.58U             | 0.66U             | 0.58U          | 0.57U          | 0.7U           | 0.92U          | 0.610          |
| Iron                        |             |                                | 13000         | 5230              | 69 200 J          | 1940U          | 1910U          | 21900          | 13500          | 15100          |
| Lend                        | 400         | 600                            | 97.2          | 217               | 520J              | 71.6           | 24.2           | <u>640</u>     | 125            | 122J           |
| Maanacium                   |             |                                | 2190          | 373J              | 2780J             | 546J           | 188J           | 3280           | 758J           | 718J           |
| Mencenese                   |             |                                | 152           | 25.9              | 247J              | 16.6U          | 8,6U           | 96,3           | 42             | 97.7J          |
| Mercury                     | 14          | 270                            | 0.23          | 0.12              | 2                 | 0.12UJ         | 0.1J           | 5.5            | 0,18U          | .8             |
| Nickel                      | 250         | 2400                           | 248           | 302               | 59.6J             | 2.4J           | 5,6J           | 72.4           | 18,9           | 35.8J          |
| Batassium                   |             | -                              | 1110J         | 495J              | 745J              | 274J           | 1 <b>7</b> 5J  | 6500J          | 2760J          | 490J           |
| Selenium                    | 63          | 3100                           | 0.82J         | 1. <del>6</del> J | 1.9J              | 1J             | Q.76U          | 2.7J           | 33.3           | 1.9            |
| Selemen                     | 110         | 4100                           | 0.520         | 0,54U             | 0.52J             | 0.120          | 0,11U ·        | Q.67U          | 0.88U          | 0.12U          |
| Suder                       |             |                                | 6950          | 864U              | 346U              | 363U           | 210U           | 5950           | 1390J          | 178U           |
| Soulum<br>Thallium          | 2           | 2                              | 0.98U         | 10                | 0.78UJ            | 0.7U           | 1.5J           | <u>2,6J</u>    | 1.6U           | 0.72U          |
| i nellium                   | 4<br>370    | 7100                           | 50.5          | 31.6              | 210J              | 4.7J           | 3.1J           | 20.2           | 40             | 18.1J          |
| Vanadium<br>Zinc            | 1500        | 1500                           | 55.2          | 35.6              | 561J              | 3,5UJ          | 24.6J          | 703            | 22.7           | 302J           |

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Table 5-5. Metals and Cyanide in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                 |              |                   |                  |          |          |          |          | 100010   | 106810   | 105811   | LOSB12       |
|-----------------|--------------|-------------------|------------------|----------|----------|----------|----------|----------|----------|----------|--------------|
|                 |              |                   | Sample ID: LOSB4 | LOSB4    | LOSE8    | LOSB9    | LOSBA    | 04       | 09       | 02       | 02           |
|                 | NJDEP Soil C | leanup Criteria * | Depth: 02        | 05       | 02       | 02       | 10       | 10       | 10       | 10       | 10           |
|                 |              |                   | Zone"": LO       |          | 55       |          | 10/25/04 | 10/28/94 | 10/28/94 | 10/25/94 | 10/25/94     |
| Analyte (mg/kg) | Residential  | Non-Residential   | Date: 10/24/94   | 10/24/94 | 10/24/94 | 10/25/34 | 10/23/34 | 10/20/04 | 10/20/04 | 10/20/01 |              |
|                 |              | _                 | 5490.1           | 9140J    | 4400J    | 7800J    | 1470     | 2780     | 2210     | 3140J    | 4220J        |
| Aluminum        | -            | 240               | 0.540.1          | 0.43UJ   | 1.1UJ    | 0.66UJ   | 0,67UJ   | 1.3UJ    | 0.28UJ   | 0.48UJ   | 2.7UJ        |
| Antimony        | 14           | 340               | 18.8             | 7.1      | 34.9     | 13.1J    | 35.3J    | 36.9J    | 15J      | 4J       | <u>28.3J</u> |
| Arsenic         | 20           | 47000             | 263              | 164      | 69.9     | 49.7J    | 33.3J    | 75       | 32.3J    | 25.2J    | 142          |
| Barium          | 700          | 47000             | 0.171            | 0.18.1   | 0.25.1   | 0.15J    | 0.05U    | 0.16J    | 0.13J    | 0.16J    | 0.23J        |
| Beryllium       | 1            | 1                 | 9,175<br>B       | 8.100    | R        | 0.31J    | 0.11J    | 0.73J    | 0.56J    | 0.19J    | 5J           |
| Cedmium         | 1            | 100               |                  | 72101    | 9130.1   | 6700J    | 932J     | 1630     | 1020J    | 2210J    | 3120J        |
| Calcium         | ••           |                   | 34703            | 13.0     | 7 6 1    | 12 1.1   | 2.5J     | 3.9J     | 6.9J     | 5J       | 8,4J         |
| Cobelt          |              |                   | 7.75             | 13.2     | 7.05     | 70.11    | 26.31    | 66 6.1   | 38.9.1   | 42.1J    | 177J         |
| Copper          | 600          | 600               | 62J              | 50.5J    | 2217     | 0.10     | 0 560    | 3.8      | 0.58U    | 0.66U    | 0.71U        |
| Cyanida         | 1100         | 21000             | 0,530            | 0.530    | 0.580    | 0.040    | 7270     | 17000    | 11500    | 10200    | 43500        |
| iron            |              | ••                | 24100            | 22400    | 50100    | 24300    | 7370     | 570      | PG 7     | 83.2.1   | 292.J        |
| Lead            | 400          | 600               | 277J             | 163J     | 347J     | 144J     | 217      | 5/8      | 4101     | 11801    | 2020.1       |
| Magnesium       |              |                   | 3260J            | 6900J    | 2170J    | 5780J    | 8861     | 1140     | 4103     | 74 2     | 213          |
| Manganese       |              |                   | . 305J           | 295      | 202J     | 274      | 31       | 116      | 43.5     | 0.48     | 9.01         |
| Mercury         | 14           | 270               | 0.38             | 0.46     | 4.8      | 4.1      | 0.24J    | 2,8J     | 0.25J    | 11.01    | 3100         |
| Nickel          | 250          | 2400              | 20.8J            | 22.8J    | 37.8J    | 19,9J    | 5.8J     | 14.2     | 11.9     | 11.01    | 300          |
| Potassium       |              | ••                | 563J             | 398J     | 732J     | 429J     | 252J     | 502J     | 308J     | 304J     | 4935         |
| Selenium        | 63           | 3100              | 0.71UJ           | 0.72UJ   | 1.2J -   | 0.86U    | 0.74U    | 1.2      | 1.3      | 0.880    | 1.23         |
| Silver          | 110          | 4100              | 0.13J            | 0.18J    | 0.17J    | 0.13U    | 0.11U    | 0.11U    | 0.120    | 0.130    | 0.22J        |
| Cadium          |              | ••                | 328U             | 53.8U    | 527U     | 1480     | 354U     | 465U     | 458U     | 3330     | 5300         |
| Thellium        | 2            | 2                 | 0.63UJ           | 0.64UJ   | Q,7UJ    | 0.76U    | 0.65U    | 0.68U    | 0.69U    | 0.78U    | 0.85UJ       |
|                 | 370          | 7100              | 31J              | 49.6J    | 74.7J    | 49.2J    | 13.4     | 24.5     | 9.4J     | 37.3J    | 73.2J        |
| vanadium        | 1500         | 1500              | 116J             | . 61     | 549J     | 121,     | 41.9J    | 208J     | 201J     | 216      | 1 100        |
| Zinc            | 1900         | , 500             |                  |          |          |          |          |          |          |          |              |

Table 5-5. Metals and Cyanide in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                 |               |                  |                   |             |              | · ·          |             |                    |          |              |
|-----------------|---------------|------------------|-------------------|-------------|--------------|--------------|-------------|--------------------|----------|--------------|
|                 |               |                  | Sample ID: LOSB12 | LOSB13      | LOSB13FR     | LOSB13       | LOSB14      | LOSB15             | LOSB16   | LOSB17       |
|                 | NJDEP Soil Cl | eanup Criteria * | Depth: 06         | 02          | <b>Q2</b>    | 08           | 02          | 02                 | 04       | 02           |
|                 |               |                  | Zone"": LO        | LO          | LO           | ĻQ           | LO          | LO                 | LO       |              |
| Analyte (mg/kg) | Residential   | Non-Residential  | Date: 10/25/94    | 10/31/94    | 10/31/94     | 10/31/94     | 10/25/94    | 10/24/94           | 10/25/94 | 10/24/94     |
|                 |               |                  |                   |             |              |              |             | 6400 I             | 1040     | 33701        |
| Aluminum        |               |                  | 1 170             | 3550        | 3780         | 3290J        | 6280J       | 64300              | 0.4411   | 0 55111      |
| Antimony        | 14            | 340              | 0.54UJ            | 3.4J        | 1.8UJ        | 1.6J         | 1.500       | 4,4J               | 40.91    | 27.3         |
| Arsenic         | 20            | 20               | 8.7J              | <u>249J</u> | <u>51,3J</u> | <u>64,3J</u> | 18J         | <u>23.4</u><br>152 | 144      | <u> </u>     |
| Barium          | 700           | 47000            | 26.5J             | 60          | 67.1         | 48.3         | 83.9        | 152                | 0.111    | 021          |
| Beryllium       | 1             | 1                | 0.05U             | 0.21J       | 0.27J        | 0.2J         | 0.4J        | 0.55J              | 0.10     | 1.2          |
| Cadmium         | 1             | 100              | 0.17J             | 0.9J        | 1.1J         | R            | ft          | N                  | 3./      | 197001       |
| Calcium         |               |                  | 1580              | 5580J       | 3250J        | 6720J        | 5180J       | 4800J              | 10503    | 531          |
| Cobalt          |               | <b></b> ,        | 4.1J              | 4.5J        | 4.9J         | 5.2J         | 5.6J        | 27.7               | 70.91    | 3,33         |
| Copper          | 600           | 600              | 28.4J             | 112J        | 78.6J        | 52.3J        | 95.2J       | 1903               | /U.8J    | 72.25        |
| Cvanide         | 1100          | 21000            | 0.64U             | 0.57U       | 0.570        | 0,56UJ       | 0.67U       | 0:580              | 0.560    | 0.80         |
| Iron            |               | -                | 13200             | 18800       | 18700        | 24800        | 33700       | 35500              | 7690     | 10100        |
| Laad            | 400           | 600              | 75.1              | <u>792J</u> | 458J         | 257J         | <u>671J</u> | 455J               | 449      | <u>10105</u> |
| Megnesium       |               |                  | 1120J             | 1930        | 1160         | 3290J        | 1160J       | 2250J              | 708J     | 10705        |
| Mandonéee       |               |                  | 43.7              | 129         | 202          | 280          | 418         | 196J               | 35,3     | 1573         |
| Margun          | 14            | 270              | 0.47J             | 1.7J        | 1.6J         | 1.3          | 0.7         | 1                  | 0.29J    | 0.67         |
| Mercury         | 250           | 2400             | 14.6              | 19.5        | 19.1         | 11.2J        | 22.5J       | 91,3J              | 21,4     | 41.7J        |
| NICKO           |               | ••               | 251J              | 403J        | 47 2 J       | 423J         | 791J        | 1060J              | 322J     | 526J         |
| Potassium       | 81            | 3100             | 0.98J             | 2.1         | 1.9          | 2J           | 0.91UJ      | 1.8J               | 0.75U    | 1.5          |
| Selenium        | 110           | 4100             | 0.13U             | 0,18J       | 0.18J        | 0.13J        | 0.13UJ      | 0.33J              | 0.11U    | 0.12J        |
| Silver          | 110           |                  | 267U              | 178U        | 461U         | 197U         | 748J        | 2050               | 327U     | 1650         |
| Sodium          |               | •                | 0.76U             | 0.69U       | 0.67U        | 0.67UJ       | 0.8UJ       | 0.7UJ              | 0.66U    | 0.72U        |
| Thallium        | 2             | 4                | 23.9              | 34.6        | 35 .         | 16.8J        | 69J         | 64.1J              | 12.1     | 13.2J        |
| Vanadium        | 370           | /100             | 32 5 1            | 174J        | 213J         | 137          | 76.9        | 221J               | 887J     | 290J         |
| Zinc            | 1500          | 1900             | 02.00             |             |              |              |             |                    |          |              |

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| • .             | NJDEP Soil C | lesnup Criteria * | Sample ID: LOSB18-02<br>Depth; 02 | LOSB18<br>08 | LOSB18FR<br>08 | MBSB01<br>02  | MBSB02<br>02 | MBS 803<br>06 | MBSB03<br>10  | MBSBO3FR<br>10<br>MB |
|-----------------|--------------|-------------------|-----------------------------------|--------------|----------------|---------------|--------------|---------------|---------------|----------------------|
| Analyte (mg/kg) | Residential  | Non-Residential   | Zone**: LO<br>Date: 10/24/94      | 10/24/94     | 10/24/94       | 10/25/94      | 10/21/94     | 10/25/94      | 10/25/94      | 10/25/94             |
|                 |              |                   |                                   |              |                | 55401         | 27101        | 214001        | 1780 1        | 2090                 |
| Aluminum        |              |                   | 3660J                             | 999J         | 11305          | 5540J         | 27103        | 214003        | 4.51          | 30.0                 |
| Antimony        | 14           | 340               | 1.2UJ                             | 0.380J       | 0.3105         | 1.205         | 0.2800       | 1071          | - 100         | 1801                 |
| Arsenic         | 20           | 20                | <u>26.4</u>                       | <u>30.8</u>  | <u>25,6</u>    | 17,2          | 9.4          | 10.75         | 2200          | 1603                 |
| Barium          | 700          | 47000             | 55.7                              | 19.9J        | 18J            | 63.1          | 33.5J        | 61.3          | 22.9J         | 14.65                |
| Beryllium       | 1            | 1                 | 0.23J                             | 0.09U        | 0.12U          | 0.22J         | 0.52J        | 0.84J         | 0.23J         | 0.19J                |
| Cadmium         | 1            | 100               | 0.37J                             | 0.08U        | 0.08U          | R             | 0.1J         | 0.25J         | 0.0901        | 0.080J               |
| Calcium         |              | -+                | 10600J                            | 748J         | 693J           | 15100J        | 1640J        | 15500J        | 1150J         | 1250J                |
| Cobalt          |              | **                | 5.2J                              | 2.7J         | 3.2J           | 29.9          | 8.9J         | 5.9J          | 14,9          | 6.8J                 |
| Copper          | 600          | 600               | 57.2J                             | 16.8J        | 14.9J          | 18 <u>2</u> J | 81.2J        | 97.5J         | <u>24100J</u> | <u>17100J</u>        |
| Cvanida         | 1100         | 21000             | 0.57U                             | 0.67U        | 0.65U          | 0.57U         | 0.58U        | 0.74U         | 0.72U         | 0,69U                |
| Iron            | ••           |                   | 11600                             | 3840         | 5570           | 27000         | 10200        | 20200         | 20300         | 17000                |
| Lead            | 400          | 600               | 111J                              | 4.9J         | 4,4J           | 219J          | 120J         | 47.3J         | <u>675J</u>   | 505J                 |
| Magnacium       |              |                   | 1230J                             | 159J         | 160J           | 2270J         | 1240J        | 19800J        | 465J          | 376J                 |
| Magnesium       |              |                   | 133J                              | 8.9J         | 9.7J           | 193J          | 62.9J        | 230           | 65.7          | 72.7                 |
| Manganese       | 14           | 270               | 0.38                              | 0.13U        | 0.13U          | 0.51          | 0.37         | 0.18          | 0.22          | 0.16                 |
| Mercury         | 17           | 2400              | 26.9.                             | 9.3J         | 10.3J          | 106J          | 32.3J        | 24.8J         | 125J          | 49J                  |
| NICKEI          | 250          | 2400              | 591.1                             | 286.         | 329J           | 993J          | 345J         | 3550          | 300J          | 247J                 |
| Potassium       |              |                   | 1.11                              | 0.90         | 0.880          | 0.770         | 0.78U        | 1U            | 1.5           | 1.4J                 |
| Selenium        | 63           | 3100              | 0.1.U                             | 0.00         | 0.130          | 0.110.1       | 0.13J        | 0.15U         | 5.1J          | 3.6J                 |
| Silver          | 110          | 4100              | 0.110                             | 450          | 62411          | 3400          | 6221         | 1670          | 325U          | 283U                 |
| Sodium          |              |                   | 5250                              | 4560         | 0200           | 0 48111       | 0 6911       | 0 890         | 0.86U         | 0.83U                |
| Thallium        | 2            | 2                 | 0.69UJ                            | 0.790        | 0.780          | 0.8800        | 70.01        | 60.71         | 19 7 1        | 14.1.1               |
| Venadium        | 370          | 7100              | 21.4J                             | 7J           | 6.7J           | 35.5J         | / 2.3J       | 50.75<br>E2 0 | 10.20         | 140                  |
| Zinc            | 1500         | 1500              | 98.4J                             | 10.8UJ       | 13.1J          | 107J          | 1601         | 33.0          | 230           |                      |

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|                 | NJDEP Soil C | leanup Criteris * | Sample ID: MDCSB02<br>Depth: 03 | N2TFSB2<br>02 | NZTFSB4<br>02 | NZ11584<br>06 | 02       | 06       | 02               |
|-----------------|--------------|-------------------|---------------------------------|---------------|---------------|---------------|----------|----------|------------------|
|                 |              |                   | Zona**: MDC                     | N2TF          | N2TF          | N2TF          | N2TF     | N2TF     | AP               |
| Analyte (mg/kg) | Residential  | Non-Residential   | Date: 10/11/94                  | 10/19/94      | 10/28/94      | 10/28/94      | 10/19/94 | 10/19/94 | 10/19/94         |
|                 |              |                   | 7030                            | 7530          | 14600         | 2520          | 8270     | 5490J    | 3570             |
| Aluminum        | -            | 240               | 0.82.1                          | 10.4J         | 19.2J         | 6.1J          | 10.7J    | 1.3UJ    | 0.96J            |
| Antimony        | 14           | 340               | 10                              | 9.8           | 7.1J          | 8.1J          | 5.5J     | 5.8      | 18.3             |
| Arsenic         | 20           | 47000             | 107                             | 77.7          | 68.7          | 19J           | 45.9     | 20.4J    | 32.2J            |
| Barium          | 700          | 47000             | 0.18J                           | 0.26J         | 0.36J         | 0.74J         | 0.33J    | 0.31J    | 0.17U            |
| Beryllium       |              | 100               | 0.52.1                          | R             | R             | L8.0          | R        | 0.070    | R                |
| Çadmium         | •            | 100               | 21200                           | 27300.1       | 44800         | 4760          | 15600J   | 1950J    | 1410 <b>0</b> 0J |
| Celcium         |              |                   | 21200                           | 35            | 74.6          | 12.7          | 32.3     | 8.9J     | 4.1J             |
| Cobalt          | -            |                   | 0.55                            | 33<br>71 6    | 1191          | 43.9.J        | 73.1     | 36.1J    | 71.2             |
| Copper          | 600          | 600               | 63.3                            | 0.74          | 0.6611        | 0.63U         | 0.57U    | 0.570    | 0.57U            |
| Cyanide         | 1100         | 21000             | .550                            | 24200         | 53200         | 12000         | 26400    | 14100    | 25500            |
| ron             |              |                   | 19800                           | 36200         | 35200         | 951           | 119      | 40.7J    | 159              |
| Leed            | 400          | 600               | 526                             | 342           | 357           | 2520          | 7660     | 2080J    | 1620             |
| Magnesium       |              | <del></del>       | 4190                            | 10900         | 22500         | 2330          | 201      | 90.7J    | 257              |
| Manganese       |              |                   | 154J                            | 227           | 444           | 0.211         | 0.14     | 0.110    | 1.4              |
| Mercury         | 14           | 270               | 0.88J                           | 15.4          | 0.555         | . 0.213       | 118      | 28.5J    | 67.1             |
| Nickel          | 250          | 2400              | 51.6                            | 154           | 301           | 70            | 7231     | 906.J    | 1000J            |
| Potassium       | `            |                   | 851J                            | 586J          | 0075          | 3435          | 0 78111  | 0.760    | 0.76UJ           |
| Selenium        | 63           | 3100              | 0,61UJ                          | 0.84UJ        | 0.8903        | 1.3           | 0.531/   | 0.110    | 0.54U            |
| Silver          | 110          | 4100              | 0.1J                            | 0.590         | 0,255         | 0.795         | 442111   | 22011    | R                |
| Sodium          |              | -                 | 1510J                           | R             | 55.6U         | 1800          | 44200    | 0.6711   | <br>10.1         |
| Thailium        | 2            | 2                 | 0,66UJ                          | 1.1UJ         | 1.2J          | <u>3.7</u>    | 105      | 47.31    | 34.4.1           |
| Vanadium        | 370          | 7100              | 37.6                            | 188           | 373 .         | 53.9          | 159      | 47.3J    | 101              |
| Zine            | 1500         | 1500              | 111                             | 134           | 308J          | 76.3J         | 178      | 54./J    | IV E             |

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| Analyte (mg/kg) | NJDEP Soll Cleanup Criteria *<br>Residential Non-Residential |         | Sample ID: N3TFS82<br>Depth: 06<br>Zone**: AP<br>Date: 10/19/94 | N3TFSB2FR<br>06<br>AP<br>10/19/94 | N3TFSB1<br>O2<br>N3TF<br>10/18/94 | N3TFSB3<br>02<br>N3TF<br>10/13/94 | N3TFSB4<br>O2<br>N3TF<br>10/17/94 | N3TFSB5<br>08<br>N3TF<br>10/1 <u>9/94</u> | N3TFSB6<br>02<br>N3TF<br>10/18/94 |
|-----------------|--------------------------------------------------------------|---------|-----------------------------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------------------------|-----------------------------------|
| Aluminum        |                                                              |         | 4830                                                            | 3480                              | 10000                             | 12400                             | 13900                             | 4110                                      | 7590                              |
| Antimony        | 14                                                           | 340     | 1,1J                                                            | 0.8J                              | 1,1J                              | 17.1J                             | 26.5J                             | 2.1J                                      | 12.1J                             |
| Arsenio         | 20                                                           | 20      | <u>120J</u>                                                     | <u>47.4J</u>                      | <del>9</del> .7                   | 7.3                               | 8.9                               | 2J                                        | <u>27.9</u>                       |
| Barlum          | 700                                                          | 47000   | 35.5J                                                           | 21.4J                             | 76.7                              | 36.9J                             | 49.6                              | 7,6J                                      | 66.1                              |
| Benditum        | 1                                                            | t       | 0.2U                                                            | 0.14U                             | 0.42J                             | 0.14J                             | 0.22J                             | 0.3J                                      | 0.120                             |
| Cadmium         | 1                                                            | 100     | 0.38U                                                           | 0.25U                             | R                                 | R -                               | R                                 | 0,110                                     | R                                 |
| Calaium         |                                                              |         | 3220J                                                           | 2310J                             | 2880J                             | 29400J                            | 57400J                            | 229J                                      | 26800J                            |
| Celoium         |                                                              | **      | 6.5J                                                            | 7.7J                              | 7                                 | 125                               | 77.7                              | 4.3J                                      | 34.2                              |
| Coparc          | 600                                                          | 600     | 70.5                                                            | 51.5                              | 48.6                              | 48.6J                             | 43.6J                             | 13                                        | 107                               |
| Copper          | 1100                                                         | 21000   | 0.68U                                                           | 0.66U                             | 0.570                             | 0.60                              | 0.60                              | 0.58U                                     | 0.60                              |
| Cyanida         | 1100                                                         | 21000   | 10900                                                           | 10600                             | 23300                             | 65100                             | 51200                             | 10700                                     | 27500                             |
| Iron            |                                                              | <br>600 | 770.1                                                           | 170J                              | 110                               | 70.9                              | 83.9                              | 5.1                                       | 131                               |
| Lead            | 400                                                          | 000     | 50101                                                           | 2520J                             | 2010                              | 39400                             | 29800                             | 1250                                      | 9240                              |
| Magnesium       |                                                              |         | 71.9                                                            | 74.7                              | 194                               | 492                               | 480                               | 82.9                                      | 219                               |
| Manganese       |                                                              |         | 71,5                                                            | 0.63                              | 0.29                              | 0.17                              | 0.38                              | 0.120                                     | 0.16                              |
| Mercury         | 14                                                           | 270     | 0.4<br>84 E                                                     | 827                               | 46.8                              | 485                               | 331                               | 30.7                                      | 172                               |
| Nickel          | 250                                                          | 2400    | 1000                                                            | 4521                              | 868.                              | 330J                              | 610J                              | 937J                                      | 532J                              |
| Potassium       |                                                              |         | 0.000                                                           | 151                               | 0 750.0                           | 0.80J                             | 0.81UJ                            | 0.790                                     | 0,81UJ                            |
| Selenium        | 63                                                           | 3100    | 0.9105                                                          | 1.55                              | 0.5300                            | 0.560                             | 0.570                             | 0.56U                                     | 0.57U                             |
| Silver          | 110                                                          | 4100    | 0.640                                                           | 0.010                             | 0,550                             | 50 11                             | R                                 | 130U                                      | R                                 |
| Sodium          | ••                                                           |         | 777U                                                            | 2020                              | 27505                             | 1 111                             | 1 101                             | 10.1                                      | 1.1UJ                             |
| Thallium        | 2                                                            | 2       | 1.2UJ                                                           | 1.105                             | 0.9900                            | 1.105                             | 409                               | 17.7                                      | 197                               |
| Venadium        | 370                                                          | 7100    | 28.1                                                            | 23.5                              | 53,4                              | 013                               | 180                               | 57 2                                      | 136                               |
| Zinc            | 1500                                                         | 1500    | 103                                                             | 64.7                              | 226                               | 240                               | 100                               | J / . E                                   |                                   |

Table 5-5. Metals and Cyanide in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                 |              |                   | Sample ID: N3TFSB7 | N3TFSB8          | N3TFSB8  | N3TFSB9     | PN1SB2   | PN1SB2       | PSSB1         | PSSB1        |
|-----------------|--------------|-------------------|--------------------|------------------|----------|-------------|----------|--------------|---------------|--------------|
|                 | NJDEP Soil C | leanup Criteria * | Depth: U2          | UZ<br>NATE       | NATE     | NATE        | P1       | D1           | MB            | MB           |
| A               | Desidential  | Non Posidential   | Zone**: N31F       | N31F<br>10/18/94 | 10/18/94 | 11/02/94    | 11/02/94 | 11/02/94     | 10/31/94      | 10/31/94     |
| Anelyte (mg/kg) | Nesidential  | NOL-LOSICOLUCI    |                    | 10/10/04         |          |             |          |              |               |              |
| Aluminum        | -            |                   | 10900              | 12700            | 10500J   | 5510        | 1860     | 5770         | 4140          | 1360         |
| Antimony        | 14           | 340               | 1 <b>7.4J</b>      | 30.9J            | 0,29UJ   | 108J        | 0.26UJ   | 1.1UJ        | 0.27UJ        | 1.3UJ        |
| Arsenic         | 20           | 20                | <u>23.7</u>        | <u>372</u>       | 4.9      | <u>361J</u> | 7.1J     | <u>37,4J</u> | <u>25.2.J</u> | <u>76,6J</u> |
| Berium          | 700          | 47000             | 57.5               | 53.5             | 25.4J    | 102         | 51.3     | 45.2J        | 29.8J         | 26.5J        |
| Bervlium        | 1            | 1                 | 0,19U              | <u>1,5</u>       | 0.44J    | 0.1U        | 0.12J    | 0.38J        | 0.22J         | 0.08U        |
| Cadmium         | 1            | 100               | R                  | R                | 0.07U    | R           | 0.51J    | 1.6          | 0.68J         | 0.28J        |
| Calcium         |              | -                 | 37800J             | 31500J           | 355J     | 17100       | 5730     | 110000       | 15900         | 2070         |
| Cobalt          |              |                   | 53.9               | 88.3             | 4.3J     | 23.9        | 5.2J     | 7.5J         | 3.7J          | 3.3J         |
| Copper          | 600          | 600               | 52.9               | 104              | 97.3J    | 99J         | 53.7J    | 143J         | 86.1J         | 118J         |
| Cvanide         | 1100         | 21000             | 0.63U              | 0.59U            | 0.61U    | 0,63U       | 0.59     | 0.59U        | 0.58U         | 0.580        |
| Iron            |              |                   | 41800              | 51900            | 19200    | 48900       | 8800     | 16300        | 9190          | 7200         |
| Laad            | 400          | 600               | 180                | 261              | 7.9J     | 2460        | 98       | 262          | 105J          | 159          |
| Magnesium       |              |                   | 20700              | 28700            | 2240J    | 9280        | 759J     | 5660         | 1830          | 443J         |
| Manganese       |              |                   | 321                | 400              | 107J     | 212         | 52.6     | 660          | 116           | 34.6         |
| Mercury         | 14           | 270               | 0.17               | 0.24             | 0.12U    | 7.9J        | 21,9J    | 2.3J         | 0.11UJ        | 0.21J        |
| Nickel          | 250          | 2400              | 343                | 378              | 22.4J    | 143         | 15,1     | 14.6         | 15,8          | 20.7         |
| Potassium       |              | -                 | 669J               | 869J             | 1370J    | 469J        | 417J     | 903J         | 575J          | 347J         |
| Selenium        | 63           | 3100              | 0.82UJ             | 0.8UJ            | 0.82U    | 9.2J        | 1,3      | 0.80         | 0.77U         | 2            |
| Silver          | 110          | 4100              | 0.58U              | 0.57U            | 0.12U    | 0.7J        | 0.11U    | 0;41J        | 0.110         | 0.110        |
| Sodium          |              |                   | 652UJ              | 7120J            | 355U     | 225U        | 243U     | 233U         | 942U          | 333U         |
| Thellium        | 2            | 2                 | 1.1UJ              | 1,6J             | 0.720    | 1.1J        | 0.66U    | 0.7U         | 0.68U         | 0,670        |
| Venedium        | 370          | 7100              | 314                | 384              | 20,9J    | 269         | 13.7     | 23.4         | 30.6          | 11.4         |
| Zinc            | 1500         | 1500              | 105                | 412              | 120J     | 131J        | 122J     | 261J         | 212J          | 131J         |

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|                 |              |                   | Sample iD | : SSB1     | S\$83    | SSB3          | STFSB1     | STFSB1   | STESB2   |
|-----------------|--------------|-------------------|-----------|------------|----------|---------------|------------|----------|----------|
|                 | NJDEP Soil C | leanup Criteria * | Depth     | : 16       | 06       | 10            | 02         | 08       | 08       |
|                 |              |                   | Zone**    | : 55       | SS       | SS            | STF        | STF      | STF      |
| Analyte (mg/kg) | Residential  | Non-Residential   | Date      | : 10/24/94 | 10/24/94 | 10/24/94      | 10/26/94   | 10/26/94 | 10/26/94 |
| Aluminum        |              |                   |           | 3020J      | 1050J    | 6000J         | 8560J      | 4300     | 3220     |
| Antimony        | 14           | 340               |           | 0.81UJ     | 5.6J     | 0,930         | 2.6J       | 0.66UJ   | 0,3UJ    |
| Arsenic         | 20           | 20                |           | 104J       | 60.4J    | 42.8J         | <b>L</b> 8 | 9.3J     | 2J       |
| Barium          | 700          | 47000             |           | 39,2J      | 28.8J    | 61.5          | 138        | 46J      | 18.4J    |
| Bervilium       | 1            | 1                 |           | 0.18J      | 0.09J    | 0,63J         | 0.57J      | 0.22J    | 0.16J    |
| Cadmium         | 1            | 100               |           | 0,07UJ     | 0.1UJ    | 0.46J         | 0.34J      | 0.08J    | 0.08UJ   |
| Calcium         |              | **                |           | 16700J     | 3370J    | 53700J        | 18500J     | 3970     | 510U     |
| Cobalt          |              |                   |           | 4J         | 4.2J     | 10.6J         | 36.6       | 37.1     | 19.2     |
| Copper          | 600          | 600               |           | 44.6J      | 84.1J    | 165           | 129J       | 133J     | 103J     |
| Cvanide         | 1100         | 21000             |           | 0,59U      | 0.82U    | 30.7          | 0.58U      | 0.67U    | 0.64U    |
| ron             |              |                   | •         | 10500      | 14300    | 16600         | 17500      | 12100    | 9080     |
| Lead            | 400          | 600               |           | 331J       | 178J     | 155J          | 116J       | 71.3     | 20.8     |
| Magnesium       |              |                   |           | 1830J      | 525J     | 6290J         | 6880J      | 1820     | 1010J    |
| Manganese       |              |                   |           | 248        | 30.3     | 194           | 189        | 83.2     | 51.3     |
| Mercury         | 14           | 270               |           | 1.3        | 2.6      | 1.9           | 0.24       | 0,16J    | 0.12UJ   |
| Nickel          | 250          | 2400              |           | 10.5J      | 6.5J     | 1 <b>6.7J</b> | 118J       | 90.6     | 93.9     |
| Potassium       |              | -                 |           | 697J       | 461J     | 1370          | 890J       | 892J     | 807J     |
| Selenium        | 63           | 3100              |           | 0.89J      | 4.8      | 2.2           | 0.79U      | 1.3J     | 0.860    |
| Silver          | 110          | 4100              |           | 0.12U      | 0.54J    | 0,19J         | 0.12U      | 0.13U    | 0.13U    |
| Sodium          | ••           |                   |           | 599J       | 299U     | 465U          | 780U       | 10500    | 3010     |
| Thallium        | 2            | 2                 |           | 0.7U       | 0.980    | 0.79U         | 0.70       | 0.780    | 0.760    |
| Vanedium        | 370          | 7100              |           | 12.5J      | 14.1J    | 15.9J         | 81.3J      | 42.4     | 21.2     |
| Zinc            | 1500         | 1500              |           | 76.9       | 36.1     | 208           | 165        | 381      | 40,9J    |

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|                  |             |                       | Sample ID: FBNA1-100594 | FBNA5-101994 | FBNA6-102094 | FBNA7-102594  | FBNA9-102694 |
|------------------|-------------|-----------------------|-------------------------|--------------|--------------|---------------|--------------|
|                  | NJDEP Soil  | Cleanup Criteria *    | Depth:                  |              |              |               |              |
| Analyte (mg/kg)  | Residential | Non-Residential       | Date: 10/05/94          | 10/19/94     | 10/20/94     | 10/25/94      | 10/26/94     |
| Akuminum         | _           | _                     | 62.2J                   | 82.5J        | 82.4J        | 88.5J         | 334          |
| Antimony         | 14          | 340                   | 1.20                    | 1.2U         | 1.20         | 2.8J          | 1.2U         |
| Areanic          | 20          | 20                    | 50                      | 2.4U         | 2.40         | 2. <b>4</b> U | 2.4U         |
| Rerium           | 700         | 47000                 | 1. <b>7J</b>            | 0.3J         | 0.97J        | 1.2J          | 3,1J         |
| Bandium          | 1           | 1                     | 0.10                    | 0.10         | 0.1U         | 0.1U          | 0.1U         |
| Codmium          | 1           | 100                   | 0.3U                    | 0.3U         | 0.3U         | 0.3U          | 0.30         |
| Celeium          |             |                       | 19.9J                   | 2.8U         | 2.8U         | 29.9J         | 488J         |
| Cabalt           |             |                       | 0.50                    | 0.5U         | 0.5U         | 0,50          | 0.50         |
| Codant           | 600         | 800                   | 0.30                    | 0.3U         | 0.3U         | 0.35J         | 5.9J         |
| Copper           | 1100        | 21000                 | 100                     | 10U          | 10U          | 10U           | 100          |
| Cyanide          | 1100        | 2,000                 | 70                      | 15.8J        | 19.6J        | 43.7J         | 2000         |
| iron             | 400         | 800                   | 1_4U                    | 1.4U         | 1.4U         | 1.40          | 4.4          |
| Lead             | 400         | -                     | 6.7.1                   | 3.6U         | 3.60         | 9J            | 81.1J        |
| Magnesium        |             | _                     | 0.20                    | 0.20         | 1.4J         | 0,35J         | 20,6         |
| Manganese        |             | 270                   | 0.2U                    | 0.2U         | 0.2U         | 0.20          | 0.20         |
| Meroury          | 14          | 2/0                   | 0.70                    | 0.70         | 6.7J         | 0.7U          | 2.8J         |
| Nickel           | 290         | 2400                  | 61.1J                   | 51.3J        | 41.7J        | 52.43         | 186J         |
| Potessium        |             | 2100                  | 3 40                    | 3.40         | 3.4U         | 3.4U          | 3.4U         |
| Selenium         | 63          | 4100                  | 2 411                   | 0.50         | 0.5U         | 0.50          | 0.5U         |
| Silver           | 110         | 4100                  | 373.1                   | 213U         | 215J         | 297J          | 914J         |
| Sodium           |             |                       | 4 511                   | 3U           | 30           | 3U            | 3U           |
| Thallium         | 2           | ž                     | 4.50                    | 0.40         | 0.40         | 0.4U          | 0.71J        |
| Vanadium<br>Zino | 370<br>1500 | 7100<br>1 <b>50</b> 0 | 2.3J                    | 1.1J         | 2J           | 8.8J          | 7.3J         |

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|                  |             |                    | Sample ID: FBNA11-102794 | FBNA13-102894 | FBNA14-102894 | FBNA17-103194 |  |
|------------------|-------------|--------------------|--------------------------|---------------|---------------|---------------|--|
|                  | NJDEP Soil  | Cleenup Criteria * | Depth:                   |               |               |               |  |
|                  |             |                    | Zone**:                  |               |               |               |  |
| Analyte (mg/kg)  | Residential | Non-Residential    | Date: 10/27/94           | 10/28/94      | 10/28/94      | 10/31/94      |  |
| A la una la sama |             |                    | 168.1                    | 151J          | 11 <b>4</b> J | 166J          |  |
| Antimony         | 14          | 340                | 1.20                     | 1,20          | 1,20          | 1.2U          |  |
| Anumony          | 20          | 20                 | 2.40                     | 2.4U          | 2.4U          | 2.4U          |  |
| Arsenic          | 700         | 47000              | 1.1.1                    | 0.85J         | 0,65J         | 0.27J         |  |
| Bendlows         | ,00         | 1                  | 0.10                     | 0.1U          | 0.1U          | 0.1U          |  |
| Beryillum        | 1           | 100                | 0.3U                     | 0.30          | 0.3U          | 0.3U          |  |
| Calmium          | •           | -                  | 63.2.1                   | 65.2J         | 35.7J         | 21.1J         |  |
| Çalolum<br>Du lu |             |                    | 0.50                     | 0.50          | 0.5U          | Q.5U          |  |
| Cobalt           |             | 800                | 0.30                     | 0.3U          | 0.3U          | 1.6J          |  |
| Copper           | 1100        | 11000              | 100                      | 100           | 100           | 100           |  |
| Cyanide          | 1100        | 21000              | 66.31                    | 31.4.1        | 41.9J         | 70            |  |
| Iron             |             |                    | 1 411                    | 1 411         | 1.40          | 1.40          |  |
| Lead             | 400         | 500                | 1:40                     | 21.97         | 17.1.1        | 11.8J         |  |
| Magnesium        |             |                    | 15.64                    | 21.55         | 0.57.1        | 0.25J         |  |
| Manganese        |             |                    | 2,13                     | 0,455         | 0.20          | 0.2U          |  |
| Marcury          | 14          | 270                | 0.20                     | 0.20          | 0.20          | 1.7.1         |  |
| Nickel           | 250         | 2400               | 0.70                     | 0.70          | 1141          | 151.          |  |
| Potassium        | ••          |                    | 128J                     | 136J          | 2.411         | 3 411         |  |
| Selenium         | 63          | 3100               | 3.40                     | 3.40          | 3,4U          | 0.50          |  |
| Silver           | 110         | 4100               | 0.50                     | 0.50          | 0.50          | 7691          |  |
| Sodium           |             |                    | 672J                     | 771J          | 6993          | 211           |  |
| Thallium         | 2           | 2                  | 30                       | 30            | 30            | 50<br>0 AU    |  |
| Venedium         | 370         | 7100               | 0.4U                     | 0.40          | 0.40          | 0,70          |  |
| Zinc             | 1500        | 1500               | 1,5J                     | 8.1J          | 6.9J          | 0.745         |  |

Table 5-5. Metals and Cyanide in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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Analyte concentrations and New Jersey Department of Environmental Protection (NJDEP) criteria in milligrams per kilogram (mg/kg) (equivalent to

parts per million (ppm)).

Analyses were performed by CompuChem Environmental Corporation, Research Triangle Park, North Carolina, using Contract Laboratory Program

(CLP) protocols contained in the Statement of Work (SOW) ILM03.

Sample results exceeding the NJDEP non-residential criteria are underlined.

Chromium results are reported separately in Table 5-5.

FBNA Indicates a field blank associated with non-aqueous samples.

PQL Practical quantitation level.

FR Field replicate of previous sample.

U The compound was analyzed for, but not detected at the specific detection limit.

J Estimated result.

R Rejected result.

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-- No applicable criteria.

\* NJDEP soil cleanup criteria, February 3, 1992; last revised February 3, 1994.

\*\* Zones as defined in Table 3-2.

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|                 |       | 6              | Sample            | Total<br>Chromium<br>Comparative | Hexavalent<br>Chromium<br>Comparative |               |  |  |
|-----------------|-------|----------------|-------------------|----------------------------------|---------------------------------------|---------------|--|--|
| Sample Location | Zone* | Sample<br>Date | Depth<br>(ft bls) | 10,000 mg/kg                     | 100 mg/kg                             | 10 mg/kg      |  |  |
| 3TFIRMB3        | N3TF  | 10/6/94        | 04                | 225J                             | NA                                    | NA            |  |  |
| 3TFIRMB3        | N3TF  | 10/6/94        | 14                | 17.9J                            | NA NA                                 | NA            |  |  |
| 3TFIRMB4        | N3TF  | 10/17/94       | 02                | 3100                             | 9.2J                                  | 9.2J          |  |  |
| 3TFIRMB4        | N3TF  | 10/17/94       | 06                | 678                              | NA                                    | NA            |  |  |
| AGTFSB1         | AGTF  | 10/20/94       | 02                | 418                              | 2.57UJ                                | 2.57UJ        |  |  |
| AGTFSB1         | AGTF  | 10/20/94       | 06                | 16.2                             | R                                     | R             |  |  |
| AGTFSB2         | AGTF  | 10/28/94       | 04                | 129                              | 2.29UJ                                | 2.29UJ        |  |  |
| AGTFSB3         | AGTF  | 10/27/94       | 02                | 1670                             | 79.81J                                | <u>79.81J</u> |  |  |
| AGTFSB3         | AGTF  | 10/27/94       | 06                | 1300                             | 2.49UJ                                | 2.49UJ        |  |  |
| AGTFSB4         | AGTF  | 10/20/94       | 02                | 284                              | 7.04J                                 | 7.04J         |  |  |
| AGTFSB4         | AGTF  | 10/20/94       | 06                | 154                              | R                                     | R             |  |  |
| AHTFSB1         | AHTF  | 10/19/94       | 02                | 10.9                             | R                                     | R             |  |  |
| AHTFSB1         | AHTE  | 10/19/94       | 04                | 10.9J                            | 2.31UJ                                | 2.31UJ        |  |  |
| AHTFSB2         | AHTF  | 10/14/94       | 02                | 30.4                             | 15J                                   | <u>15J</u>    |  |  |
| AHTFSB2         | AHTF  | 10/14/94       | 06                | 26.6J                            | NA                                    | NA            |  |  |
| AHTFSB3         | AHTF  | 10/20/94       | 06                | 9.3                              | R                                     | Ŕ             |  |  |
| AHTFSB3         | AHTF  | 10/20/94       | 10                | 9                                | R                                     | R             |  |  |
| AHTFSB4         | AHTF  | 10/14/94       | 02                | 10.8                             | 7.5J                                  | 7.5J          |  |  |
| AHTFSB4         | AHTF  | 10/14/94       | 08                | 47                               | NA                                    | NA            |  |  |
| APSB1           | AP    | 10/27/94       | 06                | 10.9                             | 2.4UJ                                 | 2.4UJ         |  |  |
| APSB1           | AP    | 10/27/94       | 10                | 3.9                              | 2.4UJ                                 | 2.4UJ         |  |  |
| APSB2           | AP    | 10/26/94       | 02                | 1 <b>7</b> 7                     | <u>5.7J</u>                           | 5.7J          |  |  |
| APSB2           | AP    | 10/26/94       | 06                | 219                              | 9.66J                                 | 9.66J         |  |  |
| APSB3           | AP    | 10/21/94       | 06                | 18J                              | 2.44UJ                                | 2.44UJ        |  |  |
| APSB4           | AP    | 10/21/94       | 04                | 18.2J                            | 2.57UJ                                | 2.57UJ        |  |  |
| APSB4           | AP    | 10/21/94       | 08                | 7J                               | 2.41UJ                                | 2.41UJ        |  |  |
| APSB5           | AP    | 10/12/94       | 02                | 685J                             | 5.6J                                  | 5.6J          |  |  |
| APSB5           | AP    | 10/12/94       | 06                | 107                              | NA                                    | NA            |  |  |
| APSB6           | AP    | 10/21/94       | 06                | 37.1                             | 7.05J                                 | 7.05J         |  |  |
| APSB6           | AP    | 10/21/94       | 10                | 5.3                              | 2.61UJ                                | 2.61UJ        |  |  |
| DTSB1           | DT    | 10/27/94       | 06                | 38.1                             | 2.18UJ                                | 2.18UJ        |  |  |
| DTSB1           | DT    | 10/27/94       | . 08              | 22.2                             | 2.27UJ                                | 2.27UJ        |  |  |
| DTSB2           | DT    | 10/27/94       | 04                | 8.8                              | 2.26UJ                                | 2.26UJ        |  |  |
| DTSB2           | DT    | 10/27/94       | 08                | 8.9                              | 2.28UJ                                | 2.28UJ        |  |  |
| DTSB3           | DT    | 10/27/94       | 04                | 56.1                             | 2.44UJ                                | 2.44UJ        |  |  |
| DTSB3FR1        | DT    | 10/27/94       | 4                 | 41.6                             | 2.46UJ                                | 2.46UJ        |  |  |
| DTSB3FR2        | DT    | 10/28/94       | 4                 | NA                               | 2,37UJ                                | 2.37UJ        |  |  |
| EC2SB1          | ECP   | 10/27/94       | 04                | 13.9                             | 2.31UJ                                | 2.31UJ        |  |  |

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|                 |       | Samala   | Sample   | Total<br>Chromium<br>Comparative<br>Criteria of | Hexavalent<br>Chromium<br>Comparative<br>Criteria of |               |  |  |
|-----------------|-------|----------|----------|-------------------------------------------------|------------------------------------------------------|---------------|--|--|
| Sample Location | Zone* | Date     | (ft bis) | 10,000 mg/kg                                    | 100 mg/kg                                            | 10 mg/kg      |  |  |
| EC2SB1          | ECP   | 10/27/94 | 12       | 15.6                                            | 2.21UJ                                               | . 2.21UJ      |  |  |
| ECIRMB1         | U     | 10/24/94 | 02       | 3.7                                             | 2.34UJ                                               | 2.34UJ        |  |  |
| ECIRMB1         | U     | 10/24/94 | 06       | 8.9J                                            | 3.38UJ                                               | 3.38UJ        |  |  |
| ECIRMB3         | N3TF  | 10/19/94 | 02       | 358                                             | R                                                    | R             |  |  |
| ECIRMB3         | N3TF  | 10/19/94 | 06       | 10                                              | 2.63UJ                                               | 2.63UJ        |  |  |
| ECPSB1          | ECP   | 10/20/94 | 02       | 8.2                                             | 11.94J                                               | <u>11.94J</u> |  |  |
| ECPSB1          | ECP   | 10/20/94 | 08       | 3.8                                             | R                                                    | R             |  |  |
| ECPSB2          | ECP   | 10/20/94 | 06       | 6.2                                             | R                                                    | R             |  |  |
| ECPSB2          | ECP   | 10/20/94 | 12       | 24.9                                            | R                                                    | R             |  |  |
| ECPSB3          | ECP   | 10/21/94 | 04       | 26.1                                            | 2.39UJ                                               | 2.39UJ        |  |  |
| ECPSB4          | ECP   | 10/19/94 | 08       | 13.3                                            | R                                                    | R             |  |  |
| ECPSB5          | ECP   | 10/19/94 | 02       | 130                                             | R                                                    | R             |  |  |
| ECPSB5          | ECP   | 10/19/94 | 08       | 8                                               | 2.28UJ                                               | 2.28UJ        |  |  |
| EGTFSB1         | GTF   | 10/27/94 | 04       | 6.1                                             | 2.53UJ                                               | 2.53UJ        |  |  |
| GFSB1           | STF   | 10/12/94 | 02       | 65.9J                                           | NA                                                   | NA            |  |  |
| GFSB1           | STF   | 10/12/94 | 06       | 13.9                                            | NA                                                   | · NA          |  |  |
| GTFIRMB1        | GTF   | 11/16/94 | 02       | 255J                                            | 2.37UJ                                               | 2.37UJ        |  |  |
| GTFIRMB1        | GTF   | 10/6/94  | 08       | 36.3                                            | NA                                                   | NA            |  |  |
| GTFIRMB2        | GTF   | 10/17/94 | 02       | 326                                             | 3.3J                                                 | 3.3J          |  |  |
| GTFIRMB2        | GTF   | 10/17/94 | 08       | 7.9                                             | NA                                                   | NA            |  |  |
| GTFIRMB3        | GTF   | 11/16/94 | 02       | 190J                                            | 2.28UJ                                               | 2.28UJ        |  |  |
| GTFIRMB3        | GTF   | 10/5/94  | 10       | 13.5J                                           | NA                                                   | NA            |  |  |
| GTFIRMB4        | GTF   | 10/17/94 | 02       | 1680                                            | 48.1J                                                | <u>48.1J</u>  |  |  |
| GTFIRMB4        | GTF   | 10/17/94 | 08       | 27.2                                            | NA                                                   | NA            |  |  |
| GTFIRMB5        | GTF   | 10/5/94  | 02       | 65.9J                                           | 7J                                                   | 7J            |  |  |
| GTFIRMB5FR      | GTF   | 10/5/94  | 2        | 40.6J                                           | R                                                    | R             |  |  |
| GTFIRMB5        | GTF   | 10/5/94  | 06       | 22.3J                                           | NA                                                   | NA            |  |  |
| GTFIRMB6        | GTF   | 10/5/94  | 04       | 19.5J                                           | NA                                                   | NA            |  |  |
| GTFIRMB6        | GTF   | 10/5/94  | 08       | 75.1J                                           | NA                                                   | NA            |  |  |
| GTFIRMB7        | GTF   | 10/17/94 | 02       | 63.3                                            | 12.8J                                                | <u>12.8J</u>  |  |  |
| GTFIRMB7        | GTF   | 10/17/94 | 08       | 40.9                                            | NA                                                   | NA            |  |  |
| GTFIRMB8        | GTF   | 10/18/94 | 02       | 104                                             | 2.32UJ                                               | 2.32UJ        |  |  |
| GTFIRMB8        | GTF   | 10/18/94 | 08       | 85.4                                            | 2.55UJ                                               | 2.55UJ        |  |  |
| GTFIRMB9        | GTF   | 10/5/94  | 02       | 173J                                            | 2.62UJ                                               | 2.62UJ        |  |  |
| GTFIRMB9        | GTF   | 10/5/94  | 06       | 44.5J                                           | NA                                                   | NA            |  |  |
| GTFSB1          | GTF   | 10/10/94 | 02       | 42.9J                                           | 19.8J                                                | 19.8J         |  |  |
| GTFSB1          | GTF   | 10/10/94 | 08       | 15.4J                                           | NA                                                   | NA            |  |  |
| GTESB2          | GTF   | 10/13/94 | 02       | 41.2                                            | 16J                                                  | 16J           |  |  |

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|                 |       | Comple                | Sample   | Total<br>Chromium<br>Comparative | Hexavalent<br>Chromium<br>Comparative |          |  |  |
|-----------------|-------|-----------------------|----------|----------------------------------|---------------------------------------|----------|--|--|
| Sample Location | Zone* | Date                  | (ft bls) | 10,000 mg/kg                     | 100 mg/kg                             | 10 mg/kg |  |  |
| GTFSB2          | GTF   | 10/13/94              | 08       | 19.2                             | NA                                    | NA       |  |  |
| GTFSB3          | GTF   | 10/10/94              | 02       | 21.9J                            | 1J                                    | 1J       |  |  |
| GTFSB3          | GTF   | 10/10/94              | 08       | 250                              | NA                                    | NA       |  |  |
| GTFSB4          | GTF   | 10/13/94              | 02       | 132J                             | 1.2J                                  | 1.2J     |  |  |
| GTFSB4          | GTF   | 10/13/94              | 08       | 34.3                             | NA                                    | NA       |  |  |
| GTFSB4FR        | GTF   | 10/13/94              | 8        | 57.1                             | NA                                    | NA       |  |  |
| GTFSB5          | GTF   | 10/13/94              | 02       | 59.3J                            | 2.2UJ                                 | 2.2UJ    |  |  |
| GTFSB5          | GTF   | 10/13/94              | -08      | 29.8J                            | NA                                    | NA       |  |  |
| GTFSB6          | GTF   | 10/11/94              | 02       | 24.9J                            | 1.7J                                  | 1.7J     |  |  |
| GTFSB6          | GTF   | 10/11/94              | 12       | 20.1                             | NA                                    | NA       |  |  |
| GTFSB7          | GTF   | 10/13/94              | 02       | 68.3                             | 2.63UJ                                | 2.63UJ   |  |  |
| GTFSB7          | GTF   | 10/13/94              | 08       | 16                               | NA                                    | NA       |  |  |
| GTFSB8          | GTF   | 10/13/94              | 04       | 35.1                             | NA                                    | NA       |  |  |
| GTFSB8          | GTF   | 10/13/94              | 08       | 20.8                             | NA                                    | NA       |  |  |
| GTFSB9          | GTF   | 10/13/94              | 02       | 342                              | 7.2J                                  | 7.2J     |  |  |
| GTFSB9          | GTF   | 10/13/94              | 08       | 573                              | 2.28UJ                                | 2.28UJ   |  |  |
| LAIRMB1         | LO    | 10/24/94              | 02       | 38.9                             | 4.17J                                 | 4.17J    |  |  |
| LAIRMB1         | LO    | 10/24/94              | 08       | 17.7J                            | 3UJ                                   | 3UJ      |  |  |
| LOSB1           | LO    | 10/25/94              | 04       | 2.3J                             | 2.32UJ                                | 2.32UJ   |  |  |
| LOSB1           | LO    | 10/25/94              | 08       | 1.4J                             | 2.29UJ                                | 2.29UJ   |  |  |
| LOSB2           | LO -  | 11/16/94              | 04       | 21.6                             | NA                                    | NA       |  |  |
| LOSB2           | LO    | 10/14/ <del>9</del> 4 | 08       | 30.9                             | NA                                    | NA       |  |  |
| LOSB3           | LO    | 10/24/94              | 02       | 8.5                              | 2.48UJ                                | 2.48UJ   |  |  |
| LOSB3           | LO    | 10/24/94              | 04       | 13J                              | 2.64UJ                                | 2.64UJ   |  |  |
| LOSB4           | LO    | 10/24/94              | 02       | 19.2                             | 2.14UJ                                | 2.14UJ   |  |  |
| LOSB4           | LO    | 10/24/94              | 06       | 30.2                             | 2.16UJ                                | 2.16UJ   |  |  |
| LOSB5           | LO    | 10/11/94              | 04       | 6J                               | NA                                    | NA       |  |  |
| LOSB5           | LO    | 10/11/94              | 08       | 6.4J                             | NA                                    | NA       |  |  |
| LOSB6           | LO    | 10/25/94              | 04       | 8.3J                             | 2.69UJ                                | 2.69UJ   |  |  |
| LOSB7           | LO    | 10/14/94              | 04       | 5.5J                             | NA                                    | NA       |  |  |
| LOSB8           | SS    | 10/24/94              | 02       | 22.4                             | 2.31UJ                                | 2.31UJ   |  |  |
| LOSB8           | SS    | 10/24/94              | 08       | 11.4J                            | 2.69UJ                                | 2.69UJ   |  |  |
| LOSB9           | LO    | 10/25/94              | 02       | 19.2                             | 2.5UJ                                 | 2.5UJ    |  |  |
| LOSB9           | LO    | 10/25/94              | 06       | 4.4U                             | 2.22UJ                                | 2.22UJ   |  |  |
| LOSB10          | LO    | 10/28/94              | 04       | 26.5                             | 2.26UJ                                | 2.26UJ   |  |  |
| LOSB10          | LO    | 10/28/94              | 08       | 5.70                             | 2.36UJ                                | 2.36UJ   |  |  |
| LOSB11          | LO    | 10/25/94              | 02       | 44.7                             | 2.62UJ                                | 2.62U.I  |  |  |
| LOSB11          | 10    | 10/25/94              | 06       | 12.6                             | 2.65111                               | 2.650.0  |  |  |

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|                 |       | 01             | Sample   | Total<br>Chromium<br>Comparative | Hexavalent<br>Chromium<br>Comparative |               |  |  |
|-----------------|-------|----------------|----------|----------------------------------|---------------------------------------|---------------|--|--|
| Sample Location | Zone* | Sample<br>Date | (ft bls) | 10,000 mg/kg                     | 100 mg/kg                             | 10 mg/kg      |  |  |
| LOSB12          |       | 10/25/94       | 02       | 53.6                             | 2.79UJ                                | 2.79UJ        |  |  |
| LOSB12          | LO    | 10/25/94       | 06       | 32.3                             | 2.58UJ                                | 2.58UJ        |  |  |
| LOSB13          | LO    | 10/31/94       | 02       | 86.5                             | 2.26UJ                                | 2.26UJ        |  |  |
| LOSB13-FR       | LO    | 10/31/94       | 2        | 73                               | 2.32UJ                                | 2.32UJ        |  |  |
| LOSB13          | LÕ    | 10/31/94       | 08       | 14.7                             | 2.26UJ                                | 2.26UJ        |  |  |
| LOSB14          | LO    | 10/25/94       | 02       | 68.7                             | 2.71UJ                                | 2.71UJ        |  |  |
| LOSB14          | LO    | 10/25/94       | 06       | 40.5                             | 2.21UJ                                | 2.21UJ        |  |  |
| LOSB15          | LO    | 10/24/94       | 02       | 96.2                             | 2.35UJ                                | 2.35UJ        |  |  |
| LOSB16          | LO    | 10/25/94       | 04       | 53.8                             | 2.19UJ                                | 2.19UJ        |  |  |
| LOSB16          | LO    | 10/25/94       | 08       | 138                              | 2.33UJ                                | 2.33UJ        |  |  |
| LOSB17          | LO    | 10/24/94       | 02       | 9.5                              | 2.42UJ                                | 2.42UJ        |  |  |
| LOSB18          | LO    | 10/24/94       | 02       | 8. <del>9</del>                  | 2.3UJ                                 | 2.3UJ         |  |  |
| LOSB18          | LO    | 10/24/94       | 08       | 2,7                              | 2.69UJ                                | 2.69UJ        |  |  |
| LOSB18FR        | LO    | 10/24/94       | 08       | 3.1                              | 2.59UJ                                | 2.59UJ        |  |  |
| MBSB1           | MB    | 10/25/94       | 02       | 94.5                             | 2.31UJ                                | 2.31UJ        |  |  |
| MBSB1           | МВ    | 10/25/94       | 08       | 20.1J                            | 2.31UJ                                | 2.31UJ        |  |  |
| MBSB2           | MB    | 10/21/94       | 02       | 53.4                             | 2.34UJ                                | 2.34ÚJ        |  |  |
| MBSB2           | мв ~  | 10/21/94       | 06       | 7.9J                             | 2.35UJ                                | 2.35UJ        |  |  |
| MBSB3           | MB    | 10/25/94       | 06       | 54.7                             | 2.96UJ                                | 2.96UJ        |  |  |
| MBSB3           | MB    | 10/25/94       | 10       | 5.4                              | 2.38UJ                                | 2.38UJ        |  |  |
| MBSB3FR         | MB -  | 10/25/94       | 10       | 4.2                              | 2.78UJ                                | 2.78UJ        |  |  |
| MBSB4           | MB    | 10/21/94       | 04       | 1050J                            | 13J                                   | <u>13 J</u>   |  |  |
| MBSB4           | MB    | 10/21/94       | 10       | 1830                             | 23.96J                                | <u>23.96J</u> |  |  |
| MDCSB1          | MDC   | 10/26/94       | 04       | 8.2                              | 2.33UJ                                | 2.33UJ        |  |  |
| MDCSB1          | MDC   | 10/26/94       | 08       | 11.4                             | 2.36UJ                                | 2.36UJ        |  |  |
| MDCSB2          | MDC   | 10/11/94       | 03       | 37.5J                            | NA                                    | NA            |  |  |
| N2TESB1         | N2TF  | 11/17/94       | 02       | NA                               | 11.8J                                 | <u>11.8J</u>  |  |  |
| N2TFSB1         | N2TF  | 10/12/94       | 04       | 1580                             | NA                                    | NA            |  |  |
| N2TFSB1         | N2TF  | 10/12/94       | 08       | 624                              | NA                                    | NA            |  |  |
| N2TFSB2         | N2TF  | 10/19/94       | 02       | 1820                             | R                                     | R             |  |  |
| N2TFSB2         | N2TF  | 10/19/94       | 06       | 24.8J                            | 2.42UJ                                | 2.42UJ        |  |  |
| N2TFSB3         | N2TF  | 10/19/94       | 06       | 5150                             | <u>255J</u>                           | <u>255J</u>   |  |  |
| N2TFSB3         | N2TF  | 10/19/94       | 10       | 610                              | 8.46J                                 | 8.46J         |  |  |
| N2TFSB4         | N2TF  | 10/28/94       | 02       | 3890                             | 2.61UJ                                | 2.61UJ        |  |  |
| N2TFSB4         | N2TF  | 10/28/94       | 06       | 443                              | 2.48UJ                                | 2.48UJ        |  |  |
| N2TFSB5         | N2TF  | 10/19/94       | 02       | 1840                             | R                                     | R             |  |  |
| N2TFSB5         | N2TF  | 10/19/94       | 06       | 266                              | 2.31UJ                                | 2.31UJ        |  |  |
| NOTESBA         | N2TE  | 10/19/94       | 04       | 2420                             | 73.8J                                 | <u>73.8J</u>  |  |  |

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|                 |       | Correla               | Sample   | Total<br>Chromium<br>Comparative | Hexavalent<br>Chromium<br>Comparative |               |  |  |
|-----------------|-------|-----------------------|----------|----------------------------------|---------------------------------------|---------------|--|--|
| Sample Location | Zone* | Sample<br>Date        | (ft bls) | 10,000 mg/kg                     | 100 mg/kg                             | 10 mg/kg      |  |  |
| N2TFSB6         | N2TF  | 10/19/94              | 06       | 721                              | R                                     | R             |  |  |
| N3TFSB1         | N3TF  | 10/18/94              | 02       | 180                              | 2.27UJ                                | 2.27UJ        |  |  |
| N3TFSB1         | N3TF  | 10/18/94              | 12       | 32.4J                            | 2.25UJ                                | 2.25UJ        |  |  |
| N3TFSB2         | AP    | 10/19/94              | 02       | 51.7                             | R                                     | R             |  |  |
| N3TFSB2         | AP    | 10/19/94              | 06       | 31.9                             | R                                     | R             |  |  |
| N3TFSB2FR       | АР    | 10/19/ <del>9</del> 4 | 6        | 28.7                             | R                                     | R             |  |  |
| N3TFSB3         | N3TF  | 10/13/94              | 02       | 3040                             | <u>175J</u>                           | <u>175J</u>   |  |  |
| N3TFSB3         | N3TF  | 10/13/94              | 08       | 3980J                            | NA                                    | NA            |  |  |
| N3TFSB4         | N3TF  | 10/17/94              | 02       | 4570                             | 2.12UJ                                | 2.12UJ        |  |  |
| N3TFSB4         | N3TF  | 10/17/94              | 06       | 386J                             | NA                                    | NA            |  |  |
| N3TFSB5         | N3TF  | 10/19/94              | 04       | -552                             | 14.3J                                 | <u>14.3J</u>  |  |  |
| N3TFSB5         | N3TF  | 10/19/94              | 08       | 386                              | 14.1J                                 | <u>14.1J</u>  |  |  |
| N3TFSB6         | N3TF  | 10/18/94              | 02       | 2060                             | 2,42UJ                                | 2.42UJ        |  |  |
| N3TFSB6         | N3TF  | 10/18/94              | 06       | 211J                             | 2.69UJ                                | 2.69UJ        |  |  |
| N3TFSB7         | N3TF  | 10/18/94              | 02       | 2980                             | 2.49UJ                                | 2.49UJ        |  |  |
| N3TFSB7         | N3TF  | 10/18/94              | 06       | 63.8                             | 2.37UJ                                | 2.37UJ        |  |  |
| N3TFSB8         | N3TF  | 10/18/94              | 02       | 4490                             | <u>293J</u>                           | <u>293J</u>   |  |  |
| N3TFSB8         | N3TF  | 10/18/94              | 06       | 24.8                             | 2.46UJ                                | 2.46UJ        |  |  |
| N3TFSB9         | N3TF  | 11/2/94               | 02       | 2760                             | 2.58UJ                                | 2.58UJ        |  |  |
| PESTSB1         | PEST  | 10/20/94              | 04       | 23.9                             | 14.81J                                | <u>14.81J</u> |  |  |
| PESTSB2         | PEST  | 10/20/94              | 10       | . 28.6                           | 3.64UJ                                | 3.64UJ        |  |  |
| PN1SB2          | P1    | 11/2/94               | 04       | 7.4U                             | 2.23UJ                                | 2.23UJ        |  |  |
| PN1SB2          | P1    | 11/2/94               | 08       | 13.6                             | 2.33UJ                                | 2.33UJ        |  |  |
| PSSB1           | MB    | 10/31/94              | 02       | 9.2U                             | 2.31UJ                                | 2.31UJ        |  |  |
| PSSB1           | MB    | 10/31/94              | 06       | 5.6U                             | 2.31UJ                                | 2.31UJ        |  |  |
| SSB1            | SS    | 10/24/94              | 06       | 241J                             | 2.25UJ                                | 2.25UJ        |  |  |
| SSB1            | SS    | 10/24/94              | 16       | 16.6                             | 2.31UJ                                | 2.31UJ        |  |  |
| SSB2            | SS    | 10/12/94              | 04       | 29.1                             | NA                                    | NA            |  |  |
| SSB2            | SS    | 10/12/94              | 08       | 8.7J                             | NA                                    | NA            |  |  |
| SSB3            | SS    | 10/24/94              | 06       | 458                              | 3.28UJ                                | 3.28UJ        |  |  |
| SSB3            | SS    | 10/24/94              | 10       | 65.1                             | 2.63UJ                                | 2.63UJ        |  |  |
| STFSB1          | STF   | 10/26/94              | 02       | 424                              | 2.37UJ                                | 2.37UJ        |  |  |
| STFSB1          | STF   | 10/26/94              | 06       | 215                              | 2.69UJ                                | 2.69UJ        |  |  |
| STFSB2          | STF   | 10/26/94              | 04       | 45                               | 2.19UJ                                | 2.19UJ        |  |  |
| STFSB2          | STF   | 10/26/94              | 08       | 9.5U                             | 2.61UJ                                | 2.61UJ        |  |  |
| STFSB3          | STF   | 10/26/94              | 04       | 19.8                             | 2.56UJ                                | 2.56UJ        |  |  |
| T998SB1         | U     | 10/12/94              | 04       | 6J                               | NA                                    | NA            |  |  |
| T998SB1         | U     | 10/12/94              | 08       | 12.7J                            | NA                                    | NA            |  |  |

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| Sample Location |           | Comple   | Sample   | Total<br>Chromium<br>Comparative<br>Criteria of | Hexavalent<br>Chromium<br>Comparative<br>Criteria of |            |  |  |
|-----------------|-----------|----------|----------|-------------------------------------------------|------------------------------------------------------|------------|--|--|
|                 | Zone*     | Date     | (ft bls) | 10,000 mg/kg                                    | 100 mg/kg                                            | 10 mg/kg   |  |  |
| FBNA1-100594    |           | 10/5/94  |          | 0.7U                                            | NA                                                   | NA         |  |  |
| FBNA2-100694    |           | 10/6/94  |          | 0.7U                                            | NA                                                   | NA         |  |  |
| FBNA3-101194    |           | 10/11/94 |          | 0.70                                            | NA                                                   | NA         |  |  |
| FBNA4-101394    | 4 10/     |          |          | 0.76J                                           | NA                                                   | NA         |  |  |
| FBNA5-101994    |           | 1019/94  |          | 0.7U                                            | 2U                                                   | 2U         |  |  |
| FBNA6-102094    |           | 10/20/94 |          | 0.83J                                           | 2U                                                   | 20         |  |  |
| FBNA7-102194    |           | 10/21/94 | -        | 5.4U                                            | 2U                                                   | 20         |  |  |
| FBNA7-102594    |           | 10/25/94 |          | 0.7U                                            | 2U                                                   | <u>2</u> U |  |  |
| FBNA9-102694    |           | 10/26/94 | ••       | 9.6J                                            | 2U                                                   | 2U         |  |  |
| FBNA10-102694   |           | 10/26/94 | -        | NA                                              | 2U ·                                                 | 2U         |  |  |
| FBNA11-102794   |           | 10/27/94 |          | 0.70                                            | 2U                                                   | 2U         |  |  |
| FBNA13-102894   |           | 10/28/94 |          | 0.70                                            | 2U                                                   | 20         |  |  |
| FBNA14-102894   | -102034 1 |          |          | 0.7U                                            | 20                                                   | 2U         |  |  |
| FBNA17-103194   |           | 10/31/94 |          | 0.7U                                            | ·2U                                                  | 2U         |  |  |
| FBNA18-111694   |           | 11/16/94 |          | NA                                              | 20                                                   | 2U         |  |  |

Analyte concentrations and comparative criteria in milligrams per kilogram (mg/kg) (equivalent to parts per million [ppm]).

Analyses were performed by CompuChem Environmental Corporation, Research Triangle Park, North Carolina, using Contract Laboratory Program (CLP) protocols contained in the Statement of Work (SOW) ILM03.0 for total chromium and New Jersey Modified USEPA 3060A/7196 for hexavalent chromium

Some samples were analyzed for total chromium only and not for the remaining metals that constitute the target analyte list for metals. In these cases, the total chromium was analyzed using SW846 Method 6010.

Exceedances of comparative criteria are shown in bold and are underlined.

- FBNA Indicates a field blank associated with a non-aqueous samples.
- FR Field replicate of previous sample.
- U The compound was analyzed for, but not detected at the specified detection limit.
- J Estimated result
- R Rejected result

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- Not applicable
- NA Not analyzed

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- ft bis Feet below land surface
- Zones as defined in Table 3-2.

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Table 5-7. Summery of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                          |                                          |                                                     |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                     | Descent of Complete                                       |
|------------------------------------------|------------------------------------------|-----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------|
| Constituent                              | Minimum<br>Quantifiable<br>Concentration | Geometrio'<br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Semples<br>Anelyzed | Percent of<br>Samples with<br>Quantifiable<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Number of Sempler<br>Exceeding NJDEP<br>Impect to Groundwater<br>Solj Criterie | Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Exceeding NJDEP<br>Impect to Groundweter<br>Soil Criterie |
|                                          |                                          |                                                     |                                          | Tote                                        | le for All A                     | 1040                                                         |                                                                          |                                                                                |                                                     |                                                           |
|                                          |                                          |                                                     |                                          | (breakdowne f                               | or individual an                 | eies follow)                                                 |                                                                          |                                                                                |                                                     |                                                           |
| Volatile Organic Compounds (ug/kg)       |                                          |                                                     |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                     |                                                           |
|                                          | 2900.00                                  | 2800.00                                             | 2800.00                                  | 1                                           | 108                              | 1                                                            | 0                                                                        | 0                                                                              | 0                                                   | •                                                         |
| 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1 | 1700.00                                  | 353800.00                                           | 780000.00                                | 3                                           | 108                              | 3                                                            | 0                                                                        | 0                                                                              | 0                                                   | 0                                                         |
| 7-Butenene                               | 2.00                                     | 22.13                                               | 82.00                                    | 24 .                                        | 108                              | 22                                                           | ¢                                                                        | 0                                                                              | 0                                                   | 0                                                         |
| 2-Jexenone                               | 31.00                                    | 31.00                                               | 31.00                                    | 1                                           | 108                              | 1                                                            | 0                                                                        | 0                                                                              | 0                                                   | 0                                                         |
| 2-Propanel                               | 17.00                                    | 17.00                                               | 17.00                                    | 1                                           | 108                              | 1                                                            | 0                                                                        | 0                                                                              | 0                                                   | 0                                                         |
| 4-Methyl-2-pentenone                     | 7.00                                     | 50.75                                               | 160.00                                   | 4                                           | 109                              | 4                                                            | 0                                                                        | 0                                                                              | °,                                                  | 0                                                         |
| Acetone                                  | 180.00                                   | 6110.00                                             | 18000.00                                 | 3                                           | 108                              | 3                                                            | 0                                                                        | 0                                                                              | Ň                                                   | 2                                                         |
| Benzene                                  | 1.00                                     | 882.68                                              | 11000.00                                 | 19                                          | 1019                             | 18                                                           | 0                                                                        | 2                                                                              | ò                                                   | 5                                                         |
| Cerbon disulfide                         | 2.00                                     | 4,75                                                | 11.00                                    | 4                                           | 108                              | 4                                                            | 0                                                                        | Ĕ                                                                              | ĩ                                                   | 5                                                         |
| Chicrobenzene                            | 1.00                                     | 62910.24                                            | 990000.00                                | 21                                          | 100                              | 19                                                           |                                                                          | ő                                                                              | ò                                                   | ō                                                         |
| Chloroform                               | 43.00                                    | 43,00                                               | 43.00                                    | 1                                           | 108                              | 1                                                            | ě                                                                        | ň                                                                              | ō                                                   | ō                                                         |
| Ethylbenzene                             | 1.00                                     | 2222.50                                             | 36000.00                                 | -33                                         | 109                              | 31                                                           | 0                                                                        | ő                                                                              | 0                                                   | ò                                                         |
| Hexono                                   | 1.00                                     | 4680.41                                             | 120000.00                                | 81                                          | 108                              |                                                              | ŏ                                                                        | ő                                                                              | ò                                                   | 0                                                         |
| Methyl-t-butyl sther                     | 10.00                                    | 10.00                                               | 10.00                                    | 1                                           | 108                              |                                                              | ő                                                                        | 0                                                                              | ò                                                   | 0                                                         |
| Tetrachiorsethene                        | 1.00                                     | 2.00                                                | 3.00                                     | Z                                           | 108                              | 4 29                                                         | ŏ                                                                        | ŏ                                                                              | ō                                                   | 0                                                         |
| Toluene                                  | 1.00                                     | 733.27                                              | 11000.00                                 | 30                                          | 108                              | 41                                                           | ŏ                                                                        | 4                                                                              | 0                                                   | 4                                                         |
| Xylenes (Total)                          | 1.00                                     | 3721.22                                             | 49000.00                                 | 40                                          | 108                              | 50                                                           | ŏ                                                                        | 0                                                                              | 0                                                   | 0                                                         |
| n-Propylbenzene                          | 1.00                                     | 6966.20                                             | 130000.00                                | 64                                          | 108                              | ••                                                           | •                                                                        |                                                                                |                                                     |                                                           |
| Semivolatile Organic Compounds (ug/kg)   |                                          |                                                     |                                          |                                             |                                  |                                                              |                                                                          |                                                                                | _                                                   |                                                           |
| 1.7.Dishiaraharitete                     | 62.00                                    | 940536.40                                           | 4700000.00                               | 5                                           | 108                              | 6                                                            | 0                                                                        | 1                                                                              | 0                                                   | ģ                                                         |
| 1.2-Dichlorobenzene                      | 140.00                                   | 870.00                                              | 1 200.00                                 | 2                                           | 107                              | 2                                                            | 0                                                                        | . 0                                                                            | ,<br>,                                              | 1                                                         |
| 1 A.Dichierobergane                      | 60.00                                    | 31358.67                                            | 240000.00                                | 8                                           | 108                              | 8                                                            | 0                                                                        | 1                                                                              | õ                                                   | à                                                         |
| 2.4-Olmethylahanal                       | 250.00                                   | 260.00                                              | 250.00                                   | 1                                           | 108                              | 1                                                            | 0                                                                        | °,                                                                             | ŏ                                                   | ō                                                         |
| 2-Chieronephthelene                      | 1900.00                                  | 1900.00                                             | 1900.00                                  | 1                                           | 108                              | 1                                                            | , e                                                                      | ě                                                                              | ő                                                   | ō                                                         |
| 7-Methylnaphthelene                      | 48.00                                    | 24186.89                                            | 310000.00                                | 70                                          | 108                              | 65                                                           | Ŷ                                                                        | č                                                                              | ò                                                   | 0                                                         |
| 4-Methylphenol                           | 210.00                                   | 210.00                                              | 210.00                                   | 1                                           | 108                              | !                                                            | Š                                                                        | , i i i i i i i i i i i i i i i i i i i                                        | ō                                                   | o                                                         |
| 4-Nitrophenol                            | 1600.00                                  | 1800.00                                             | 1600.00                                  |                                             | 108                              |                                                              | õ                                                                        | ă                                                                              | ò                                                   | 0                                                         |
| Acenephthene                             | 40.00                                    | 2623.87                                             | 11000.00                                 | 16                                          | 108                              |                                                              | ň                                                                        | ŏ                                                                              | 0                                                   | 0                                                         |
| Aconaphthylene                           | 1 60.00                                  | 586.67                                              | 1100.00                                  | 3                                           | 108                              | 75                                                           | ŏ                                                                        | ŏ                                                                              | 0                                                   | 0                                                         |
| Anthracene                               | 44,00                                    | 4114.78                                             | 50000.00                                 | 27                                          | 108                              | 20                                                           | ů.                                                                       | ò                                                                              | 10                                                  | 0                                                         |
| Benzolejanthracene                       | 100.00                                   | 4437,58                                             | 84000.00                                 | 62                                          | 108                              | 49                                                           | 36                                                                       | ò                                                                              | 33                                                  | 0                                                         |
| Senzo(a)pyrane                           | 46.00                                    | 4158.40                                             | 37000.00                                 | 53                                          | 108                              | 66                                                           |                                                                          | +                                                                              | 8                                                   | 1                                                         |
| Benze(b)/fuorentheme                     | 88.00                                    | 4560.14                                             | 96000.00                                 | 78                                          | 108                              | 24                                                           | ō                                                                        | 0                                                                              | 0                                                   | 0                                                         |
| Benzolg,h,i)perviene                     | 210.00                                   | 3126.43                                             | 14000.00                                 | 20<br>E0                                    | 108                              | 56                                                           |                                                                          | 0                                                                              | 8                                                   | ¢                                                         |
| Senzo(k)fluoranthene                     | 92.00                                    | 4664.60                                             | 30000.00                                 | 1                                           | 108                              | 1                                                            | 0                                                                        | 0                                                                              | , Ó                                                 | 0                                                         |
| Butyl benzyl phthelete                   | 220.00                                   | 220.00                                              | 19000 00                                 | ;                                           | 108                              | 7                                                            | 0                                                                        | 0                                                                              | ¢                                                   | 0                                                         |
| Carbazole                                | 51.00                                    | 5044,43                                             | \$7000.00                                | 79                                          | 108                              | 73                                                           | 2                                                                        | 0                                                                              | 2                                                   | 0                                                         |
| Chrysens                                 | 170.00                                   | 180.40                                              | 410.00                                   | 5                                           | 108                              | 6                                                            | 0                                                                        | 0                                                                              | o                                                   | 0                                                         |
| Di-n-butyl phthelate                     | 47.00                                    | 47.00                                               | 47.00                                    | 1                                           | 108                              | 1                                                            | 0                                                                        | 0                                                                              | 0                                                   | č                                                         |
| Di-n-octyl phthelate                     | 63.00                                    | 2471.92                                             | 21000.00                                 | 24                                          | 108                              | 22                                                           | 18                                                                       | 0                                                                              | 14                                                  | Š                                                         |
| Diberzota,hiantivacene                   | 47.00                                    | 2217.83                                             | 4300.00                                  | 6                                           | 108                              | 6                                                            | 0                                                                        | 0                                                                              | Ŷ                                                   | Ň                                                         |
|                                          | 82.00                                    | 1615.14                                             | 9300.00                                  | 51                                          | 108                              | 47                                                           | 0                                                                        | 0                                                                              | ů                                                   | ŏ                                                         |
| riugraninene<br>Elugraninene             | 71.00                                    | 3448.44                                             | 17000.00                                 | 26                                          | 108                              | 23                                                           | 0                                                                        | 0                                                                              | 4                                                   | ō                                                         |
| riugrafie                                | 53.00                                    | 1928.09                                             | 14000.00                                 | 32                                          | 108                              | 30                                                           | 4                                                                        | 0                                                                              |                                                     | ĩ                                                         |
| Mitratedinter viewing (1)                | 380.00                                   | 75180.00                                            | 160000.00                                | 2                                           | 108                              | 2                                                            | 0                                                                        | 1<br>9                                                                         | ň                                                   | 2                                                         |
| Nanhthainne                              | 45.00                                    | 18632.77                                            | 240000.00                                | 36                                          | 108                              | 32                                                           | 0                                                                        | ć                                                                              | à                                                   | ō                                                         |
| Pentechiotophenel                        | 75.00                                    | 5069.75                                             | 9600.00                                  | 4                                           | 108                              | 4                                                            | U                                                                        | v                                                                              | -                                                   |                                                           |

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Table 5-7. Summary of Detected Concentrations of All Constituents In Soil Samples Collected During the Phase (A Remedial Investigation, Bayonne Plant, Bayonne, New Jarsey.

| Constituent                         | Minimum<br>Quantifiable<br>Cencentration | Geometric <sup>1</sup><br>Mean<br>Quentifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | Parcent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soll Criteria | Number of Semples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria | Percent of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soll Criteria | Percent of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria |
|-------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                     |                                          |                                                                 |                                          | Totels for                                  | All Areas                        | (continued)                                                  |                                                                          |                                                                                |                                                                           |                                                                                 |
| Semivoletile Organic Compounds (ug/ | (continued)                              |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Phenenthrem                         | 69.00                                    | 8043.04                                                         | \$4000.00                                | 81                                          | 108                              | 76                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Pyrene                              | 54.00                                    | 6706.83                                                         | 120000.00                                | 88                                          | 108                              | 80                                                           | 0                                                                        | 1                                                                              | 0                                                                         | ò                                                                               |
| bie(2-Ethylhexyl)phtheiste          | 110,00                                   | 1335.17                                                         | 9300.00                                  | 29 .                                        | 108                              | 27                                                           | 0                                                                        | v                                                                              | v                                                                         | ·                                                                               |
| Perticides/PCBs (un/kn)             |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| 4.45000                             | 4.10                                     | 2720.58                                                         | 85000.00                                 | 32                                          | 105                              | 30                                                           | 1                                                                        | 1                                                                              | 1                                                                         | 1                                                                               |
| 4,4'-DDE                            | 4.30                                     | 31.02                                                           | 280.00                                   | 33                                          | 106                              | 31                                                           |                                                                          | Ň                                                                              | ĩ                                                                         | ō                                                                               |
| 4,41-0DT                            | 4.60                                     | 1779.53                                                         | 40000.00                                 | 27                                          | 105                              | 28                                                           |                                                                          | ě                                                                              | ò                                                                         | ŏ                                                                               |
| Aldrin                              | 2.10                                     | 25,50                                                           | 110.00                                   |                                             | 106                              |                                                              | ŏ                                                                        | ň                                                                              | ő                                                                         | ō                                                                               |
| Avodor-1254                         | 45.00                                    | 45.00                                                           | 45.00                                    | 1                                           | 105                              | 1                                                            | ŏ                                                                        | ň                                                                              | ō                                                                         | ō                                                                               |
| Arodor-1260                         | 77.00                                    | 77.00                                                           | 77.00                                    | 1                                           | 106                              |                                                              | ,                                                                        | õ                                                                              | 1                                                                         | à                                                                               |
| Dieldvin                            | 2.20                                     | 291.82                                                          | 5800.00                                  | 20                                          | 105                              |                                                              | à                                                                        | ŏ                                                                              | 0                                                                         | 0                                                                               |
| Endoeulfen f                        | 3.40                                     | 18,45                                                           | 36.00                                    | :                                           | 105                              |                                                              | ŏ                                                                        |                                                                                | 0                                                                         | 0                                                                               |
| Endoeulfan H                        | 20.00                                    | 20.00                                                           | 20.00                                    | -                                           | 108                              | ,                                                            | ŏ                                                                        | ŏ                                                                              | 0                                                                         | 0                                                                               |
| Endosulfan sulfate                  | 24.00                                    | 24.00                                                           | 24.00                                    | ź                                           | 105                              | r<br>R                                                       | ō                                                                        | ò                                                                              | 0                                                                         | 0                                                                               |
| Endrin                              | 3.70                                     | 12.00                                                           | 28.00                                    | .,                                          | 106                              | 10                                                           | ŏ                                                                        | ò                                                                              | 0                                                                         | 0                                                                               |
| Endrin eldehyde                     | 0.79                                     | 18.84                                                           | 88.00                                    | 11                                          | 105                              | 14                                                           | ō                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Endrin ketone                       | 1.70                                     | 18.11                                                           | /4.00                                    | 10                                          | 105                              | 6                                                            | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Heptechlor opoxide                  | 6.30                                     | 13,14                                                           | 20.00                                    | 13                                          | 105                              | 12                                                           | ò                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Methoxychier                        | 55.00                                    | 263.00                                                          | 5.00                                     | 1                                           | 105                              | 1                                                            | . 0                                                                      | 0                                                                              | 0                                                                         | 0                                                                               |
| alpha-BHC                           | 6.60                                     | 9.80                                                            | 10.00                                    | 18                                          | 105                              | 17                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| eiphe-Chiordane                     | 1.60                                     | 13.07                                                           | 57.00                                    | 3                                           | 105                              | 3                                                            | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| bete-BHC                            | 9.20                                     | 84.30                                                           | 1800.00                                  | 23                                          | 105                              | 22                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| gemme-Chlordane                     | 2.00                                     |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Inorganica (ma/ka)                  |                                          |                                                                 |                                          |                                             |                                  | ~~                                                           | •                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Aluminum                            | 505.00                                   | 6484.64                                                         | 23300.00                                 | 111                                         | 114                              | 47                                                           | ő                                                                        | ŏ                                                                              | 0                                                                         | 0                                                                               |
| Antimony                            | 0.27                                     | 11.76                                                           | 238.00                                   | 09                                          | 112                              | 100                                                          | 49                                                                       | ō                                                                              | 44                                                                        | 0                                                                               |
| Areenic                             | 1.60                                     | 38.39                                                           | 372.00                                   | 112                                         | 114                              | 100                                                          | 0                                                                        | ò                                                                              | · 0                                                                       | 0                                                                               |
| \$arium                             | 8.00                                     | 154.14                                                          | 6 290.00                                 | 82                                          | 112                              | 82                                                           | Å.                                                                       | ò                                                                              | 4                                                                         | 0                                                                               |
| Beryllium                           | 0.07                                     | 0.38                                                            | 2.00                                     | 48                                          | 112                              | 43                                                           | 0                                                                        | 0                                                                              | 0                                                                         | o                                                                               |
| Cadmium                             | 0.0                                      | 1,00                                                            | 141000.00                                | 110                                         | 112                              | 88                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Celcium                             | 220.00                                   | 278 10                                                          | E160.00                                  | 176                                         | 121                              | 97                                                           | 0                                                                        | 0                                                                              | 0                                                                         | . 0                                                                             |
| Chromium                            | 1.40                                     | 3/0,14                                                          | 84.7.00                                  | 112                                         | 112                              | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | a                                                                               |
| Cobalt                              | 1.20                                     | 414.07                                                          | 74100.00                                 | 112                                         | 112                              | 100                                                          | 6                                                                        | 0                                                                              | 5                                                                         | Ū.                                                                              |
| Copper                              | 0.50                                     | 3.07                                                            | 30.70                                    | 16                                          | 112                              | 14                                                           | ٥                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Cyenide                             | 1.00                                     | 36 813                                                          | 293.00                                   | 32                                          | 141                              | 23                                                           | 17                                                                       | 17                                                                             | 12                                                                        | 12                                                                              |
| Hexavalent chromium                 | 2940.00                                  | 22971.73                                                        | 104000.00                                | 110                                         | 112                              | 88                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ŏ                                                                               |
| Iron                                | 4.90                                     | 637.87                                                          | 7590.00                                  | 112                                         | 112                              | 100                                                          | 22                                                                       | υ.                                                                             | 20                                                                        | ŏ                                                                               |
|                                     | 53.90                                    | 4146.87                                                         | 38400.00                                 | 112                                         | 112                              | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | õ                                                                               |
|                                     | 5.90                                     | 178.70                                                          | 860.00                                   | 110                                         | 112                              | 69                                                           | 0                                                                        | U C                                                                            |                                                                           | ō                                                                               |
| Na an ag an Appen                   | 0,10                                     | 1.64                                                            | 21,90                                    | 96                                          | 112                              | 86                                                           | •                                                                        | 0                                                                              | 1                                                                         | ō                                                                               |
| marcus y<br>Niekol                  | 2.40                                     | 125.35                                                          | 2860.00                                  | 112                                         | 112                              | 100                                                          | 1                                                                        | 0                                                                              | a                                                                         | ō                                                                               |
|                                     | 175,00                                   | B10.66                                                          | 6500.00                                  | 109                                         | 112                              | 97                                                           | ů é                                                                      | č                                                                              | ŏ                                                                         | 0                                                                               |
| Selecit m                           | 0.74                                     | 2.68                                                            | 33.30                                    | 63                                          | 112                              | 68                                                           | 0                                                                        | ŏ                                                                              | ō                                                                         | ō                                                                               |
| Silver                              | 0.10                                     | 0.78                                                            | 6.10                                     | 60                                          | 112                              | 46                                                           | ŏ                                                                        | ŏ                                                                              | ō                                                                         | 0                                                                               |
| Serium                              | 599.00                                   | 6040.87                                                         | 38300.00                                 | 30                                          | 112                              | 27                                                           | v                                                                        | •                                                                              | -                                                                         |                                                                                 |

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Table 5-7. Summary of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jarsey.

| Constituent                            | Minimum<br>Quentifiable<br>Concentration | Geometric <sup>1</sup><br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifishis<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | Percent of<br>Semples with<br>Quantifisble<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Number of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria | Percent of Semples<br>Exceeding NJOEP<br>Nor-Residential<br>Soli Criteria | Percent of Semples<br>Exceeding NJDEP<br>Impect to Groundwater<br>Soli Criteria |  |  |  |  |
|----------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|--|--|--|--|
|                                        | Totals for All Areas (continued)         |                                                                 |                                          |                                             |                                  |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                |                                                                           |                                                                                 |  |  |  |  |
| inorgenics (mg/kg) (continued)         |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                |                                                                           | 0                                                                               |  |  |  |  |
| Theilium                               | 1,10                                     | 2.23                                                            | 3.70                                     | 8                                           | 112                              | 7                                                            | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              |                                                                           | 0                                                                               |  |  |  |  |
| Vanadium                               | 3.10                                     | 77.78                                                           | 613.00                                   | 112                                         | 112                              | 100                                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 3                                                                         | ō                                                                               |  |  |  |  |
| Zine.                                  | 17.90                                    | 352.01                                                          | 8080.00                                  | 110                                         | 112                              | 96                                                           | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | v                                                                              | •                                                                         |                                                                                 |  |  |  |  |
|                                        |                                          |                                                                 |                                          | "A"                                         | -Hill Tenk                       | Area                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                |                                                                           |                                                                                 |  |  |  |  |
| Volatile Organic Compounde (ug/kg)     |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                |                                                                           | •                                                                               |  |  |  |  |
| 2. Budenene                            | 8.00                                     |                                                                 | 8.00                                     | 1                                           | 4                                | 26                                                           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | ŏ                                                                               |  |  |  |  |
| 2-Duranu - A                           | 4.00                                     |                                                                 | 980.00                                   | 2                                           | 4                                | 60                                                           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | ŏ                                                                               |  |  |  |  |
| Hexans                                 | 17000.00                                 |                                                                 | 17000.00                                 | 1                                           | 4                                | 26                                                           | U A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ŏ                                                                              | ŏ                                                                         | ò                                                                               |  |  |  |  |
| Xvienes (Totel)                        | 1,00                                     |                                                                 | 610.00                                   | 2                                           | 4                                | 50                                                           | ő                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ŏ                                                                              | ō                                                                         | 0                                                                               |  |  |  |  |
| n-Propylbenzene                        | 82.00                                    |                                                                 | 12000.00                                 | •                                           | •                                | 100                                                          | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                |                                                                           |                                                                                 |  |  |  |  |
| Semivoletile Organic Compounds (ug/kg) |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                |                                                                           | a                                                                               |  |  |  |  |
| 2. Marshy in a shifth since            | 780.00                                   |                                                                 | 25000.00                                 | 4                                           | 4                                | 100                                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | õ                                                                               |  |  |  |  |
| Accorditions                           | 1300.00                                  |                                                                 | 1300.00                                  | 1                                           | 4                                | 26                                                           | , in the second s | ŏ                                                                              | ō                                                                         | 0                                                                               |  |  |  |  |
| Benzolejenthrecene                     | 410.00                                   |                                                                 | 410.00                                   | 1                                           | 4                                | 20                                                           | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ō                                                                              | ō                                                                         | 0                                                                               |  |  |  |  |
| Chrypene                               | 400.00                                   |                                                                 | 1200.00                                  | 3                                           | •                                | 25                                                           | ò                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ō                                                                              | 0                                                                         | Ċ                                                                               |  |  |  |  |
| Dibenzofuran                           | 960,00                                   |                                                                 | 960.00                                   | 1                                           |                                  | 60                                                           | ò                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | 0                                                                               |  |  |  |  |
| Fluerene                               | 1000.00                                  |                                                                 | 1800.00                                  | * *                                         | Ĩ.                               | 50                                                           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | 0                                                                               |  |  |  |  |
| Naphthalana                            | 470.00                                   |                                                                 | 4400.00                                  | 3                                           | 4                                | 76                                                           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | 0                                                                               |  |  |  |  |
| Phenanthrene                           | 2800.00                                  |                                                                 | 1500.00                                  | 3                                           | 4                                | 76                                                           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | Ģ                                                                         | •                                                                               |  |  |  |  |
| Pyrane                                 | \$20.00                                  |                                                                 |                                          |                                             |                                  |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                |                                                                           |                                                                                 |  |  |  |  |
| Pesticides/PC8s (ug/kg)                |                                          |                                                                 |                                          | -                                           |                                  | 50                                                           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | o                                                                         | 0                                                                               |  |  |  |  |
| 4,4'-000                               | 09,90                                    |                                                                 | 21.00                                    | 4                                           | -                                | 25                                                           | ò                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | Q                                                                         | 0                                                                               |  |  |  |  |
| 4,4'-DDT                               | 4.90                                     |                                                                 | 4.80                                     | •                                           | -                                |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                |                                                                           |                                                                                 |  |  |  |  |
| Inerganics (mg/kg)                     |                                          |                                                                 |                                          |                                             |                                  |                                                              | <u>,</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0                                                                              | 0                                                                         | 0                                                                               |  |  |  |  |
| Alterninem                             | 3730.00                                  |                                                                 | 6710.00                                  | 4                                           | 4                                | 100                                                          | à                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | õ                                                                              | ò                                                                         | 0                                                                               |  |  |  |  |
| Antiment                               | 0.41                                     |                                                                 | 2.70                                     | 3                                           |                                  | 100                                                          | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 50                                                                        | o                                                                               |  |  |  |  |
| Areenic                                | 9.00                                     |                                                                 | 88.80                                    | 2                                           |                                  | 100                                                          | õ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | 0                                                                               |  |  |  |  |
| Barium                                 | 32.60                                    |                                                                 | 047                                      | 4                                           | 4                                | 100                                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | ů,                                                                              |  |  |  |  |
| Beryllium                              | 0.21                                     |                                                                 | 0.12                                     | i                                           | 4                                | 25                                                           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | õ                                                                               |  |  |  |  |
| Cedmium                                | 489.00                                   |                                                                 | 1450.00                                  | 4                                           | 4                                | 100                                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | ő                                                                         | ő                                                                               |  |  |  |  |
| Celcium                                | B.00                                     |                                                                 | 47.00                                    | 8                                           | 9                                | -                                                            | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | õ                                                                         | 0                                                                               |  |  |  |  |
| Chromium                               | 4.80                                     |                                                                 | 6.50                                     | 4                                           | 4                                | 100                                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | ō                                                                         | 0                                                                               |  |  |  |  |
| Content                                | 60.10                                    |                                                                 | 445.00                                   | 4                                           | 4                                | 100                                                          | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1                                                                              | 17                                                                        | 17                                                                              |  |  |  |  |
| Nevavalent sivemium                    | 7.60                                     |                                                                 | 15.00                                    | 2                                           |                                  | 100                                                          | ò                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | 0                                                                               |  |  |  |  |
| Manganase                              | 54.50                                    |                                                                 | 84,30                                    | •                                           | 2                                | 76                                                           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | 0                                                                               |  |  |  |  |
| Mercury                                | 0.12                                     |                                                                 | U./D                                     | 4                                           | 4                                | 100                                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | 0                                                                         | v                                                                               |  |  |  |  |
| Nickel                                 | 13.70                                    |                                                                 | 23400.00                                 | 4                                           | 4                                | 100                                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | . 0                                                                            | 0                                                                         | 0                                                                               |  |  |  |  |
| hon                                    | 13600.00                                 |                                                                 | 512.00                                   | 4                                           | •                                | 100                                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | Å                                                                         | ŏ                                                                               |  |  |  |  |
| Load                                   | 784.00                                   |                                                                 | 1950.00                                  | 4                                           | 4                                | 100                                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                              | ŏ                                                                         | ō                                                                               |  |  |  |  |
| Magneelum<br>Potessium                 | 540.00                                   |                                                                 | 1110.00                                  | 4                                           | 4                                | 100                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                |                                                                           | · · · · · · · · · · · · · · · · · · ·                                           |  |  |  |  |

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Table 5-7. Summary of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remodial Investigation, Sayonne Plant, Bayonne, Naw Jaraey.

| Constituent                           | Minimum<br>Quantifiable<br>Concentration | Geometric <sup>1</sup><br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | Percent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Number of Samples<br>Exceeding NJOEP<br>Impact to Groundwater<br>Seil Criteria | Percent of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soli Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Percent of Semples<br>Exceeding NJDEP<br>Impact to Groundweter<br>Soll Criteria |
|---------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                       |                                          |                                                                 |                                          | "A"-HIII T                                  | ank Area (                       | continued)                                                   |                                                                          |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                 |
| inorgenice (mg/kg) (continued)        |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                 |
| Selenium                              | 1.00                                     |                                                                 | 1.00                                     | 1                                           | 4                                | 25                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Venedium                              | 20.00                                    |                                                                 | 26.20                                    | 4                                           | 4                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Zine                                  | 43.00                                    |                                                                 | 224.00                                   | 4 .                                         | 4                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
|                                       |                                          |                                                                 |                                          | L                                           | ube Oil Are                      |                                                              |                                                                          |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                 |
| Voletile Organic Compounda (ug/kg)    |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                 |
|                                       | 1 700 00                                 |                                                                 | 1700.00                                  | •                                           | 25                               | 4                                                            | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
|                                       | 3.00                                     |                                                                 | 82.00                                    | 7                                           | 25                               | 28                                                           | ò                                                                        | Ö                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
|                                       | 31.00                                    |                                                                 | 31.00                                    | 1                                           | 25                               | 4                                                            | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| A Marine 2 and another                | 28.00                                    |                                                                 | 28.00                                    | t                                           | 25                               | 4                                                            | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Carboo diaufida                       | 11.00                                    |                                                                 | 11.00                                    | 1                                           | 26                               | 4                                                            | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Chierobenzene                         | 2.00                                     |                                                                 | 2.00                                     | 1                                           | 25                               | 4                                                            | 0                                                                        | Ó                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Ethulhanzana                          | 3.00                                     |                                                                 | 660.00                                   | 8                                           | 25                               | 32                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Etry internet                         | 1.00                                     |                                                                 | 4500.00                                  | 14                                          | 25                               | 68                                                           | 0                                                                        | 0                                                                              | .0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                                                                               |
| Tatrabiornethere                      | 1.00                                     |                                                                 | 1,00                                     | 1                                           | 25                               | 4                                                            | 0                                                                        | ¢                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Tehana                                | 2.00                                     |                                                                 | 270.00                                   | 4                                           | 25                               | 16                                                           | 0                                                                        | e.                                                                             | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Yvienes (Totel)                       | 5.00                                     |                                                                 | 4700.00                                  | 10                                          | 25                               | 40                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| n-Propylbenzene                       | 4.00                                     |                                                                 | 6500.00                                  | Ð                                           | 25                               | 38                                                           | o                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | U                                                                               |
| Semivolatão Organic Compounde (ug/kg) |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          | _                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | •                                                                               |
| 2.4-Dimethylahanol                    | 250.00                                   |                                                                 | 250.00                                   | 1                                           | 25                               | 4                                                            | 0                                                                        | 0                                                                              | ě.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ő                                                                               |
| 2-Methyinaphthalene                   | 76.00                                    |                                                                 | 120000.00                                | 14                                          | 25                               | 58                                                           | 0                                                                        | ě                                                                              | ň                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | o o                                                                             |
| 4-Methylphenol                        | 210.00                                   |                                                                 | 210.00                                   | 1                                           | 26                               | 4                                                            | 0                                                                        | ŏ                                                                              | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ō                                                                               |
| Acanaphthene                          | 130.00                                   |                                                                 | 720.00                                   | 2                                           | 26                               | 8                                                            | 0                                                                        | ŏ                                                                              | ò                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Acenaphthylene                        | 180.00                                   |                                                                 | 180.00                                   | 1                                           | 26                               | 20                                                           | ŏ                                                                        | ŏ                                                                              | ō                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Anthracene                            | 46.00                                    |                                                                 | 1300.00                                  | 6                                           | 20                               | 52                                                           | 3                                                                        | ō                                                                              | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                                                                               |
| Senzo(e)enthracene                    | 340,00                                   |                                                                 | 62000.00                                 | 13                                          | 26                               | 49                                                           | 11                                                                       | 0                                                                              | 44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                                                                               |
| Senzo(s)pyrene                        | 81.00                                    |                                                                 | 37000,00                                 | 12                                          | 26                               | 60                                                           | 4                                                                        | 0                                                                              | 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                                                                               |
| Benzo(b)fluoranthene                  | 290.00                                   |                                                                 | 28000.00                                 |                                             | 25                               | 36                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Benzoig,h,l)perviene                  | 380.00                                   |                                                                 | 27000.00                                 | 15                                          | 25                               | 60                                                           | 4                                                                        | 0                                                                              | 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                                                                               |
| Bargo(k)fluorenthene                  | 92.00                                    |                                                                 | 280.00                                   | 1                                           | 26                               | 4                                                            | 0                                                                        | c                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Cerbezele                             | 280.00                                   |                                                                 | 97000.00                                 | 18                                          | 26                               | 72                                                           | 1                                                                        | 0                                                                              | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Chrysens .                            | 270.00                                   |                                                                 | 10000.00                                 | 7                                           | 26                               | 28                                                           | 5                                                                        | 0                                                                              | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                                                                               |
| Dibenzola,njentracene                 | 160.00                                   |                                                                 | 9300.00                                  |                                             | 26                               | 35                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Pluerantheme                          | 260.00                                   |                                                                 | 1500.00                                  | 4                                           | 26                               | 16                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Pluorene                              | 530.00                                   |                                                                 | 7600.00                                  | 7                                           | 25                               | 26                                                           | _ †                                                                      | o                                                                              | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Noenet 1,2,3-colpyrame                | 50.00                                    |                                                                 | 25000.00                                 | 8                                           | 25                               | 24                                                           | , Ó                                                                      | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ŏ                                                                               |
| n april na amara                      | 75.00                                    |                                                                 | 76.00                                    | 1                                           | 25                               | 4                                                            | ο,                                                                       | . 0                                                                            | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ő                                                                               |
| renteuneroprante.                     | 170.00                                   |                                                                 | 17000.00                                 | 15                                          | 26                               | 80                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ő                                                                               |
| Promo                                 | 210.00                                   |                                                                 | 69000.00                                 | 20                                          | 25                               | 80                                                           | 0                                                                        | 0                                                                              | , in the second s | ŏ                                                                               |
| bist2-Ethylhexyliphtheiste            | 670.00                                   |                                                                 | 8300.00                                  | 3                                           | 25                               | 12                                                           | o                                                                        | V                                                                              | v                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -                                                                               |
| Pesticides/PCBs (ug/kg)               |                                          |                                                                 |                                          |                                             |                                  |                                                              | _                                                                        |                                                                                | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 6                                                                               |
| 4.45000                               | 4.10                                     |                                                                 | 85000.00                                 | 8                                           | 24                               | 33                                                           | 1                                                                        | ,                                                                              | õ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ō                                                                               |
| 4.4'-DDE                              | 5.40                                     |                                                                 | 31.00                                    | 4                                           | 24                               | 17                                                           | 0                                                                        | Ň                                                                              | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ō                                                                               |
| 4,4'-DDT                              | 1 30.00                                  |                                                                 | 48000.00                                 | 2                                           | 24                               | 8                                                            | 1                                                                        | · · · · · · · · · · · · · · · · · · ·                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                 |

See lest page for footnotes.

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Table 5-7. Summery of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonna, New Jersay.

| Constituent                         | Minimum<br>Quentifieble<br>Concentration | Geometric <sup>1</sup><br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifieble<br>Concentrations | Number of<br>Samples<br>Analyzed      | Percent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soli Criteria | Number of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Sell Criteris | Percent of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soli Criterie | Percent of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria |
|-------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                     |                                          | ,                                                               |                                          | Lube O                                      | il Area (co                           | ntinued)                                                     |                                                                          |                                                                                |                                                                           |                                                                                 |
| Pesticides/PCBs (ug/kg) (continued) |                                          |                                                                 |                                          |                                             |                                       |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Aldrin                              | 32,00                                    |                                                                 | 32.00                                    | 1                                           | 24                                    | 4                                                            | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Dieldrin                            | 3,80                                     |                                                                 | 6600.00                                  | 4                                           | 24                                    | 17                                                           | 1                                                                        | 0                                                                              |                                                                           | õ                                                                               |
| Endrin aldehyde                     | 4.80                                     |                                                                 | 9,30                                     | 2                                           | 24                                    |                                                              | 0                                                                        | ò                                                                              | ő                                                                         | ō                                                                               |
| Endrin ketone                       | 11,00                                    |                                                                 | 74.00                                    | 2                                           | 24                                    | 8                                                            | 0                                                                        | ò                                                                              | ŏ                                                                         | ō                                                                               |
| Heptechlor epoxide                  | 8,60                                     |                                                                 | 8.60                                     | 1                                           | 24                                    | 1                                                            | č                                                                        | ő                                                                              | ō                                                                         | 0                                                                               |
| Methoxychlor                        | \$3.00                                   |                                                                 | 93.00                                    | 1                                           | 24                                    |                                                              | ő                                                                        | 0                                                                              | 0                                                                         | • •                                                                             |
| alpha-Chlordene                     | 12.00                                    |                                                                 | 31.00                                    | 2                                           | 74                                    | 13                                                           | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| gemme-Chlordene                     | 4.00                                     |                                                                 | 1800.00                                  | •                                           | •••                                   |                                                              | -                                                                        |                                                                                |                                                                           |                                                                                 |
| Inorganica (mg/kg)                  |                                          |                                                                 |                                          |                                             |                                       |                                                              | -                                                                        | •                                                                              | •                                                                         | o                                                                               |
| Aluminum                            | 652.00                                   |                                                                 | 18000.00                                 | 23                                          | 24                                    | 96                                                           | 0                                                                        | 0                                                                              | ŏ                                                                         | õ                                                                               |
| Antimony                            | 1.60                                     |                                                                 | 8,10                                     | 6                                           | 24                                    | 26                                                           | 15                                                                       | 0                                                                              | 63                                                                        | ō                                                                               |
| Areenic                             | 4.00                                     |                                                                 | 249.00                                   | 24                                          | 24                                    | 100                                                          | 0                                                                        | õ                                                                              | . 0                                                                       | 0                                                                               |
| Sarium                              | 18.80                                    |                                                                 | 302.00                                   | 24                                          | 24                                    | 75                                                           | ŏ                                                                        | ŏ                                                                              | 0                                                                         | 0                                                                               |
| Beryillum                           | 0.13                                     |                                                                 | 0.88                                     | 14                                          | 24                                    | 68                                                           | ò                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Çedmium                             | 0.11                                     |                                                                 | 21500.00                                 | 23                                          | 24                                    | 86                                                           | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Calcium                             | /48.00                                   |                                                                 | 138.00                                   | 32                                          | 34                                    | -                                                            | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Chromium                            | 1,40                                     |                                                                 | 27.70                                    | 24                                          | 24                                    | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 9                                                                               |
| Cobelt                              | 16.80                                    |                                                                 | 322.00                                   | 24                                          | 24                                    | 100                                                          | 0                                                                        | 0                                                                              | . 0                                                                       | ò                                                                               |
| Capper                              | 3.80                                     |                                                                 | 3.60                                     | 1                                           | 24                                    | 4                                                            | 0                                                                        | 0                                                                              | ,<br>,                                                                    | 0                                                                               |
| Cyanice chamilies                   | 4,17                                     |                                                                 | 4.17                                     | 1                                           | 28                                    | 4                                                            | . 0                                                                      | 0                                                                              | ň                                                                         | ő                                                                               |
| ires                                | 3840.00                                  |                                                                 | 89200.00                                 | 22                                          | 24                                    | 92                                                           | •                                                                        | Ň                                                                              | 17                                                                        | 0                                                                               |
| Land                                | 4.90                                     |                                                                 | 1010.00                                  | 24                                          | 24                                    | 100                                                          | 4                                                                        | ŏ                                                                              | ö                                                                         | 0                                                                               |
| Magnesium                           | 159.00                                   |                                                                 | 6900.00                                  | 24                                          | 24                                    | 100                                                          | ě .                                                                      | ō                                                                              | · 0                                                                       | <b>Ö</b> .                                                                      |
| Mengeneee                           | 8.90                                     |                                                                 | 418.00                                   | 22                                          | 24                                    | 89                                                           | 0                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Mercury                             | 0,10                                     |                                                                 | 9.80                                     | 21                                          | 24 .                                  | 100                                                          | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Nickel                              | 2.40                                     |                                                                 | 91,30                                    | 24                                          | 24                                    | 100                                                          | Ó                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Poteeskum                           | 176.00                                   |                                                                 | 000.00                                   | 16                                          | 24                                    | 63                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Selenium                            | 0.88                                     |                                                                 | 0.52                                     | 8                                           | 24                                    | 38                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Silver                              | 748.00                                   |                                                                 | 5950.00                                  | 6                                           | 24                                    | 25                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ŏ                                                                               |
| Sodium                              | 1.50                                     |                                                                 | 2.60                                     | 2                                           | 24                                    | 8                                                            | 1                                                                        | 0                                                                              | ÷                                                                         | ŏ                                                                               |
| Vegetium                            | 3.10                                     |                                                                 | 210.00                                   | 24                                          | 24                                    | 100                                                          | 0                                                                        | 0                                                                              | õ                                                                         | ò                                                                               |
| Zine                                | 22.70                                    |                                                                 | 1100.00                                  | 22                                          | 24                                    | •                                                            | v                                                                        | •                                                                              | -                                                                         |                                                                                 |
|                                     |                                          |                                                                 |                                          | P                                           | ier No. 1 A                           | rea                                                          |                                                                          |                                                                                |                                                                           |                                                                                 |
|                                     |                                          |                                                                 |                                          |                                             |                                       |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Voletile Organia Compounda (ug/kg)  |                                          |                                                                 |                                          | <b>.</b> .                                  | •                                     | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| 2-Butenone                          | 4.00                                     |                                                                 | 38.00                                    | 2                                           | · · · · · · · · · · · · · · · · · · · | 50                                                           | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| 2-Propanol                          | 17.00                                    |                                                                 | 17.00                                    | 1                                           | 2                                     | 60                                                           | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Hexana                              | 5.00                                     |                                                                 | 31.00                                    | ;                                           | 2                                     | 60                                                           | 0                                                                        | 0                                                                              | C                                                                         | 0                                                                               |
| Toluene                             | 21.00                                    |                                                                 | 2 00                                     | i                                           | 2                                     | 50                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Xylanes (Total)                     | 2.00                                     |                                                                 | 25.00                                    | 1                                           | 2                                     | 60                                                           | 0                                                                        | 0                                                                              | ¢                                                                         | U                                                                               |
| n-Propylbenzene                     | 20.00                                    |                                                                 | •••••                                    |                                             |                                       |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |

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Table 5-7. Summary of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jensey.

| Constituent                            | Minimum<br>Quantifiable<br>Concentration | Geometria <sup>1</sup><br>Maen<br>Quantilieble<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Semples<br>Analyzed | Percent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Number of Semples<br>Exceeding NJDEP<br>Impect to Groundwater<br>Soli Criteria | Percent of Samples<br>Exceeding NJDEP<br>Nor-Residential<br>Soil Criteria | Percent of Samples<br>Exceeding NJDEP<br>Impect to Groundwater<br>Soll Criteria |
|----------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <u></u>                                |                                          |                                                                 |                                          | Pier No.                                    | . 1 Area (c                      | ontinued)                                                    |                                                                          |                                                                                |                                                                           |                                                                                 |
| Semivoletile Organic Compounds (ug/kg) |                                          |                                                                 |                                          |                                             |                                  |                                                              | _                                                                        |                                                                                |                                                                           | 0                                                                               |
| Anthracene                             | 1200.00                                  |                                                                 | 1200.00                                  | 1                                           | 2                                | 50                                                           | 0                                                                        | 0                                                                              | 50                                                                        | ő                                                                               |
| Benyalalenthrecens                     | 5800.00                                  |                                                                 | 5900.00                                  | 1                                           | 2                                | 60                                                           | 1                                                                        |                                                                                | 100                                                                       | ō                                                                               |
| Bergeleinvrane                         | 1200.00                                  |                                                                 | 4400.00                                  | 2,                                          | 2                                | 100                                                          | 2                                                                        | ő                                                                              | 50                                                                        | ů.                                                                              |
| Berra (billior anthone                 | 1400.00                                  |                                                                 | 4700.00                                  | 2                                           | 2                                | 100                                                          | 1                                                                        | ő                                                                              | ă                                                                         | ō                                                                               |
| Berneit b linerviene                   | 1500.00                                  |                                                                 | 2800.00                                  | 2                                           | 2                                | 100                                                          | 0                                                                        | ě                                                                              | 50                                                                        | ò                                                                               |
| Burgerighting anthone                  | 1400.00                                  |                                                                 | 4600.00                                  | 2                                           | 2                                | 100                                                          | 1                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Servers                                | 980.00                                   |                                                                 | 8400.00                                  | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | 100                                                                       | ò                                                                               |
| Citysene<br>All second blastication    | 740.00                                   |                                                                 | 2000.00                                  | 2                                           | 2                                | 100                                                          | 2                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| CipelSole'uterraneere                  | 930.00                                   |                                                                 | 4000.00                                  | 2                                           | 2                                | 100                                                          | 0                                                                        | U .                                                                            | ň                                                                         | e e                                                                             |
| Hubrantherw                            | 1500.00                                  |                                                                 | 1500.00                                  | 1                                           | 2                                | 60                                                           | 0                                                                        | U                                                                              | Ň                                                                         | à                                                                               |
|                                        | 780.00                                   |                                                                 | 2000.00                                  | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | Ň                                                                         | ă                                                                               |
| Indenot1,2,3-colpyrene                 | 590.00                                   |                                                                 | 6900.00                                  | 2                                           | 2                                | 100                                                          | ¢                                                                        | 0                                                                              | ž                                                                         | ā                                                                               |
| Phone:throne                           | 710.00                                   |                                                                 | 4700.00                                  | 2                                           | 2                                | 100                                                          | o                                                                        | 0                                                                              | v                                                                         | •                                                                               |
| Pyrene                                 | 110.00                                   |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
|                                        |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Pesticides/PCBs (U0/Kg)                |                                          |                                                                 |                                          | _                                           | -                                | FO                                                           |                                                                          | a                                                                              | 0                                                                         | 0                                                                               |
| 44.000                                 | 28.00                                    |                                                                 | 28.00                                    | 1                                           | 2                                | 50                                                           | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Endrin                                 | 26.00                                    |                                                                 | 28.00                                    | 1                                           | 2                                | 80                                                           | •                                                                        | -                                                                              |                                                                           |                                                                                 |
|                                        |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Inorganica (mg/kg)                     |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                | •                                                                         | 0                                                                               |
|                                        | 1 840 00                                 |                                                                 | 6770.00                                  | 2                                           | 2                                | 100                                                          | ¢                                                                        | 0                                                                              | 50                                                                        | ň                                                                               |
| Aluminum                               | 7 10                                     |                                                                 | 37.40                                    | 2                                           | 2                                | 100                                                          | 1                                                                        | 0                                                                              | ~                                                                         | ň                                                                               |
| Areenic                                | 45.70                                    |                                                                 | 51.30                                    | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | š                                                                         | ő                                                                               |
| Barium                                 | A 12                                     |                                                                 | 0.38                                     | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | ě                                                                         | ő                                                                               |
| Beryllium                              | 0.12                                     |                                                                 | 1.60                                     | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | Ň                                                                         |                                                                                 |
| Cedmium                                | 5730.00                                  |                                                                 | 110000.00                                | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | ň                                                                         |                                                                                 |
| Celcium                                | 13.60                                    |                                                                 | 13.80                                    | 1                                           | Z                                | 50                                                           | 0                                                                        | 0                                                                              | ò                                                                         | 0                                                                               |
| Chromium                               | 5 20                                     |                                                                 | 7.60                                     | 2                                           | 2                                | 100                                                          | 0                                                                        | ů.                                                                             | n i                                                                       | Ō                                                                               |
| Cebet                                  | 89.70                                    |                                                                 | 143.00                                   | 2                                           | 2                                | 100                                                          | D                                                                        | 0                                                                              |                                                                           | Ċ                                                                               |
| Copper                                 | 05.70                                    |                                                                 | 0.59                                     | 1                                           | 2                                | 60                                                           | 0                                                                        | U                                                                              | ň                                                                         | ō                                                                               |
| Cyanida                                | 9900 00                                  |                                                                 | 18300.00                                 | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | ň                                                                         | ō                                                                               |
| Iren                                   | 000.00                                   |                                                                 | 262.00                                   | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | č                                                                         | ò                                                                               |
| Lead                                   | 759.00                                   |                                                                 | 5660.00                                  | 2                                           | 2                                | 100                                                          | ¢.                                                                       | U                                                                              | ě                                                                         | à                                                                               |
| Magnesium                              | 100.00                                   |                                                                 | 660.00                                   | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | Ň                                                                         | ŏ                                                                               |
| Manganase                              | 2.00                                     |                                                                 | 21.00                                    | 2                                           | 2                                | 100                                                          | 0                                                                        | Q<br>A                                                                         | ň                                                                         | ō                                                                               |
| Mercury                                | 14.60                                    |                                                                 | 15.10                                    | 2                                           | 2                                | 100                                                          | 0                                                                        | v                                                                              | ŏ                                                                         | ō                                                                               |
| Nickel                                 | 417.00                                   |                                                                 | 903.00                                   | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | ŏ                                                                         | ō                                                                               |
| Potaseium                              | 417.00                                   |                                                                 | 1.30                                     | 1                                           | z                                | 50                                                           | 0                                                                        | 0                                                                              | Ň                                                                         | ā                                                                               |
| Selenium                               | 1.00                                     |                                                                 | 0.41                                     | 1                                           | 2                                | 50                                                           | 0                                                                        | Q                                                                              |                                                                           | õ                                                                               |
| Silver                                 | 0.41                                     |                                                                 | 23.40                                    | 2                                           | 2                                | 100                                                          | ۰.                                                                       | 0                                                                              | ž                                                                         | õ                                                                               |
| Vanadium                               | 13.70                                    |                                                                 | 261.00                                   | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | U                                                                         | v                                                                               |
| Zinc                                   | 122.00                                   |                                                                 | 201.00                                   | -                                           | -                                |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |

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Teble 5-7. Summery of Detected Concentrations of Ali Constituents in Soil Semples Collected During the Phase iA Remedial Investigation, Beyonns Plant, Bayonne, New Jersey.

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Constituent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Minimum<br>Quantifiable<br>Concentration | Geometric'<br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Semples<br>Analyzed | Parcent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Number of Samples<br>Exceeding NJOEP<br>Impact to Groundwater<br>Soll Criteria | Percent of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criterie | Percent of Samplee<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |                                                     |                                          | No                                          | . 2 Tenk F                       | ield                                                         |                                                                          |                                                                                |                                                                           |                                                                                 |
| Volatile Organic Compounds (ug/kg)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |                                                     |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           | _                                                                               |
| 2-Butenone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 39.00                                    |                                                     | 39.00                                    | 1                                           | 6                                | 20                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Senzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 290.00                                   |                                                     | 290,00                                   | 1                                           | 6                                | 20                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Ethylbenzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | \$700.00                                 |                                                     | 9700.00                                  | 1 .                                         | 5                                | 20                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ŏ                                                                               |
| Hetterie                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.00                                     |                                                     | 7100.00                                  | 4                                           | 6                                | 80                                                           | 0                                                                        | 0                                                                              | Ň                                                                         | 8                                                                               |
| Toluene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 6000.00                                  |                                                     | 6000.00                                  | 1                                           | 5                                | 20                                                           | ő                                                                        | 1                                                                              | õ                                                                         | 20                                                                              |
| Xylenes (Total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3,00                                     |                                                     | 30000.00                                 | 3                                           | Ē                                | 40                                                           | ő                                                                        | 0                                                                              | ŏ                                                                         | 0                                                                               |
| n-Propylbenzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 260.00                                   |                                                     | 6300.00                                  | 4                                           | v                                |                                                              | ·                                                                        | -                                                                              |                                                                           |                                                                                 |
| Semivoistile Organic Compounds (ug/kg)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                          |                                                     |                                          |                                             | _                                |                                                              | _                                                                        |                                                                                | •                                                                         | 0                                                                               |
| 2-Methylnaphthalane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 510.00                                   |                                                     | 110000.00                                | 4                                           | 5                                | 80                                                           | Ŷ                                                                        | 0                                                                              | ŏ                                                                         | ŏ                                                                               |
| Senzo(e)anthracene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 100.00                                   |                                                     | 1800.00                                  | 2                                           | è                                | *0                                                           | Ň                                                                        | ŏ                                                                              | ő                                                                         | ò                                                                               |
| Senzo(z)pyrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 45.00                                    |                                                     | 46.00                                    | 1                                           | 6                                | 20                                                           | ŏ                                                                        | ō                                                                              | ō · ·                                                                     | 0                                                                               |
| Bengo(b)fluoranthene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 170.00                                   |                                                     | 170.00                                   | 1                                           | 5                                | 20                                                           | ŏ                                                                        | ò                                                                              | Ô                                                                         | 0                                                                               |
| Benze (k) fluoranthene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 180.00                                   |                                                     | 2200.00                                  | 3                                           | š                                | 60                                                           | ò                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Civysens                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 290.00                                   |                                                     | 51.00                                    | 1                                           | 6                                | 20                                                           | ò                                                                        | 0                                                                              | Ó                                                                         | 0                                                                               |
| Diberzo(a,h)enthracene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 7100.00                                  |                                                     | 3100.00                                  | 1                                           | 5                                | 20                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Diberzeturan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 82.00                                    |                                                     | 82.00                                    | 1                                           | 5                                | 20                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Pluorenunene<br>Kiusaan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1900.00                                  |                                                     | 8700.00                                  | 2                                           | 5                                | 40                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Nambahanan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2200.00                                  |                                                     | 39000.00                                 | 3                                           | 6                                | 60                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Phonenthrane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 100.00                                   |                                                     | 18000.00                                 | 5                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              | ő                                                                         | č                                                                               |
| Pyrana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 67.00                                    |                                                     | 14000.00                                 | 6                                           | 6                                | 100                                                          | 0                                                                        | 0                                                                              | Ň                                                                         | ŏ                                                                               |
| ble12-Ethylhexylphthalate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 220.00                                   |                                                     | 2400.00                                  | 3                                           | 6                                | 80                                                           | 0                                                                        | U                                                                              | ·                                                                         | -                                                                               |
| Pesticides/PCBs (ug/kg)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                          |                                                     |                                          |                                             |                                  |                                                              |                                                                          | _                                                                              |                                                                           |                                                                                 |
| 4 (1005                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 7.70                                     |                                                     | 48.00                                    | 2                                           | 5                                | 40                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ò                                                                               |
| 4,4 -000<br>4 4-00T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 54.00                                    |                                                     | 54.00                                    | 1                                           | 5                                | 20                                                           | 0                                                                        | 0                                                                              | Ň                                                                         | ň                                                                               |
| Aldrin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2.50                                     |                                                     | 2,60                                     | 1                                           | 6                                | 20                                                           | 0                                                                        | ő                                                                              | ŏ                                                                         | 0                                                                               |
| Endosulfan eulfate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 24.00                                    |                                                     | 24.00                                    | 1                                           | 6                                | 20                                                           | 0                                                                        | Ď                                                                              | ō                                                                         | 0                                                                               |
| Methoxychlor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 120.00                                   |                                                     | 120.00                                   | !                                           | 6                                | 20                                                           | ő                                                                        | õ                                                                              | ō                                                                         | 0                                                                               |
| elpha-Chlordene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3.00                                     |                                                     | 3.00                                     | 1                                           | 6                                | 20                                                           | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| beta-BHC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 6,10                                     |                                                     | 0.10                                     | •                                           | •                                |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Inergenice (mg/kg)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |                                                     |                                          |                                             | _                                |                                                              |                                                                          | •                                                                              | o                                                                         | 0                                                                               |
| Atuminum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2520.00                                  |                                                     | 14600.00                                 | 6                                           | 6                                | 100                                                          | 0                                                                        | ŏ                                                                              | ō                                                                         | 0                                                                               |
| Antimony                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 6.10                                     |                                                     | 19.20                                    | 4                                           | 5                                | 100                                                          | ŏ                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Arsenic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 5.50                                     |                                                     | 9,80                                     | 2                                           | 5                                | 100                                                          | ò                                                                        | ō                                                                              | 0                                                                         | C                                                                               |
| Barlum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 19.00                                    |                                                     | 11.10                                    | 2                                           | 5                                | 100                                                          | ò                                                                        | ò                                                                              | 0                                                                         | 0                                                                               |
| Beryllium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.26                                     |                                                     | 0.74                                     |                                             | 5                                | 20                                                           | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Cedmium .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.80                                     |                                                     | 44800.00                                 | 5                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Calcium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1860.00                                  |                                                     | 5150.00                                  | 12                                          | 12                               | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | U<br>O                                                                          |
| Chromium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 27,0V<br>8 90                            |                                                     | 74.60                                    | 5                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              | o<br>,                                                                    | ů                                                                               |
| Cobait                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 36.10                                    |                                                     | 119.00                                   | 6                                           | 6                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | ŏ                                                                               |
| Copper                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.74                                     |                                                     | 0.74                                     | 1                                           | 5                                | . 20                                                         | 0                                                                        | 0                                                                              | 30                                                                        | 30                                                                              |
| Lyerson<br>Neversiest shronium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 8.46                                     |                                                     | 265.00                                   | 4                                           | 10                               | 40                                                           | 3                                                                        | 3                                                                              | 0                                                                         | 0                                                                               |
| free and the second s | 12000.00                                 | ,                                                   | 63200.00                                 | 5                                           | 6                                | 100                                                          |                                                                          | о<br>О                                                                         | 20                                                                        | 0                                                                               |
| Lead                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 40.70                                    |                                                     | 951.00                                   | 6                                           | в                                | 100                                                          | •                                                                        |                                                                                |                                                                           |                                                                                 |

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Table 5-7. Summery of Detected Concentrations of All Constituents in Seil Samples Collected During the Phase 1A Remedial Investigation, Beyonne Plant, Bayonne, New Jersey.

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| Constituent                            | Minimum<br>Quantifiable<br>Concentration | Geometric <sup>1</sup><br>Mean<br>Quantifiable<br>Concentration | Meximum<br>Quantifiable<br>Concentration | Number of<br>Quentifiable<br>Concentrations | Number of<br>Semples<br>Analyzed | Percent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soll Criteria | Number of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Sell Criteria | Percent of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Percent of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soll Criteria |
|----------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                        |                                          |                                                                 |                                          | No. 2 Ta                                    | ink Field (c                     | ontinued)                                                    |                                                                          |                                                                                |                                                                           |                                                                                 |
| Inorganica (mg/kg) (continued)         |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                | _                                                                         | -                                                                               |
| Meanetium                              | 2080.00                                  |                                                                 | 22500.00                                 | 5                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Mendaneee                              | 77.20                                    |                                                                 | 402,00                                   | 6                                           | 6                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | č                                                                               |
| Mercury                                | 0.14                                     |                                                                 | 15.40                                    | 4                                           | 5                                | 80                                                           | 0                                                                        | 0                                                                              | Š                                                                         | 0                                                                               |
| Nickal                                 | 28,50                                    |                                                                 | 301.00                                   | 5                                           | 6                                | 100                                                          | 0                                                                        | 0                                                                              | ě                                                                         | õ                                                                               |
| Potassium                              | 343,00                                   |                                                                 | 906.00                                   | 5                                           | 6                                | 100                                                          | 0                                                                        | . 0                                                                            | 0                                                                         | ŏ                                                                               |
| Selenium                               | 1.30                                     |                                                                 | 1,30                                     | 1                                           | 5                                | 20                                                           | 0                                                                        | Ň                                                                              | ŏ                                                                         |                                                                                 |
| Silver                                 | 0.25                                     |                                                                 | 0.79                                     | . 2                                         | 6                                | 40                                                           | 0                                                                        | ŏ                                                                              | 20                                                                        | ō                                                                               |
| Theilium                               | 1.20                                     |                                                                 | 3,70                                     | 2                                           | 5                                | 40                                                           |                                                                          | ő                                                                              | 0                                                                         | 0                                                                               |
| Vanedium                               | 47.30                                    |                                                                 | 373.00                                   | 6                                           | 5                                | 100                                                          | ň                                                                        | õ                                                                              | ō                                                                         | o                                                                               |
| Zinc                                   | 54,70                                    |                                                                 | 308.00                                   | 6                                           | 0                                | 100                                                          | J                                                                        | -                                                                              | -                                                                         |                                                                                 |
|                                        |                                          |                                                                 |                                          | A*p                                         | heit Plant /                     | Area                                                         |                                                                          |                                                                                |                                                                           |                                                                                 |
| Volatile Organic Compounds (ug/kg)     |                                          |                                                                 |                                          |                                             |                                  |                                                              | -                                                                        |                                                                                | 0                                                                         | o                                                                               |
| 1.1.1-Trichloroethere                  | 2800.00                                  |                                                                 | 2800.00                                  | 1                                           | 7                                | 14                                                           | 0                                                                        | 0                                                                              | Ď                                                                         | ō                                                                               |
| 2-Butenene                             | 14,00                                    |                                                                 | 14.00                                    | 2                                           | 7                                | 29                                                           | 0                                                                        | ŏ                                                                              | ő                                                                         | ō                                                                               |
| Benzena                                | 2.00                                     |                                                                 | 2.00                                     | 1                                           | 1                                | 14                                                           | 0                                                                        | ,                                                                              | ò                                                                         | 14                                                                              |
| Chierobenzane                          | 2,00                                     |                                                                 | 6900.00                                  | 3                                           | 1                                | . 43                                                         | ő                                                                        | ė                                                                              | ò                                                                         | 0                                                                               |
| Ethylbenzene                           | 6.00                                     |                                                                 | 9.00                                     | 2                                           | 2                                | 20                                                           | ŏ                                                                        | ě                                                                              | ò                                                                         | 0                                                                               |
| Hexane                                 | 1.00                                     |                                                                 | 350.00                                   | 3                                           | <u>'</u>                         | 43                                                           | Ň                                                                        | ò                                                                              | ò                                                                         | 0                                                                               |
| Totuene                                | 9.00                                     |                                                                 | 300,00                                   | 2.                                          | 4                                | 45                                                           | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Xylenes (Total)                        | 7.00                                     |                                                                 | 14,00                                    | 2                                           | 4                                | 57                                                           | ò                                                                        | ò                                                                              | 0                                                                         | 0                                                                               |
| n-Propylaenzene                        | 8.00                                     |                                                                 | 40000.00                                 | •                                           | '                                | 47                                                           | ,                                                                        | -                                                                              |                                                                           |                                                                                 |
| Semivolatile Organic Compounds (ug/kg) |                                          |                                                                 |                                          |                                             |                                  |                                                              | -                                                                        | · •                                                                            | 0                                                                         | o                                                                               |
| 1.4-Dichlerobenzene                    | 4000.00                                  |                                                                 | 17000.00                                 | 2                                           | 8                                | 26                                                           | ~                                                                        | ŏ                                                                              | ō                                                                         | o                                                                               |
| 2-Methvinaphthelene                    | 2300.00                                  |                                                                 | 34000.00                                 | 5                                           |                                  | 53                                                           | 0                                                                        | ŏ                                                                              | ō                                                                         | ō                                                                               |
| Acenaphthene                           | 3100.00                                  |                                                                 | 4200.00                                  | Z                                           |                                  | 20<br>95                                                     | ň                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Anthreame                              | 990.00                                   |                                                                 | 3100.00                                  | 2                                           |                                  | 20                                                           | ĩ                                                                        | ō                                                                              | 13                                                                        | 0                                                                               |
| Benzo(s)anthrecene                     | 140.00                                   |                                                                 | 8300.00                                  |                                             | ¢<br>a                           | 50                                                           | à                                                                        | 0                                                                              | 50                                                                        | 0                                                                               |
| Benzo(a)pyrane                         | 970.00                                   |                                                                 | 8000.00                                  | 2                                           | а<br>А                           | 50                                                           | õ                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Benze(b)fluorenthene                   | 00.00                                    |                                                                 | 3100.00                                  | 3                                           | Å                                | 38                                                           | ō                                                                        | 0                                                                              | · 0                                                                       | 0                                                                               |
| Banzo (g.h.ilperylane                  | 970.00                                   |                                                                 | 2100.00                                  | Å                                           | 8                                | 60                                                           | Ó                                                                        | 0                                                                              | ¢                                                                         | 0                                                                               |
| Benzo(k)fivorenthene                   | 600.00                                   |                                                                 | 12000.00                                 | Å                                           | 8                                | 75                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Chrysens                               | 190.00                                   |                                                                 | 1100.00                                  | 2                                           | ē                                | 25                                                           | 1                                                                        | 0                                                                              | 13                                                                        | 0                                                                               |
| Dibenzole, hierthracene                | 4200.00                                  |                                                                 | 4300.00                                  | 1                                           | 8                                | 13                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Dibenzofuran                           | 140.00                                   |                                                                 | 6800.00                                  | 4                                           | 8                                | 60                                                           | 0                                                                        | 0                                                                              | 0                                                                         |                                                                                 |
| Fluorenthene                           | 7800.00                                  |                                                                 | 2900.00                                  | 1                                           | 9                                | 13                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Fluorene                               | 470.00                                   |                                                                 | 1800.00                                  | 3                                           | 8                                | 38                                                           | 0                                                                        | 0                                                                              | °,                                                                        | 0                                                                               |
| Indeno(1,2,3-cd)pyrene                 | 10000.00                                 |                                                                 | 10000.00                                 | 1                                           | 8                                | 13                                                           | 0                                                                        | 0                                                                              | v                                                                         | č                                                                               |
| Naphthiaiste                           | 1400.00                                  |                                                                 | 1400.00                                  | 1                                           | 8                                | 13                                                           | 0                                                                        | 0                                                                              | . 0                                                                       | ů n                                                                             |
| Pentachiorophene:                      | 87.00                                    |                                                                 | 28000.00                                 | 9                                           | 8                                | 76                                                           | 0                                                                        | 0                                                                              | 0                                                                         | Č.                                                                              |
| Phenemonene                            | 600.00                                   |                                                                 | 12000.00                                 | 7                                           | 9                                | 88                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ñ                                                                               |
| ryrana<br>bie(2-Ethylhexyl)phtheleta   | 590.00                                   |                                                                 | 1900.00                                  | 3                                           | 8                                | 38                                                           | 0                                                                        | 0                                                                              |                                                                           |                                                                                 |

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Table 5-7. Summary of Detected Concentrations of All Constituents in Soli Semples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jereey.

| Cenetiquent                        | Minimum<br>Quantifable<br>Concentration | Geometric <sup>1</sup><br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | Percent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Samplas<br>Exceeding NJDEP<br>Non-Residential<br>Soli Criteria | Number of Semples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soli Criteria | Percent of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Solt Criteria | Percent of Semples<br>Exceeding NJDEP<br>Impact to Groundwate<br>Soll Criterie |
|------------------------------------|-----------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------|
|                                    |                                         |                                                                 |                                          | Asphalt P                                   | lant Area (                      | continued)                                                   |                                                                          |                                                                                |                                                                           |                                                                                |
| Pesticides/PCBe (ug/kg)            |                                         |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                |
| A 4:000                            | 130.00                                  |                                                                 | 130.00                                   | 1                                           | 7                                | 14                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| 4-005                              | 16.00                                   |                                                                 | 34.00                                    | 2                                           | ,                                | 29                                                           | •                                                                        | 0                                                                              | ٥                                                                         | 0                                                                              |
| 4'-DDT                             | 58.00                                   |                                                                 | 120.00                                   | 3.                                          | 7                                | 43                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| vector 1254                        | 45.00                                   |                                                                 | 45.00                                    | 1                                           | 7                                | 14                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| rector-1280                        | 77.00                                   |                                                                 | 77.00                                    | 1                                           | 7                                | 14                                                           | ٥                                                                        | 0                                                                              | 0                                                                         | v i                                                                            |
| volden                             | 5.90                                    |                                                                 | 17.00                                    | 3                                           | 7                                | 43                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| ndon ifn: i                        | 20.00                                   |                                                                 | 20.00                                    | 1                                           | 7                                | 14                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| navio aldebrde                     | 88.00                                   |                                                                 | 65.00                                    | 5                                           | 7                                | 14                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Larin batana                       | 3.70                                    |                                                                 | 36.00                                    | 3                                           | 7                                | 43                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
|                                    | 55.00                                   |                                                                 | 270.00                                   | 2                                           | 7                                | 29                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| neuropy gener                      | 7.00                                    |                                                                 | 39,00                                    | 3                                           | 7                                | 43                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| apra-unioridene                    | 7.40                                    |                                                                 | 7.40                                     | 1                                           | 7                                | 14                                                           | 0                                                                        | 0                                                                              | 0                                                                         | C                                                                              |
| amma-Chiordana                     | 1144                                    |                                                                 |                                          |                                             |                                  |                                                              | а.<br>С                                                                  |                                                                                |                                                                           |                                                                                |
| norgenics (mg/kg)                  |                                         |                                                                 |                                          |                                             | _                                |                                                              | · ·                                                                      | •                                                                              | 0                                                                         | ٥                                                                              |
| ilum inum                          | 1320.00                                 |                                                                 | 9640.00                                  | 7                                           | 7                                | 100                                                          |                                                                          | 0                                                                              | ő                                                                         | ò                                                                              |
| otimory                            | 0.64                                    |                                                                 | 4.10                                     | ,                                           | 7                                | 100                                                          | . 0                                                                      | 0                                                                              | 43                                                                        | ŏ                                                                              |
| reanis                             | 7.70                                    |                                                                 | 120.00                                   | 7                                           | 7                                | 100                                                          | 1                                                                        | ě                                                                              | õ                                                                         | ò                                                                              |
|                                    | 32.20                                   |                                                                 | 103.00                                   | 7                                           | 7                                | 100                                                          | , v                                                                      | Ň                                                                              | ò                                                                         | ò                                                                              |
| lervillian                         | 0.14                                    |                                                                 | 0.36                                     | 6                                           | 7                                | 1                                                            |                                                                          | č                                                                              | ò                                                                         | 0                                                                              |
| ladmium                            | 0.15                                    |                                                                 | 0.16                                     | 1                                           | 2                                | 14                                                           | 0                                                                        | č                                                                              | ŏ                                                                         | 0                                                                              |
| - Initati                          | 883.00                                  |                                                                 | 141000.00                                | 7                                           | 7                                | 100                                                          | , v                                                                      | ž                                                                              | à                                                                         | o                                                                              |
| The only m                         | 3.80                                    |                                                                 | 685,00                                   | 13                                          | 13                               | 100                                                          |                                                                          | ŏ                                                                              | ò                                                                         | 0                                                                              |
| Cohelt                             | 4.10                                    |                                                                 | 24.10                                    | 7                                           | 2                                | 100                                                          | <b>.</b> .                                                               | Ň                                                                              | õ                                                                         | 0                                                                              |
| Conner                             | 65.10                                   |                                                                 | 481.00                                   | 1                                           | 7                                | 100                                                          | 0                                                                        | ň                                                                              | ò                                                                         | 0                                                                              |
| levevalent chromium                | 5.60                                    |                                                                 | 9.66                                     | 4                                           | 12                               | 33                                                           | Ň                                                                        | ň                                                                              | ò                                                                         | 0                                                                              |
|                                    | 5460,00                                 |                                                                 | 38000.00                                 | 7                                           | 1                                | 100                                                          |                                                                          | ò                                                                              | 14                                                                        | 0                                                                              |
| and                                | 116.00                                  |                                                                 | 770.00                                   | 7                                           | <u>'</u>                         | 100                                                          |                                                                          |                                                                                | 0                                                                         | 0                                                                              |
| damesium                           | 318.00                                  |                                                                 | 6150.00                                  | 7                                           | 1                                | 100                                                          | ő                                                                        | ő                                                                              | Ó                                                                         | 0                                                                              |
| Angenese                           | 83.20                                   |                                                                 | 266.00                                   | 7 '                                         | 7                                | 100                                                          |                                                                          | 0                                                                              | ō                                                                         | 0                                                                              |
| Arreury                            | 0.29                                    |                                                                 | 1.70                                     | 7                                           | 1                                | 100                                                          | ŏ                                                                        |                                                                                | 0                                                                         | 0                                                                              |
| lickal                             | 34,90                                   |                                                                 | 92,80                                    | 7                                           | 7                                | 100                                                          | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                              |
| Petensium                          | 263.00                                  |                                                                 | 1000.00                                  | 6                                           | 7                                | 00<br>4 2                                                    | ň                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Selectium                          | 1.60                                    |                                                                 | z.00                                     | 3                                           | 7                                | 43                                                           | ő                                                                        | ò                                                                              | ò                                                                         | 0                                                                              |
| Rilver                             | 0.12                                    |                                                                 | 0.19                                     | 4                                           | 7                                | 57                                                           | ň                                                                        | ŏ                                                                              | ò                                                                         | 0                                                                              |
| Sadium                             | 780.00                                  |                                                                 | 1210.00                                  | 2                                           | ,                                | 20                                                           | Ň                                                                        | ŏ                                                                              | ò                                                                         | 0                                                                              |
| Venedium                           | 18.60                                   |                                                                 | 112.00                                   | 7                                           | 7                                | 100                                                          | ě                                                                        | ŏ                                                                              | ò                                                                         | 0                                                                              |
| Tine                               | 48.20                                   |                                                                 | 562.00                                   | 7                                           | 7                                | 100                                                          | v                                                                        | ×                                                                              | -                                                                         |                                                                                |
|                                    |                                         |                                                                 |                                          | A\.                                         | Gas Tank                         | Field                                                        |                                                                          |                                                                                |                                                                           |                                                                                |
|                                    |                                         |                                                                 |                                          | A1                                          |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                |
| Veletile Organia Compounda (ug/kg) |                                         |                                                                 |                                          |                                             | · _                              |                                                              | •                                                                        | ٥                                                                              | 0                                                                         | 0                                                                              |
| 1-Butanel                          | 280000.00                               |                                                                 | 280000.00                                | 1                                           | 6                                | 17                                                           |                                                                          | ŏ                                                                              | ō                                                                         | 0                                                                              |
| Benzene                            | 4.00                                    |                                                                 | 12.00                                    | 2                                           | 6                                | 33                                                           |                                                                          | ň                                                                              | ō                                                                         | 0                                                                              |
| Sthuikanzene                       | 1.00                                    |                                                                 | 190.00                                   | 2                                           |                                  | 33                                                           | ~                                                                        | Ň                                                                              | ō                                                                         | 0                                                                              |
|                                    | 2.00                                    |                                                                 | 28,00                                    | 3                                           | 6                                | 50                                                           | <u>,</u>                                                                 | Š                                                                              | ō                                                                         | 0                                                                              |
|                                    | 2,00                                    |                                                                 | 8.00                                     | 2                                           | 6                                | 33                                                           | 0                                                                        | Ň                                                                              | õ                                                                         | 0                                                                              |
| I Gruen P<br>Vulamas (Tatal)       | 2.00                                    |                                                                 | 78.00                                    | 2                                           | 6                                | 33                                                           | 0                                                                        | ~                                                                              | ŏ                                                                         | ò                                                                              |
| VAIALIAN (LACU)                    | 700.00                                  |                                                                 | 13000.00                                 | 2                                           | 6                                | 33                                                           | o                                                                        | v                                                                              |                                                                           | -                                                                              |

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Table 5-7, Summary of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jensey.

| Constituent                            | Minimum<br>Quentifisble<br>Concentration | Geometric <sup>1</sup><br>Meen<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Semples<br>Analyzed | Percent of<br>Samples with<br>Quantifiable<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Number of Semples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soll Criteria | Percent of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Solf Criteria | Percent of Samples<br>Exceeding NJDEP<br>Impect & Groundwster<br>Soli Criteria |
|----------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------|
|                                        |                                          |                                                                 |                                          | AV-Gas T                                    | ank Field (                      | continued)                                                   |                                                                          |                                                                                |                                                                           |                                                                                |
| Semivoletile Organic Compounds (ug/kg) |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                |
| 2-Chioronaphthalene                    | 1900.00                                  |                                                                 | 1900.00                                  | 1                                           | 8                                | 17                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| 2-Methylnaphthalans                    | 120.00                                   |                                                                 | 45000.00                                 | 4                                           |                                  | 67                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ŏ                                                                              |
| Acenaphthene                           | 88.00                                    |                                                                 | 88,00                                    | 1 .                                         |                                  | - 17                                                         |                                                                          | ŏ                                                                              | ő                                                                         | ō                                                                              |
| Anthracene                             | 320.00                                   |                                                                 | 2100.00                                  |                                             |                                  | 83                                                           | 1                                                                        | ò                                                                              | 17                                                                        | 0                                                                              |
| Benzo(a)anthracene                     | 100.00                                   |                                                                 | 12000.00                                 | 5                                           | ě                                | 83                                                           | 5                                                                        | ò                                                                              | 83                                                                        | 0                                                                              |
| Serge(a)pyrene                         | 1100.00                                  |                                                                 | 8400.00                                  | 4                                           |                                  | 67                                                           | 1                                                                        | 0                                                                              | 17                                                                        | • 0                                                                            |
| Bengolomuorenuore<br>Bengolomuorenuore | 960.00                                   |                                                                 | 5900.00                                  | 4                                           | 6                                | 67                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Benzoitifkofenthene                    | 1100.00                                  |                                                                 | \$700.00                                 | 4                                           | 8                                | 67                                                           | 1                                                                        | 0                                                                              | 17                                                                        | 0                                                                              |
| Chrysten                               | 840.00                                   |                                                                 | 1 2000.00                                | 8                                           | 6                                | 100                                                          | C                                                                        | Q                                                                              | 0                                                                         | 0                                                                              |
| Di-n-buryi phthelate                   | 87.00                                    |                                                                 | 87.00                                    | 1                                           | 6                                | 17                                                           | 0                                                                        | 0                                                                              |                                                                           | 0                                                                              |
| Dibenzela, h) antivecene               | 760.00                                   |                                                                 | 5400.00                                  | 2                                           | 6                                | 33                                                           | 2                                                                        | 0                                                                              | 33                                                                        | ě                                                                              |
| Dibergefuran                           | 1600.00                                  |                                                                 | 1600.00                                  | 1                                           |                                  | 17                                                           | 0                                                                        | Š                                                                              | ő                                                                         | ò                                                                              |
| Fluorenthene                           | 1200.00                                  |                                                                 | 5000.00                                  |                                             |                                  | 6/<br>47                                                     |                                                                          | ŏ                                                                              | õ                                                                         | ō                                                                              |
| Fluorene                               | 130.00                                   |                                                                 | 6000.00                                  | 4                                           |                                  | 87                                                           | 1                                                                        | ŏ                                                                              | 17                                                                        | 0                                                                              |
| Indeno(1,2,3-cd)pyrone                 | E00.00                                   |                                                                 | 4600.00                                  |                                             | Å                                | 83                                                           | ċ                                                                        | ò                                                                              | 0                                                                         | 0                                                                              |
| Phonenthrane                           | 1200,00                                  |                                                                 | 11000.00                                 | 6                                           |                                  | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Pyrene                                 | 690.00                                   |                                                                 | 11000,00                                 | •                                           | •                                |                                                              |                                                                          |                                                                                |                                                                           |                                                                                |
| Pesticides/PCBs (up/kg)                |                                          |                                                                 |                                          |                                             | _                                | ••                                                           |                                                                          | 0                                                                              | 0                                                                         | 0                                                                              |
| 4,4'-DDE                               | 14.00                                    |                                                                 | 14.00                                    | 1                                           | 6                                | 20                                                           | 0                                                                        | ŏ                                                                              | ò                                                                         | ò                                                                              |
| 4,4'-DDT                               | 6.90                                     |                                                                 | 6.90                                     | 1                                           | 6                                | 20                                                           | ŏ                                                                        | õ                                                                              | ō                                                                         | 0                                                                              |
| Aldrin                                 | 17.00                                    |                                                                 | 17.00                                    | -                                           | ŝ                                | 20                                                           | ō                                                                        | ō                                                                              | 0                                                                         | 0                                                                              |
| Endoeulfan I                           | 3.40                                     |                                                                 | 21.00                                    | <b>i</b> '                                  | 5                                | 20                                                           | Ó                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Endrin aldehyde                        | 21.00                                    |                                                                 | 3.90                                     | i                                           | 5                                | 20                                                           | 0                                                                        | <b>0</b> .                                                                     | 0                                                                         | 0                                                                              |
| Endrin ketone                          | 170.00                                   |                                                                 | 170.00                                   | 1                                           | 5                                | 20                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Nigthoxycraw<br>ciaka Chiomione        | 5.00                                     |                                                                 | 5.00                                     | 1                                           | 5                                | 20                                                           | . 0                                                                      | 0                                                                              | 0                                                                         | č                                                                              |
| namma-Chiordana                        | 2.00                                     |                                                                 | 2.00                                     | ٦                                           | 6                                | 20                                                           | 0                                                                        | U                                                                              | v                                                                         | •                                                                              |
|                                        |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                |
| inerganice (mg/kg)                     |                                          |                                                                 | 7500.00                                  | 5                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Aluminum                               | 1810.00                                  |                                                                 | 59.70                                    | 3                                           | 5                                | 60                                                           | Ó                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Antimony                               | 5.00                                     |                                                                 | 237.00                                   | 5                                           | 6                                | 100                                                          | 3                                                                        | 0                                                                              | 60                                                                        | 0                                                                              |
| Areenic                                | 34.10                                    |                                                                 | 75.50                                    | 6                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Bandikan                               | 0.30                                     |                                                                 | 2.00                                     | 4                                           | 6                                | 80                                                           | 2                                                                        | 0                                                                              | ••                                                                        | ă                                                                              |
| Certrition                             | 0.35                                     |                                                                 | 0.48                                     | 2                                           | 6                                | 40                                                           | 0                                                                        | ů.                                                                             | ŏ                                                                         | 0                                                                              |
| Calcium                                | 478.00                                   |                                                                 | 19100.00                                 | 6                                           | 6                                | 100                                                          | . 0                                                                      | č                                                                              | ò                                                                         | ō                                                                              |
| Chremium                               | 18.20                                    |                                                                 | 1870.00                                  | ?                                           | 2                                | 100                                                          | Å.                                                                       | ò                                                                              | ò                                                                         | 0                                                                              |
| Cobalt                                 | 4,60                                     |                                                                 | 28,80                                    | 5                                           | 5                                | 100                                                          | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                              |
| Copper                                 | 94.00                                    |                                                                 | 354.00                                   | 5                                           |                                  | 33                                                           | 1                                                                        | 1                                                                              | 17                                                                        | 17                                                                             |
| Hexavalent chromium                    | 7.04                                     |                                                                 | 79.91                                    | ∠<br>5                                      | 5                                | 100                                                          | 0                                                                        | ¢                                                                              | 0                                                                         | 0                                                                              |
| Iron                                   | 12600.00                                 |                                                                 | 46600.00                                 | 6                                           | š                                | 100                                                          | 2                                                                        | C                                                                              | 40                                                                        | 0                                                                              |
| Lead                                   | 170,00                                   |                                                                 | 7150.00                                  | 6                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Magneefum                              | 268.00                                   |                                                                 | 309.00                                   | 5                                           | 5                                | 100                                                          | Q                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Manganase                              | 0.17                                     |                                                                 | 0.89                                     | 6                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                              |
| Mercury                                | 16.60                                    |                                                                 | 140.00                                   | 6                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              | č                                                                         | ŏ                                                                              |
| Potessium                              | 477,00                                   |                                                                 | 893.00                                   | 5                                           | 6                                | 100                                                          | 0                                                                        | v                                                                              |                                                                           |                                                                                |

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Table 5-7. Summary of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersay.

| Constituent                            | Minimum<br>Quantifishie<br>Concentration | Geometric <sup>1</sup><br>Mean<br>Quantifieble<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quentifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | Percent of<br>Semples with<br>Quentifiable<br>Concentrations | Number of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soll Criteria | Number of Samplee<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soll Criterie | Percent of Sompleo<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Percent of Semplee<br>Exceeding NJOEP<br>Impact to Groundwater<br>Soll Criteria |
|----------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                        |                                          |                                                                 |                                          | AV-Gas 1                                    | 'ank Field (                     | continued)                                                   |                                                                          |                                                                                |                                                                           |                                                                                 |
| Inergenice (mg/kg)                     |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Selenium                               | 1.00                                     |                                                                 | 4.30                                     | 4                                           | 6                                | 80                                                           | 0                                                                        | 0                                                                              | 0                                                                         | D                                                                               |
| Silver                                 | 0.28                                     |                                                                 | 0.53                                     | 2                                           | 6                                | 40                                                           | 0                                                                        | 0                                                                              | Ö                                                                         | 0                                                                               |
| Thellum                                | 3.40                                     |                                                                 | 3.40                                     | ÷.                                          | 6                                | 20                                                           | 1                                                                        | o                                                                              | 20                                                                        | 0                                                                               |
| Vanadium                               | 10.50                                    |                                                                 | 171.00                                   | 6                                           | 6                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Zine                                   | 146.00                                   |                                                                 | 933.00                                   | 6                                           | 6                                | 100                                                          | ¢                                                                        | 0                                                                              | ¢                                                                         | 0                                                                               |
|                                        |                                          |                                                                 |                                          | Evva                                        | Chamical                         | Plant                                                        |                                                                          |                                                                                |                                                                           |                                                                                 |
|                                        |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Volatile Organic Compounds (up/kg)     |                                          |                                                                 |                                          |                                             | _                                |                                                              | _                                                                        | •                                                                              | •                                                                         | n                                                                               |
| Bergene                                | 4.00                                     |                                                                 | 43.00                                    | 3                                           | 6                                | 60                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ů.                                                                              |
| Carbon disulfide                       | 2.00                                     |                                                                 | 2.00                                     | 1                                           |                                  | 20                                                           |                                                                          | 2                                                                              | 20                                                                        | 40                                                                              |
| Chlorobenzene                          | 5.00                                     |                                                                 | 950000.00                                |                                             |                                  | 100                                                          |                                                                          | •                                                                              | . 0                                                                       | 0                                                                               |
| Ethylbenzene                           | 4.00                                     |                                                                 | 13000.00                                 | 3                                           | 8                                | 80                                                           | ŏ                                                                        | ŏ                                                                              | ō                                                                         | 0                                                                               |
| Hexene                                 | 4.00                                     |                                                                 | 110000.00                                |                                             | Ĕ                                | 60                                                           | ō                                                                        | ò                                                                              | 0                                                                         | 0                                                                               |
| Toluene                                | 3,00                                     |                                                                 | 48000.00                                 | 3                                           | Ř                                | 60                                                           | ŏ                                                                        | ٩                                                                              | 0                                                                         | 20                                                                              |
| Xylenes (Total)                        | 6.00                                     |                                                                 | 1100.00                                  | Å                                           | 6                                | 80                                                           | ò                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| n-Propylbenzene                        | 4.00                                     |                                                                 | 1100.00                                  | •                                           | •                                |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Semivoletile Orgenic Compounds (ug/kg) |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                | •                                                                         | 20                                                                              |
| 1.2-Dichlerobenzene                    | 4700000.00                               |                                                                 | 4700000.00                               | 1                                           | 6                                | 20                                                           | 0                                                                        | 1                                                                              | ň                                                                         | 0                                                                               |
| 1.3-Dichloroberzene                    | 1200.00                                  |                                                                 | 1200.00                                  | 1                                           | 6                                | 20                                                           | 0                                                                        | 1                                                                              | ŏ                                                                         | 20                                                                              |
| 1,4-Dichierobenzene                    | 820.00                                   |                                                                 | 240000.00                                | 3                                           |                                  | 80                                                           | Č,                                                                       | ò                                                                              | ò                                                                         | 0                                                                               |
| 2-Methylnephthalene                    | 830.00                                   |                                                                 | 12000.00                                 | 3                                           | 5                                | 40                                                           | , i                                                                      | ő                                                                              | 20                                                                        | 0                                                                               |
| Benzo(s)antivecens                     | 2900,00                                  |                                                                 | 27000.00                                 | 2                                           | 5                                | 20                                                           |                                                                          | ō                                                                              | 20                                                                        | 0                                                                               |
| Bengolalpyrana                         | 33000.00                                 |                                                                 | 33000.00                                 |                                             | 5                                | 40                                                           | 1                                                                        | ò                                                                              | 20                                                                        | 0                                                                               |
| Benza(b)flueranthene                   | 1400.00                                  |                                                                 | 12000.00                                 | 4                                           | 5                                | 20                                                           | Ó                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Benzolg, h, il perviene                | 13000.00                                 |                                                                 | 28000.00                                 | 2                                           | 5                                | 40                                                           | 1                                                                        | ¢                                                                              | 20                                                                        | 0                                                                               |
| Benzoikifluoranthene                   | 1400.00                                  |                                                                 | 28000.00                                 | 2                                           | 5                                | 80                                                           | 0                                                                        | C                                                                              | 0                                                                         | 0                                                                               |
| Chrysene                               | 1300.00                                  |                                                                 | 21000.00                                 | 1                                           | 6                                | 20                                                           | 1                                                                        | o                                                                              | 20                                                                        | 0                                                                               |
| Dibenzole,hiantivecene                 | R40.00                                   |                                                                 | 840.00                                   | 1                                           | 5                                | 20                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Pluorentheme                           | 2700.00                                  |                                                                 | 2700.00                                  | 1                                           | 6                                | 20                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| hudrene 2 7.ediourere                  | 13000.00                                 |                                                                 | 13000.00                                 | 1                                           | 6                                | 20                                                           | 1                                                                        | 0                                                                              | 20                                                                        | 20                                                                              |
|                                        | 7600.00                                  |                                                                 | 240000.00                                | 2                                           | 6                                | 40                                                           | 0                                                                        | 1                                                                              | č                                                                         | 0                                                                               |
| Phenenthrane                           | 990.00                                   |                                                                 | 8000.00                                  | 4                                           | 6                                | 80                                                           | 0                                                                        | 0                                                                              | ŏ                                                                         | ō                                                                               |
| Pyrene                                 | 870.00                                   |                                                                 | 4300.00                                  | 4                                           | 5                                | 80                                                           | ŭ                                                                        | v                                                                              | •                                                                         |                                                                                 |
| Pesticidas/PC6s (ug/kg)                |                                          |                                                                 |                                          |                                             | _                                |                                                              | •                                                                        | 0                                                                              | D                                                                         | 0                                                                               |
| 4.4*-DDE                               | 5.30                                     |                                                                 | 48.00                                    | J. 3                                        | 6                                | 60                                                           | 0                                                                        |                                                                                | ŏ                                                                         | ō                                                                               |
| Aldrin                                 | 110.00                                   |                                                                 | 110.00                                   | 1                                           | 6                                | 20                                                           | Ň                                                                        | ŏ                                                                              | ō                                                                         | ٥                                                                               |
| Endosulfan I                           | 36.00                                    |                                                                 | 35,00                                    | 1                                           | 5                                | 20                                                           | ő                                                                        | ō                                                                              | ò                                                                         | 0                                                                               |
| Endrin ketone                          | 1.70                                     |                                                                 | 15.00                                    | 2                                           | 8                                | 20                                                           | ŏ                                                                        | Ō                                                                              | Ô                                                                         | 0                                                                               |
| Methoxychior                           | 91.00                                    |                                                                 | 91.00                                    | 1                                           | 5                                | 20                                                           | õ                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| elpha-Chlordene                        | 39.00                                    |                                                                 | 38.00                                    |                                             | Ě                                | 20                                                           | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| gemme-Chlordene                        | 53.00                                    |                                                                 | 00.00                                    | 1                                           | •                                | ••                                                           | -                                                                        |                                                                                |                                                                           |                                                                                 |

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Table 5-7. Summary of Detected Concentrations of All Constituents in Soil Samples Cellected During the Phase IA Remedial Investigation, Bayonns Plant, Bayonne, New Jersey.

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| Constituent                            | Minimum<br>Quantifiable<br>Concentration | Geometric <sup>1</sup><br>Meen<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | Percent of<br>Samples with<br>Quantifiable<br>Concentrations | Number of Semples<br>Exceeding NJDEP<br>Non-Residentlei<br>Soll Criteria | Number of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soll Criteria | Percent of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soli Criteria | Percent of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soli Criteria |
|----------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                        |                                          |                                                                 |                                          | Exxon Cher                                  | nicals Plan                      | t (continued)                                                |                                                                          |                                                                                | •                                                                         |                                                                                 |
| Inerganica (mg/kg)                     |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           | •                                                                               |
| Aluminum                               | 649.00                                   |                                                                 | 3870.00                                  | 6                                           | 6                                | 100                                                          | 0                                                                        | 0                                                                              | ñ                                                                         | ě                                                                               |
| Antimony                               | 1.80                                     |                                                                 | 42.50                                    | 2                                           | 6                                | 40                                                           | 0                                                                        | ŏ                                                                              | 80                                                                        | 0                                                                               |
| Argenic                                | 11.00                                    |                                                                 | 207.00                                   | 5 ·                                         | e e                              | 100                                                          | ÷                                                                        | ō                                                                              | 0                                                                         | . 0                                                                             |
| Berium                                 | 6.00                                     |                                                                 | 99,80                                    | 5                                           | č                                | 80                                                           | ő                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Beryllum                               | 0.07                                     |                                                                 | 0.23                                     | 3                                           | š                                | 20                                                           | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Cedmium                                | 0.36                                     |                                                                 | 20300.00                                 | 5                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | . 0                                                                             |
| Celcium                                | 307.00                                   |                                                                 | 130.00                                   | 8                                           | 8                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Chromium                               | 3.80                                     |                                                                 | 8.80                                     | 6                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              |                                                                           | 0                                                                               |
| Çebat                                  | 110.00                                   |                                                                 | 1490.00                                  | 5                                           | 5                                | 100                                                          | 1                                                                        | 0                                                                              | 20                                                                        | 0                                                                               |
| Copper                                 | 0.66                                     |                                                                 | 0.66                                     | 1                                           | 5                                | 20                                                           | 0                                                                        | 0                                                                              | ŭ                                                                         | 14                                                                              |
| Levendert chromism                     | 11.94                                    |                                                                 | 11.84                                    | 1                                           | 7                                | 14                                                           | 1                                                                        | 1                                                                              |                                                                           | ø                                                                               |
| Iron                                   | 9680.00                                  |                                                                 | 24600.00                                 | 6                                           | 6                                | 100                                                          | o o                                                                      | ŏ                                                                              | õ                                                                         | °.                                                                              |
| teed                                   | 25.60                                    |                                                                 | 380.00                                   | 6                                           | 6                                | 100                                                          | Š                                                                        | ŏ                                                                              | ò                                                                         | 0                                                                               |
| Magnesium                              | 53.90                                    |                                                                 | 3060.00                                  | 6                                           |                                  | 100                                                          | Ň                                                                        | ő                                                                              | ò                                                                         | 0                                                                               |
| Manganese                              | 18.20                                    |                                                                 | 107.00                                   | 6                                           |                                  | 80                                                           | ě                                                                        | ò                                                                              | 0                                                                         | 0                                                                               |
| Mercury                                | 0.24                                     |                                                                 | 2,00                                     | 4                                           | ÷                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Nickel                                 | 21.20                                    |                                                                 | 70.90                                    | <b>D</b>                                    | 5                                | 80                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Potamium                               | 439.00                                   |                                                                 | 2 80                                     | 4                                           | 6                                | 80                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Selenium                               | 0.93                                     |                                                                 | 0.47                                     | 3                                           | 5                                | 60                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Silver                                 | 789.00                                   |                                                                 | 6800.00                                  | 2                                           | 6                                | 40                                                           | 0                                                                        | 0                                                                              | 0                                                                         | Š                                                                               |
| Sodum                                  | 2.70                                     |                                                                 | 2.70                                     | 1                                           | 6                                | 20                                                           | 1                                                                        | 0                                                                              | 20                                                                        | ě                                                                               |
| Theodism '                             | 10.10                                    |                                                                 | 368.00                                   | 5                                           | 5                                | 100                                                          | 0                                                                        | 0                                                                              | ŏ                                                                         | 0                                                                               |
| Zine                                   | 41.70                                    |                                                                 | 475.00                                   | 6                                           | 5                                | 100                                                          | 0                                                                        | v                                                                              | •                                                                         |                                                                                 |
|                                        |                                          |                                                                 |                                          | N                                           | o. 3 Tank i                      | ield                                                         |                                                                          |                                                                                |                                                                           |                                                                                 |
|                                        |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Volatile Organic Compounds (ug/kg)     |                                          |                                                                 |                                          |                                             |                                  | -                                                            | 0                                                                        | 0                                                                              | o                                                                         | 0                                                                               |
| 1-Butanol                              | 780000.00                                |                                                                 | 780000.00                                | 1                                           | 14                               | 21                                                           | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| 2-Butanone                             | 25.00                                    |                                                                 | 48.00                                    | 3                                           | 14                               | ,                                                            | ŏ                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Acetone                                | 18000.00                                 |                                                                 | 18000.00                                 | É                                           | 14                               | 36                                                           | ò                                                                        | 2                                                                              | 0                                                                         | 14                                                                              |
| Bergene                                | 5.00                                     |                                                                 | 2.00                                     | ĩ                                           | 14                               | 7                                                            | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Carbon disulfide                       | 2.00                                     |                                                                 | 110000.00                                | 5                                           | 14                               | 36                                                           | 0                                                                        | 2                                                                              | 0                                                                         |                                                                                 |
| Chierebenzene                          | 10.00                                    |                                                                 | 36000.00                                 | 6                                           | 14                               | 43                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ŏ                                                                               |
| Ethylbenzone                           | 23.00                                    |                                                                 | 120000.00                                | 7                                           | 14                               | 50                                                           | 0                                                                        | 0                                                                              | ň                                                                         | 0                                                                               |
| Haxane                                 | 1.00                                     |                                                                 | 430.00                                   | Б                                           | 14                               | 36                                                           | 0                                                                        | 0                                                                              | č                                                                         | 7                                                                               |
| Toluene<br>Mulanan (Total)             | 7,00                                     |                                                                 | 42000.00                                 | 8                                           | 14                               | 67                                                           | <u>,</u>                                                                 | 0                                                                              | . 0                                                                       | 0                                                                               |
| n-Propylbenzene                        | 46,00                                    |                                                                 | 37000.00                                 | 10                                          | 14                               | 21                                                           | v                                                                        | •                                                                              |                                                                           |                                                                                 |
| Semivoletile Organic Compounds (ug/kg) |                                          |                                                                 |                                          |                                             |                                  |                                                              | _                                                                        | •                                                                              | 0                                                                         | o                                                                               |
|                                        | 62.00                                    |                                                                 | 1600.00                                  | 3                                           | 14                               | 21                                                           | 0                                                                        | 0                                                                              | ŏ                                                                         | ō                                                                               |
| 1,2-Uichiorobenzene                    | 140.00                                   |                                                                 | 140.00                                   | 1                                           | 14                               | 7                                                            | 0                                                                        | ň                                                                              | ŏ                                                                         | 0                                                                               |
| 1,4-Dichtersbergens                    | 60.00                                    |                                                                 | 16000.00                                 | 4                                           | 14                               | 29                                                           | Ň                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| 2-Mathyinachthaisne                    | 46.00                                    |                                                                 | 310000.00                                | 13                                          | 14                               | 83                                                           | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Agenephthene                           | 40.00                                    |                                                                 | 2100.00                                  | 4                                           | 14                               |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |

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Table 5-7. Summary of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Janey.

| ······································ |                                          | Geometric                     |                               | Number of                      | No-shar of          | Percent of<br>Samples with     | Number of Samples                | Number of Semples<br>Exceeding NJDEP   | Percent of Semplee<br>Exceeding NJDEP | Percent of Samples<br>Exceeding NJDEP  |
|----------------------------------------|------------------------------------------|-------------------------------|-------------------------------|--------------------------------|---------------------|--------------------------------|----------------------------------|----------------------------------------|---------------------------------------|----------------------------------------|
| Constituent                            | Minimum<br>Quantifiable<br>Concentration | Quantifiable<br>Concentration | Quantifieble<br>Concentration | Quantifiable<br>Concentrations | Samples<br>Analyzed | Quantifiable<br>Concentratione | Non-fieldentiel<br>Soll Criteria | Impect to Groundweter<br>Soil Criterie | Non-Residential<br>Soli Criteria      | Impact to Groundwater<br>Sell Criteria |
| · · · · · · · · · · · · · · · · · · ·  |                                          |                               |                               | No. 3 Ta                       | ank Field (c        | ontinued)                      |                                  |                                        |                                       |                                        |
| Semivoletile Organic Compounds (us/kg) |                                          |                               |                               |                                |                     |                                |                                  |                                        |                                       |                                        |
| Anthropping                            | 48.00                                    |                               | 130.00                        | 2                              | 14                  | 14                             | 0                                | 0                                      | 0                                     | 0                                      |
| Senzolelanthracana                     | 200.00                                   |                               | 1700.00                       | 7                              | 14                  | 60                             | 0                                | 0                                      | 0                                     | ů.                                     |
| Bentolalovrane                         | 130,00                                   |                               | 2500.00                       | <b>6</b>                       | 14                  | 43                             | 3                                | °,                                     | 21                                    | ŏ                                      |
| Benzelbifluoranthene                   | 370.00                                   |                               | 2600.00                       | 8                              | 14                  | 43                             | 0                                | 0                                      | Ď                                     | ŏ                                      |
| Benzolg,h,ilperviene                   | 940,00                                   |                               | 2600.00                       | 2                              | 14                  | 14                             | 0                                | ŏ                                      | ò                                     | 0                                      |
| Benzo(k)fluorenthene                   | 420,00                                   |                               | 2500.00                       |                                | 14                  | •3                             | ŏ                                | ò                                      | 0                                     | 0                                      |
| Carbazole                              | 51.00                                    |                               | 61.00                         | 7                              | 14                  | 50                             | ŏ                                | 0                                      | 0                                     | 0                                      |
| Chrysene                               | 360.00                                   |                               | 3200.00                       | 4                              | 14                  | 7                              | ō                                | 0                                      | •                                     | 0                                      |
| Di-n-butyl phthelete                   | 160.00                                   |                               | 2300.00                       | 3                              | 14                  | 21                             | 1                                | 0                                      | 7                                     | 0                                      |
| Dibenzols,hienthracene                 | 240.00                                   |                               | 2200.00                       | 5                              | 14                  | 38                             | 0                                | 0                                      | 0                                     | 0                                      |
| Fluoranthene                           | 2800.00                                  |                               | 6700.00                       | 3                              | 14                  | 21                             | 0                                | 0                                      | 0                                     | 0                                      |
|                                        | 89.00                                    |                               | 1900.00                       | 5                              | 14                  | 36                             | 0                                | 8                                      | ů,                                    | 7                                      |
| hidding (1,2,3°Colpy: 0)0              | 150000.00                                |                               | 150000.00                     | 1                              | 14                  | 7                              | 0                                | 1                                      | Ň                                     | ò                                      |
| Nechthelene                            | 64.00                                    |                               | \$1000.00                     | 8                              | 14                  | 67                             | 0                                | 0                                      | ő                                     | ò                                      |
| Phananthrape                           | 310.00                                   |                               | 94000.00                      | 12                             | 14                  | 86                             | 0                                | ů.                                     | ō                                     | ō                                      |
| Pytene                                 | 340.00                                   |                               | 3000.00                       | 2                              | 14                  |                                | ŏ                                | 0                                      | ò                                     | 0                                      |
| bie(2-Ethylhexyl)phthelete             | 110.00                                   |                               | 890.00                        | 3                              | 14                  | • '                            | •                                | -                                      |                                       |                                        |
| Pesticides/PCBs (ug/kg)                |                                          |                               |                               |                                |                     |                                | _                                | •                                      | 0                                     | 0                                      |
| 4.4%000                                | 4.60                                     |                               | 280.00                        | 6                              | 13                  | 36                             | 0                                | 0                                      | ŏ                                     | ò                                      |
| 4 4'-DDE                               | 4.30                                     |                               | 260.00                        | 10                             | 13                  | 77                             | ů<br>ů                           | ŏ                                      | ō                                     | o                                      |
| 4.4'-DDT                               | 17.00                                    |                               | 290.00                        | 4                              | 13                  | 31                             | ő                                | ŏ                                      | ō                                     | 0                                      |
| Aldrin                                 | 2.10                                     |                               | 41.00                         | 3                              | 13                  | 25                             | å                                | ō                                      | 0                                     | 0                                      |
| Dieldrin                               | 2.20                                     |                               | 9,10                          | 2                              | 13                  |                                | ō                                | 0                                      | 0                                     | 0                                      |
| Endrin                                 | 7.30                                     |                               | 10.00                         | ,<br>i                         | 13                  | 8                              | 0                                | 0                                      | 0                                     | 0                                      |
| Endrin aldehyde                        | 10.00                                    |                               | 11.00                         | i                              | 13                  | 9                              | 0                                | 0                                      | 0                                     | 0                                      |
| Endrin katono                          | 11.00                                    |                               | 230.00                        | 2                              | 13                  | 18                             | 0                                | 0                                      | 0                                     | 0                                      |
| Methexychlor                           | 5.60                                     |                               | 5.50                          | 1                              | 13                  | 8                              | 0                                | 0                                      | 0                                     | õ                                      |
| elpha-BMC                              | 2.30                                     |                               | 11.00                         | 5                              | 13                  | 38                             | 0                                | 0                                      | Ň                                     | ŏ                                      |
| appro-Chief and                        | 4.20                                     |                               | 4.20                          | 1                              | 13                  | 8                              | 0                                | 0                                      | ŏ                                     | 0                                      |
| genme-Chlordana                        | 5.00                                     |                               | 23.00                         | 4                              | 13                  | 31                             | Ū                                | •                                      | -                                     |                                        |
| (norganics (mg/kg)                     |                                          |                               |                               |                                |                     |                                |                                  |                                        | •                                     | 0                                      |
|                                        | 608.00                                   |                               | 13900.00                      | 13                             | 13                  | 100                            | 0                                | 0                                      | 0                                     | ŏ                                      |
|                                        | 1.10                                     |                               | 108.00                        | 12                             | 13                  | 92                             | ç                                | v                                      | 54                                    | 0                                      |
| Amenic                                 | 2.00                                     |                               | 372.00                        | 13                             | 13                  | 100                            | 1                                | ő                                      | 0                                     | 0                                      |
| Barium                                 | 7.60                                     |                               | 102.00                        | 13                             | 13                  | 100                            | 1                                | õ                                      | 8                                     | 0                                      |
| Beryllium                              | 0.14                                     |                               | 1.60                          |                                | 13                  | 82                             | ò                                | ò                                      | 0                                     | 0                                      |
| Calcium                                | 229.00                                   |                               | 57400.00                      | 13                             | 13                  | 100                            | ō                                | ò                                      | 0                                     | 0                                      |
| Chromium                               | 10.00                                    |                               | 4570.00                       | 21                             | 21                  | 100                            | ō                                | 0                                      | 0                                     | 0                                      |
| Cobeit                                 | 4.30                                     |                               | 128.00                        | 13                             | 13                  | 100                            | 1                                | 0                                      | 8                                     | 0                                      |
| Copper                                 | 13.00                                    |                               | 712.00                        | 5                              | 18                  | 31                             | 4                                | 4                                      | 25                                    | 25                                     |
| Haxevalent chromium                    | 9.20                                     |                               | 65100.00                      | 13                             | 13                  | 100                            | 0                                | 0                                      | 0                                     | 0                                      |
| Iron                                   | 8190,00<br># 1A                          |                               | 2480.00                       | 13                             | 13                  | 100                            | 1                                | 0                                      | 8                                     | ~                                      |
| Lead                                   | 129.00                                   |                               | 39400.00                      | 13                             | 13                  | 100                            | 0                                | 0                                      | 0                                     | ŏ                                      |
| Magnesium                              | 43.00                                    |                               | 492.00                        | 13                             | 13                  | 100                            | 0                                | U                                      | v                                     | •                                      |

See last page for footnotes,

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Table 5-7. Summary of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

| Constituent                                         | Minimum<br>Quantifiable<br>Concentration | Geometric <sup>1</sup><br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentratione | Number of<br>Samples<br>Analyzed | Percent of<br>Samples with<br>Quantifiable<br>Concentrations | Number of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Number of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Sell Criteria | Percent of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criterie | Percent of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soll Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     |                                          |                                                                 |                                          | No. 3 Te                                    | ınk Field (c                     | ontinued)                                                    |                                                                          |                                                                                |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Inorgenics (mg/kg) (continued)                      |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Marcury                                             | 0.16                                     |                                                                 | 7.00                                     | 10                                          | 13                               | 77                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Nickel                                              | 22.40                                    |                                                                 | 2650.00                                  | 13                                          | 13                               | 100                                                          | 1                                                                        | 0                                                                              | •                                                                         | õ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Peterelum                                           | 240.00                                   |                                                                 | 1370.00                                  | 13                                          | 13                               | 100                                                          | 0                                                                        | Ň                                                                              | ŏ                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Selenium                                            | 1,10                                     |                                                                 | 9.20                                     | 3                                           | 13                               | 23                                                           | 0                                                                        | õ                                                                              | ŏ                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Silver                                              | 0.17                                     |                                                                 | 0.81                                     | 3                                           | 13                               | 23                                                           | ŏ                                                                        | 0                                                                              | ò                                                                         | o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Sodium                                              | 7120.00                                  |                                                                 | 7120.00                                  | 1                                           | 13                               | 15                                                           | ò                                                                        | ō                                                                              | Ó                                                                         | . 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Thelium                                             | 1.10                                     |                                                                 | 413.00                                   | 17                                          | 13                               | 100                                                          | ō                                                                        | 0                                                                              | •                                                                         | o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Venedium                                            | 11.70                                    |                                                                 | 471.00                                   | 13                                          | 13                               | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Zinc                                                | 45.40                                    |                                                                 | 421.00                                   |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                     |                                          |                                                                 |                                          | Gei                                         | <u>terel Tank</u>                | <u>Field</u>                                                 |                                                                          |                                                                                |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Volatile Organic Compounds (ug/kg)                  |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                | -                                                                         | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1.8                                                 | 2.00                                     |                                                                 | 65.00                                    | 7                                           | 24                               | 29                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2-Bicanone<br>4-Mathelia 2-Bentemant                | 0.00                                     |                                                                 | 160.00                                   | 3                                           | 24                               | 13                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Anatona                                             | 0.00                                     |                                                                 | 170.00                                   | 2                                           | 24                               | 8                                                            | 0                                                                        | 0                                                                              | ě                                                                         | ő                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Berrene                                             | 1.00                                     |                                                                 | 420.00                                   | 4                                           | 24                               | 17                                                           | 0                                                                        | 0                                                                              | ů                                                                         | ō                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Chierobergene                                       | 2.00                                     |                                                                 | 40.00                                    | 3                                           | 24                               | 13                                                           | 0                                                                        | ŏ                                                                              | ő                                                                         | ō                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Chipreform                                          | 0.00                                     |                                                                 | 43.00                                    | 1                                           | 24                               |                                                              | Š                                                                        | ŏ                                                                              | õ                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Ethylbergene                                        | 0.00                                     |                                                                 | 6600.00                                  | 3                                           | 24                               | 13                                                           | ň                                                                        | ŏ                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Hexane                                              | 1.00                                     |                                                                 | 9,00                                     | 18                                          | 24                               |                                                              | ŏ                                                                        | ò                                                                              | 0                                                                         | C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Tetrachioroethens                                   | 0,00                                     |                                                                 | 3.00                                     | 1                                           | 24                               | 38                                                           | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Toluene                                             | 1.00                                     |                                                                 | 3900.00                                  |                                             | 24                               | 39                                                           | ò                                                                        | 1                                                                              | 0                                                                         | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Xylenes (Total)                                     | 4.00                                     |                                                                 | 13000.00                                 | , i                                         | 24                               | 33                                                           | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| n-Propyibenzene                                     | 1.00                                     |                                                                 | 13000.00                                 | ÷                                           | •                                |                                                              |                                                                          |                                                                                |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Semivolatile Organic Compounde (ug/kg)              |                                          |                                                                 |                                          |                                             | 23                               | 47                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2-Methylnapithelene                                 | 59.00                                    |                                                                 | 1600.00                                  | 1                                           | 23                               | 4                                                            | 0                                                                        | •                                                                              | . 0                                                                       | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4-Nitrophenol                                       | 0.00                                     |                                                                 | 11000.00                                 | 2                                           | 23                               | 9                                                            | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Acenaphthene                                        | 44.00                                    |                                                                 | 2500.00                                  | 6                                           | 23                               | 28                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Antinacene                                          | 140.00                                   |                                                                 | 1900.00                                  | 16                                          | 23                               | 70                                                           | 0                                                                        | 0                                                                              | 17                                                                        | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                     | 80.00                                    |                                                                 | 1100.00                                  | 13                                          | 23                               | 67                                                           | 4                                                                        | 0                                                                              | 17                                                                        | , and the second s |
| Barzotsipyrene<br>Barzotsipyrene                    | 88.00                                    |                                                                 | 2700.00                                  | 16                                          | 23                               | 70                                                           | 0                                                                        |                                                                                | ő                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Remotion hillion and and                            | 0.00                                     |                                                                 | 420.00                                   | · 2                                         | 23                               | 9                                                            | U O                                                                      | ŏ                                                                              | õ                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Benzolkifluorenthene                                | 99.00                                    |                                                                 | 2800.00                                  | 16                                          | 23                               | 10                                                           | ő                                                                        | õ                                                                              | ō                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Butvi benzvi phthalate                              | 0.00                                     |                                                                 | 220.00                                   | 1                                           | 23                               |                                                              | ŏ                                                                        | ō                                                                              | Ó                                                                         | - O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Carbazole                                           | 0.00                                     |                                                                 | 510.00                                   | 2                                           | 40                               | 78                                                           | ŏ                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Chrysene                                            | 170.00                                   |                                                                 | 8400.00                                  | 1                                           | 23                               | 13                                                           | ò                                                                        | o <sup>.</sup>                                                                 | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Di-n-butyl phtheiste                                | 0.00                                     |                                                                 | 410.00                                   | ,<br>,                                      | 23                               |                                                              | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Diberzo(a,h)anthracene                              | 0.00                                     |                                                                 | 47.00                                    | 1                                           | 23                               | 4                                                            | 0                                                                        | 0                                                                              | . 0                                                                       | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Dibenzefuren                                        | 0.00                                     |                                                                 | 2300.00                                  | 17                                          | 23                               | 74                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Flueranthene                                        | 180.00                                   |                                                                 | 17000.00                                 | 3                                           | 23                               | 13                                                           | ¢                                                                        | . Q                                                                            | 0                                                                         | v<br>^                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Fluorene                                            | 51.00                                    |                                                                 | 310.00                                   | 6                                           | 23                               | 26                                                           | 0                                                                        | 0                                                                              | 0                                                                         | Ň                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Indeno(1,2,3-cd)pyrene<br>N-Nitrosodiphenylemine(1) | 0.00                                     |                                                                 | 360.00                                   | 1                                           | 23                               | 4                                                            | 0                                                                        | 0                                                                              | <u> </u>                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

See last page for feetnetes.

GERAGHTY & MILLER, INC.

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Table 6-7, Summary of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remedial investigation, Bayonne Plant, Bayonne, New Jarsay.

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| Constituent                            | Minimum<br>Quantifiable<br>Concentration | Geometric <sup>1</sup><br>Meen<br>Quentifieble<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quentifiable<br>Concentrations | Number of<br>Semples<br>Anelyzed | Percent of<br>Samples with<br>Quantifiable<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Number of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soll Criteria | Percent of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soli Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Percent of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria |
|----------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                        |                                          |                                                                 |                                          | General T                                   | ank Field (                      | continued)                                                   |                                                                          |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                 |
| Semivolatile Organic Compounds (ug/kg) | (continued)                              |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                 |
| Nachthalans                            | 45.00                                    |                                                                 | 24000.00                                 |                                             | 23                               | 39                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | . 0                                                                             |
| Percechiorsphenol                      | 0.00                                     |                                                                 | 8200.00                                  | 1                                           | 23                               | 4                                                            | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ,<br>,                                                                          |
| Phenenthrend                           | 69.00                                    |                                                                 | 45000.00                                 | 16 -                                        | 23                               | 70                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ő                                                                               |
| Pyrane                                 | 54.00                                    |                                                                 | 15000.00                                 | 19                                          | 23                               | 83                                                           | 0                                                                        | 0                                                                              | ž                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ě                                                                               |
| bis(2-Ethylhexyliphthelate             | 120.00                                   |                                                                 | 2300.00                                  | 12                                          | 23                               | 62                                                           | 0                                                                        | U                                                                              | v                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | •                                                                               |
| Pesticid <u>es/PC8s (ug/kg)</u>        |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                                                                               |
| 4.4%000                                | 7.80                                     |                                                                 | 190.00                                   | 10                                          | 24                               | 42                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| 4.4'-DDE                               | 4.80                                     |                                                                 | 38.00                                    | 10                                          | 24                               | 42                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| A ALODT                                | 4.80                                     |                                                                 | 360.00                                   | 13                                          | 24                               | 64                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ě                                                                               |
| Aldria                                 | 3.00                                     |                                                                 | 3.90                                     | 2                                           | 24                               | 8                                                            | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ő                                                                               |
| Dialdrin                               | 4.00                                     |                                                                 | 32.00                                    | 8                                           | 24                               | 38                                                           | 0                                                                        | 0                                                                              | ų.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ě                                                                               |
| Endoeifan I                            | 0.00                                     |                                                                 | 5.40                                     | 1                                           | 24                               | 4                                                            | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ě                                                                               |
| Endria                                 | 0.00                                     |                                                                 | 3.70                                     | 1                                           | 24                               | 4                                                            | 0                                                                        | 0                                                                              | ő                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ŏ                                                                               |
| Endrin aldahuda                        | 0.00                                     |                                                                 | 26.00                                    | 4                                           | 24                               | 17                                                           | o .                                                                      | 9                                                                              | ě                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | č                                                                               |
| Fodrio katone                          | 0.00                                     |                                                                 | 9.40                                     | 2                                           | 24                               | 8                                                            | 0                                                                        | 0                                                                              | Ň                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ě                                                                               |
| Hentechior epoxide                     | 0.00                                     |                                                                 | 24.00                                    | 3                                           | 24                               | 13                                                           | 0                                                                        | 0                                                                              | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | o o                                                                             |
| Methoxychior                           | 0.00                                     |                                                                 | 210.00                                   | 3                                           | 24                               | 13                                                           | , e                                                                      | ŏ                                                                              | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ō                                                                               |
| elohe-Chlordene                        | 1.50                                     |                                                                 | 08.8                                     | 3                                           | 24                               | 13                                                           | 0                                                                        | ŏ                                                                              | ő                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ō                                                                               |
| gemme-Chlordens                        | 2.20                                     |                                                                 | 75.00                                    | 12                                          | 24                               | 60                                                           | v                                                                        | v                                                                              | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                 |
| inorganice (mg/kgi                     |                                          |                                                                 |                                          |                                             |                                  |                                                              | _                                                                        |                                                                                | <u>^</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0                                                                               |
|                                        | 1070.00                                  |                                                                 | 18000.00                                 | 31                                          | 31                               | 100                                                          | 0                                                                        | 0                                                                              | ő                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ŏ                                                                               |
| Antimony                               | 0.27                                     |                                                                 | 239.00                                   | . 26                                        | 31                               | 84                                                           | 0                                                                        | °,                                                                             | 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ò                                                                               |
| Arnanic                                | 1,60                                     |                                                                 | 42.20                                    | 31                                          | 31                               | 100                                                          | ,                                                                        | ě                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ō                                                                               |
| Berturn                                | 24.50                                    |                                                                 | 6290.00                                  | 31                                          | 31                               | 100                                                          |                                                                          | ě                                                                              | š                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Bervilium                              | 0.13                                     |                                                                 | 1.30                                     | 28                                          | 31                               | 80                                                           | <b>.</b>                                                                 | ŏ                                                                              | ō                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Cedmium                                | 0.08                                     |                                                                 | 18,40                                    | 17                                          | 31                               | 100                                                          | ŏ                                                                        | ŏ                                                                              | ò                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Celcium                                | 862.00                                   |                                                                 | 27700,00                                 | 31                                          | 31                               | 100                                                          | Ď                                                                        | ō                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Chromium                               | 6.10                                     |                                                                 | 1880.00                                  | 38                                          | 30                               | 100                                                          | õ                                                                        | ò                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Cobeit                                 | 3.00                                     |                                                                 | 842.00                                   | 31                                          | 31                               | 100                                                          | 2                                                                        | 0                                                                              | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Copper                                 | 29,40                                    |                                                                 | 1610.00                                  | 31                                          | 31                               | 35                                                           | i õ                                                                      | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Cyanida                                | 0.64                                     |                                                                 | 2.20                                     | 10                                          | 19                               | 53                                                           | 4                                                                        | 4                                                                              | 21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 21                                                                              |
| Hexavelent chromium                    | 1.00                                     |                                                                 | 40.10                                    | 31                                          | 31                               | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Iron                                   | 6230.00                                  |                                                                 | 7590.00                                  | 31                                          | 31                               | 100                                                          | 12                                                                       | 0                                                                              | 39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                                                                               |
| Leed                                   | 11.00                                    |                                                                 | 28100.00                                 | 31                                          | 31                               | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Megnesium                              | 334.00                                   |                                                                 | 474.00                                   | 31                                          | 31                               | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Manganase                              | 20.00                                    |                                                                 | 6.00                                     | 27                                          | 31                               | 87                                                           | 0                                                                        | 0                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| Marcury                                | 15.00                                    |                                                                 | 1520.00                                  | 31                                          | 31                               | 100                                                          | 0                                                                        | 0                                                                              | v                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                               |
| NICKO                                  | 300.00                                   |                                                                 | 8100.00                                  | 31                                          | 31                               | 100                                                          | 0                                                                        | 0                                                                              | , in the second s | ŏ                                                                               |
| Potaeeuum                              | 0.74                                     |                                                                 | 9.30                                     | 23                                          | 31                               | 74                                                           | 0                                                                        | 0                                                                              | ů.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Ď                                                                               |
| Selenari<br>Class                      | 0.24                                     |                                                                 | 4.60                                     | 18                                          | 31                               | 61                                                           | 0                                                                        | 0                                                                              | ň                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ō                                                                               |
| Silver<br>Cadhan                       | 1240.00                                  |                                                                 | 36400.00                                 | 12                                          | 31                               | 39                                                           | 0                                                                        | 0                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ő                                                                               |
| Soonum<br>Veneratium                   | 12.30                                    |                                                                 | 400.00                                   | 31                                          | 31                               | 100                                                          | 0                                                                        | 0                                                                              | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ō                                                                               |
| A BLIGHTPH II                          | 17.90                                    |                                                                 | 8080.00                                  | 31                                          | 31                               | 100                                                          | 3                                                                        | v                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                 |

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Table 5-7, Summary of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jafeey.

| Constituent                            | Minimum<br>Quentifieble<br>Concentration | Geometric <sup>1</sup><br>Meen<br>Quentifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quentifiable<br>Concentrations | Number of<br>Semples<br>Analyzed | Percent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soll Criteria | Number of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soll Criteria | Percent of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Percent of Samples<br>Exceeding NJDEP<br>Impect to Groundwater<br>Soll Criterie |
|----------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                        |                                          |                                                                 |                                          | Sol                                         | vent Tank                        | Field                                                        |                                                                          |                                                                                |                                                                           |                                                                                 |
| Voletile Organic Compounde (ug/kg)     |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Rentene                                | 260.00                                   |                                                                 | 290.00                                   | 2                                           | 4                                | 50                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Citorobenzene                          | 200.00                                   |                                                                 | 200.00                                   | 1                                           | 4                                | 26                                                           | 0                                                                        | 0                                                                              | Ň                                                                         | ő                                                                               |
| Ethylbenzene                           | 350.00                                   |                                                                 | 480.00                                   | 2.                                          | 4                                | 50                                                           | 0                                                                        | 0                                                                              | ŏ                                                                         | ō                                                                               |
| Hexene                                 | 8100.00                                  |                                                                 | 6100.00                                  | 1                                           | 4                                | 26                                                           |                                                                          | ě                                                                              | ō                                                                         | 0                                                                               |
| Toluene                                | 250.00                                   |                                                                 | 250.00                                   | :                                           |                                  | 20                                                           | ŏ                                                                        | e e                                                                            | ō                                                                         | 0                                                                               |
| Xylenee (Totel)                        | 280.00                                   |                                                                 | 280.00                                   | 1                                           |                                  | 100                                                          | 0                                                                        | ō                                                                              | 0                                                                         | · 0                                                                             |
| n-Propylbergene                        | 960.00                                   |                                                                 | 13000.00                                 | •                                           | -                                | 100                                                          | -                                                                        |                                                                                |                                                                           |                                                                                 |
| Semivolatile Organic Compounds (ug/kg) |                                          |                                                                 |                                          |                                             |                                  |                                                              | •                                                                        | n                                                                              | o                                                                         | . 0                                                                             |
| 2-Methvinephthalene                    | 12000.00                                 |                                                                 | 180000.00                                | 4                                           | 4                                | 100                                                          | 0                                                                        | 0                                                                              | ŏ                                                                         | ō                                                                               |
| Acenephthene                           | 1400.00                                  |                                                                 | 6000.00                                  | 2                                           | 4                                | B0<br>75                                                     | , v                                                                      | ŏ                                                                              | . 0                                                                       | · 0                                                                             |
| Anthracene                             | 2700.00                                  |                                                                 | 11000.00                                 | 3                                           | •                                | 70                                                           | ů                                                                        | 0                                                                              | ò                                                                         | 0                                                                               |
| Benze (e) anthrecens                   | 390.00                                   |                                                                 | 3400.00                                  | 3                                           | :                                | 50                                                           | ĩ                                                                        | ō                                                                              | 26                                                                        | 0                                                                               |
| Berize (a) pyrane                      | 620.00                                   |                                                                 | 2600.00                                  | 2                                           |                                  | 50                                                           | ō                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Banzo (b) fluoranthene                 | 690.00                                   |                                                                 | 1400.00                                  | ÷                                           | 1                                | 50                                                           | ò                                                                        | 0                                                                              | C                                                                         | 0                                                                               |
| Banzo (k) fluorenthene                 | 740.00                                   |                                                                 | 4200.00                                  | 4                                           | 4                                | 26                                                           | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Carbazole                              | 4200.00                                  |                                                                 | 5700.00                                  | 2                                           | Ĩ.                               | 50                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Chrysene                               | 2800.00                                  |                                                                 | 2400.00                                  | 2                                           | 4                                | 60                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Fluoranthene                           | 600.00                                   |                                                                 | 1800.00                                  | 1                                           | á.                               | 25                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Fluorane                               | 1800.00                                  |                                                                 | 130000.00                                | 2                                           | 4                                | 50                                                           | 0                                                                        | 1                                                                              | 0                                                                         | 28                                                                              |
| Naphthelene                            | 2000.00                                  |                                                                 | 8800.00                                  | ī                                           | 4                                | 25                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ő                                                                               |
| Pentachierephenol                      | 2000.00                                  |                                                                 | 22000.00                                 | 4                                           | 4                                | 100                                                          | 0                                                                        | 0                                                                              |                                                                           | ő                                                                               |
| Phenendrane                            | 3100.00                                  |                                                                 | 14000.00                                 | 3                                           | 4                                | 75                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ő                                                                               |
| bis(2-Ethyihexyi)phthelete             | 490.00                                   | -                                                               | 490.00                                   | 1                                           | 4                                | 25                                                           | 0                                                                        | U                                                                              | · ·                                                                       | -                                                                               |
| Pasticidas/PCBs (ug/kg)                |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           | •                                                                               |
|                                        | 72.00                                    |                                                                 | 72.00                                    | 1                                           | 4                                | 26                                                           | . 0                                                                      | 0                                                                              | 0                                                                         | õ                                                                               |
| 4,4-000                                | 75.00                                    |                                                                 | 75.00                                    | 1                                           | 4                                | 25                                                           | 0                                                                        | 8                                                                              | Š                                                                         | ő                                                                               |
| 4,4*•DD1<br>Federation 1               | 18.00                                    |                                                                 | 18.00                                    | 1                                           | 4                                | 26                                                           | 0                                                                        | 0                                                                              | ŏ                                                                         | ō                                                                               |
| Engoalatan r<br>Kadaarifan adista      | 24.00                                    |                                                                 | 24.00                                    | 1                                           | 4                                | 26                                                           | 0                                                                        | č                                                                              | 0                                                                         | 0                                                                               |
| Endela                                 | 10.00                                    |                                                                 | 10.00                                    | 1                                           | 4                                | 25                                                           | ě                                                                        | ē                                                                              | ō                                                                         | 0                                                                               |
| Endrin aldeityde                       | 22.00                                    |                                                                 | 22.00                                    | 1                                           | •                                | 20                                                           | ŏ                                                                        |                                                                                | 0                                                                         | 0                                                                               |
| Endrin ketone                          | 6,40                                     |                                                                 | 7.40                                     | z                                           | 1                                | 25                                                           | ŏ                                                                        | 0                                                                              | 0                                                                         | o                                                                               |
| eiphe-Chierdane                        | 30,00                                    |                                                                 | 30,00                                    | 1                                           | •                                | 20                                                           | •                                                                        |                                                                                |                                                                           |                                                                                 |
| Inorganica (mg/kg)                     |                                          |                                                                 |                                          |                                             |                                  |                                                              | •                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Aluminum                               | 3220.00                                  |                                                                 | 23300.00                                 | 4                                           | 4                                | 100                                                          |                                                                          | ŏ                                                                              | ò                                                                         | 0                                                                               |
| Antimony                               | 2.60                                     |                                                                 | 4.10                                     | 2                                           | 4                                | 100                                                          | · ·                                                                      | à                                                                              | 25                                                                        | 0                                                                               |
| Americ                                 | 2.00                                     |                                                                 | 46.70                                    | 4                                           | •                                | 100                                                          |                                                                          | ō                                                                              | ٥                                                                         | 0                                                                               |
| Badum                                  | 18.40                                    |                                                                 | 170.00                                   | 4                                           | :                                | 100                                                          | õ                                                                        | ò                                                                              | 0                                                                         | 0                                                                               |
| BeryRium                               | 0.16                                     |                                                                 | 0.91                                     | 4                                           | 2                                | 50                                                           | õ                                                                        | ō                                                                              | o                                                                         | 0                                                                               |
| Cadmium                                | 0.08                                     |                                                                 | 0.34                                     | 2 3                                         | 7                                | 75                                                           | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Calcium                                | 3870.00                                  |                                                                 | 18600.00                                 | В                                           | ;                                | 66                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Chromium                               | 13.90                                    |                                                                 | 397.00                                   | Ă                                           | Å                                | 100                                                          | 0                                                                        | 0                                                                              | . 0                                                                       | 0                                                                               |
| Cobalt                                 | 18.20                                    |                                                                 | 1330.00                                  | 4                                           | 4                                | 100                                                          | 1                                                                        | 0                                                                              | 26                                                                        | v                                                                               |
| Copper                                 | 103.00                                   |                                                                 | 1444.44                                  | •                                           |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |

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Table 6-7. Summary of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Janesy.

| Constituent                            | Minimum<br>Quantifiable<br>Concentration | Geometric <sup>1</sup><br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Semples<br>Analyzed | Percent of<br>Semples with<br>Quantifiable<br>Cancentrations | Number of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soll Criterie | Number of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria | Percent of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Sell Criterie | Percent of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria |
|----------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                        |                                          |                                                                 | · · ·                                    | Solvent T                                   | ank Field (                      | continued)                                                   | · · · · · · · · · · · · · · · · · · ·                                    |                                                                                |                                                                           |                                                                                 |
| inergenice (mg/kg) (centinued)         |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Iron                                   | 9080.00                                  |                                                                 | 30800.00                                 | 4                                           | 4                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Land                                   | 20,80                                    | *                                                               | 324.00                                   | 4                                           | -4                               | 100                                                          | Q -                                                                      | 0                                                                              | 0                                                                         | ő                                                                               |
| Magnesium                              | 1010.00                                  |                                                                 | 6880.00                                  | 4 1                                         | 4                                | 100                                                          | 0                                                                        | 0                                                                              | , v                                                                       | õ                                                                               |
| Menganese                              | 51.30                                    |                                                                 | 281.00                                   | 4                                           | 4                                | 100                                                          | 0                                                                        | 0                                                                              | Ň                                                                         | ő                                                                               |
| Mercury                                | 0.16                                     |                                                                 | 1,30                                     | 3                                           | 4 .                              | 76                                                           | 0                                                                        |                                                                                | ě                                                                         | ő                                                                               |
| Nickel                                 | 80.60                                    |                                                                 | 00.006                                   | 4                                           | 4                                | 100                                                          | 0                                                                        |                                                                                | 0                                                                         | å                                                                               |
| Poteesium                              | 807.00                                   |                                                                 | 5090.00                                  | 4                                           | 4                                | 100                                                          | 0                                                                        | č                                                                              |                                                                           | 0                                                                               |
| Selenium                               | 1.30                                     |                                                                 | 2.40                                     | 2                                           | 4                                | -00                                                          | Ň                                                                        | ŏ                                                                              | ō                                                                         | 0                                                                               |
| Silver                                 | 0.56                                     |                                                                 | 0.56                                     | 1                                           | :                                | 20                                                           | 0                                                                        | ő                                                                              | ō                                                                         | 0                                                                               |
| Sedium                                 | 3010.00                                  |                                                                 | 36300.00                                 | 2                                           | 1                                | 100                                                          | ů                                                                        | 0                                                                              | ō                                                                         | 0                                                                               |
| Venedium                               | 21.20                                    |                                                                 | 83.60                                    | 1                                           | 7                                | 100                                                          | ŏ                                                                        | ō                                                                              | o                                                                         | 0                                                                               |
| Zinc                                   | 38.00                                    |                                                                 | 167.00                                   | •                                           | -                                |                                                              | -                                                                        |                                                                                |                                                                           |                                                                                 |
|                                        |                                          |                                                                 | 0                                        | lore and East                               | Side Treat                       | ment Plant Are                                               | 14                                                                       |                                                                                |                                                                           |                                                                                 |
|                                        |                                          |                                                                 | r                                        | tere and cast                               | 0100 11001                       |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Inerganice (mg/kg)                     |                                          |                                                                 |                                          |                                             |                                  |                                                              | _                                                                        |                                                                                | •                                                                         | 0                                                                               |
| Chramium                               | 23.90                                    |                                                                 | 28.60                                    | 2                                           | 2                                | 100                                                          | 0                                                                        | 0                                                                              | 50                                                                        | 50                                                                              |
| Hexevalent chromium                    | 14.81                                    |                                                                 | 14.61                                    | 1                                           | 2                                | 60                                                           | 1                                                                        | •                                                                              | ••                                                                        |                                                                                 |
|                                        |                                          |                                                                 |                                          | Dom                                         | antio Trada                      | A                                                            |                                                                          |                                                                                |                                                                           |                                                                                 |
|                                        |                                          |                                                                 |                                          | Dom                                         |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Semivoletile Organic Compounds (ug/kg) |                                          |                                                                 |                                          | _                                           |                                  |                                                              | ^                                                                        | 0                                                                              | o                                                                         | o                                                                               |
| Anthracene                             | 60000.00                                 |                                                                 | 60000.00                                 |                                             | 1                                | 100                                                          |                                                                          | 0                                                                              | ō                                                                         | 0                                                                               |
| Carbezole                              | 18000,00                                 |                                                                 | 18000.00                                 | 1                                           | 1                                | 100                                                          | õ,                                                                       | ō                                                                              | 0                                                                         | 0                                                                               |
| Chrysene                               | 4100.00                                  |                                                                 | 4100.00                                  | 1                                           |                                  | 100                                                          | ň                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Fluoranthene                           | 4800.00                                  |                                                                 | 4800.00                                  |                                             |                                  | 100                                                          | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Fluorene                               | 6300.00                                  |                                                                 | 8300.00                                  |                                             | ÷                                | 100                                                          | ō                                                                        | 0                                                                              | 0                                                                         | o                                                                               |
| Phenenthrene                           | 9000.00                                  |                                                                 | 8000.00                                  | i                                           | i                                | 100                                                          | Ó                                                                        | o                                                                              | 0                                                                         | 0                                                                               |
| Pyrene                                 | 8000.00                                  |                                                                 | 8000.00                                  | •                                           |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Peeticides/PCBe (ug/kg)                |                                          |                                                                 |                                          | _                                           |                                  |                                                              |                                                                          | 0                                                                              | 0                                                                         | o                                                                               |
| 4,4'-DDD                               | 61.00                                    |                                                                 | 61.00                                    | 1                                           | -                                | 100                                                          | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Endrin ketone                          | 10.00                                    |                                                                 | 10.00                                    | !                                           | :                                | 100                                                          | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| gemme-Chlordane                        | 12.00                                    |                                                                 | 12.00                                    | 1                                           | •                                | 100                                                          | -                                                                        | -                                                                              |                                                                           |                                                                                 |
| Inorgenice (mg/kg)                     | ч.                                       |                                                                 |                                          |                                             | _                                | 100                                                          | D                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Aluminum                               | 6310.00                                  |                                                                 | 6310.00                                  | 1                                           | 1                                | 100                                                          | ŏ                                                                        | ō                                                                              | 0                                                                         | ٥                                                                               |
| Antimony                               | 0.72                                     |                                                                 | 0.72                                     | 1                                           |                                  | 100                                                          | 0                                                                        | Ó                                                                              | 0                                                                         | 0                                                                               |
| Arsenic                                | 18.60                                    |                                                                 | 10,60                                    | 1                                           | ,                                | 100                                                          | ō                                                                        | <b>0</b> ·                                                                     | 0                                                                         | 0                                                                               |
| Berium                                 | 76,70                                    |                                                                 | /8./0                                    |                                             | i                                | 100                                                          | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Beryllium                              | 0.36                                     |                                                                 | 0.30                                     | ÷                                           | i                                | 100                                                          | o                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Cedmium                                | 0.28                                     |                                                                 | 1490.00                                  | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Calcium                                | 1400.00                                  |                                                                 | 58.10                                    | 5                                           | 6                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Chromium                               | 20.30                                    |                                                                 | 29.30                                    | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | o                                                                         | v                                                                               |
| Coball                                 | L+                                       |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |

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Table 5-7. Summary of Detected Concentrations of All Constituents In Soil Samples Collected During the Phase IA Remedial Investigation, Beyonne Plant, Beyonne, New Jersey.

|                                           |                                          | · · · · · · · · · · · · · · · · · · ·                           |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
|-------------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Constituent                               | Minimum<br>Quantifieble<br>Concentration | Geometric <sup>1</sup><br>Meen<br>Quantifieble<br>Concentration | Maximum<br>Quentifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Semples<br>Analyzed | Percent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criterls | Number of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria | Percent of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Solt Criteria | Perpent of Semples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria |
|                                           |                                          |                                                                 |                                          | Domestic 1                                  | frade Area                       | (continued)                                                  |                                                                          |                                                                                | •                                                                         |                                                                                 |
| Inorganics (mg/kg) (continued)            |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Colorer                                   | 472.00                                   |                                                                 | 472.00                                   | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Iron                                      | 16200.00                                 |                                                                 | 15200.00                                 | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Land                                      | 129.00                                   |                                                                 | 129.00                                   | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Magneeium                                 | 2800.00                                  |                                                                 | 2800.00                                  | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Manganose                                 | 352.00                                   |                                                                 | 352.00                                   | 1                                           | 1                                | 100                                                          | 0                                                                        | 8                                                                              |                                                                           | Ň                                                                               |
| Mercury                                   | 0.81                                     |                                                                 | 0.81                                     | 5                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | ů ř                                                                       | ŏ                                                                               |
| Nickel                                    | 197.00                                   |                                                                 | 187.00                                   | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | ů                                                                         | ŏ                                                                               |
| Poteneium                                 | 1120.00                                  |                                                                 | 1120,00                                  | 1                                           | 1                                | 100                                                          | 0                                                                        | ő                                                                              | ň                                                                         | ŏ                                                                               |
| Scienium                                  | 1.30                                     |                                                                 | 1.30                                     | 1                                           | !                                | 100                                                          | ,<br>,                                                                   | ŏ                                                                              | ŏ                                                                         | ŏ                                                                               |
| Silver                                    | 0,44                                     |                                                                 | 0,44                                     | 1                                           |                                  | 100                                                          | 0.                                                                       | ő                                                                              | ŏ                                                                         | ō                                                                               |
| Sodium                                    | 1510,00                                  |                                                                 | 1510.00                                  | 1                                           | 1                                | 100                                                          | Š                                                                        |                                                                                | ŏ                                                                         | C C                                                                             |
| Vanadium                                  | 82.80                                    |                                                                 | 62.80                                    | 1                                           | 1                                | 100                                                          | ŏ                                                                        | ő                                                                              | ò                                                                         | 0                                                                               |
| Zine                                      | 549.00                                   |                                                                 | 649.00                                   | 1                                           | 1                                | 100                                                          | v                                                                        | -                                                                              | •                                                                         |                                                                                 |
|                                           |                                          |                                                                 |                                          | 1                                           | Utilities Are                    | ba                                                           |                                                                          |                                                                                |                                                                           |                                                                                 |
|                                           |                                          |                                                                 |                                          | -                                           |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| <u>Volatile Organic Compounds (ug/kg)</u> |                                          | `                                                               |                                          |                                             |                                  |                                                              |                                                                          | •                                                                              | · •                                                                       | 0                                                                               |
| Hexens                                    | 2.00                                     |                                                                 | 2.00                                     | T                                           | 1                                | 100                                                          | 0                                                                        | U                                                                              | v                                                                         | ·                                                                               |
| Semivolatile Organic Compounds (ug/kg)    |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                | 100                                                                       | •                                                                               |
| Rent olein viene                          | 770.00                                   |                                                                 | 770.00                                   | 1                                           | 1                                | 100                                                          | 1                                                                        | 0                                                                              | 0                                                                         | ŏ                                                                               |
| Sergoibiliuerenthere                      | 1200.00                                  |                                                                 | 1200.00                                  | 1                                           | !                                | 100                                                          | 0                                                                        | ň                                                                              | ŏ                                                                         | ò                                                                               |
| Benzofkifluoranthene                      | 1200.00                                  |                                                                 | 1200.00                                  | 1                                           | 1                                | 100                                                          | , v                                                                      | ŏ                                                                              | ō                                                                         | ō                                                                               |
| Chrysene                                  | 1400.00                                  |                                                                 | 1400.00                                  | 1                                           | -                                | 100                                                          | ŏ                                                                        | ŏ                                                                              | ò                                                                         | 0                                                                               |
| Pyrene                                    | 1100,00                                  |                                                                 | 1100.00                                  |                                             | •                                |                                                              | •                                                                        |                                                                                |                                                                           |                                                                                 |
| Pesticides/PC8s (up/kp)                   |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
|                                           | 82.00                                    |                                                                 | 62.00                                    | 1                                           | 1                                | 100                                                          | ٥                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| 4,41000                                   | 8.90                                     |                                                                 | 8.90                                     | 1                                           | 1                                | 100                                                          | 0                                                                        | 8                                                                              | 0                                                                         | ŏ                                                                               |
| 4,4-DDT                                   | 200.00                                   |                                                                 | 200.00                                   | \$                                          | 1                                | 100                                                          | <u>o</u>                                                                 | 0                                                                              | 0                                                                         | ŏ                                                                               |
| e,e -vvi<br>Dieldrin                      | 27.00                                    |                                                                 | 27.00                                    | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | Ô                                                                         | õ                                                                               |
| Methoxychiar                              | 130.00                                   |                                                                 | 130.00                                   | 1                                           | 1                                | 100                                                          | 0                                                                        | v                                                                              | •                                                                         | -                                                                               |
| Inorganios (mo/ko)                        |                                          |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                | _                                                                         | •                                                                               |
|                                           | 787.00                                   |                                                                 | 787.00                                   | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | ů l                                                                             |
|                                           | 4.30                                     |                                                                 | 4,30                                     | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Arsenic                                   | 8.40                                     |                                                                 | 9,40                                     | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | š                                                                               |
| S or Nam                                  | 0.47                                     |                                                                 | 0.47                                     | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | ,<br>,                                                                    | ŏ                                                                               |
| geryllum<br>Actology                      | 254.00                                   |                                                                 | 254.00                                   | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              |                                                                           | ň                                                                               |
| Chemin                                    | 3.70                                     |                                                                 | 15.60                                    | 6                                           | 6                                | 100                                                          | 0                                                                        | 0                                                                              | ŏ                                                                         | ŏ                                                                               |
| Coholt                                    | · 2.10                                   |                                                                 | 2.10                                     | · 1                                         | 1                                | 100                                                          | 0                                                                        | ő                                                                              | ő                                                                         | ō                                                                               |
| Copper                                    | 17.70                                    |                                                                 | 17.70                                    | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | ŏ                                                                         | ō                                                                               |
| iron                                      | 2940.00                                  |                                                                 | 2940.00                                  | 1                                           | !                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | ō                                                                               |
| Lend                                      | 122.00                                   |                                                                 | 122.00                                   | 1                                           | 1                                | 100                                                          | 0                                                                        | ŏ                                                                              | õ                                                                         | 0                                                                               |
| Magneeium                                 | 105.00                                   |                                                                 | 108.00                                   | 1                                           | 1                                | 100                                                          | 0                                                                        | ŏ                                                                              | ō                                                                         | . <b>O</b>                                                                      |
| Manganasa                                 | 14.70                                    |                                                                 | 14.70                                    | 1                                           | 1                                | 100                                                          | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Nickel                                    | 19.40                                    |                                                                 | 19.40                                    | 1                                           |                                  | 100                                                          | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Venedium                                  | 61,10                                    |                                                                 | 61.10                                    | 1                                           | ,                                | 100                                                          | ō                                                                        | 0                                                                              | o                                                                         | 0                                                                               |
| Zine                                      | 27,10                                    |                                                                 | 27.10                                    | •                                           |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |

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Table 5-7, Summery of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remadial investigation, Bayonne Plant, Bayonne, New Jersey.

| Constituent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Minimum<br>Quentifiable<br>Concentration C | Geometric <sup>1</sup><br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Semples<br>Analyzed | Percent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Number of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soli Criteria | Percent of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soll Criteria | Percent of Samples<br>Exceeding NJDEP<br>Impect to Groundwata<br>Sell Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                            |                                                                 |                                          | Mai                                         | in Building                      | Aree                                                         |                                                                          |                                                                                |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>Volatile Organic Compounds (ug/kg)</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                            |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 5 enzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 6.00                                       |                                                                 | 6.00                                     | 1                                           | 6                                | 17                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Carbon disulfide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4.00                                       |                                                                 | 4,00                                     | 1                                           |                                  | 17                                                           | 0                                                                        | 0                                                                              | 0                                                                         | Ň                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Chieroberzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 7.00                                       |                                                                 | 630.00                                   | 2                                           |                                  | 33                                                           | 0                                                                        | ů,                                                                             | ŏ                                                                         | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Ethylbenzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3.00                                       |                                                                 | 570.00                                   | 3                                           |                                  | 60                                                           | 0                                                                        | 0                                                                              | Ň                                                                         | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Hexane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3.00                                       |                                                                 | 1100.00                                  | 3                                           |                                  | 60                                                           | 0                                                                        | ů                                                                              | ò                                                                         | ō                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Toluene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.00                                       |                                                                 | 3.00                                     | 1                                           | 9                                | 17                                                           | 0                                                                        | ő                                                                              | õ                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Xylenes (Total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4.00                                       |                                                                 | 1200.00                                  | 3                                           | •                                | 60                                                           | ě                                                                        | ő                                                                              | ŏ                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| n-Propylbenzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 20.00                                      |                                                                 | 11000.00                                 | 4                                           | •                                | 8/                                                           | U                                                                        | v                                                                              | •                                                                         | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Semivolatile Organic Compounds (ug/kg)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1.2-Dichloraberrana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 780.00                                     |                                                                 | 780.00                                   | 1                                           | 8                                | 17                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 7.Methylaeththeise                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 490.00                                     |                                                                 | 48000.00                                 | 6                                           | 8                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Environment and the second                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 390.00                                     |                                                                 | 7200.00                                  | 2                                           | 8                                | 33                                                           | 1                                                                        | 0                                                                              | 17                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Bernalelavrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 370.00                                     |                                                                 | 8100.00                                  | 2                                           | 6                                | 33                                                           | 1                                                                        | 0                                                                              | 17                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 850.00                                     |                                                                 | 3700.00                                  | 2                                           | 8                                | 33                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ě                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Berrie in hilleendene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 350.00                                     |                                                                 | 6300.00                                  | 2                                           | 5                                | 33                                                           | 0                                                                        | 0                                                                              | , v                                                                       | Ň                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Barre offelting resting to the second s | 600.00                                     |                                                                 | 3800.00                                  | 2                                           | 6                                | 33                                                           | 0                                                                        | 8                                                                              | 0                                                                         | ů                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Chrysens                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 620.00                                     |                                                                 | 12000.00                                 | 4                                           | 8                                | 67                                                           | 0                                                                        | 0                                                                              |                                                                           | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Diversola hientivacana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 220.00                                     |                                                                 | 3300.00                                  | 2                                           | 6                                | 33                                                           | 1                                                                        | 0                                                                              |                                                                           | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Ek er arthana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 480.00                                     |                                                                 | 480.00                                   | 1                                           | 6                                | 17                                                           | 0                                                                        | 0                                                                              | ŏ                                                                         | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Indene(1.2.3-cd)ovrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 230.00                                     |                                                                 | 2300.00                                  | 2                                           | 6                                | 33                                                           | 0                                                                        | 0                                                                              | ě                                                                         | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Phenenthrana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1500.00                                    |                                                                 | 23000.00                                 | 4                                           | 6                                | 87                                                           | 0                                                                        | ě                                                                              | 0                                                                         | ò                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Pyrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1700.00                                    |                                                                 | 9800.00                                  | 4                                           | ę                                | 67                                                           | 0                                                                        | 0                                                                              | ő                                                                         | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| bis(2-Ethylhaxyliphtheists                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2100.00                                    |                                                                 | 2800.00                                  | 3                                           | •                                | 50                                                           | U                                                                        | v                                                                              | · ·                                                                       | ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Pesticides/PCBs (ug/kg)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                            |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 7 20                                       |                                                                 | 7.90                                     | 2                                           | 6                                | 33                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4,4"-DDD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 13.00                                      |                                                                 | 13.00                                    | 1                                           | 6                                | 17                                                           | 0                                                                        | 0                                                                              | 0                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| alpha-Chlordane<br>beta-BHC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 57.00                                      |                                                                 | 57.00                                    | 1                                           | 8                                | 17                                                           | 0                                                                        | o                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| In and an interferent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                            |                                                                 |                                          |                                             |                                  |                                                              |                                                                          |                                                                                |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                            |                                                                 | 21402.00                                 | 4                                           | 6                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Aluminum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1380.00                                    |                                                                 | 21400.00                                 | 1                                           | š                                | 17                                                           | ō                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Antimony                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 4.50                                       |                                                                 | 7.00                                     |                                             | ē                                | 100                                                          | 3                                                                        | 0                                                                              | 50                                                                        | ¢                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Americ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 9,40                                       |                                                                 | A1 10                                    |                                             | 6                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Berlum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 22.90                                      |                                                                 | 0.84                                     | 5                                           | 6                                | 83                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Beryllum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.24                                       |                                                                 | 0.69                                     | 4                                           | 6                                | 67                                                           | 0                                                                        | 0                                                                              | 0                                                                         | , and the second |
| Cedmium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1160.00                                    |                                                                 | 15900.00                                 | 6                                           | 6                                | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Celelum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 6.40                                       |                                                                 | 1830.00                                  | 8                                           | 10                               | 80                                                           | 0                                                                        | Q                                                                              | 0                                                                         | ×                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Chromium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3.30                                       |                                                                 | 28.90                                    | 6                                           |                                  | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | Ň                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Gobert                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | R1.20                                      |                                                                 | 24100.00                                 | 6                                           |                                  | 100                                                          | 1                                                                        | 0                                                                              | 17                                                                        | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Copper                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 13.00                                      |                                                                 | 23.96                                    | 2                                           | 10                               | 20                                                           | 2                                                                        | 2                                                                              | 20                                                                        | 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Mexevenent Chromitism                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 7200.00                                    | ·                                                               | 27000.00                                 | 6                                           | 6                                | 100                                                          | 0                                                                        | 0                                                                              | U<br>17                                                                   | ò                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| tron                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 47.30                                      |                                                                 | 675.00                                   | 6                                           | 6                                | 100                                                          | 1                                                                        | Ū.                                                                             |                                                                           | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Less .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 443.00                                     |                                                                 | 18800.00                                 | 6                                           | e                                | 100                                                          | 0                                                                        | 0                                                                              | ~                                                                         | ő                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 34.50                                      |                                                                 | 230.00                                   | 6                                           | e                                | 100                                                          | 0                                                                        | v                                                                              | ~                                                                         | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.18                                       |                                                                 | 0.61                                     | 5                                           |                                  | 83                                                           | 0                                                                        | U A                                                                            | 0                                                                         | ő                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Mercury                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 15.80                                      |                                                                 | 125.00                                   | 8                                           | 6                                | 100                                                          | 0                                                                        | U                                                                              | v                                                                         | *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

See last page for footnotes.

GERAGHTY & MILLER, INC.

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Table 5-7. Summary of Detected Concentrations of All Constituents in Soil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jarsey.

| Constituent                                  | Minimum<br>Quantifiable<br>Concentration | Geometric'<br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | Percent of<br>Samples with<br>Quantifiable<br>Concentrations | Number of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soft Criteria | Number of Samples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soll Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Percent of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soli Criteria | Percent of Semples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria |
|----------------------------------------------|------------------------------------------|-----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                              |                                          |                                                     |                                          | Main Buik                                   | ding Ares (                      | continued)                                                   |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                           |                                                                                 |
| inorgenics (mg/kg) (cominued)                |                                          |                                                     |                                          |                                             |                                  |                                                              |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                           | _                                                                               |
| Potentium                                    | 300.00                                   |                                                     | 3660.00                                  | 6                                           | 8                                | 100                                                          | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | 0                                                                               |
| Selanium                                     | 1.60                                     |                                                     | 2,00                                     | 2                                           |                                  | 33                                                           | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | 0                                                                               |
| Silver                                       | 0.13                                     |                                                     | 5.10                                     | 2                                           |                                  | 33                                                           | C                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Ň                                                                         | õ                                                                               |
| Sodium                                       | 1870.00                                  |                                                     | 3400.00                                  | 2                                           | a                                | 33                                                           | ů                                                                        | , in the second s | ŏ                                                                         | ŏ                                                                               |
| Venedium                                     | 11.40                                    |                                                     | 72,90                                    | 8                                           |                                  | 100                                                          | ő                                                                        | ō                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Ď                                                                         | ō                                                                               |
| Zinc                                         | 63.00                                    |                                                     | 288.00                                   | •                                           | 0                                | TŲŲ                                                          | v                                                                        | · ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                           |                                                                                 |
|                                              |                                          |                                                     |                                          | \$                                          | tockpile Ar                      | 68                                                           |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                           |                                                                                 |
| Veletile Organic Compounds (ug/kg)           |                                          |                                                     |                                          |                                             |                                  |                                                              |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | •                                                                         | •                                                                               |
| 2-Butanene                                   | 8.00                                     |                                                     | 8.00                                     | 1                                           | 3                                | 33                                                           | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Ň                                                                         | õ                                                                               |
| Chiorobenzene                                | 1.00                                     |                                                     | 1,00                                     | 1                                           | 3                                | 33                                                           | °,                                                                       | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ő                                                                         | ő                                                                               |
| Hexene                                       | 5.00                                     |                                                     | 7.00                                     | 2                                           | 3                                | 87                                                           | Ň                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ŏ                                                                         | ō                                                                               |
| Methyl-t-butyl ether                         | 10.00                                    |                                                     | 10.00                                    | 1                                           | 3                                | 33                                                           | ò                                                                        | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ō                                                                         | o                                                                               |
| Xylenes (Total)                              | 2.00                                     |                                                     | 2.00                                     | ,                                           | 3                                | 67                                                           | ŏ                                                                        | ō                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | 0                                                                               |
| n-Propylbenzene                              | 1.00                                     |                                                     | 14.00                                    | 2                                           | •                                | 01                                                           | -                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                           |                                                                                 |
| Semivolatile Organic Compounds (ug/kg)       |                                          |                                                     |                                          |                                             |                                  |                                                              |                                                                          | _                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                           | 0                                                                               |
| 2-Mathvineshthelens                          | 490.00                                   |                                                     | 1600.00                                  | 2                                           | 3                                | 67                                                           | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | 0                                                                               |
| Acenaphthene                                 | 2300.00                                  |                                                     | 2300.00                                  | 1                                           | 3                                | 33                                                           | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ŏ                                                                         | ŏ                                                                               |
| Acenaphthylene                               | 490.00                                   |                                                     | 1100.00                                  | 2                                           | 3                                | 87                                                           |                                                                          | ő                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ò                                                                         | ō                                                                               |
| Anthracene                                   | 440,00                                   |                                                     | 16000.00                                 | 3                                           | 3                                | 100                                                          | 3                                                                        | ŏ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 100                                                                       | 0                                                                               |
| Benzo(a) anthracene                          | 6500.00                                  |                                                     | 34000.00                                 | 3                                           | ă                                | 100                                                          | 3                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 100                                                                       | 0                                                                               |
| Benzelelpyrene                               | 2200.00                                  |                                                     | 36000.00                                 | 3                                           | ž                                | 100                                                          | 2                                                                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 67                                                                        | 33                                                                              |
| Benzo (b) fluorenthene                       | 1400.00                                  |                                                     | 14000.00                                 | 3                                           | 3                                | 100                                                          | 0                                                                        | o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | 0                                                                               |
| Benzelg,n,iperviene<br>Remzelki livezentiene | 2700.00                                  |                                                     | \$6000.00                                | 3                                           | 3                                | 100                                                          | 2                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 67                                                                        | 0                                                                               |
|                                              | 3600.00                                  |                                                     | 3600.00                                  | 1                                           | 3                                | 33                                                           | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | ő                                                                               |
| Chrynada                                     | 4800.00                                  |                                                     | 61000.00                                 | 3                                           | 3                                | 100                                                          | 1                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | . 47                                                                      | ŏ                                                                               |
| Dibergola,h)entivacene                       | 900.00                                   |                                                     | 4600.00                                  | 2                                           | 3                                | 67                                                           | 2                                                                        | ů                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | 0                                                                               |
| Dibertofuren                                 | 3300.00                                  |                                                     | 3300.00                                  | 1                                           | 3                                | 33                                                           | ŏ                                                                        | ő                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ō                                                                         | 0                                                                               |
| Fluoranthene                                 | 1200.00                                  |                                                     | 5500.00                                  | 3                                           | 3                                | 67                                                           | õ                                                                        | ò                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | 0                                                                               |
| Fluorene                                     | 3400.00                                  |                                                     | 14000.00                                 | 2                                           | 3                                | 67                                                           | i                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33                                                                        | 0                                                                               |
| Indeno(1,2,3-od)pyrene                       | 2400.00                                  |                                                     | 2000.00                                  | ī                                           | 3                                | 33                                                           | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | 0                                                                               |
| Naphthalene                                  | 1000.00                                  |                                                     | 84000.00                                 | 3                                           | 3                                | 100                                                          | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | 0                                                                               |
| Pyrana                                       | 5400.00                                  |                                                     | 120000.00                                | 3                                           | 3                                | 100                                                          | 0                                                                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | U                                                                         | 33                                                                              |
| Pesticide/PC8+ (ug/kg)                       |                                          |                                                     |                                          |                                             |                                  |                                                              |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                           |                                                                                 |
|                                              | 15.00                                    |                                                     | 15.00                                    | 1                                           | 3                                | 33                                                           | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | 0                                                                               |
| Dialdrift                                    | 13.00                                    |                                                     | 13.00                                    | 1                                           | 3                                | 33                                                           | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                                                         | 0 \                                                                             |
| Englin<br>Englis - Mahyda                    | 9.00                                     |                                                     | 9.00                                     | 1                                           | 3                                | 33                                                           | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | . 0                                                                       | 0                                                                               |
| Endrin katone                                | 69.00                                    |                                                     | 69,00                                    | 1                                           | 3                                | 33                                                           | 0                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ň                                                                         | õ                                                                               |
| Heptechler epoxide                           | 16.00                                    |                                                     | 16.00                                    | 1                                           | 3                                | 33                                                           | 0                                                                        | ů                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ŏ                                                                         | 0                                                                               |
| Methoxychior                                 | 1600.00                                  |                                                     | 1600.00                                  | 1                                           | 3                                | 33                                                           | U                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ·                                                                         |                                                                                 |

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Table 5-7. Summary of Detected Concentrations of All Constituents in Soli Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

| Constituent                            | Minimum<br>Quantifiable<br>Concentration | Geometric <sup>1</sup><br>Meen<br>Quantifisble<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of '<br>. Semples<br>Analyzed | Percent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soll Criteria | Number of Samples<br>Exceeding NJDEP<br>Impect to Groundwater<br>Soll Criteria | Percent of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criteria | Percent of Samples<br>Exceeding NJDEP<br>Impect to Groundwater<br>Soli Criterie |
|----------------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|--------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                        |                                          |                                                                 |                                          | Stockpi                                     | ie Area (co                          | ntinued)                                                     |                                                                          |                                                                                |                                                                           | ,                                                                               |
| Inorganica (mg/kg)                     |                                          |                                                                 |                                          |                                             |                                      |                                                              |                                                                          |                                                                                |                                                                           | 0                                                                               |
| Aluminum                               | 1050.00                                  |                                                                 | 00.000B                                  | 3                                           | 3                                    | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | ŏ                                                                               |
| Antimony                               | 5.60                                     |                                                                 | 5.80                                     | 1                                           | 3                                    | 33                                                           | 2                                                                        | ŏ                                                                              | 100                                                                       | 0                                                                               |
| Areenic                                | 42.80                                    |                                                                 | 104.00                                   | 3,                                          | 3                                    | 100                                                          | ő                                                                        | ŏ                                                                              | 0                                                                         | 0                                                                               |
| Barium                                 | 28.80                                    |                                                                 | 81,60                                    | 3                                           | 3                                    | 100                                                          | ō                                                                        | Ó                                                                              | 0                                                                         | o                                                                               |
| Beryillum                              | 0.09                                     |                                                                 | 0.65                                     | 1                                           | 3                                    | 33                                                           | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Cadmium                                | 0,40                                     |                                                                 | E3700.00                                 | 3                                           | 3                                    | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Celcium                                | 870.00                                   |                                                                 | 458.00                                   | 6                                           | 6                                    | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
|                                        | 4.00                                     |                                                                 | 10.60                                    | 3                                           | 3                                    | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | č                                                                               |
| Cober                                  | 44.60                                    |                                                                 | 165.00                                   | 3                                           | 3                                    | 100                                                          | 0                                                                        | 0                                                                              | Ň                                                                         | ŏ                                                                               |
| Cuenida                                | 30.70                                    |                                                                 | 30.70                                    | 1                                           | 3                                    | 33                                                           | 0                                                                        | 0                                                                              | ő                                                                         | ō                                                                               |
| kon                                    | 10500.00                                 |                                                                 | 16600.00                                 | 3                                           | 3                                    | 100                                                          | Š                                                                        | ů,                                                                             | ō                                                                         | 0                                                                               |
| Land                                   | 155.00                                   |                                                                 | 331,00                                   | 3                                           | 3                                    | 100                                                          | Å                                                                        | ō                                                                              | ō                                                                         | 0                                                                               |
| Magnesium                              | 525.00                                   |                                                                 | 6290.00                                  | 3                                           | 3                                    | 100                                                          | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Menganese                              | 30.30                                    |                                                                 | 249.00                                   | 3                                           | 3                                    | 100                                                          | ō,                                                                       | 0                                                                              | 0                                                                         | 0                                                                               |
| Mercury                                | 1.30                                     |                                                                 | 2.00                                     | 3                                           | 3                                    | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Nickel                                 | 8.60                                     |                                                                 | 1320.00                                  | 3                                           | 3                                    | 100                                                          | 0                                                                        | <b>\$</b>                                                                      | 0                                                                         | 0                                                                               |
| Poteelum                               | 401.00                                   |                                                                 | 4.80                                     | 3                                           | 3                                    | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | ő                                                                               |
| Selenium                               | 0.00                                     |                                                                 | 0.54                                     | z                                           | 3                                    | 67                                                           | •                                                                        | 0                                                                              | 0                                                                         | õ                                                                               |
| Silver                                 | 599.00                                   |                                                                 | 589.00                                   | 1                                           | 3                                    | 33                                                           | 0                                                                        | 0                                                                              | 0                                                                         | ě                                                                               |
| Social                                 | 12.50                                    |                                                                 | 15.90                                    | 3                                           | 3                                    | 100                                                          | 0                                                                        | Ň                                                                              | ŏ                                                                         | 0                                                                               |
| Zior                                   | 36.10                                    |                                                                 | 208.00                                   | 3                                           | 3                                    | 100                                                          | 0                                                                        | Ŷ                                                                              | •                                                                         |                                                                                 |
| 411 <del>~</del>                       |                                          |                                                                 |                                          | MD                                          | C Building                           | Area                                                         |                                                                          |                                                                                |                                                                           |                                                                                 |
|                                        |                                          |                                                                 |                                          |                                             | •                                    |                                                              |                                                                          |                                                                                |                                                                           |                                                                                 |
| Volstile Organic Compounds (ug/kg)     |                                          |                                                                 |                                          |                                             |                                      |                                                              | _                                                                        | •                                                                              | 0                                                                         | 0                                                                               |
| Tabulh and one                         | 1.00                                     |                                                                 | 1.00                                     | ٦                                           | 1                                    | 100                                                          | 0                                                                        | 0                                                                              | ŏ                                                                         | ò                                                                               |
| Frukipeuraum                           | 1,00                                     |                                                                 | 1.00                                     | 1                                           | 1                                    | 100                                                          | 0                                                                        | ŏ                                                                              | ō                                                                         | 0                                                                               |
| Tokena                                 | 2.00                                     |                                                                 | z.00                                     | 1                                           | 1                                    | 100                                                          | ŏ                                                                        | ŏ                                                                              | ò                                                                         | 0                                                                               |
| Xylenes (Total)                        | 7.00                                     |                                                                 | 7.00                                     | 1                                           | 1                                    | 100                                                          | •                                                                        |                                                                                |                                                                           |                                                                                 |
| Semivoletile Organic Compounds (ug/kg) |                                          |                                                                 |                                          |                                             |                                      |                                                              | •                                                                        | •                                                                              | 0                                                                         | 0                                                                               |
|                                        | 200.00                                   |                                                                 | 200.00                                   | 1                                           | 1                                    | 100                                                          | 0                                                                        | e e                                                                            | ŏ                                                                         | 0                                                                               |
| Benzolejevine<br>Restolejevine         | 270.00                                   |                                                                 | 270.00                                   | 1                                           | 1                                    | 100                                                          | Š                                                                        | c c                                                                            | ò                                                                         | 0                                                                               |
| Berrothilluorenthene                   | 610.00                                   |                                                                 | 510,00                                   | 1                                           | !                                    | 100                                                          | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Banzolkifluoranthene                   | 490.00                                   |                                                                 | 490.00                                   | 1                                           |                                      | 100                                                          | ŏ                                                                        | ¢.                                                                             | 0                                                                         | 0                                                                               |
| Chrysens                               | 230.00                                   |                                                                 | 230.00                                   | 1                                           | -                                    | 100                                                          | ò                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Di-n-ostyl phthelete                   | 47.00                                    |                                                                 | 47,00                                    | 4                                           | i                                    | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Fluorenthene                           | 150.00                                   |                                                                 | 64.00                                    | i                                           | 1                                    | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | 0                                                                               |
| Naphthálana                            | · 64,00                                  |                                                                 | 150.00                                   | 1                                           | T                                    | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | ŏ                                                                               |
| Phenenthrene                           | 160.00                                   |                                                                 | 480.00                                   | 1                                           | 1                                    | 100                                                          | 0                                                                        | 0                                                                              | 0                                                                         | õ                                                                               |
| Pyrene<br>Na fata la sudiatatata       | 1000.00                                  |                                                                 | 1000.00                                  | 1                                           | 1                                    | 100                                                          | 0                                                                        | 0                                                                              | ŏ                                                                         | ò                                                                               |
| Bie (2-6 thý hex y i pritie ate        | 7030.00                                  |                                                                 | 7030.00                                  | 1                                           | 1                                    | 100                                                          | 0                                                                        | ŏ                                                                              | ō                                                                         | 0                                                                               |
|                                        | 0.82                                     |                                                                 | 0.82                                     | 1                                           | 1                                    | 100                                                          | ŏ                                                                        | ō                                                                              | o                                                                         | 0                                                                               |
| Amenic                                 | 10.00                                    |                                                                 | 10.00                                    | !                                           | 1                                    | 100                                                          | ŏ                                                                        | ō                                                                              | 0                                                                         | 0                                                                               |
| Berlum                                 | 107.00                                   |                                                                 | 107.00                                   | 1                                           | 1                                    | 100                                                          |                                                                          |                                                                                |                                                                           |                                                                                 |

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Table 5-7. Summary of Detected Concentrations of Ali Constituents in Seil Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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| Constituent                    | Minimum<br>Quentifieble<br>Concentration | Geometric <sup>1</sup><br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Cencentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | Percent of<br>Semples with<br>Quantifiable<br>Concentrations | Number of Semples<br>Exceeding NJDEP<br>Non-Residential<br>Soli Criteria | Number of Semples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soll Criteria | Percent of Samples<br>Exceeding NJDEP<br>Non-Residential<br>Soil Criterie | Percent of Semples<br>Exceeding NJDEP<br>Impact to Groundwater<br>Soil Criteria |
|--------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                |                                          |                                                                 |                                          | MDC Buil                                    | ding Ares (                      | continued)                                                   |                                                                          |                                                                                |                                                                           |                                                                                 |
| Inorgenics (mg/kg) (continued) |                                          |                                                                 |                                          |                                             |                                  |                                                              | _                                                                        |                                                                                | •                                                                         | •                                                                               |
| Berylikum                      | 0.18                                     |                                                                 | 0.18                                     | \$                                          | 1                                | 100                                                          | 0                                                                        | 0                                                                              |                                                                           | ő                                                                               |
| Cadmium                        | 0.52                                     |                                                                 | 0.82                                     | 1                                           | 1                                | 100                                                          | 0                                                                        | 0                                                                              | Ň                                                                         | ő                                                                               |
| Caletum                        | 21200.00                                 |                                                                 | 21200.00                                 | 1,                                          | 1                                | 100                                                          | 0                                                                        | 0                                                                              | Ň                                                                         | ŏ                                                                               |
| Chromium                       | 8.20                                     |                                                                 | 37.50                                    | 3                                           | 3                                | 100                                                          | 0                                                                        | 0                                                                              |                                                                           | ŏ                                                                               |
| Cobalt                         | 6.90                                     |                                                                 | 6.90                                     | 1                                           | 1 4                              | 100                                                          | 0                                                                        | ě.                                                                             | ŏ                                                                         | ō                                                                               |
| Conter                         | 85,30                                    |                                                                 | 85.30                                    | 1                                           | 1                                | 100                                                          | 0                                                                        | ŏ                                                                              | č                                                                         | . 0                                                                             |
| line                           | 19500.00                                 |                                                                 | 19800.00                                 | 1                                           | 1                                | 100                                                          |                                                                          |                                                                                | ò                                                                         | 0                                                                               |
| Laat                           | 528.00                                   |                                                                 | 528.00                                   | 1                                           | 1                                | 100                                                          | 0                                                                        | ő                                                                              | ŏ                                                                         | ō                                                                               |
| Megnesium                      | 4190.00                                  | •                                                               | 4190.00                                  | 1                                           | ,                                | 190                                                          | U                                                                        | , i i i i i i i i i i i i i i i i i i i                                        | ě                                                                         | ő                                                                               |
| Managemen                      | 154.00                                   |                                                                 | 154.00                                   | 1                                           | 1                                | 100                                                          | 0                                                                        | ž                                                                              | ò                                                                         | ō                                                                               |
| Maraury                        | 0.88                                     |                                                                 | 0.88                                     | 1                                           | 1                                | 100                                                          | 0                                                                        | ě                                                                              | ň                                                                         | ò                                                                               |
| Nickel                         | 51.60                                    |                                                                 | 61.60                                    | 1                                           | 1                                | 100                                                          | ů.                                                                       | ŏ                                                                              | ō                                                                         | 0                                                                               |
| Potenelum                      | 851.00                                   |                                                                 | 851.00                                   | 1                                           | 1                                | 100                                                          | ů,                                                                       | ŏ                                                                              | ő                                                                         | 0                                                                               |
| Silver                         | 0.10                                     |                                                                 | 0.10                                     | 1                                           | 1                                | 100                                                          | 0                                                                        | č                                                                              | ŏ                                                                         | ō                                                                               |
| Satur                          | 1510.00                                  |                                                                 | 1610,00                                  | 1                                           | 1                                | 100                                                          | 0                                                                        | Ň                                                                              | ő                                                                         | ō                                                                               |
| Venditm                        | 37.60                                    |                                                                 | 37, <del>6</del> 0                       | 1                                           | 1                                | 100                                                          | 0                                                                        | ě                                                                              | 0                                                                         | ō                                                                               |
| Zins                           | 111.00                                   |                                                                 | 111.00                                   | 1                                           | 1                                | 100                                                          | U                                                                        |                                                                                |                                                                           |                                                                                 |

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Ranges of concentrations and exceedances do not inicude quality essurance/quality control semples such as replicates, field blanks, and metrix apike/metrix apike duplicates.

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NJDEP New Jersey Department of Environmental Protection.

Polychlorinated biphanyte.

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PC8¢

Milligram per kilogram (parts per million), mg/kg

Microgram per kilogram (parts per billion). ug/kg

Geometric mean provided only for whole site summery, not for individual area data.

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| Table 5-8. Hydrocarbon and NAPL Observations in Soil and | Temporary Well Points Installed During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey. |
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|                                            |                                  | Borehole and Soil Measurements/Observations                              |                                       | Temporary W                     | ell Point Mean                 | arementa/Obs                   | สารนี้ยาม                                 |                                                               |                                               |
|--------------------------------------------|----------------------------------|--------------------------------------------------------------------------|---------------------------------------|---------------------------------|--------------------------------|--------------------------------|-------------------------------------------|---------------------------------------------------------------|-----------------------------------------------|
| Boring Identification/<br>Well Designation | Depth of<br>Borehole<br>(ft bis) | Description of<br>Hydrocarbon Observations<br>in Soil                    | Depth to<br>Saturated Soil<br>(R bis) | Scrooned<br>Interval<br>(R bis) | Days"<br>After<br>Installation | Depth'<br>to Water<br>(ft bmp) | Depth <sup>1</sup><br>to NAPL<br>(ft bmp) | Maximum <sup>3</sup><br>Apparent<br>NAPL<br>Thickness<br>(ft) | NAPL Observations                             |
| "A" -Hill Tank Area                        |                                  |                                                                          |                                       |                                 |                                |                                |                                           |                                                               |                                               |
| AHTFSBI                                    | 14                               | HC 3.0 to 3.5 ft bis; at 10.0 to 14.0 ft bis; strong, odor.              | 4                                     | 0-10                            | 6                              | 7.38                           | 4.2                                       | 3.28                                                          | Lagni orown product.                          |
| AHTFSB2                                    | 12                               | HC 0.0 to 6.0 ft bis.                                                    | 6                                     | 0-12                            | 6                              | 4.13                           | 4.03                                      | 0.11                                                          | Clear light brown product.                    |
| AHTF383                                    | 18                               | No HC observed; location initially selected for groundwater sample.      | 10                                    | 0-15                            | 14                             | 15.20                          | 14.32                                     | 0. <b>88</b>                                                  | Clear cil.                                    |
| AHTF3B4                                    | 14                               | No HC observed.                                                          | 6                                     | 0-10                            | 6                              | 9.16                           | 3.19                                      | 6.83                                                          | Light brown, clear product.                   |
| ube Oil Area                               |                                  |                                                                          |                                       |                                 |                                |                                |                                           |                                                               | فمنشحت متحاد بويسينا فكرا                     |
| , <b>03</b> B1                             | 16                               | Trace HC and trace sheen on water 4.0 to<br>10.0 ft bls.                 | 8                                     | 0-10                            | 9                              | 6.89                           | 5.89                                      | 1.0                                                           | Light brown, clear product.                   |
| LOSB2                                      | 12                               | Light HC residuum 2.5 to 3.0 ft bis;<br>semi-residuum 5.0 to 9.0 ft bis. | 2.5                                   | 0-11                            | 12                             | 3.4                            | N <b>3</b>                                | 0.05                                                          | Brownish/green product.                       |
| .OSB3                                      | 12                               | HC 4.0 to 12.0 ft bis.                                                   | 3                                     | 0-10                            | 10                             | 6.24                           | 6,01                                      | 0.23                                                          | Light brown product.                          |
| LOSB4                                      | 14                               | HC 4.0 to 6.0 ft bis. Trace droplets of brown oil.                       | 4                                     | 0-10                            | 14                             | 6.29                           | NS                                        | Тгвое                                                         | No NAPL observed.                             |
| .0585/<br>WD GMMW1                         | 14                               | Brown HC residuum 2.0 to 10.0 ft bls.                                    | 3.7                                   | 2.5-12.5                        | 10                             | 4.5                            | 4.0                                       | 1.75                                                          | Brown clear to dark brown product.            |
| 0586                                       | 12                               | No HC observed.                                                          | 3.5                                   | A                               |                                |                                |                                           | 0                                                             | No NAPL observed.                             |
| ,OSB7                                      | 5                                | Brown HC residuum in soil and sheen 2.0 to 6.0                           | 4.3                                   | 0-5                             | 12                             | 1.78                           | N5                                        | Truce                                                         | No NAPL observed.                             |
| 0185                                       | 16                               | HC 2.0 to 12.0 ft bla.                                                   | 8                                     | 0-15                            | 10                             | 10.42                          | 8.42                                      | 3.23                                                          | Light brown product.                          |
| LOSE?                                      | 14                               | Black oly HC-like material with wax-like material<br>6.0 to 8.0 ft bla.  | 5.8                                   | 0-10                            | 13                             | 6.43                           | NS                                        | Тлюк                                                          | Thick black oil on bailer, trace<br>floating. |
| .OSB10                                     | 16                               | HC in sends, 12.0 to 13.5 ft bls.                                        | 12                                    | 0-10                            | 10                             | 6.23                           | 6.22                                      | 0.30                                                          |                                               |
| .O3B11                                     | 14                               | HC 3.0 to 7.0 ft blu.                                                    | -8.5                                  | 0-14                            | 15                             | 4.22                           | 4.1                                       | 0.12                                                          | Light brown weathered oil.                    |
| LOSB12                                     | 14                               | HC on soil 2.0 to 6.0 ft bis; brown fluid HC 6.0<br>to 12.0 ft bis.      | 5                                     | 0-14                            | 13                             | 5.71                           | NS                                        | Trace                                                         | Brown westhered oil, this film on probe.      |
| LOSBIJ                                     | 16                               | HC stains 0.0 to 8.0 ft bis.                                             | 8                                     | 0-10                            | 9                              | 6.43                           | NS                                        | 0.02                                                          | Thick, brown oil on probe.                    |
| 09814                                      | 15                               | HC 7.0 to 8.5 ft bls. Brown oil.                                         | 7                                     | 0-15                            | 15                             | 4.42                           | NS                                        | Trace                                                         | No NAPL observed.                             |
|                                            | -*                               | No NC observed                                                           | 2                                     | ٨                               |                                |                                |                                           | 0                                                             | No NAPL observed.                             |

See last page for footnotes.

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#### Table 5-8. Hydrocarbon and NAPL Observations in Soil and Temporary Well Points Installed During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

|                                            |                                  | Borehole and Soil Measurements/Observations                                                                                                                               |                                        | Тепротыу W                       | el Point Mean                              | urements/Obs                               | ervationa                                 |                                                               |                               |
|--------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|--------------------------------------------|--------------------------------------------|-------------------------------------------|---------------------------------------------------------------|-------------------------------|
| Boring Identification/<br>Well Designation | Depth of<br>Borshole<br>(ft bis) | Description of<br>Hydrocarbon Observations<br>in Soil                                                                                                                     | Depth to<br>Saturnied Soil<br>(ft bis) | Screened<br>interval<br>(ft bis) | Days <sup>1</sup><br>After<br>installation | Depth <sup>1</sup><br>to Water<br>(ft bmp) | Depth <sup>1</sup><br>to NAPL<br>(ft bmp) | Maximum <sup>2</sup><br>Apparent<br>NAPL<br>Thickness<br>(ft) | NAPL Observations             |
| Late Oil Area (continued)                  | ·                                |                                                                                                                                                                           |                                        | _                                |                                            |                                            |                                           |                                                               |                               |
| LOSB16                                     | 14                               | Trace HC 10.0 to 12.0 ft bis. HC 5.0 to 6.0 ft bis.                                                                                                                       | 10                                     | 3-13                             | 15                                         | 7.21                                       | 7.18                                      | 0.03                                                          | Brows weathered oil.          |
| LOSB17                                     | 3                                | No HC observed.                                                                                                                                                           | NA                                     | ٨                                |                                            |                                            |                                           | 0                                                             | No NAPL observed.             |
| LOSBIS                                     | 14                               | Wax bits 2.0 to 10.0 ft bis.                                                                                                                                              | NA                                     | ٨                                |                                            |                                            |                                           | o                                                             | No NAPL observed.             |
| • LAIRMƏI                                  | 12                               | Brown HC residuum 4.0 to 10.0 ft bis.                                                                                                                                     | 4                                      | 0-10                             | 2                                          | 1.87                                       | 1.85                                      | 0.02                                                          | Clear to light brown product. |
| * LAIRMB2                                  | 9                                | Oil at 1.5 ft bis; spoons coated with oil/water/alt<br>and heavy sheet 4.0 to 8.0 ft bis; odor and<br>sheet.                                                              | 1.5                                    | Q-9                              | 14 .                                       | 4.07                                       | N3                                        | Trace                                                         | Light brown product.          |
| * LAIRMB3                                  | 12                               | No HC observed.                                                                                                                                                           | 4                                      |                                  |                                            |                                            |                                           | 0                                                             | No NAPL observed.             |
| • LAIRMB4/<br>(S) GMMW-19                  | 12                               | Clayey-like studge has heavy sheen when wend 2.0 .                                                                                                                        | 6                                      | 0-10                             | 10                                         | 3.45                                       | 3.32                                      | 0.15                                                          | Light brown, close product.   |
| • LAIRMBS                                  | 12                               | Odor, brown HC residuan droplets on spoon<br>4.0 to 6.0 ft bis; absen 6.0 to 10.0 ft bis; 10.0 to<br>12.0 spoon costed with HC residuan. Dark<br>brown, greenish product. | . 9                                    | 0-10                             | 14                                         | 5.68                                       | NS                                        | Trace                                                         | No NAPL observed.             |
| * LAIRMB6                                  | 12                               | Truce shoen at 12.0 ft bls.                                                                                                                                               | 8                                      | ٨                                |                                            |                                            |                                           | 0                                                             | No NAPL observed.             |
| • LAIRMB7                                  | 20                               | Sheens and brown to green HC residuum 5.0<br>to 16.0 ft bis. Dark brown, greenish product.                                                                                | 7.9                                    | 0-15                             | 14                                         | 8.15                                       | N5                                        | Trace                                                         | No NAPL observed.             |
| <u>Pier No. 1 Ares</u><br>PN13B2           | 16                               | HC statining 0.0 to 10.0 ft bis.                                                                                                                                          | 8                                      | 0-10                             | ,                                          | 4.98                                       | N3                                        | 0,19                                                          | Truce light brown product.    |
| No. 2 Tank Field                           |                                  |                                                                                                                                                                           |                                        |                                  |                                            |                                            |                                           |                                                               |                               |
| N2TF3B1/<br>(W) GMMW2                      | 18                               | Visual HC at 6.0 ft bis. Brown product.                                                                                                                                   | 6                                      | 6-16                             | 17                                         | 4.11                                       | NS                                        | Trace                                                         | No NAPL observed.             |
| N2TF3B2                                    | 12                               | Truce HC 4.0 to 8.0 ft bis; saturated 8.0 to 10.0<br>ft bis.                                                                                                              | 6                                      | 0-10                             | 15                                         | 6.14                                       | NS                                        | 0.03                                                          | Light brown, clear product.   |
| NZTFSBJ                                    | 14                               | HC 8.0 to 13.0; trace.                                                                                                                                                    | 6                                      | 0-14                             | 15                                         | 7.20                                       | N3                                        | Trace                                                         | Truce droplets.               |
| N2TF3B4                                    | 12                               | HC 0.0 to 11.5 ft bis. Sheen of light brown product.                                                                                                                      | 2                                      | 0-10                             | 10                                         | 5.57                                       | 5,54                                      | 0.04                                                          | Light brown oil.              |
| NZTF8B5                                    | 16                               | HC 4.0 to 8.0 ft bis.                                                                                                                                                     | 6                                      | 0-10                             | 15                                         | 7.47                                       | NS                                        | Trace                                                         | No NAPL observed.             |
| N21F884                                    | 14                               | No HC observed; stains observed.                                                                                                                                          | 6                                      | 0-10                             | 15                                         | 6.94                                       | 6.93                                      | 0.02                                                          | Droplets of elear product.    |
| 1411.980                                   |                                  | NG 5.0 in 12.0 ft bis Black product.                                                                                                                                      | 10                                     | 0-16                             | 12                                         | 9.4                                        | N3                                        | Trace                                                         | No NAPL observed.             |

See last page for footnotes.

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| Table 5-8. H | . Hydrocarbon and NAPL Observations in Soil and Temporary Well Points Installed During the F | Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey. |
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|--------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|

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| ••••••••                                   |                                  | Borshole and Soil Measurements/Observations                                                                          |                                       | Temporary W                     | ell Point Mean                             | rements/Obs                    | ervations                                  |                                  |                                      |
|--------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------|--------------------------------------------|--------------------------------|--------------------------------------------|----------------------------------|--------------------------------------|
|                                            |                                  |                                                                                                                      |                                       |                                 |                                            |                                |                                            | Maximum <sup>2</sup><br>Apparent |                                      |
| Boring Identification/<br>Well Designation | Depth of<br>Borehole<br>(ft bla) | Description of<br>Hydrocarbon Observations<br>in Soil                                                                | Depth to<br>Saturated Soil<br>(R bis) | Screened<br>interval<br>(R bis) | Days <sup>1</sup><br>After<br>Installation | Depth'<br>to Water<br>(ft bmp) | Depth <sup>1</sup><br>to NAPL<br>(ft barp) | NAPL<br>Thickness<br>(ft)        | NAPL Observations                    |
| Arphalt Plant Area                         |                                  |                                                                                                                      |                                       |                                 |                                            |                                |                                            |                                  |                                      |
| APSB2/<br>(W) GMMW3                        | 20                               | HC and water 6.0 to 16.0 ft bis.                                                                                     | 8                                     | 7-17                            | 14                                         | 9.02                           | 8,07                                       | 3.07                             | Black thick product.                 |
| Арзвэ                                      | 16                               | Tex-like HC 4.5 to 4.7 ft bis; trace HC<br>remiduum and sheen 5.5 to 7.0 ft bis; HC droplets<br>15.9 to 16.0 ft bis. | 6                                     | 0-10                            | 13                                         | 8.89                           | N3                                         | Trace                            | Shoon.                               |
| APSB4                                      | 12                               | Ter-like HC 3.5 to 4.0 ft bis; brown HC droplets.<br>Semi-viscous HC residurm, 6.0 to 10.0 ft bis.                   | 8                                     | 0-10                            | 11                                         | 7. t                           | 6.9                                        | 0.2                              | Thick black weathered oil.           |
| APSB5/<br>(W) GMMW4                        | 14                               | Black, thick HC 5.0 to 6.0 ft bis.                                                                                   | 9                                     | 4-14                            | 17                                         | 5.63                           | NS                                         | Trace                            | No NAPL observed.                    |
| APSB6                                      | 20                               | Hard black HC 3.5 to 6.0 ft bis; saturated with brown HC residums 8.0 to 10.5 ft bis.                                | 9.5                                   | 0-15                            | 10                                         | 8.40                           | 8,35                                       | 0.05                             | 7bjok bleok tar.                     |
| <u>AVGes Tank Field</u><br>AGTFSB1         | 18                               | HC 0.0 to 4.0 ft bis; seturated HC 4.0 to 14.0 ft<br>bis.                                                            | 7                                     | 0-15                            | 5                                          | 10.93                          | 8.94                                       | 1.99                             | Black oil, weathered.                |
| AGTFSB2                                    | 12                               | Black HC 2.0 to 4.0 ft bls.                                                                                          | 2                                     | 0-10                            | 7                                          | 8.46                           | 7,42                                       | 2.94                             | Thick, black product.                |
| AGTF5B3                                    | 16                               | Sheen and HC 2.0 to 9.0 ft bis.                                                                                      | 8                                     | 0-10                            | 13                                         | 6.58                           | 6.52                                       | 1.09                             | Light brown product.                 |
| AGTFSB4                                    | 14                               | HC 4.0 to 12.0 ft bls.                                                                                               | 7                                     | 0-10                            | 15                                         | 9.06                           | B.34                                       | 0.72                             | Binck westhered oil.                 |
| Exten Chemical Plant<br>ECP5B1             | 20                               | Dropiets to saturated with brown HC residuum<br>10.0 to 12.0 ft bis.                                                 | 11                                    | 0-15                            | 5                                          | 10.32                          | 8.8                                        | 1.52                             | Light brown, clear product.          |
| ECPSB2                                     | 20                               | Sheen and trace black to brown HC residuum.<br>4.0 to 12.0 R bla, and at 20.0 R bis.                                 | 10                                    | 0-20                            | 14                                         | 10.36                          | 8.78                                       | 1.58                             | Brown oil.                           |
| FCP3B3                                     |                                  | No HC observed; Refusel at 4.0 ft bis.                                                                               | NA                                    |                                 |                                            |                                |                                            | 0                                | No NAPL observed                     |
| ECPSB4                                     | 8                                | Stiff tar and black viscous residuum; sheen on<br>water 6.0 to 8.0 ft bis; called trace on field<br>forms Docietts.  | 6                                     | 0-8                             | 14                                         | 7.72                           | NS                                         | Тласе                            | No NAPL observed                     |
| ECPSB5                                     | 18                               | Seturated with brown HC residuan 6.0 to 14.0<br>R bia.                                                               | 6                                     | 0-10                            | 13                                         | 6.48                           | NS                                         | 0.11                             | Black oil.                           |
| • ECIRMB1                                  | 16                               | No HC observed.                                                                                                      | 6                                     | A                               |                                            |                                |                                            | C                                | No NAPL observed.                    |
| • ECIRMB2/<br>(3) GMMW-18                  | 12                               | Sheens and trace black to green HC residuum.<br>7.0 to 8.0 ft bla.                                                   | 4                                     | 0-10                            | 1                                          | 5.09                           | 4.59                                       | 0.55                             | Brown to light brown semi-clear oil. |

See last page for footnotes.

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#### Table 5-8. Hydrocerbon and NAPL Observations in Soil and Temporary Weil Points Installed During the Phase IA Remedial Investigation, Beyonne Plant, Beyonne, New Jensey.

| ·····                                             |                                  |                                                                                                                                                                                 | Temporary W                           | ell Point Mean                   | urementa/Obs                               | ervations                                   |                                           |                                                               |                                                                                          |
|---------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------|--------------------------------------------|---------------------------------------------|-------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Boring Identification/<br>Well Designation        | Depth of<br>Borshole<br>(ft bis) | Description of<br>Hydrocarbon, Observations<br>in Soil                                                                                                                          | Depth to<br>Saturated Soii<br>(R bia) | Screened<br>interval<br>(ft bls) | Days <sup>1</sup><br>After<br>Installation | Deptin <sup>1</sup><br>to Water<br>(ft bmp) | Depth <sup>1</sup><br>to NAPL<br>(ft bmp) | Maximum <sup>3</sup><br>Apparent<br>NAPL<br>Thickness<br>(ft) | NAPL Observations                                                                        |
| Exxon Chemical Plant (conta                       | nued)                            | · · · · · · · · · · · · · · · · · · ·                                                                                                                                           |                                       |                                  |                                            |                                             |                                           |                                                               |                                                                                          |
| * ECIRMB3                                         | 12                               | Brown HC residuum 3.5 to 6.6 ft bls.                                                                                                                                            | 4                                     | 0-10                             | 5                                          | 4.34                                        | 3.96                                      | 0.38                                                          | Light clear product.                                                                     |
| EC25B1                                            | 16                               | HC 2.0 to 12.0 ft bla.                                                                                                                                                          | 14                                    | 5-15                             | 10                                         | 9.20                                        | 8.04                                      | 1.16                                                          |                                                                                          |
| No. 3 Tank Field                                  |                                  |                                                                                                                                                                                 |                                       |                                  |                                            |                                             |                                           |                                                               |                                                                                          |
| N3TF581/<br>(¥) 0MM¥5                             | 14                               | Sheen 4.0 to 6.0 ft bis; HC residuum 8.0 to 13.0<br>ft bis.                                                                                                                     | 10                                    | 3-13                             | 21                                         | 17.63                                       | 4.32                                      | 8.29                                                          | Light brown product.                                                                     |
| N3TF5B2                                           | 12                               | Saturated with brown HC residuam 4.0 to 11.5 ft bis.                                                                                                                            | 5                                     | 0-9                              | 15                                         | 6,12                                        | NS                                        | Trace                                                         | No NAPL observed.                                                                        |
| NJTF3BJ/<br>(W) OMMW6                             | 16                               | Light brown weathered product.                                                                                                                                                  | 6.5                                   | 4-14                             | 18                                         | 10.10                                       | NS                                        | Trace                                                         | No NAPL observed.                                                                        |
| N3TFSB4                                           | 34                               | Very trace sheen; groundwater sample collected<br>but standpipe left in ground to measure HC, if<br>present.                                                                    | 4,5                                   | 0~10                             |                                            |                                             |                                           | 0                                                             | No NAPL observed.                                                                        |
| N3TF3B5                                           | 12                               | No HC observed.                                                                                                                                                                 | 8                                     | ٨                                |                                            |                                             |                                           | . 0                                                           | No NAPL observed.                                                                        |
| N3TF586                                           | 12                               | Saturated with HC residuum 3.5 to 6.0 ft bis;<br>sheens 2.3 to 8.0 ft bis. Sheen.                                                                                               | 2.3                                   | 3-8                              | 17                                         | 5.1                                         | NS                                        | Trace                                                         | No NAPL observed.                                                                        |
| N3TF5B1                                           | 12                               | Slippery soil, sheen, and trace HC 4.0 to 6.0 ft<br>bia. Light brown clear product.                                                                                             | 3.5                                   | 0-10                             | 17                                         | 2.01                                        | N3                                        | Truce                                                         | No NAPL observed.                                                                        |
| N3TF388/<br>(W) GMMW7                             | 16                               | Red to brown HC residuum 4.0 to 6.0 ft bis;<br>sheen 6.0 to 10.0 ft bis.                                                                                                        | 4                                     | 3-13                             | 21                                         | 7.70                                        | 3.05                                      | 4.65                                                          | Light brown clear product. After well<br>development, product more readily entered well. |
| N3TF8B9                                           |                                  | No HC observed.                                                                                                                                                                 | NA                                    | 0-8                              | ŝ                                          | 2.46                                        | HS                                        | 0                                                             | No NAPL observed                                                                         |
| • STFIRMB1/<br>(S) GMMW-16                        | 16                               | Light brown HC residuum costing drill rods ; HC<br>is difficult to see on soil which is a brown sand.                                                                           | 2.5                                   | 0-15                             | 6                                          | 10.23                                       | 5.21                                      | <del>6</del> .1                                               | Light brown, clear.                                                                      |
| * 3TFIRMB2                                        | 12                               | Brown HC residuum mixed with water, HC<br>residuum, and aborne 4.0 to 9.0 ft bis.                                                                                               | 4                                     | 0-8                              | 4                                          | 6.68                                        | 6.03                                      | 0.65                                                          | Light brown, clear product.                                                              |
| • JTFIRMB3/<br>(8) GMMW-17                        | 18                               | Cinders saturated with light black HC residuum<br>2.5 to 4.0 ft bla.                                                                                                            | 2.5                                   | 0-10                             | 13                                         | 3.27                                        | 3.11                                      | 0.16                                                          | Similar to product in 3TFIRMB1.                                                          |
| • 3TFIRMB4                                        | 12                               | Brown HC residuum and residuum droplets 4.0<br>to 10.0 ft bis.                                                                                                                  | 4                                     | 0-10                             | 4                                          | 5.88                                        | 5.47                                      | 0.41                                                          | . Light brown clear product.                                                             |
| <u>General Tank Field</u><br>OTFSB1/<br>(W) GMMW8 | - 20                             | Saturated with HC 6.0 to 8.0 ft bis; field<br>log states possible 2 ft floating product.<br>Semi-viscous brown HC residuum. Black oil,<br>weathered, tzr-like, heavy black oil. | 6                                     | 3-16                             | 16                                         | 5,19                                        | N\$<br>                                   | Ттвоя                                                         | No NAPL observed.                                                                        |

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| Table 5-8. | . Hydrocention and NAPL Observations in Soil and Temporary Weil Points installed During the Phase IA Remedial Investigation, Bayonne Plant, Bay | ronne, New Jersey. |
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|------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|

| <del>~~,,</del>                            |                                  | Borebole and Soil Measurements/Observations                                                                                                       | Temporary W                            | ell Point Mean                   | n en en ta /Obs                            | ervetions                                  |                                           |                                                               |                                                                                     |  |
|--------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|--------------------------------------------|--------------------------------------------|-------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|--|
| Boring Identification/<br>Well Designation | Depth of<br>Borehole<br>(ft bla) | Description of<br>Hydrocarbon Observations<br>in Soil                                                                                             | Depth to<br>Seturated Soil<br>(ft bis) | Screened<br>Interval<br>(ft bis) | Days <sup>1</sup><br>After<br>Installation | Depth <sup>1</sup><br>to Water<br>(ft bup) | Depth <sup>1</sup><br>to NAPL<br>(ft bmp) | Maximum <sup>2</sup><br>Apperent<br>NAPL<br>Thickness<br>(ft) | NAPL Observations                                                                   |  |
|                                            |                                  |                                                                                                                                                   |                                        |                                  | ·                                          |                                            |                                           |                                                               |                                                                                     |  |
| General Tank Field (continued)             |                                  |                                                                                                                                                   |                                        |                                  |                                            |                                            |                                           |                                                               |                                                                                     |  |
| (TTFSB2                                    | 16                               | Senarated with brown HC residuran 3.0 to 8.0 ft<br>bis; sheen and droplets 8.0 to 13.0 ft bis. (Black<br>cil.)                                    | 6                                      | 0-14                             | 11                                         | 5.63                                       | 5.39                                      | 0,74                                                          | Barck OL                                                                            |  |
| GTFSB3/<br>(W) GMMW9                       | 16                               | Heavy sheens 4.0 to 12.0 R bis; HC saturation<br>7.5 to 8.0 R bis. Residuum, dropiets.                                                            | 7.5                                    | 3-13                             | 16                                         | 5.16                                       | 5.15                                      | 0.01                                                          | Binck oil.                                                                          |  |
| OTF384                                     | 16                               | Sticky tar-like black HC, sheen, droplets 5.5 to<br>13.9 ft bls. (Bleck oil.)                                                                     | 5                                      | 0-15                             | 13                                         | 7.33                                       | NS                                        | Truco                                                         | No NAPL observed.                                                                   |  |
| GTFSB5                                     | 16                               | Trace shoen droplets 8.0 to 15.0 R bia. Black.<br>oil.                                                                                            | 8                                      | 0-15                             | 13                                         | 7.08                                       | NS                                        | Trace                                                         | No NAPL observed.                                                                   |  |
| GTF3B6/<br>GN/ GM/W10                      | 16                               | Saturated with coal tar 6.0 to 13.8 ft bis.                                                                                                       | 6                                      | 3-13                             | 15                                         | 5.2                                        | 5.1<br>-                                  | 0.3                                                           | Senzi-viscous brown HC susiduzta.<br>Ter-like; black oli, very viscous.             |  |
| GTF387                                     | 16                               | Tar 7.3 to 10.0 ft bir; sheen and droplets 10.0 to 12.0 ft bis.                                                                                   | 5.7                                    | 0-15                             | 13                                         | 5.96                                       | N3                                        | 0.02                                                          | Black oil.                                                                          |  |
| GTTSB                                      | 16                               | Gummy HC 2.0 to 6.0 ft bia; coal tar saturated<br>6.0 to 10.5 ft bia.                                                                             | 6                                      | 0-15                             | 5                                          | 8.2                                        | NS                                        | 1.2                                                           | Black viscous oil.                                                                  |  |
| (TTFSB9                                    | 16                               | Saturated with tar 4.0 to 10.0 ft bis; heavy about 10.0 to 16.0 ft bis.                                                                           | 5.8                                    | 0-15                             | 7 •                                        | 8.18                                       | 6.15                                      | 2.07                                                          | Semi-viscous brown HC residuum.<br>Black viscous oil, measured with tape and probe. |  |
| EGTFSB1                                    | 14                               | Visual HC and staining 6.0 to 10.0 ft bis. Sheen<br>on water table, strong odor.                                                                  | 6                                      | 0-14                             | 11                                         | 4.33                                       | N3                                        | Trace                                                         | No NAPL observed.                                                                   |  |
| • GIFIRMBI                                 | 16                               | Brown HC residuum stains spoon, moist, 6.3<br>to 7.2 R bis. (black thick product).                                                                | 7.2                                    | 0-10                             | 14                                         | 6.54                                       | NS                                        | Trace                                                         | No NAPL observed.                                                                   |  |
| • GTFIRMB2                                 | 14                               | HC visible on drill rods, on soil, and on water<br>4 0 to 9.0 ft bis. (bisck cill).                                                               | 4                                      | 0-5                              | 17                                         | 8.84                                       | N <b>S</b>                                | Treco                                                         | No NAPL observed.                                                                   |  |
| * GTFIRMB3                                 | 16                               | Cinders are lightly coaled with brown HC<br>residuum, trace sheen 8.0 to 13.0 R bis. (black<br>thick product).                                    | 10                                     | 0-10                             | 15                                         | 8.39                                       | NS                                        | Trace                                                         | No NAPL observed.                                                                   |  |
| • GTFIRMB4                                 | 18                               | Pinkish ož HC 4.0 to 8.0 ft bls.<br>(droclets and black ožy material).                                                                            | 6                                      | 0~10                             | 17                                         | 6.87                                       | N3                                        | Trace                                                         | No NAPL, observed.                                                                  |  |
| * GTFIRMB5/<br>(8) GMMW-20                 | 24                               | Adhenive tex-like stiff black HC 4.0 to 6.0 ft bis;<br>heavy shoen on water 4.0 to 10.0 ft bis; pure<br>brown HC residuum 6.0 to 22.0 ft bis.     | 2                                      | 0-20                             | 14                                         | 5,89                                       | NS                                        | 0.03                                                          | Black HC droplets on baller; dark black<br>tar-Eke HC on probe.                     |  |
| • OTFIRMB6                                 | 20                               | Sity black to gray metallic haster material 2.0 to<br>4.0 ft bia; clear to brown HC residuant gives<br>abeen; sheet on water 10.0 to 19.0 ft bis. | 9                                      | 0-15                             | 14                                         | 5.34                                       | NS                                        | 0.02                                                          | Black, viscous product.                                                             |  |

See last page for footnotes.

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| Table 5- 8. | Hydrocarbon and NAPL Observations in Soil and Temporary Weil Points Installed During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey. |
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|                                           |                                  | Revelue and Soil Meanmaniants/Observations                                               | Temporary W                            | ell Point Measu                  |                                            |                                            |                                           |                                                               |                   |
|-------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|--------------------------------------------|--------------------------------------------|-------------------------------------------|---------------------------------------------------------------|-------------------|
| Boring Kentification/<br>Well Designation | Depth of<br>Borshole<br>(ft bls) | Description of<br>Hydrocarton Observations<br>in Soil                                    | Depth to<br>Seturnted Soil<br>(ft bis) | Screened<br>interval<br>(ft bis) | Days <sup>1</sup><br>After<br>Installation | Depth <sup>1</sup><br>to Water<br>(ft bmp) | Depth <sup>1</sup><br>to NAPL<br>(ft bmp) | Maximum <sup>2</sup><br>Apparent<br>NAPL<br>Thickness<br>(ft) | NAPL Observations |
| General Tunk Field (continued)            |                                  |                                                                                          |                                        |                                  |                                            |                                            |                                           |                                                               | N                 |
| • GTFIRMB7                                | 20                               | HC saturated 6.0 to 8.0 ft bis. HC droplets.                                             | 8                                      | 5-10                             | 9                                          | 4,70                                       | NS                                        | Trace                                                         | NO NAPL OOSCIVED. |
| • OTFIRMB8                                | 20                               | HC 7.5 to 12.0 ft bis; sheen on water and spoon<br>12.0 to 20.0 ft bis. (bisolt, thick). | 10                                     | 5-15                             | 10                                         | 7.16                                       | NS                                        | Trace                                                         | No NAPL observed. |
| • GTFIRMB9                                | 12                               | No HC observed; groundwater aample was<br>collected itom this IRM boring.                | 6                                      | ί ,                              |                                            |                                            |                                           | O                                                             | No NAPL observed. |
| A ATTENDING                               | 16                               | No HC observed.                                                                          | 6                                      | ٨                                |                                            |                                            |                                           | ¢                                                             | No NAPL observed. |
| - UTRIMBIV                                |                                  |                                                                                          | 4                                      |                                  |                                            |                                            |                                           | 0                                                             | No NAPL observed. |
| * GTFIRMBII                               | •                                |                                                                                          | 6                                      |                                  |                                            |                                            |                                           | 0                                                             | No NAPL observed. |
| • GTFIRMB12                               | 12                               | No HC observed.                                                                          | · · · ·                                |                                  |                                            |                                            |                                           | 0                                                             | No NAPL observed. |
| • OTFIRMBIS                               | 16                               | No HC observed.                                                                          | •                                      |                                  |                                            |                                            |                                           | 0                                                             | No NAPL observed  |
| * OTFIRMB14                               | 18                               | No HC observed.                                                                          | 8                                      | •                                |                                            |                                            |                                           | •                                                             | No NAPL observed. |
| • OTFIRMB15                               | 12                               | Trace black bound HC smears on gloves 2.0 to<br>4.0 ft bis and 8.0 to 10.0 ft bis.       | 4                                      | *                                |                                            |                                            |                                           | U                                                             |                   |
| • GTFIRMB16                               | 12                               | Very trace sheen on water pouring from spoons<br>6.0 to 12.0 ft bis.                     | 4                                      | <b>0-10</b>                      | 13                                         | 4.42                                       | 4.41                                      | Trace                                                         | Sneed.            |
| • OTFIRMB17                               | 10                               | No HC observed.                                                                          | 5.5                                    | *                                |                                            |                                            |                                           | 0                                                             | Ne NAPL observed. |
| • GTFIRME18                               | 18                               | Black to brown HC in soil 6.0 to 12.0 ft bis.                                            | 6                                      | 6-10                             | 13                                         | 4.7                                        | NS                                        | Ттьов                                                         | NO NAPL observed. |
| Solvent Tenk Field                        |                                  |                                                                                          |                                        | A.10                             | 13                                         | 6.24                                       | 6.17                                      | 0.11                                                          |                   |
| STFSBI                                    | 14                               | Vistal HC 2.0 to 12.0 ft bis.                                                            | 2                                      | -10                              |                                            | 4 75                                       | 4.26                                      | 0.02                                                          |                   |
| STF3B2                                    | 16                               | Visual HC 4.0 to 14 R bis.                                                               | 4                                      | 0-10                             | 14                                         | 4.64                                       | NR                                        | 0.03                                                          |                   |
| STF583                                    | 34                               | Visual HC 4.0 to 10.0 ft bls.                                                            | 4                                      | 0-10                             | 12                                         | 4.90                                       | 143                                       | 0.01                                                          |                   |
| GFSB1/<br>(W) GMMW14                      | 16                               | Heavy black oil and oily cinders 4.0 to 8.0 ft bla.                                      | 7                                      | 4-14                             | 14 '                                       | 5.35                                       | N5                                        | Тльсе                                                         | No NAPL observed. |
| Piers and East Side                       |                                  |                                                                                          |                                        |                                  |                                            |                                            |                                           |                                                               |                   |
| Treatment Plant Area<br>PESTSB1           | 20                               | HC residum, sridescent absen 4.0 to 8.0 ft bis.                                          | 10                                     | 0-10                             | 6                                          | 7.11                                       | 7,1                                       | 0.01                                                          |                   |
| PESTSB2                                   | 20                               | HC residuum is a silty slurry 8.0 to 12.0 ft bis.                                        | 10                                     | 0-10                             | 6                                          | 6.54                                       | 6,38                                      | 0.16                                                          |                   |

See last page for footnotes.

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|                                            | Temporary W                      |                                                                                                                                 |                                         |                                  |                                            |                                            |                                           |                                                               |                   |
|--------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------|--------------------------------------------|--------------------------------------------|-------------------------------------------|---------------------------------------------------------------|-------------------|
| Boring Identification/<br>Well Designation | Depth of<br>Borehole<br>(ft bis) | Description of<br>Hydrocarbon Observations<br>in Soil                                                                           | Depth to<br>Secturated Soil<br>(ft bis) | Screened<br>Interval<br>(ft bis) | Deys <sup>1</sup><br>After<br>Installation | Depth <sup>1</sup><br>to Water<br>(ft bmp) | Depth <sup>1</sup><br>to NAPL<br>(ft bmp) | Maximum <sup>a</sup><br>Apparent<br>NAPL<br>Thickness<br>(ft) | NAPL Observations |
| Domestic Trade Area                        |                                  |                                                                                                                                 |                                         |                                  |                                            |                                            |                                           |                                                               |                   |
| DTSB1/<br>(W) GMMW11                       | 18                               | No visual HC observed.                                                                                                          | 8                                       | 5.5-15                           | 13                                         | 7.3                                        | N5                                        | Тласе                                                         | No NAPL observed. |
| DTSB2                                      | 18                               | HC staining .0 to 4 ft bis; visual HC 6.0 to 6.5 ft                                                                             | ¢                                       | 0-15                             | 13                                         | 6.19                                       | 6.05                                      | 0.3                                                           |                   |
| DTSB3                                      | 14                               | Bieck HC 2 to 6.0 ft bis.                                                                                                       | 2                                       | 0-14                             | 11                                         | 4,42                                       | NS                                        | Тлюе                                                          | No NAPL observed. |
| Main Building Area                         | 16                               | Vienati HC 6.0 to 10.0 ft bis.                                                                                                  | 6                                       | 0-15                             |                                            |                                            |                                           | 0                                                             | No NAPL observed. |
| MBSB1                                      | 24                               | HC 8.0 to 22.0 ft bis costing inside and outside                                                                                | 16                                      | 0-20                             | 13                                         | 16.62                                      | 8.99                                      |                                                               | No NAPL observed. |
| MBSB3                                      | 22                               | Dropiets to trace brown to black HC residuum<br>in solis 8.0 to 12.0 ft bis: spoon ftill of HC<br>residuum 12.0 to 21.0 ft bis. | 12                                      | 0-20                             | 14                                         | 13,47                                      | 13.39                                     | 0.11                                                          |                   |
| WRSBA                                      | 16                               | HC 7.0 to 12.0 ft bis; sheen 12.0 to 14.0 ft bis.                                                                               | 10                                      | 0-15                             | 17                                         | 14.2                                       | N3                                        | Trace                                                         | No NAPL observed. |
| P53B1                                      | 6                                | HC 0.0 to 4.0 ft bia.                                                                                                           | 5                                       | 0-10                             | 9                                          | 6.97                                       | N8                                        | Trace                                                         | No NAPL observed. |
| <u>Stockgile Ares</u><br>SSB1              | 24                               | Trace HC 10.0 to 16.0 ft bis.                                                                                                   | 18                                      | 0-20                             | 15                                         | 19.11                                      | 18.21                                     | 1.25                                                          |                   |
| SSB2/                                      | 16                               | Greenish HC 2.0 to 10.0 ft bis.                                                                                                 | 4                                       | 3-13                             | 9                                          | 7,34                                       | NS                                        | Тлан                                                          |                   |
| 55B3                                       | 12                               | Trace HC 8.0 to 9.5 ft bis.                                                                                                     | 8.5                                     | 0-10                             | 11                                         | 6.62                                       | NS                                        | Trace                                                         | No NAPL observed. |
| Utilities Ares<br>19985B1/<br>(W) GMMW13   | 16                               | HC residuum 2.0 to 8.0 ft bis.                                                                                                  | 2                                       | 3-13                             | 9                                          | 5.01                                       | N3                                        | Trace                                                         |                   |
| MDC Building Area<br>MDCSB1                | 14                               |                                                                                                                                 | . 8                                     | , 0-10                           | 13                                         | 7.04                                       | 7.0                                       | 0.14                                                          |                   |
| MDCSB7/<br>(W) GMMW15                      | 17                               | HC-stained-winders below water table.                                                                                           | 10                                      | <del>5-</del> 16                 | 15                                         | 6.73                                       | 6.68                                      | 0.05                                                          |                   |

# Table 5-8. Hydrocarbon and NAPL Observations in Soil and Temporary Well Points Installed During the Phase IA Remediai Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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## Table 5-8. Hydrocurbon and NAPL Observations in Soil and Temporary Well Points Installed During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Unless otherwise noted, all soil borings and monitoring wells finted in this table were installed during the Phase IA RJ.

- Depth to NAPL and depth to water as measured in a well point or monitoring well on the last measurement event prior to borehole abandonment or conversion to a monitoring well. 1
- Maximum apparent NAPL discusses measured during the monitoring period (periodic measurements were collected at various intervals throughout the approximately 2-week monitoring period). 1
- Denotes a soli boring and/or monitoring well installed as part of the NAPL IRM investigation at the General Tank Field, No. 3 Tank Field, Ecoton Chemical Plant (Utilities Area), and Lube Oil Area.
- NAPL Non-equeous phase liquid.
- Feet below land surface. fi bla

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- Feet below measuring point, which is the top of the temporary well point at approximately land surface. ft breve
- A Feet.
- Hydroourbon. Descriptions in this table are based primarily on visual observations made by the field geologist, with assistance from other knowledgeable field personnel. Most descriptions of HC hydrocarbons is soil are sugmented by field screening data collected using an organic vapor analyzer (OVA).
- No signal from product interface probe, indicating that NAPL is not present or is not measureable with the probe. The probe usually cannot indicate/measure a NAPL layer that is too thin or that is in NS separate globules or droplets.
- Trace less than 0.01 foot, represented by a sheen; not measurable using an oil/water interface probe. Trece
- Temporary drivepoint installed. A
- Temporary well point. (S)
- Well (W)
- Interim Remodial Measure. IRM

NAPL measurements for Monitoring Wells GMMW1 through GMMW15 were taken only from the 4-inch permanent monitoring well that was installed immediately after the boring was drilled.

NAPL measurements for Monitoring Wells GMMW16 through GMMW20 were initially takes from the 2-inch temporary well point that was installed invinediately after the boring was dailed (measurements indicated

NOTE: In certain instances, NAPL was observed in a temporary drivepoint intended for groundwater sampling. In these instances, groundwater samples were not obtained and the drivepoint was measured for NAPL in the same fashion as the temporary well points.

|         | Apparent <sup>1</sup>  | Specific |  |
|---------|------------------------|----------|--|
|         | NAPL Thickness<br>(ft) | Gravity  |  |
| GMMW1   | 0.73                   | 0.885    |  |
| GMMW5   | 4.67                   | 0.853    |  |
| GMMW7   | 4.81                   | 0.841    |  |
| GMMW16  | 4.12                   | 0.830    |  |
| GMMW18  | 0.95                   | 0.870    |  |
| AHTFSB1 | 3.28                   | 0.820    |  |
| AHTFSB4 | 6.83                   | 0.820    |  |
| MBSB2   | 8.0                    | 0.820    |  |
| GTFSB9  | 2.07                   | 0.960    |  |
| EC2SB1  | 1.16                   | 0.968    |  |
| ECPSB2  | 1.58                   | 0.970    |  |
| AGTFSB3 | 1.09                   | 0.965    |  |
| AGTFSB4 | 0.72                   | 0.970    |  |
| SSB1    | 1.25                   | 0.916    |  |
| ITMW1   | 9.90                   | 0.830    |  |
| ITMW2   | 2.98                   | 0.870    |  |
| ITMW4   | 0.25                   | 0.971    |  |
| P7MW1   | 1.72                   | 0.900    |  |
| SHERI3  | 0.5                    | 0.936    |  |
| MW3     | 7.74                   | 0.807    |  |
| MW7     | 1.38                   | 0.790    |  |
| MW8     | 13.6                   | 0.832    |  |
| MW12    | 8.53                   | 0.797    |  |
| MW13    | 10.14                  | 0.802    |  |
| PKMW8   | 0.21                   | 0.945    |  |
| PKMW11  | 9.29                   | 0.882    |  |
| PKMW12  | 9.34                   | 0.870    |  |
| PKMW14  | 0.75                   | 0.920    |  |
| EB2     | 1.05                   | 0.901    |  |
| EB3     | 1.08                   | 0.901    |  |
| EB12    | 4.18                   | 0.910    |  |
| EB13    | 0.52                   | 0.995    |  |
| EB16    | 1.71                   | 0.885    |  |
| EB17    | 0.02                   | 0.918    |  |
| EB19    | 2.01                   | 0.907    |  |
| EB24    | 0.13                   | 0.895    |  |
| EB59    | 1.01                   | 0.862    |  |
| EB62    | 2.45                   | 0.991    |  |
| EB69    | 3.57                   | 0.990    |  |

Table 5-9. Hydrometer Test Results, Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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| Location I.D. | Apparent <sup>1</sup><br>NAPL Thickness<br>(ft) | Specific<br>Gravity |   |
|---------------|-------------------------------------------------|---------------------|---|
| FR72          | 0.64                                            | 0.851               |   |
| EB72<br>FB73  | 0.54                                            | 0.940               |   |
| EB76          | 0.74                                            | 0.889               |   |
| FB80          | 3.9                                             | 0.800               | • |
| EB81          | 0.15                                            | 0.990               |   |
| FB104         | 0.73                                            | 0.917               |   |
| FB106         | 0.70                                            | 0.927               |   |
| FBR5          | 1.7                                             | 0.885               |   |
| EBR12         | 1.03                                            | 0.865               |   |
| EBR18         | 1.05                                            | 0.852               |   |

| Table 5-9. | Hydrometer Test Results, | Phase IA | Remedial | Investigation, | Bayonne | Plant, |
|------------|--------------------------|----------|----------|----------------|---------|--------|
|            | Bayonne, New Jersey.     |          |          |                |         |        |

<sup>1</sup> NAPL samples were collected from RI/IRM standpipes or monitoring wells. Presented NAPL thicknesses are the maximum NAPL thickness measured at each location from temporary well points or at monitoring wells during the December 12, 1994 low-tide synoptic water/NAPL measuring event.

- NAPL Non-aqueous phase liquid.
- ft Feet.
- RI Remedial investigation.
- IRM Interim remedial measure.

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| Descriptive Location or<br>Operational Area                                                    | Plume<br>No. (See<br>Figure 5-5) | Apparent NAPL<br>Thickness Range<br>(feet) | Specific Gravity<br>Range | Inferred NAPL Type *                                                                                         | Currently Subject<br>to IRM | Deferred<br>to RI | ` |
|------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------|---|
| Pier 5 and East Side, Treatment Plant<br>Area, and MDC Building Area                           | 1, 2, and 3                      | 0.16 - 3.57                                | 0.851 - 0.991             | Degraded gasolines and diesel,<br>kerosene, No. 5 and No. 6 fuel oils,<br>and high viscosity lube base stock | ×                           |                   |   |
| Low Sulfur and Solvent Tank Fields                                                             | 4                                | 0.15 - 13.6                                | 0.797 - 0.99              | Gasoline and heavy fuel oils (e.g.,<br>No. 6 fuel oil).                                                      | ×                           |                   |   |
| General Tank Field                                                                             | 5 and 6                          | 0.24 - 2.07                                | 0.960                     | No. 6 fuel oil.                                                                                              |                             | x                 |   |
| AV-Gas Tank Field and Domestic<br>Trade Area (includes southern part<br>of Interceptor Trench) | 7                                | 0.20 - 9.9                                 | 0.83 - 0.970              | Diesel/aviation fuel; lube oil and<br>No. 6 fuel oils.                                                       | x                           |                   |   |
| Asphalt Plant and Exxon Chemicals Plant (includes Utilities Area)                              | 8 and 9                          | 0.11 - 4.67                                | 0.853 - 0.970             | Lube oil, No. 6 oil, and asphalt.                                                                            | x                           | x                 |   |
| No. 3 Tank Field                                                                               | 10                               | 0.16 - 4.81                                | 0.830 - 0.841             | Kerosene or cutback<br>naphtha/powerformer feedstock.                                                        | x                           |                   |   |
| No. 2 Tank Field and Main Building<br>Area (includes northern Interceptor<br>Trench area       | 11 and 12                        | 0.10 - 2.98                                | 0.87 - 0.971              | Diesel; No. 2 and No. 6 fuel oils.                                                                           | x                           | ·                 |   |
| "A"-Hill Tank Field                                                                            | 13                               | 0.11 - 8.0                                 | 0.82                      | Diesel.                                                                                                      |                             | ×                 |   |
| Lube Oil and Stockpile Area (includes<br>Platty Kill Canal)                                    | 14, 15,<br>and 16                | 0.11 - 3.23                                | 0.885 - 0.945             | Lube oil and No. 2 fuel oil.                                                                                 | x                           | x                 |   |
| Pier No. 1 (includes Helipad Area)                                                             | 17                               | 0.38 - 4.18                                | 0.885 - 0.995             | Lube oil/No. 6 oil.                                                                                          | ×                           |                   |   |

Table 5-10. Summary of NAPL Findings, Bayonne Plant, Bayonne, New Jersey

Based on specific gravity measurements and operating characteristics.

NAPL Non-aqueous phase liquid.

IRM Interim remedial investigation.

RI Remedial investigation.

AV Aviation gasoline.

MDC Metropolitan Distribution Center.

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Groundwater        |            |             |             |             |             |             |             |             |             |             |             |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Quality Standard   |            |             |             |             |             |             |             |             |             |             |             |             |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | (Higher of POI s)  | Date:      | 01/26/95    | 01/26/95    | 01/25/95    | 01/24/95    | 01/27/95    | 01/24/95    | 01/25/95    | 01/25/95    | 01/25/95    | 01/25/95    | 01/23/95    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | trugilor of 1 deor |            |             |             |             |             |             |             |             |             |             |             |             |
| Total Petroleum Hydrocarbons<br>{mg/L}                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1.0                |            | <u>17.4</u> | <u>6,62</u> | <u>25,3</u> | <u>10.7</u> | <u>10.2</u> | <u>12.9</u> | <u>16.9</u> | <u>42.1</u> | <u>13.9</u> | <u>16,6</u> | <u>21.5</u> |
| Volatile Organic Compounds (ug/L)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |            |             |             |             |             |             |             |             |             |             |             | 1011        |
| 1.1.1.Trichiorosthana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 30                 |            | 10U         | 100         | 100         | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 100         |
| 1.1.2.2.Tetrachioroathana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2                  |            | 10UJ        | 10UJ        | 10UJ        | 10UJ        | 10UJ        | 100J        | 10UJ        | 10UJ        | 1005        | 1005        | 1005        |
| 1,1,2,2,100 activity of the second seco | 3                  |            | 100         | 100         | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         |
| 1.1-Dichloroethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 70                 |            | 100         | 10U         | 10U         | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 100         |
| 1.1-Dichloroethene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2                  |            | 100         | 10U         | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 2011        | 2011        |
| 1, 2-Dibromoethene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |            | 20U         | 20U         | 20U         | 20UJ        | 20U         | 20UJ        | 200         | 200         | 100         | 1011        | 100         |
| 1.2-Dishloroethene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2                  |            | 10U         | 10U         | 100         | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 100         |
| 1.2. Dichloroethane(Total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 110                |            | 10U         | 100         | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         |
| 1.2-Dichloropropaga                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1                  |            | 10U         | 10U         | 10U         | 100         | 10U         | 100         | 100         | 100         | F00U        | 50011       | 5000        |
| 1 Rutanel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |            | 500U        | 500U        | 500U        | 500U        | 500U        | 500U        | 5000        | 5000        | 5000        | 5000        | 5000        |
| 2 Butanol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |            | 500U        | 500U        | 500U        | 500U        | 500U        | 500U        | 5000        | 1000        | 10111       | 1011        | 10UJ        |
| 2-Butenone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 300                |            | 10UJ        | 10UJ        | 10UJ        | 10UJ        | 10UJ        | 1000        | 1005        | 1005        | 1003        | 1000        | 1003        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 100 **             |            | 10UJ        | 10UJ        | 10UJ        | 10UJ        | 10UJ        | 1000        | 1003        | 5000        | 5000        | 5000        | 5000        |
| 2.Methyd-2.nronanol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 500 **             |            | 500U        | 500U        | 500U        | 500U        | 500U        | 5000        | 5000        | 5000        | 5000        | 500U        | 500U        |
| 2-Propagol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |            | 500U        | 500U        | 500U        | 500U        | 500U        | 5000        | 5000        | 100         | 100         | 100         | 100         |
| A-Methyl-7-pentanone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 400                |            | 10U         | 10U         | 10U         | 10UJ        | 100         | 1000        | 1011        | 1000        | 100         | 1000        | 1000        |
| Agetope                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 700                |            | 10UJ        | 10UJ        | 10UJ        | 10UJ        | 49J         | 1003        | 1005        | 27          | 100         | 100         | 10U         |
| Benzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                  |            | 10U         | 100         | 100         | 100         | 100         | 100         | <u>90</u>   | 1011        | 100         | 100         | 100         |
| Bromodichloromethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1                  |            | 100         | 10U         | 100         | 100         | 100         | 100         | 1000        | 100         | 100         | 100         | 100         |
| Bromoform                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4                  |            | 1000        | 10UJ        | 100         | 100         | 100         | 100         | 1005        | 100         | 100         | 100         | 100         |
| Bromomethene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10                 |            | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         |
| Carbon disulfide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -+                 |            | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 10U         | 100         |
| Carbon tetrachloride                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2                  |            | 10U         | 100         | 100         | 100         | 100         | 100         | 311         | 7100        | 12U         | 10U         | 10U         |
| Chlorobenzane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4                  |            | 10U         | 100         | 110         | 16          | 100         | 100         | 100         | 100         | 10U         | 10U         | 10U         |
| Chloroethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 100 **             |            | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         |
| Chieroform                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 6                  |            | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 1000        | 10UJ        | 10UJ        | 100         |
| Chloromethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 30                 |            | 10U         | 100         | 1000        | 100         | 1003        | 100         | 100         | 100         | 100         | 10U         | 100         |
| cis-1.3-Dichloropropene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.02               |            | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 10U         | 10U         | 100         |
| Dibromochloromethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 10                 |            | 100         | 100         | 100         | 100         | 100         | 100         | 100         |             |             |             |             |

Table 5-11. Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                                                                                                                                                                                                         | NJDEP *                                                      | Sample ID: | EB1                                                                              | E829                                                                              | EB51                                                                             | EB68                                                                               | EBR13                                                                     | EBR19                                                               | GMMW2                                                            | GMMW3                                                                 | GMMW4                                                                      | GMMW6                                                                                   | GMMW8                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Analyte                                                                                                                                                                                                                 | Ground water<br>Quality Standard<br>(Higher o <u>f PQLs)</u> | Date:      | 01/26/95                                                                         | 01/26/95                                                                          | 01/25/95                                                                         | 01/24/95                                                                           | 01/27/95                                                                  | 01/24/95                                                            | 01/25/95                                                         | 01/25/95                                                              | 01/25/95                                                                   | 01/25/95                                                                                | 01/23/95                                                                  |
| Ethylbenzene<br>Hexene<br>Methyl-t-butyl ether<br>Mathylene chloride<br>n-Propylbenzene<br>Styrene<br>Tetrachloroethene<br>Toluene<br>trans-1,3-Dichloropropene<br>Trichloroethene<br>Vinyl chloride<br>Xylenes (Totel) | 700<br><br>2<br><br>100<br>1<br>100<br>0.02<br>1<br>5<br>40  |            | 10U<br>20UJ<br>20U<br>10U<br>2J<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20UJ<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20UJ<br>20UJ<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20UJ<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 19<br>28J<br>20U<br>10U<br>16J<br>10U<br>5J<br>10U<br>10U<br>10U | 9J<br>20U<br>20U<br>10U<br>4J<br>10U<br>2J<br>10U<br>10U<br>10U<br>5J | 10U<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10UJ | 10U<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U |
| Total VOCs                                                                                                                                                                                                              |                                                              |            | 2                                                                                | 0                                                                                 | 0                                                                                | 18                                                                                 | 49                                                                        | 0                                                                   | 138                                                              | 7147                                                                  | 0                                                                          |                                                                                         |                                                                           |

Table 5-11. Total Petroleum Hydrocarbone and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                   | NJDEP *            | Sample ID: | GMMW9    | GMMW10     | GMMW11      | GMMW13      | GMMW14      | GMMW15      | GMMW17      | GMMW19      | GMMW 20     | GMMW211     | GMMW21D  |
|-----------------------------------|--------------------|------------|----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|
|                                   | Groupdwater        |            |          |            |             |             |             |             |             |             |             |             |          |
|                                   | Quality Standard   |            |          |            |             |             |             |             |             |             |             |             |          |
|                                   | (Higher of POI s)  | Date:      | 01/23/95 | 01/23/95   | 01/25/95    | 01/27/95    | 01/23/95    | 01/24/95    | 01/25/95    | 01/27/95    | 01/23/95    | 01/26/95    | 01/24/95 |
| Analyte                           | (initial of ridear |            | 01120100 |            |             |             |             |             |             |             |             |             |          |
|                                   |                    |            |          |            |             |             |             |             |             |             |             |             |          |
| Total Patrolaum Hydrocarbone      | 1.0 **             |            | 5.02     | <u>121</u> | 4,25        | <u>24.2</u> | <u>4.43</u> | <u>40,2</u> | <u>7.25</u> | <u>19,2</u> | <u>6,64</u> | <u>1.85</u> | 0.68     |
| (mall)                            |                    |            |          |            |             |             |             |             |             |             |             |             |          |
| 1                                 |                    |            |          |            |             |             |             |             |             |             |             |             |          |
| Volatile Organic Compounds (ug/L) |                    |            |          |            |             |             |             |             |             |             |             | 100         | 21011    |
| 1 1 1-Trichloroethane             | 30                 |            | 100      | 10U        | 10U         | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 3100     |
| 1.1.2.2-Tetrachloroethane         | 2                  |            | 10UJ     | 10UJ       | 10UJ        | 10UJ        | 10UJ        | 1003        | 10UJ        | 1000        | 1003        | 100         | 31005    |
| 1.1.2-Trichloroethane             | 3                  |            | 100      | 100 1      | 100         | 100         | 10U         | 100         | 100         | 100         | 100         | 100         | 3100     |
| 1.1-Dichlorosthene                | 70                 |            | 10U      | 100        | 100         | 64          | 100         | 100         | 100         | 100         | 100         | 100         | 3100     |
| 1.1-Dichioroethene                | 2                  |            | 100      | 10U        | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 20011       | 8201     |
| 1.2-Dibromosthene                 | •-                 |            | 20U      | 20U        | 20U         | 200         | 20U         | 200         | 200         | 200         | 200         | 2000        | 2101     |
| 1. 2-Dichloroethane               | 2                  |            | 10U      | 100        | 1 <b>0U</b> | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 3100     |
| 1.2-Dichloroethene(Totel)         | 110                |            | 100      | 100        | 10U         | 7J          | 7J          | 100         | 100         | 100         | 100         | 100         | 3100     |
| 1.2-Dichloropropane               | 1                  |            | 100      | 100        | 1 <b>0U</b> | 100         | 100         | 100         | 100         | 100         | 5001        | 50011       | 24000.1  |
| 1-Butanol                         | ••                 |            | 500U     | 500U       | 500U        | 500U        | 500U        | 500U        | 5000        | 5000        | 5000        | 5000        | 160000   |
| 2-Butanol                         | +=                 |            | 500U     | 500U       | 500U        | 500U        | 5000        | 5000        | 5000        | 5000        | 10111       | 100         | 310111   |
| 2-Butanone                        | 300                |            | 10UJ     | 10UJ       | 10UJ        | 10UJ        | 10UJ        | 1001        | 1001        | 1003        | 1000        | 100         | 31000    |
| 2-Hexanone                        | 100 **             |            | 10UJ     | 10UJ       | 10UJ        | 10UJ        | 10UJ        | 1003        | TOUJ        | 1003        | 5000        | 50011       | 1600000  |
| 2-Mathvi-2-propanol               | 500 **             |            | 500U     | 500U       | 500U        | 500U        | 500U        | 5000        | 5000        | 5000        | EOOU        | 5000        | 16000UJ  |
| 2-Propanoi                        |                    |            | 500U     | 500U       | 500U        | 500U        | 5000        | 5000        | 5000        | 1000        | 100         | 100         | 3100     |
| 4-Mathyl-2-pentanone              | 400                |            | 10U      | 100        | 100         | 10U         | 100         | 100         | 100         | 100         | 1001        | 100         | 4300     |
| Acetone                           | 700                |            | 10UJ     | 1003       | 10UJ        | 10UJ        | 1003        | 191         | 1005        | 1000        | 21          | 11.1        | 3100     |
| Benzene                           | 1                  |            | 100      | 100        | 100         | <u>ស</u>    | <u>73</u>   | 10          | <u> 전</u>   | 1011        | 1011        | 100         | 3100     |
| Bromodichloromethene              | 1                  |            | 100      | 100        | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 310U     |
| Bromoform                         | 4                  |            | 10U      | 100        | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 310U     |
| Bromomethane                      | 10                 |            | 10U      | 100        | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 310U     |
| Carbon disulfide                  | ••                 |            | 100      | 100        | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 310U     |
| Carbon tetrachloride              | 2                  |            | 100      | 100        | 100         | 100         | 100         | 100         | 111         | 100         | 100         | 100         | 310U     |
| Chlorobenzene                     | 4                  |            | 2J       | 100        | 10U         | 100         | ZJ          | 100         | 1011        | 100         | 100         | 100         | 3100     |
| Chloroethana                      | 100 **             |            | 100      | 100        | 100         | 65          | 100         | 100         | 100         | 100         | 100         | 100         | 310UJ    |
| Chloroform                        | 6                  |            | 100      | 10U        | 100         | 10U         | 100         | 100         | 100         | 100         | 100         | 100         | 310UJ    |
| Chloromethene                     | 30                 |            | 100      | 100        | 10UJ        | 10UJ        | 100         | 100         | 100         | 1003        | 100         | 100         | 310U     |
| cis-1.3-Dichloropropene           | 0.02               |            | 10U      | 100        | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 100         | 310U     |
| Dibromochloromethane              | 10                 |            | 10U      | 100        | 100         | 100         | 100         | 100         | 100         | 100         | 100         |             |          |
| ·····                             |                    |            |          |            |             |             |             |             |             |             |             |             |          |

Table 5-11. Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                                                                                                                                                 | NJDEP •<br>Groundwater               | Semple ID: GMMV                                     | <b>/9</b> GMMW10                                           | GMMW11                                               | GMMW13                                                      | GMMW14                                                    | GMMW15                                                     | GMMW17                                                       | GMMW19                                                     | GMMW20                                                     | GMMW211                                                        | GMMW21D                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------|------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------|
| Analyte                                                                                                                                                         | Quelity Stendard<br>(Higher of PQLs) | Date: 01/23/                                        | 95 01/23/95                                                | 01/25/95                                             | 01/27/95                                                    | 01/23/95                                                  | 01/24/95                                                   | 01/25/95                                                     | 01/27/95                                                   | 01/23/95                                                   | 01/26/95                                                       | 01/24/95                                                             |
| Ethylbenzene<br>Hexane<br>Methyl-t-butyl ether<br>Methylene chloride<br>n-Propylbenzene<br>Styrene<br>Tetrachloroethene<br>Toluene<br>trans-1,3-Dichloropropene | 700<br>                              | 100<br>200<br>200<br>100<br>200<br>100<br>100<br>10 | 10U<br>20U<br>20U<br>10U<br>6J<br>10U<br>10U<br>10U<br>10U | 10U<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U | 100<br>200<br>200<br>100<br>200<br>100<br>100<br>100<br>100 | 3J<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>2J<br>10U | 10U<br>20U<br>20UJ<br>10U<br>7J<br>10U<br>10U<br>2J<br>10U | 10U<br>20U<br>20UJ<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U | 10U<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>2J<br>10U | 2J<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U | 100<br>200U<br>200U<br>100<br>200U<br>100<br>820<br>100<br>100 | 620U<br>620U<br>310U<br>620U<br>310U<br>310U<br>310U<br>310U<br>310U |
| Trichloraethene<br>Vinyi chlaride<br>Xylenes (Total)<br>Totel VOCs                                                                                              | 1<br>5<br>40                         | 1J<br>10U<br>10U<br>4                               | 10U<br>10U<br>10U<br>6                                     | 10U<br>10UJ<br>10U<br>0                              | 10U<br>10U<br>10U<br>142                                    | 100<br>3J<br>2J<br><del>9</del> 2                         | 100<br>100<br>7J<br>45                                     | 100<br>3J<br>9                                               | 10U<br>4J<br>18                                            | 100<br>7J<br>11                                            | 370<br>100<br>3193                                             | 310U<br>310U<br>28300                                                |

Table 5-11, Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                   | NJDEP *          | Semple ID: GMMW22D | GMMW23I     | GMMW23D     | GMMW23DFR   | GMMW24I      | GMMW24IFR    | GMMW24D      | MW6                                                                                                                                          | MW9        | MW10     |
|-----------------------------------|------------------|--------------------|-------------|-------------|-------------|--------------|--------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
|                                   | Groundwater      |                    |             |             |             |              |              |              |                                                                                                                                              |            |          |
|                                   | Quality Standard |                    |             |             |             |              |              |              |                                                                                                                                              |            |          |
| <u>Analvte</u>                    | (Higher of PQLs) | Date: 01/27/95     | 01/26/95    | 01/26/95    | 01/26/95    | 01/24/95     | 01/24/95     | 01/24/95     | 01/24/95                                                                                                                                     | 01/24/95   | 01/23/95 |
|                                   |                  |                    |             |             |             |              |              |              |                                                                                                                                              |            |          |
|                                   |                  |                    |             |             |             |              | 40.7         | 3.08         | 91                                                                                                                                           | 27         | 27.8     |
| Total Patroleum Hydrocarbons      | 1.0 **           | <u>1.1</u>         | <u>3,37</u> | <u>1.15</u> | <u>1.31</u> | <u>14.1</u>  | <u>10.7</u>  | 3,00         | <u><u></u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u> | £1         | <u></u>  |
| (mg/L)                            |                  |                    |             |             |             |              |              |              |                                                                                                                                              |            |          |
| Volatile Organic Compounds (ug/L) |                  |                    |             |             |             |              |              |              |                                                                                                                                              |            |          |
| 4 1 1 Tables others               | 30               | 100                | ίου         | 100         | 100         | 7100         | 2000         | 100          | 710U                                                                                                                                         | 170        | 100      |
| 1, 1, 1- I richloroethane         | 2                | 10UJ               | 10UJ        | 10UJ        | 10UJ        | 710UJ        | 200UJ        | 10UJ         | 710UJ                                                                                                                                        | 17UJ       | 100      |
| 1, 1, 2, 2-1 etrachioroethane     |                  | 100                | 100         | 100         | 100         | 7100         | 2000         | 100          | 7100                                                                                                                                         | 170        | 100      |
| 1,1,2-Trichloroetnane             | 70               | 100                | 100         | 10U         | 100         | 710U         | 2000         | 1 <u>0</u> U | 710U                                                                                                                                         | 170        | 100      |
| 1, 1-Dichloroethane               | 2                | 100                | 100         | 100         | 100         | 710U         | 200U         | 100          | 7100                                                                                                                                         | 170        | 100      |
| 1,1-Dichlorosthene                | -                | 200                | 200         | 200         | 200         | 1400U        | 400U         | 20UJ         | 1400U                                                                                                                                        | 330        | 20000    |
| 1,2-Dibromoethane                 |                  | 100                | 100         | 100         | 10U         | 710U         | 2000         | 10U          | 7100                                                                                                                                         | 170        | 100      |
| 1,2-Dichloroethane                | 110              | 100                | 100         | 100         | 100         | 710U         | 200U         | 100          | <u>11000</u>                                                                                                                                 | 170        | 100      |
| 1,2-Dichloroethene(1 otal)        | 1                | 100                | 100         | 100         | 10U         | 710U         | 200U         | 10U          | 7100                                                                                                                                         | 170        | 100      |
| 1,2-Dichloropropane               | •                | 5001               | 500U        | 500U        | 500U        | 36000UJ      | 100          | 500U         | 360000                                                                                                                                       | 840UJ      | 5000     |
| 1-Butanol                         | -                | 5000               | 500U        | 500U        | 500U        | 26000J       | 42000J       | 500U         | 360000                                                                                                                                       | 840UJ      | 5000     |
| 2-Butanoi                         |                  | 1011               | 1003        | 10UJ        | 10UJ        | 2800J        | <u>3000J</u> | 10UJ         | 710UJ                                                                                                                                        | 17UJ       | 100      |
| 2-Butenone                        | 300              | 10111              | 1001        | 10UJ        | 10UJ        | 710UJ        | 200UJ        | 10UJ         | 710UJ                                                                                                                                        | 17UJ       | 100      |
| 2-Hexenone                        | 100 **           | 5001               | 5000        | 500U        | 500U        | 36000UJ      | 100          | 500U         | 360000                                                                                                                                       | J 840UJ    | 5000     |
| 2-Methyi-2-propanol               | 500              | 5000               | 5000        | 5000        | 500U        | 36000UJ      | 7000J        | 500U         | 350000                                                                                                                                       | J 840UJ    | 5000     |
| 2-Propanol                        |                  | 101                | 100         | 100         | 100         | 7100         | 200U         | 10UJ         | 710U                                                                                                                                         | 170        | 100      |
| 4-Methyl-2-pentanone              | 400              | 100                | 100         | 1001        | 100.1       | 710UJ        | 480J         | 10UJ         | 710UJ                                                                                                                                        | 17UJ       | 100      |
| Acetone                           | 700              | 1000               | 13          | 1011        | 100         | 71 <b>0U</b> | 200U         | 100          | <u>710</u>                                                                                                                                   | <u>170</u> | 100      |
| Benzene                           | ٦                | 100                | 13          | 100         | 100         | 710U         | 200U         | <u>10</u>    | 710U                                                                                                                                         | 170        | 100      |
| Bromodichloromethane              | 1                | 20                 | 100         | 100         | 100         | 7100         | 200U         | 100          | 710U                                                                                                                                         | 17UJ       | 100      |
| Bromoform                         | 4                | 100                | 1003        | 100         | 100         | 710U         | 200U         | 10U          | 710U                                                                                                                                         | 17U        | 100      |
| Bromomethane                      | 10               | 100                | 100         | 100         | 100         | 710U         | 200U         | 10U          | 710U                                                                                                                                         | 17U        | 100      |
| Carbon disulfide                  |                  | 100                | 100         | 100         | 100         | 7100         | 2000         | 10U          | 7100                                                                                                                                         | 170        | 100      |
| Carbon tatrachloride              | 2                | 100                | 100         | 100         | 100         | 7100         | 2000         | 100          | 710U                                                                                                                                         | 17U        | 100      |
| Chlorobenzene                     | 4                | 100                | 100         | 100         | 1011        | 7100         | 2000         | 100          | 710U                                                                                                                                         | 17U        | 100      |
| Chloroethane                      | 100 **           | 100                | 100         | 100         | 161         | 7101         | 200U         | 40           | 710U                                                                                                                                         | 17U        | 100      |
| Chloroform                        | 6                | <u>16</u>          | 2J          |             | 1001        | 7100         | 2000         | 100          | 7100                                                                                                                                         | 17U        | 100      |
| Chloromethane                     | 30               | 10UJ               | 100         | 1001        | 1003        | 7100         | 2000         | 10U          | 710U                                                                                                                                         | 170        | 100      |
| cis-1.3-Dichloropropene           | 0.02             | 100                | 100         | 100         | 100         | 7100         | 2000         | 100          | 710U                                                                                                                                         | 17U        | 100      |
| Dibromochloromethene              | 10               | 100                | 100         | 100         | 100         | /100         | 2000         |              |                                                                                                                                              |            |          |
|                                   |                  |                    |             |             |             |              |              |              |                                                                                                                                              |            |          |

Table 5-11. Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                                                                                                                                                                                                         | NJDEP *                                                               | Sample ID: GMMW22D                                                               | GMMW23I                                                                       | GMMW23D                                                                                 | GMMW23DFR                                                                      | GMMW24I                                                                                               | GMMW24IFR                                                                     | GMMW24D                                                                           | MW6                                                                                                       | MW9                                                                                      | MW10                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Analyte                                                                                                                                                                                                                 | Quality Standard<br>(Higher of PQLs)                                  | Date: 01/27/95                                                                   | 01/26/95                                                                      | 01/26/95                                                                                | 01/26/95                                                                       | 01/24/95                                                                                              | 01/24/95                                                                      | 01/24/95                                                                          | 01/24/95                                                                                                  | 01/24/95                                                                                 | 01/23/95                                                                                 |
| Ethylbenzene<br>Hexene<br>Methyl-t-butyl ether<br>Methylene chloride<br>n-Propylbenzene<br>Styrene<br>Tetrachloroethene<br>Toluene<br>trans-1,3-Dichloropropene<br>Trichloroethene<br>Vinyl chloride<br>Xylenes (Total) | 700<br><br>700 **<br>2<br><br>100<br>1<br>100<br>0.02<br>1<br>5<br>40 | 10U<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 3J ,<br>9J<br>2OU<br>1OU<br>14J<br>10U<br>10U<br>1J<br>10U<br>10U<br>4J<br>46 | 10U<br>20U<br>20U<br>10U<br>5J<br>10U<br>10U<br>10U<br>10U<br>10U<br>10UJ<br>10U<br>10U | 1J<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>34 | 710U<br>1400U<br>1400UJ<br>710U<br>1400U<br>710U<br>710U<br>710U<br>710U<br>710U<br>710U<br>710U<br>7 | 200U<br>400UJ<br>200U<br>400U<br>200U<br>200U<br>200U<br>200U<br>200U<br>200U | 10U<br>20UJ<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 710U<br>1400U<br>1400UJ<br>710U<br>1400U<br>710U<br>710U<br>510J<br>710U<br>710U<br>3700<br>2300<br>18220 | 17U<br>33UJ<br>33U<br>17U<br>33U<br>17U<br>17U<br>17U<br>17U<br>17U<br>17U<br>17U<br>17U | 12000<br>2000U<br>100<br>2000U<br>100<br>100<br>100<br>100<br>100<br>100<br>38000<br>500 |
| Total VOCs                                                                                                                                                                                                              |                                                                       | 18                                                                               | 40                                                                            |                                                                                         | ¥Ŧ                                                                             |                                                                                                       |                                                                               |                                                                                   |                                                                                                           |                                                                                          |                                                                                          |

Table 5-11. Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | NJDEP •<br>Groundwater                                                                                                      | Sample ID: PKMW-4                                                                                                                    | GTFIRMB9<br>DP10                                                                                                                                    | LOSB6<br>DP10                                                                                                                                                | LOSB15<br>DP08                                                                                                                                                       | LOSE18<br>DP09                                                                                                                                              | MBSB4<br>DP16                                                                                                                                        | MBSB4FR<br>DP16                                                                                     | N2TFSB2<br>DP12                                              | N2TFSB3<br>DP10                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Queility Standard<br>(Richer of PQLs)                                                                                       | Date: 01/27/95                                                                                                                       | 10/21/94                                                                                                                                            | 10/25/94                                                                                                                                                     | 10/24/94                                                                                                                                                             | 10/24/94                                                                                                                                                    | 11/02/94                                                                                                                                             | 11/02/94                                                                                            | 11/08/94                                                     | 11/08/94                                                                                                                                                     |
| Апагуте                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |                                                                                                                                      |                                                                                                                                                     |                                                                                                                                                              |                                                                                                                                                                      |                                                                                                                                                             |                                                                                                                                                      |                                                                                                     |                                                              |                                                                                                                                                              |
| Total Petroleum Hydrocarbone<br>(mg/L)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1.0 **                                                                                                                      | <u>25.3</u>                                                                                                                          | NA                                                                                                                                                  | NA<br>₹                                                                                                                                                      | NA                                                                                                                                                                   | NA                                                                                                                                                          | NA                                                                                                                                                   | NA                                                                                                  | NA                                                           | NA                                                                                                                                                           |
| Volatile Organic Compounds (ug/L)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                             |                                                                                                                                      |                                                                                                                                                     |                                                                                                                                                              |                                                                                                                                                                      |                                                                                                                                                             |                                                                                                                                                      |                                                                                                     |                                                              |                                                                                                                                                              |
| Volatile Organic Compounds (ug/c)<br>1,1,1-Trichloroethane<br>1,1,2,2-Tetrachloroethane<br>1,1-Dichloroethane<br>1,1-Dichloroethane<br>1,2-Dibramoethane<br>1,2-Dichloroethane<br>1,2-Dichloroethane<br>1,2-Dichloroptopene<br>1-Butanol<br>2-Butanol<br>2-Butanol<br>2-Butanol<br>2-Butanol<br>2-Butanol<br>2-Hexanone<br>2-Hexanone<br>2-Hexanone<br>2-Hexanone<br>2-Methyl-2-propanol<br>4-Methyl-2-pentanone<br>Acetone<br>Benzene<br>Bromodichloromethane<br>Bromodichloromethane<br>Carbon disulfide<br>Carbon tetrachloride | 30<br>2<br>3<br>70<br>2<br><br>2<br>110<br>1<br><br>300<br>100 **<br>500 **<br><br>400<br>700<br>1<br>1<br>4<br>10<br><br>2 | 10U<br>10UJ<br>10U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10UJ<br>10UJ<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>10U<br>10U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10UJ<br>500U<br>500U<br>500U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>10U<br>10U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>500U<br>500U<br>500U<br>500U<br>10UJ<br>500U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 25U<br>25U<br>25U<br>25U<br>25U<br>25U<br>25U<br>25U<br>25U<br>1200UJ<br>25UJ<br>25UJ<br>25UJ<br>25UJ<br>25U<br>25U<br>25U<br>25U<br>25U<br>25U<br>25U<br>25U<br>25U | 10U<br>10U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10UJ<br>500U<br>500U<br>10UJ<br>10UJ<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>10U<br>10U<br>10U<br>20U<br>10U<br>10U<br>10U<br>500U<br>10UJ<br>500U<br>10UJ<br>500U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>10U<br>10U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>1 | 25UJ<br>25UJ<br>25UJ<br>25UJ<br>25UJ<br>25UJ<br>25UJ<br>25UJ | 10U<br>10U<br>10U<br>10U<br>10UJ<br>20U<br>10U<br>10U<br>10U<br>500U<br>500U<br>500U<br>10UJ<br>10UJ<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U |
| Chlorobenzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4                                                                                                                           | 10U<br>10U                                                                                                                           | 10U<br>10UJ                                                                                                                                         | 10UJ                                                                                                                                                         | 25UJ                                                                                                                                                                 | 1000                                                                                                                                                        | 100                                                                                                                                                  | 100                                                                                                 | 25UJ                                                         | 10UJ                                                                                                                                                         |
| Chloroethane<br>Chloroform<br>Chloromethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 6<br>30<br>0.02                                                                                                             | 10U<br>10U<br>10UJ<br>10U                                                                                                            | 10U<br>10UJ<br>10U                                                                                                                                  | 10U<br>10UJ<br>10U                                                                                                                                           | 25U<br>25UJ<br>25U                                                                                                                                                   | 10U<br>10UJ<br>10U                                                                                                                                          | 10U<br>10U<br>10U                                                                                                                                    | 10U<br>10U<br>10U                                                                                   | 25UJ<br>25UJ<br>25UJ<br>25UJ                                 | 100<br>100<br>100                                                                                                                                            |
| Cis-1,3-Dichloropropene<br>Dibromochloromathane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 10                                                                                                                          | 10U                                                                                                                                  | 100                                                                                                                                                 | 10U                                                                                                                                                          | 25U                                                                                                                                                                  | 100                                                                                                                                                         |                                                                                                                                                      |                                                                                                     |                                                              |                                                                                                                                                              |

Table 5-11. Total Patroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, Naw Jersey.

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|                                                                                                                                                                                                                         | NJDEP *<br>Groundwater                                            | Sample ID: PKMW-4                                                                | GTFIRMB9<br>DP10                                                                  | LOSB6<br>DP10                                                                     | LOSB15<br>DP08                                                                           | LOSB18<br>DPQ9                                                                  | MBSB4<br>DP16                                                                                 | MBSB4FR<br>DP15                                                                         | N2TFSB2<br>DP12                                                                     | N2TFSB3<br>DP10                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Analyte                                                                                                                                                                                                                 | Quality Standard<br>(Higher of PQLs)                              | Date: 01/27/95                                                                   | 10/21/94                                                                          | 10/25/94                                                                          | 10/24/94                                                                                 | 10/24/94                                                                        | 11/02/94                                                                                      | 11/02/94                                                                                | 11/08/94                                                                            | 11/08/94                                                               |
| Ethylbenzene<br>Hexene<br>Methyl-t-butyl ether<br>Methylene chloride<br>n-Propylbenzene<br>Styrene<br>Tetrachloroethens<br>Toiuene<br>trans-1,3-Dichloropropene<br>Trichloroethene<br>Vinyl chloride<br>Xylenes (Total) | 700<br>700 **<br>2<br><br>100<br>1<br>100<br>0.02<br>1<br>5<br>40 | 10U<br>20U<br>260<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20UJ<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20UJ<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 25U<br>50UJ<br>50U<br>25U<br>110<br>25U<br>25U<br>25U<br>25U<br>25U<br>25U<br>25U<br>25U | 10U<br>20UJ<br>20U<br>10U<br>20U<br>10U<br>10U<br>2J<br>10U<br>10U<br>10U<br>4J | 10U<br>20UJ<br>20U<br>69<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>21 | 10U<br>20UJ<br>20U<br>68<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 25UJ<br>4700J<br>50UJ<br>25UJ<br>25UJ<br>25UJ<br>25UJ<br>25UJ<br>25UJ<br>25UJ<br>25 | 4J<br>77J<br>20U<br>10U<br>24<br>10U<br>10U<br>10U<br>10U<br>10U<br>3J |
| Total VOCs                                                                                                                                                                                                              |                                                                   | 400                                                                              | 0                                                                                 | 0                                                                                 | 121                                                                                      | 6                                                                               | 71                                                                                            |                                                                                         | /300                                                                                |                                                                        |

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Table 5-11. Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                                    | NJDEP *<br>Groundwater<br>Quality Standard | Sample ID: N<br>D | STFSB4<br>P10     | N3TFSB5<br>DP09         | N3TFSB6<br>DP12      | PESTSB1<br>DP10   | PSSB1<br>DP10     | PSSB1-FR<br>DP10  | STFSB3<br>DP10    | FBA1-110294       |
|----------------------------------------------------|--------------------------------------------|-------------------|-------------------|-------------------------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Analvte.                                           | (Higher of PQLs)                           | Date: 1           | 0/17/94           | 10/19/94                | 11/02/94             | <u>11/08/94</u>   | 11/08/94          | 11/08/94          | 11/08/94          | 11/02/94          |
| Total Petroleum Hydrocerbone<br>(mg/L)             | 1.0 **                                     | N                 | A                 | NA                      | NA                   | NA                | NA                | NA                | NA                | NA                |
| Voiatile Organic Compounds (ug/L)                  |                                            |                   |                   |                         |                      |                   |                   |                   |                   |                   |
| 1,1,1-Trichloroethane<br>1,1,2,2-Tetrachloroethane | 30<br>2<br>3                               | 2<br>2<br>2       | 50U<br>50U<br>50U | 560UJ<br>560UJ<br>560UJ | 170U<br>170U<br>170U | 25U<br>25U<br>25U | 20U<br>20U<br>20U | 10U<br>10U<br>10U | 20U<br>20U<br>20U | 10U<br>10U<br>10U |
| 1,1,2-Inchloroethane                               | 70                                         | 2                 | 50U               | 560UJ                   | 170U                 | 25U               | 20U               | 100               | 200               | 100               |
| 1.1-Dichlorosthens                                 | 2                                          | 2                 | 500               | 560UJ                   | 1700                 | 25U               | 200               | 1003              | 200               | 100               |
| 1.2.Dibromoethane                                  |                                            | 5                 | 00                | 1100                    | 330U                 | 50U               | 40U               | 200               | 400               | 100               |
| 1.2-Dichloroethane                                 | 2                                          | 2                 | 500               | 560UJ                   | 170U                 | 250               | 200               | 100               | 200               | 100               |
| 1,2-Dichloroethene(Totel)                          | 110                                        | 2                 | 500               | 560UJ                   | 1700                 | 250               | 200               | 100               | 200               | 100               |
| 1,2-Dichloropropene                                | 1                                          | 2                 | 50U               | 560UJ                   | 1700                 | 120000            | 100               | 5000              | 100               | 500U              |
| 1-Butanoi                                          |                                            | 1                 | 20000             | 2800000                 | 83000                | 12000             | 100               | 500U              | 100               | 500U              |
| 2-Butanol                                          |                                            | 1                 | 20000             | 560UJ                   | 170UJ                | 250               | 20U               | 10UJ              | 20U               | 100               |
| 2-Butenone                                         | 300                                        | 2                 | 250UJ             | 560UJ                   | 170UJ                | 25U               | 20U               | 10UJ              | 200               | 10U               |
| 2-Hexanone                                         | 500 **                                     | - 1               | 20000             | 28000UJ                 | 8300U                | 1 200 U J         | 100               | 500U              | 100               | 5000              |
| 2-Methyl-2-propanol                                |                                            | 1                 | 20000             | 28000UJ                 | 83000                | 1200U             | 100               | 500U              | 100               | 101               |
| 2-Propenoi<br>A-Methyl-2-peptepope                 | 400                                        | 2                 | 250U              | 560UJ                   | 1700                 | 25UJ              | 20UJ              | 100               | 2003              | 61                |
| Acetone                                            | 700                                        | 2                 | 250UJ             | 560UJ                   | 240UJ                | 450               | 550               | 24UJ<br>71        | 200               | 100               |
| Benzene                                            | 1                                          | 1                 | <u>170J</u>       | 560UJ                   | <u>28J</u>           | <u>140</u>        | 2011              | 100               | 200               | 100               |
| Bromodichloromethane                               | 1                                          | 2                 | 2500              | 560UJ                   | 1700                 | 250               | 200               | 100               | 200               | 100               |
| Bromoform                                          | 4                                          |                   | 2500              | 560UJ                   | 1700                 | 250               | 200               | 100               | 20U               | 100               |
| Bromomethane                                       | 10                                         | 2                 |                   | 56003                   | 1700                 | 25U               | 200               | 10UJ              | 20U               | 10U               |
| Carbon disulfide                                   |                                            | -                 | 25000             | 56003                   | 1700                 | 25U               | 20U               | UOT               | 20U               | 100               |
| Carbon tetrachloride                               | 2                                          |                   | 14000             | 1100J                   | 270                  | 200               | 20U               | 100               | 200               | 100               |
| Chlorobenzene                                      | 100 **                                     | -                 | 250U              | 560UJ                   | 1700                 | 250               | 20U               | 10UJ              | 20U               | 100               |
| Chloroethane                                       | 6                                          |                   | 2500              | 560UJ                   | 170U                 | 25U               | 20U               | 10U               | 200               |                   |
| Chlorotorm                                         | 30                                         |                   | 250U              | 560UJ                   | 170U                 | 25UJ              | 20UJ              | 100               | 2003              | 100               |
| Chioromethene                                      | 0.02                                       | :                 | 250U              | 560UJ                   | 1700                 | 25U               | 200               | 100               | 200               | 100               |
| Dibromochloromethane                               | 10                                         |                   | 250U              | 560UJ                   | 1700                 | 250               | 200               | 100               | 200               |                   |

Table 5-11. Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                                                                                                                                                                                                         | NJDEP *<br>Groundwater                                                | Semple ID: N3TFSB4<br>DP10                                       | N3TFSB5<br>DP09                                                                                  | N3TFSB6<br>DP12                                                                                     | PESTSB1                                                                                          | PSSB1<br>DP10                                                                                  | PSSB1-FR<br>DP10                                                        | STFSB3<br>DP10                                                                                 | FBA 1-110294                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Ansivte                                                                                                                                                                                                                 | Quality Standard<br>(Higher of PQLs)                                  | Date: 10/17/94                                                   | 10/19/94                                                                                         | 11/02/94                                                                                            | 11/08/94                                                                                         | 11/08/94                                                                                       | 11/08/94                                                                | 11/08/94                                                                                       | 11/02/94                                                                                |
| Ethylbenzene<br>Hexane<br>Methyl-t-butyl ether<br>Methylene chloride<br>n-Propylbenzene<br>Styrene<br>Tetrachioroethene<br>Toluene<br>trans-1,3-Dichloropropene<br>Trichloroethene<br>Vinyl chloride<br>Xylenee (Totai) | 700<br><br>700 **<br>2<br><br>100<br>1<br>100<br>0.02<br>1<br>5<br>40 | 250U<br>500<br>500<br>250U<br>500<br>250U<br>250U<br>250U<br>250 | 560UJ<br>46003<br>1100UJ<br>560UJ<br>560UJ<br>560UJ<br>560UJ<br>560UJ<br>560UJ<br>560UJ<br>560UJ | 170U<br>1800J<br>330U<br>170U<br>420<br>170U<br>170U<br>170U<br>170U<br>170U<br>170U<br>170U<br>170 | 410<br>130<br>520J<br>25U<br>180J<br>25U<br>25U<br>17J<br>25U<br>25U<br>25U<br>25U<br>25U<br>330 | 20U<br>230<br>40U<br>20U<br>110J<br>20U<br>20U<br>20U<br>20U<br>20U<br>20U<br>20U<br>3J<br>348 | 3J<br>280J<br>200<br>100<br>130<br>100<br>100<br>1J<br>100<br>100<br>8J | 20U<br>340<br>40U<br>29J<br>20U<br>20U<br>20U<br>20U<br>20U<br>20U<br>20U<br>20U<br>20U<br>20U | 10U<br>20U<br>22U<br>22J<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U |

Table 5-11. Total Petroleum Hydrocarbone and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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| _                                      | NJDEP *          | Sample ID: FBA2-110894 | FBA1-012395 | FBA2-012495 | FBA3-012595 | FBA4-012695 | FBA5-012795 |
|----------------------------------------|------------------|------------------------|-------------|-------------|-------------|-------------|-------------|
| -                                      | Groundwater      |                        |             |             |             |             |             |
|                                        | Quality Standard |                        |             |             |             |             | 01/07/05    |
| Analyte                                | (Higher of PQLs) | Date: 11/08/94         | 01/23/95    | 01/24/95    | 01/25/95    | 01/26/95    | 01/27/95    |
|                                        |                  | · · · ·                |             |             |             |             |             |
| Total Petrolsum Hydrocarbons<br>(mg/L) | 1.0 **           | NA                     | 0.250       | 0.25U       | 0.25U       | 0.250       | 0.25U       |
| Volatile Organic Compounde (ug/L)      |                  |                        |             |             |             |             | 1011        |
| 4 4 4 Trichlereethene                  | 30               | 100                    | 10U         | 100         | 100         | 100         | 100         |
|                                        | 2                | 100                    | 10U         | 10U         | 100         | 100         | 100         |
| 1, 1, 2, 2-1 etrachioroethere          | 3                | 100                    | 100         | 100         | 10U         | 100         |             |
| 1,1,2-1 righloroethane                 | 70               | 100                    | 100         | 10U         | 100         | 100         | 100         |
| 1,1-Dichloroethane                     | 2                | 100                    | 100         | 10U         | 10U         | 10U         | 100         |
| 1,1-Dichloroethene                     | 4                | 200                    | 200         | 20U         | 20U         | 200         | 200         |
| 1,2-Dibromoethane                      |                  | 100                    | 10U         | 10U         | 10U         | 100         | 100         |
| 1,2-Dichloroethane                     | 2                | 100                    | 10U         | tou         | 10U         | 10U         | 100         |
| 1,2-Dichloroethene(Total)              | 110              | 100                    | 100         | 10U         | 100         | 100         | 100         |
| 1,2-Dichloropropane                    | 1                | FOOL                   | 5000        | 500U        | 500U        | 500U        | 5000        |
| 1-Butanol                              | ••               | 5000                   | 5000        | 500U        | 500U        | 500U        | 500U        |
| 2-Butenoi                              |                  | 5000                   | 100         | 100         | 10U         | 10U         | 10U         |
| 2-Butanone                             | 300              | 100                    | 100         | 100         | 100         | 100         | 100         |
| 2-Hexanone                             | 100 **           | 100                    | FOOL        | 5000        | 500U        | 500U        | 500U        |
| 2-Methyl-2-propenol                    | 500 **           | 5000                   | 5000        | 5000        | 500U        | 500U        | 500U        |
| 2-Propanoi                             |                  | 5000                   | 5000        | 1011        | 10U         | 100         | 10U         |
| 4-Methyl-2-pentanone                   | 400              | 100                    | 100         | 1011        | 100         | 100         | 100         |
| Acetone                                | 700              | 8J                     | 100         | 100         | 100         | 10U         | 100         |
| Renzene                                | 1                | 100                    | 100         | 100         | 100         | 10U         | 10U         |
| Bramodichloromethene                   | 1                | 100                    | 100         | 100         | 100         | 100         | 10U         |
| Bromoform                              | 4                | 100                    | 100         | 100         | 100         | 100         | 100         |
| Bromomethane                           | 10               | 100                    | 100         | 100         | 100         | 100         | 10U         |
| Cerbon diguifide                       |                  | 100                    | 100         | 100         | 100         | 100         | 10U         |
| Carbon tatenhoride                     | 2                | 100                    | 100         | 100         | 100         | 100         | 2J          |
|                                        | 4                | 100                    | 100         | 100         | 1011        | 100         | 100         |
| Chlosopausaua                          | 100 **           | 100                    | 10U         | 100         | 100         | 100         | 100         |
|                                        | 6                | 10U                    | 10U         | 100         | 100         | 1011        | 100         |
| Chierotom                              | 30               | 100                    | 100         | 100         | 100         | 100         | 100         |
| Chierométhane                          | 0.02             | 100                    | 10U         | 100         | 100         | 100         | 100         |
| cis-1,3-Dichloropropene                | 10               | 100                    | 10U         | 100         | 100         | 100         |             |
| Dibromochloromethane                   |                  | • • -                  |             |             |             |             |             |

Table 5-11. Total Patroleum Hydrocarbone and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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Table 5-11. Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                                                                                                                                                                                                         | NJDEP *<br>Groundwater                                      | Sampla ID: FBA2-110894                                                                 | FBA1-012395                                                                            | FBA2-012495                                                                     | FBA3-012595                                                                    | FBA4-012695                                                                            | FBA5-012795                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Ansiyte                                                                                                                                                                                                                 | Quality Standard<br>(Higher of PQLs)                        | Date: 11/08/94                                                                         | 01/23/95                                                                               | 01/24/95                                                                        | 01/25/95                                                                       | 01/26/95                                                                               | 01/27/95                                                                                      |
| Ethylbenzene<br>Hexane<br>Methyl-t-butyl ether<br>Methylene ahloride<br>n-Propylbenzene<br>Styrene<br>Tetrachloroethene<br>Toluene<br>trans-1,3-Dichloropropene<br>Trichloroethene<br>Vinyl chloride<br>Xylenes (Total) | 700<br><br>2<br><br>100<br>1<br>100<br>0.02<br>1<br>5<br>40 | 100<br>200<br>200<br>2J<br>200<br>100<br>100<br>100<br>100<br>100<br>100<br>100<br>100 | 10U<br>20U<br>20U<br>1J<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20U<br>20U<br>1J<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20U<br>2J<br>2OU<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>20 | 10U<br>20U<br>20U<br>1J<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20U<br>20U<br>1J<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U |

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|                                                    | NJDEP *          | Sample ID: TB-101994 | TB-102094 | TB-102194   | TB-102594 | TB-110294 | TB-110894 | TB1-012395 |
|----------------------------------------------------|------------------|----------------------|-----------|-------------|-----------|-----------|-----------|------------|
|                                                    | Groundwater      |                      |           |             |           |           |           |            |
|                                                    | Quality Standard |                      |           |             |           |           |           |            |
| Analyte                                            | (Higher of PQLs) | Date: 10/19/94       | 10/20/94  | 10/21/94    | 10/24/94  | 11/02/94  | 11/08/94  | 01/23/95   |
|                                                    |                  |                      |           |             |           |           |           |            |
| Total Petroleum Hydrocerbone<br>(mg/L)             | 1.0 **           | NA                   | NA        | NA          | NA        | NA        | NA        | NA         |
| Volatile Organic Compounde (ug/L)                  |                  |                      |           |             |           |           |           |            |
| 1.1.1-Trichloroethene                              | 30               | 100                  | 100       | 100         | 100       | 100       | 100       | 100        |
| 1 1 2 2-Tetrachloroethane                          | 2                | 100                  | 100       | 1 <b>0U</b> | 100       | 100       | 100       | 100        |
| 1 1 2-Trichloroethene                              | 3                | 10U                  | 100       | 10U         | 100       | 100       | 100       | 100        |
| 1 1-Dichlorgethene                                 | 70               | 10U                  | 100       | 100         | 100       | 100       | 100       | 100        |
| 1 1-Dichioroethene                                 | 2                | 10U                  | 100       | 100         | 10U       | 100       | 100       | 100        |
| 1.2-Dibromoethene                                  | -                | 20U                  | 20U       | 20U         | 200       | 20U       | 200       | 200        |
| 1.2-Diobioroethene                                 | 2                | 100                  | 100       | 10U         | 100       | 100       | 100       | 100        |
| 1.2-Dickloroethere(Tatel)                          | 110              | 100                  | 100       | 100         | 100       | 100       | 100       | 100        |
|                                                    | 1                | 100                  | 100       | 10U         | 100       | 100       | 100       | 100        |
| t,∠-ucnioropropane                                 |                  | 500U                 | 500U      | 500U        | 500U      | 500U      | 500U      | 500U       |
| I-Butenol                                          |                  | 500U                 | 500U      | 500U        | 500U      | 500U      | 500U      | 500U       |
| ∠-04(800)<br>2 Suteroot                            | 300              | 100                  | 100       | 100         | 100       | 10U       | 100       | 100        |
| 2-butenone                                         | 100 **           | 100                  | 100       | 100         | 100       | 100       | 100       | 100        |
|                                                    | 500 **           | 500U                 | 500U      | 500U        | 500U      | 500U      | 500U      | 5000       |
| 2-Methyl-2-propendi                                |                  | 500U                 | 500U      | 5000        | 500U      | 500U      | 500U      | 500U       |
| Z-rropano:<br>A.Mathud.2-nentanone                 | 400              | 10U                  | 100       | 10U         | 100       | 100       | 100       | 100        |
| A cotopo                                           | 700              | 100                  | 100       | 100         | 100       | 7J        | 7J        | 100        |
| Acelone                                            | 1                | 10U                  | 10U       | 10U         | 10U       | 100       | 100       | 100        |
| Demadichleromethere                                | 1                | 10U                  | 10U       | 10U         | 100       | 10U       | 100       | 100        |
| Bromodicalorometriene                              | 4                | 100                  | 10U       | 100         | 10U       | 100       | 100       | 100        |
| Bromomethene                                       | 10               | 10U                  | 10U       | 10U         | 10U       | 100       | 100       | 100        |
|                                                    | -                | 100                  | 100       | 100         | 10U       | 100       | 100       | 100        |
| Carbon disulide                                    | 2                | 10U                  | 100       | 100         | 10U       | 100       | 100       | 100        |
|                                                    | 4                | 100                  | 100       | 100         | 10U       | 100       | 100       | 100        |
|                                                    | 100 **           | 100                  | 100       | 100         | 10U       | 10U       | 100       | 100        |
|                                                    | 6                | 100                  | 100       | 100         | 10U       | 10U       | 100       | 100        |
| Chioratorm                                         | 30               | 100                  | 100       | 100         | 100       | 10U       | 10U       | 100        |
|                                                    | 0.02             | 10U                  | 100       | 100         | 100       | 10U       | 100       | 100        |
| cis- i , 3-Olonioropropene<br>Dibromochloromethane | 10               | 100                  | 100       | 100         | 100       | 100       | 100       | 100        |

Table 5-11. Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                                                                                                                                                                                                         | NJDEP *<br>Ground water                                               | Sample ID: TB-101994                                                            | TB-102094                                                          | TB-102194                                                                 | T8-102594                                                                        | TB-110294                                                                                     | TB-110894                                                          | TB1-012395                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Analyte                                                                                                                                                                                                                 | Quality Standard<br>(Higher of PQLs)                                  | Date: 10/19/94                                                                  | 10/20/94                                                           | 10/21/94                                                                  | 10/24/94                                                                         | 11/02/94                                                                                      | 11/08/94                                                           | 01/23/95                                                                                |
| Ethylbenzene<br>Hexane<br>Methyl-t-butyl ether<br>Mathylene chloride<br>n-Propylbenzene<br>Styrene<br>Tetrachloroethene<br>Toluene<br>trans-1,3-Dichloropropene<br>Trichloroethene<br>Vinyl chloride<br>Xylenes (Total) | 700<br><br>700 **<br>2<br><br>100<br>1<br>100<br>0.02<br>1<br>5<br>40 | 10U<br>20U<br>20U<br>2J<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | .100<br>200<br>200<br>5J<br>200<br>100<br>100<br>100<br>100<br>100 | 10U<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U | 10U<br>20U<br>20U<br>2J<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>20U | 100<br>200<br>200<br>200<br>100<br>100<br>100<br>100<br>100<br>100 | 10U<br>20U<br>20U<br>10U<br>20U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U<br>10U |
| Total VOCs                                                                                                                                                                                                              |                                                                       | 2                                                                               | 5                                                                  | 0                                                                         | 0                                                                                |                                                                                               | ·v                                                                 |                                                                                         |

Table 5-11. Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                   | NJDEP *          | Sample ID: TB2-Q12495 | TB3-012595 | TB4-012695 | T85-012795  |
|-----------------------------------|------------------|-----------------------|------------|------------|-------------|
|                                   | Groundwater      |                       |            |            |             |
|                                   | Quality Standard | Date: 01/24/95        | 01/25/95   | 01/26/95   | 01/27/95    |
| Analyte                           | (Higher of Puls) | 0818. 01/24/00        |            |            |             |
|                                   |                  |                       |            |            |             |
| Tatal Patroleum Mydrocarbons      | 1.0 **           | NA                    | NA         | NA         | NA          |
| (mg/L)                            |                  |                       |            |            |             |
|                                   |                  |                       |            |            |             |
| Volatile Organic Compounds (ug/L) |                  |                       |            | 101        | 1011        |
| 1.1.1-Trichloroethane             | 30               | 100                   | 100        | 100        | 100         |
| 1.1.2.2-Tetrachloroethane         | 2                | 10U                   | 100        | 100        | 100         |
| 1,1,2-Trichlorosthans             | . 3              | 100                   | 100        | 100        | 105         |
| 1.1-Dichloroethane                | 70               | 100                   | 100        | 100        | 100         |
| 1.1-Dichloroethene                | 2                | 100                   | 100        | 100        | 2011        |
| 1.2-Dibromoethane                 |                  | 200                   | 200        | 200        | 101         |
| 1.2-Diphloroethane                | 2                | 100                   | 100        | 100        | 100         |
| 1.2-Dichloroethene(Total)         | 110              | 100                   | 100        | 100        | 100         |
| 1.2-Dichloropropane               | 1                | 100                   | 100        | 100        | 5001        |
| 1-Butanol                         |                  | 5000                  | 5000       | 5000       | 5000        |
| 2-Butanol                         |                  | 5000                  | 5000       | 100        | 100         |
| 2-Butanone                        | 300              | 100                   | 100        | 100        | 100         |
| 2-Hexanone                        | 100 **           | 100                   | 100        | 5001       | 5001        |
| 2-Methyl-2-propanol               | 500 **           | 5000                  | 5000       | 5000       | 5000        |
| 2-Propanol                        |                  | 5000                  | 5000       | 1011       | 100         |
| 4-Methyl-2-pentanone              | 400              | 100                   | 100        | 100        | 100         |
| Acetone                           | 700              | 160                   | 100        | 100        | 100         |
| Benzene                           | 1                | 100                   | 100        | 100        | 100         |
| Bromodichloromethane              | 1                | 100                   | 100        | 100        | 10U         |
| Bromoform                         | - 4              | 180                   | 100        | 100        | 100         |
| Bromomethane                      | 10               | 100                   | 100        | 100        | 100         |
| Carbon disulfide                  |                  | 100                   | 100        | 100        | 100         |
| Carbon tetrachloride              | 2                | 100                   | 81         | 100        | 1J          |
| Chlorobenzene                     | 4                | 100                   | 100        | 100        | 100         |
| Chloroethane                      | 100 **           | 100                   | 104        | 100        | 100         |
| Chloroform                        | 6                | 100                   | 100        | 100        | 100         |
| Chloromethane                     | 30               | 100                   | 100        | 100        | 100         |
| cis-1,3-Dichloropropene           | 0.02             | 100                   | 100        | 100        | 10 <b>U</b> |
| Dibromochloromethene              | 10               | 100                   |            |            |             |

Table 5-11. Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                              | NJDEP •<br>Ground water              | Sample ID: TB2-012495 | TB3-012595 | TB4-012695 | TB5-012795 |  |
|----------------------------------------------|--------------------------------------|-----------------------|------------|------------|------------|--|
| Analyte                                      | Quality Standard<br>(Higher of PQLs) | Date: 01/24/95        | 01/25/95   | 01/26/95   | 01/27/95   |  |
| Ethylbenzene                                 | 700                                  | 100                   | 100        | 100        | 100        |  |
| Hexane<br>Methyl-t-butyl ether               | 700 **                               | 20U<br>20U            | 20U<br>20U | 200<br>20U | 200        |  |
| Methylene chloride                           | 2                                    | 10U<br>20U            | 2J<br>20U  | 2J<br>20ป  | 1J<br>20U  |  |
| Styrene                                      | 100                                  | 100                   | 10U        | 10U<br>10U | 10U<br>10U |  |
| Tetrachloroethene<br>Toluene                 | 1<br>100                             | 100                   | 100        | 100        | 100        |  |
| trans-1,3-Dichloropropens<br>Trichloroethene | 0.02<br>1                            | 10U<br>10U            | 10U<br>10U | 100<br>100 | 100        |  |
| Vinyl chloride                               | 5                                    | 100                   | 10U<br>10U | 10U<br>10U | 10U<br>10U |  |
| Xylenes (Totel)                              | 40                                   | 100                   | 8          | 2          | 2          |  |
| Total VOCS                                   |                                      | v                     | -          | _          |            |  |

Table 5-11. Total Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Anelyte concentrations and Naw Jersey Department of Environmental Protection (NJDEP) criteria in micrograms per liter (ug/L) (equivalent to parts per billion [ppb]) except total petroleum hydrocarbon (TPH) results and criteria, which are reported in milligrams per liter (mg/L) (equivalent to parts per million (ppm)).

Analyses were performed by CompuChem Environmental Corporation, Research Triangle Park, North Carolina, using Contract Laboratory Program (CLP) protocols contained

in the Statement of Work (SOW) OLM01.8. and New Jersey modified 418.1 for total petroleum hydrocarbons (TPH),

Exceedances of NJDEP criteria are shown in bold and are underlined.

- VOCs Volatile organic compounds.
- FBA Indicates a field blank associated with aqueous samples.
- PQL Prectical quantitation level.
- FR Field replicate of previous sample.
- TB Trip blank.
- U The compound was analyzed for, but not detected at the specific detection limit.
- J Estimated result.
- -- No applicable criteria.
- N Presumptive evidence.
- NA Not analyzed.
- NJDEP Groundwater Standards, New Jersey Register, April 5, 1993.
- • Interim generic groundwater quality criterion.

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|                              | NJDEP *          | Semple ID: EB1 | EB29     | EB51     | EB68     | EBR13    | EBR 19      | GMMW2      | GMMW3      | GMMW4    | GMMWB    | GMMW8    |
|------------------------------|------------------|----------------|----------|----------|----------|----------|-------------|------------|------------|----------|----------|----------|
|                              | Quality Standard | Data: 01/26/05 | 01/28/95 | 01/25/95 | 01/24/95 | 01/27/95 | 01/24/95    | 01/25/95   | 01/25/95   | 01/25/95 | 01/25/95 | 01/23/95 |
| Analyte (ug/L)               | (Higher of PULS) | Uate: 01/20/33 | 01120/00 | 01120100 | 01/24/00 |          |             |            |            |          |          |          |
| 1 2 4-Trichiorobenzene       | 9                | 10U            | 10U      | 10U      | 100      | 10U      | 10U         | 30U        | 100        | 100      | 100      | 100      |
| 1 2-Dichlorobenzene          | 600              | 100            | 10U      | 100      | 100      | 10U      | 10U         | 19J        | 9J         | 100      | 100      | 100      |
| 1 3-Dichlorobenzene          | 600              | 100            | 10U      | 100      | 100      | 10U      | 10U         | 30U        | 18         | 100      | 100      | 100      |
| 1 4-Dichlorobenzene          | 75               | 100            | 100      | 100      | 100      | 100      | 100         | 30         | <u>130</u> | 100      | 100      | 100      |
| 2 2'-ovybis(1-chloropropane) | 300              | 100            | 100 .    | 10UJ     | 10UJ     | 100      | 10UJ        | 30U        | 10UJ       | 1003     | 1005     | 1003     |
| 2 4 E-Trichlorophenol        | 700              | 25U            | 25U      | 25U      | 25U      | 25U      | 25U         | 75U        | 250        | 250      | 250      | 250      |
| 2.4.8-Trichlorophenol        | 20               | 100            | 100      | 100      | 10U      | 10U      | 100         | 30U        | 100        | 100      | 100      | 100      |
|                              | 20               | 100            | 100      | 100      | 10U      | 10U      | 100         | 30U        | 100        | 100      | 100      | 100      |
| 2,4-Dichlotophenol           | 100              | 10U            | 10U      | 100      | 10U      | 100      | 100         | 30U        | 100        | 100      | 100      | 100      |
| 2,4-Dimetnyiphenoi           | 40               | 250            | 25U      | 25U      | 25U      | 25U      | 25U         | 75UJ       | 25U        | 250      | 250      | 2503     |
| 2,4-Dinitrophenol            | 10               | 100            | 100      | 100      | 10U      | 100      | 100         | 30U        | 100        | 100      | 100      | 100      |
| 2,4-Dinitrotoluene           | 10               | 100            | 100      | 100      | 10U      | 100      | 100         | 30U        | 100        | 100      | 100      | 100      |
| 2,8-Dinitrotoluene           |                  | 100            | 100      | 10U      | 100      | 10U      | 1 <b>0U</b> | 30U        | 10U        | 100      | 100      | 100      |
| 2-Chloronaphthalene          | 40               | 100            | 100      | 100      | 10U      | 10U      | 100         | 30U        | 17         | 100      | 100      | 100      |
| 2-Chlorophenol               | 100 **           | 100            | 100      | 100      | 10U      | 3J       | 100         | <u>160</u> | 12         | 1J       | 2J       | 100      |
| 2-Methylnephthalene          | 100 **           | 100            | 100      | 100      | 10U      | 100      | 10U         | 30U        | 100        | 100      | 100      | 100      |
| 2-Methylphenol               | 400              | 251            | 250      | 25U      | 25U      | 25U      | 25U         | 75UJ       | 25U        | 250      | 250      | 250      |
| 2-Nitroaniline               |                  | 100            | 100      | 100      | 100      | 10U      | 10U         | 30U        | 100        | 10U      | 100      | 100      |
| 2-Nitrophenol                |                  | 100            | 100      | 100      | 100      | 100      | 10UJ        | 30U        | 100        | 100      | 10U      | 10UJ     |
| 3,3'-Dichlorobenzidine       | 60               | 100            | 2511     | 250      | 25U      | 25U      | 25U         | 75U        | 25U        | 25U      | 25U      | 250      |
| 3-Nitroaniline               | **               | 250            | 250      | 250      | 25U      | 25U      | 25U         | 75U        | 25U        | 25U      | 250      | 250      |
| 4,6-Dinitro-2-methylphenol   |                  | 250            | 101      | 1011     | 100      | 100      | 10U         | 30U        | 10U        | 10U      | 100      | 100      |
| 4-Bromophenyl phenyl ether   | •                | 100            | 100      | 100      | 100      | 100      | 100         | 30U        | 100        | 10U      | 10U      | 100      |
| 4-Chloro-3-methylphenol      | ••               | 100            | 100      | 1000     | 100.1    | 10UJ     | 10UJ        | 30UJ       | 10UJ       | 10UJ     | 10UJ     | 10UJ     |
| 4-Chloroaniline              |                  | 1005           | 1003     | 1000     | 100      | 100      | 100         | 30U        | 10U -      | 100      | 100      | 100      |
| 4-Chlorophenyl phenyl ether  |                  | 100            | 100      | 100      | 100      | 100      | 100         | 30U        | 100        | 10U      | 100      | 2J       |
| 4-Methylphenol               | 350 **           | 100            | 100      | 100      | 250      | 250      | 25U         | 75U        | 25U        | 25U      | 25U      | 25U      |
| 4-Nitroaniline               |                  | 250            | 250      | 200      | 250      | 251      | 250         | 75UJ       | 25U        | 25U      | 25U      | 25UJ     |
| 4-Nitrophenol                |                  | 250            | 250      | 1011     | 200      | 1.1      | 1.1         | 300        | 2J         | 7J       | 10U      | 10U      |
| Acenaphthene                 | 400              | 100            | 100      | 100      | 1011     | 100      | 100         | SOU        | 100        | 10U      | 10U      | 100      |
| Acenaphthylene               |                  | 100            | 100      | 100      | 100      | 100      | 101         | 300        | 10U        | 2J       | 2J       | 100      |
| Anthracene                   | 2000             | 10U            | 100      | 100      | 100      | 100      | 100         | 300        | 1J         | 2J       | 5J       | 100      |
| Renzo(a) anthracene          |                  | 2J             | 100      | 100      | 100      | 100      | 100         | 300        | 100        | 1J       | 5J       | 10U      |
| Banzo(a)pyrene               | ,                | 2J             | 100      | 100      | 100      | 100      | 100         | 300        | 100        | 1J       | BJ       | 10U      |
| Benzo(b)fluoranthene         |                  | <b>2</b> J     | 100      | 100      | 100      | 100      | 1011        | 2011       | 100        | 100      | 10U      | 10U      |
| Benzo(d b ibnet/iene         |                  | 2J             | 100      | 100      | 100      | 100      | 100         | 200        | 100        | 1J       | 9J       | 100      |
| Dento (L) Huoranthana        |                  | 2J             | 10U      | 100      | 100      | 100      | 15          | 300        |            |          |          |          |

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Table 5-12. Semivolatile Organic Compounds in Groundwater Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey,

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|                             | NJDEP *<br>Groundwater<br>Quality Standard | Sample ID: EB1 | EB29  | EB51<br>01/25/95 | EB68<br>01/24/95 | EBR13      | EBR19<br>01/24/95 | GMMW2<br>01/25/95 | GMMW3<br>01/25/95 | GMMW4<br>01/25/95 | GMMW6<br>01/25/95 | GMMW8<br>01/23/95 |
|-----------------------------|--------------------------------------------|----------------|-------|------------------|------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Analyte (Ug/L)              | (Higher of Pars)                           | Date, 01/20/04 |       |                  | • • • • •        |            |                   |                   |                   | 10111             | 1011              | 10111             |
| Burvi benzvi phthalate      | 100                                        | 100            | 100   | 10UJ             | 10UJ             | 100        | 10UJ              | 30UJ              | 1003              | 1000              | 1005              | 1005              |
| Carbazole                   |                                            | 10U            | 100   | 10U              | 100              | <b>2</b> J | 100               | 300               | 100               | 100               | 41                | 100               |
| Chrysene                    | **                                         | 3J             | 100   | 100              | 100              | 100        | 1J                | 300               | ZJ                | 35                | 1011              | 100               |
| Di-n-butvi obthalata        | 900                                        | 10U            | 100   | 100              | 1J               | 100        | 100               | 300               | 100               | 100               | 100               | 1000              |
| Di-n-octyl phthalate        | 100                                        | 100            | 100   | 10UJ             | 10UJ             | 100        | 1000              | 300               | 1005              | 1005              | 1005              | 1003              |
| Dihanzia hisothrecene       |                                            | 100            | 10U - | 100              | 100              | 100        | 100               | 300               | 100               | 100               | 100               | 100               |
| Dibenzofuren                | 100 **                                     | 10U            | 100   | 10U .            | 100              | 2J         | 100               | 4J                | 100               | 2.3               | 100               | 100               |
|                             | 5000                                       | 100            | 100   | 10U              | 100              | 100        | 100               | 30U               | 100               | 13                | 100               | 100               |
| Dietny: phinako             |                                            | 100            | 10U   | 100              | 100              | 100        | 100               | 30U               | 100               | 100               |                   | 100               |
|                             | 300                                        | 100            | 100   | 100              | 1J               | 100        | 2J                | 30U               | 100               | 31                | 0.0               | 100               |
| Filloranthone               | 300                                        | 100            | 100   | 2J               | 10U              | 1J         | 100               | 11J               | ZJ                | 3.)               | 100               | 100               |
| Fluorene                    | 10                                         | 100            | 100   | 100              | 100              | 100        | 100               | 30U               | 100               | 100               | 100               | 100               |
| Hexachlorobenzene           | 1                                          | 100            | 100   | 100              | 100              | 100        | 100               | 30U               | 100               | 100               | 100               | 100               |
| Hexachlorobutadiene         | FO                                         | 100            | 100   | 100              | 100              | 100        | 100               | 300               | 100               | 100               | 100               | 100               |
| Hexachlorocyclopentadiene   | 50                                         | 100            | 100   | 100              | 100              | 100        | 10U               | 30U               | 100               | 100               | 100               | 100               |
| Hexachloroethene            | 10                                         | 11             | 100   | 100              | 100              | 100        | 100               | 300               | 100               | 100               | 100               | 100               |
| Indeno(1,2,3-od)pyrene      |                                            | 1011           | 100   | 100              | 100              | 100        | 100 .             | 30U               | 100               | 100               | 100               | 100               |
| Isophorone                  | 100                                        | 100            | 1000  | 100              | 100              | 10UJ       | 100               | 30U               | 100               | 100               | 100               | 100               |
| N-Nitroso-di-n-propylamina  | 20                                         | 100            | 1000  | 1001             | 100              | 10UJ       | 100               | 30U               | 10UJ              | 1003              | 1003              | 100               |
| N-Nitrosodiphenylamine(1)   | 20                                         | 1005           | 1005  | 1000             | 2.1              | 9J         | 100               | 40                | 64                | 3J                | 2.J               | 100               |
| Naphthalene                 | 30 **                                      | 100            | 100   | 100              | 100              | 100        | 100               | 300               | 100               | 100               | 100               | 100               |
| Nitrobenzene                | 10                                         | 100            | 100   | 100              | 2511             | 250        | 25U               | 75U               | 25U               | 25U               | 25U               | 250               |
| Pentachlorophenol           | 1                                          | 250            | 250   | 250              | 100              | 11         | 1.1               | 30                | 2J                | 6J                | 3J                | 100               |
| Phenanthrane                | 100 **                                     | 100            | 100   | 100              | 100              | 100        | 100               | 300               | 100               | 100               | 100               | 100               |
| Phenol                      | 4000                                       | 100            | 100   | 100              | 21               | 100        | 2.1               | 4J                | 3J                | 5J                | 8J                | 1J                |
| Pyrane                      | 200                                        | 2J             | 100   | 100              | 100              | 100        | 100               | 300               | 100               | 100               | 10U               | 100               |
| his(2-Chloroethoxy)methane  | ••                                         | 10U            | 100   | 100              | 100              | 100        | 100               | 300               | 100               | 10U               | 100               | 100               |
| bie(2-Chlorosthyl)ether     | 10                                         | 100            | 100   | 100              | 100              | 11         | 2.1               | 6J                | <b>4</b> J        | 2J                | 6J                | 10UJ              |
| his (2-Ethylazyi) phthalate | 30                                         | 3J             | 3J    | <b>4</b> J       | 4J               | 13         | 2.4               | ••                |                   |                   |                   | _                 |
|                             |                                            | 19             | 3     | 6                | 13               | 20         | 11                | 267               | 266               | 43                | 60                | 3                 |

Table 5-12. Semivolatile Organic Compounds in Groundwater Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                              | NJDEP *          |                  |             |          |             |          |             |            |          |          |          |
|------------------------------|------------------|------------------|-------------|----------|-------------|----------|-------------|------------|----------|----------|----------|
|                              | Groundwater      | Sample ID: GMMW9 | GMMW10      | GMMW11   | GMMW13      | GMMW14   | GMMW15      | GMMW17     | GMMW19   | GMMW 20  | GMMW211  |
| American (confl.)            | Quality Standard | Dete: 01/23/95   | 01/23/95    | 01/25/95 | 01/27/95    | 01/23/95 | 01/24/95    | 01/25/95   | 01/27/95 | 01/23/95 | 01/26/95 |
| Analyta (ug/c)               | (myner or ricca) | Date: 01/20/00   | 01/20/00    | 01120100 | 01121100    |          |             |            |          |          |          |
| 1,2,4-Trichlorobenzene       | 9                | 100              | 100         | 10U      | 100         | 100      | 10U -       | 10U        | 100      | 100      | 100      |
| 1,2-Dichlorobenzene          | 600              | 100              | 100         | 10U      | 100         | 100      | 100         | 1J         | 100      | 100      | 3J       |
| 1,3-Dichlorobenzene          | 600              | 100              | 1 <b>0U</b> | 100      | 10U         | 100      | 100         | 100        | 100      | 100      | 100      |
| 1,4-Dichlorobenzene          | 75               | 100              | 100         | 100      | 100         | 10U      | 100         | <b>2</b> J | 100      | 100      | 4J       |
| 2,2'-oxybis(1-chloropropane) | 300              | 10UJ             | 100         | 10UJ     | 100         | 10UJ     | 10UJ        | 10UJ       | 100      | 10UJ     | 10UJ     |
| 2,4,5-Trichlorophenol        | 700              | 25U              | 25U         | 25U      | 25U         | 25U      | 25U         | 250        | 25U      | 25U      | 250      |
| 2.4.6-Trichlorophenol        | 20               | 1 <b>0</b> U     | tou         | 10U      | 10U         | 10U      | 100         | 100        | 100      | 100      | 100      |
| 2.4-Dichloropheno?           | 20               | 100              | 1 <b>0U</b> | 10U      | 1 <b>0U</b> | 100      | 100         | 100        | 100      | 100      | 100      |
| 2.4-Dimethylphenol           | 100*             | 10U              | 10U         | 1J       | 100         | 100      | 100         | 100        | 100      | 100      | 100      |
| 2.4-Dinitrophenol            | 40               | 25U              | 25UJ        | 25U      | 25U         | 25U      | 25UJ        | 250        | 250      | 250      | 250      |
| 2.4-Dinitrotoluene           | 10               | 10U              | 10U         | 100      | 100         | 100      | 10U         | 100        | 100      | 100      | 100      |
| 2.6-Dinitrotoluene           | 10               | 10U              | 10U         | 100      | 100         | 100      | 10U         | 100        | 100      | 100      | 100      |
| 2-Chloronephthalene          |                  | 10U              | 100         | 100      | 100         | 100      | 100         | 100        | 100      | 100      | 100      |
| 2-Chlorophenol               | 40               | 100              | 100         | 100      | 100         | 100      | 100         | 100        | 100      | 100      | 100      |
| 2-Methylnaphthalene          | 100 **           | 100              | 100         | 10U      | 100         | 100      | 100         | 5J         | 2J       | 100      | 100      |
| 2-Methylphenol               | 400 **           | 10U              | 10U         | 100      | 10U         | 10U      | 100         | 100        | 100      | 100      | 251      |
| 2-Nitroaniline               |                  | 25U              | 25UJ        | 250      | 25U         | 25U      | 250         | 250        | 250      | 250      | 200      |
| 2-Nitrophenol                |                  | 10U              | 10U         | 100      | 100         | 100      | 100         | 100        | 100      | 100      | 100      |
| 3.3'-Dichlorobanzidine       | 60               | 10UJ             | 10U         | 100      | 10U         | 10UJ     | 10UJ        | 10UJ       | 100      | 1003     | 100      |
| 3-Nitroanilina               | -                | 25U              | 250         | 25U      | 25U         | 25U      | 25U         | 250        | 250      | 250      | 250      |
| 4 6-Dinitro-2-methylphenol   |                  | 25U              | 25U         | 25U      | 25U         | 25U      | <u>2</u> 5U | 250        | 250      | 250      | 250      |
| A-Bromophenyl phenyl ether   |                  | 100 *            | 100         | 100      | 100         | 100      | 100         | 100        | 100      | 100      | 100      |
| 4-Chioro-3-methylphenol      |                  | 10U              | 100         | 100      | 100         | 100      | 100         | 100        | 100      | 100      | 100      |
| 4-Chlorospiline              |                  | 10UJ             | 10UJ        | 10UJ     | 10UJ .      | 10UJ     | 10UJ        | 10UJ       | 1005     | 1003     | 1003     |
| 4-Chiorophenyl phenyl ether  | ••               | 100              | 100         | 100      | 100         | 100      | 100         | 100        | 100      | 100      | 100      |
| 4-Mathylohenol               | 350 **           | 2J               | 100         | 100      | 100         | 100      | 100         | 100        | 100      | 23       | 25       |
| 4-Nitroanilina               |                  | 25U              | 25U         | 25U      | 250         | 25U      | 250         | 250        | 250      | 250      | 250      |
| 4-Nitrophenol                |                  | 25U              | 25UJ        | 25U      | . 25U       | 25U      | 25UJ        | 250        | 250      | 250      | 100      |
| Acenaphthene                 | 400              | 10U              | 100         | 15       | 100         | 2J       | 100         | 100        | 100      | 100      | 100      |
| Acenaphthylene               |                  | 10U              | 10U         | 100      | 100         | 100      | 100         | 100        | 100      | 100      | 100      |
| Anthracena                   | 2000             | 10U              | 100         | 100      | 100         | 100      | 100         | 100        | 100      | 21       | 100      |
| Benzo(a)anthracana           |                  | 100              | 100         | 10U      | 2J          | 100      | 100         | 100        | 100      | 11       | 1011     |
| Benzo(a)pyreng               |                  | 100              | 1.00        | 10U      | 2J          | 100      | 100         | 100        | 100      | 1.1      | 100      |
| Benzo(b)fluoranthene         |                  | 10U              | 100         | 10U      | 2J          | 100      | 1J          | 100        | 100      | 101      | 100      |
| Benzola h ilperviene         |                  | 100              | 100         | 100      | 100         | 100      | 100         | 100        | 100      | 100      | 100      |
| Benzoly II, II with the ne   |                  | 10U              | 100         | 10U .    | 2J          | 100      | 1J          | 100        | 100      | 13       | 100      |
| BallSofvilling               |                  |                  |             |          |             |          |             |            |          |          |          |

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Table 5-12. Semivolatile Organic Compound in Groundwater Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                                      | NJDEP *<br>Groundwater               | Sample ID: GMMWS | GMMW10     | GMMW11   | GMMW13   | GMMW14   | GMMW15   | GMMW17   | GMMW19   | GMMW20   | GMMW21I   |
|--------------------------------------|--------------------------------------|------------------|------------|----------|----------|----------|----------|----------|----------|----------|-----------|
|                                      | Quality Standard<br>(Higher of PQLs) | Date: 01/23/9    | 5 01/23/95 | 01/25/95 | 01/27/95 | 01/23/95 | 01/24/95 | 01/25/95 | 01/27/95 | 01/23/95 | 01/26/95  |
| Analyte lug/c/                       |                                      |                  |            |          | 1011     | 1001     | 1000     | 10111    | 100      | 10UJ     | 10UJ      |
| Butyl benzyl phthalate               | 100                                  | 10UJ             | 10UJ       | 1000     | 100      | 1003     | 1005     | 100      | 100      | 100      | 100       |
| Carbazole                            |                                      | 100              | 100        | 3J       | 100      | 100      | 11       | 100      | 100      | 2J       | 100       |
| Chrysene                             |                                      | 10U              | 100        | 100      | 3.       | 10       | 1011     | 100      | 100      | 100      | 100       |
| Disployed phthalate                  | 900                                  | 10U              | 100        | 2J       | 100      | 100      | 100      | 1001     | 100      | 1000     | TOUJ      |
| Dimochd phthalata                    | 100*                                 | 1003             | 10U        | 10UJ     | 100      | 1005     | 1005     | 1000     | 100      | 100      | 100       |
| Dihenz/a blenthranana                | +-                                   | 100              | 100        | 100      | 100      | 100      | 100      | 100      | 100      | 100      | 10U       |
| Dibertofuren                         | 100 **                               | 100              | 100        | 9J       | 100      | 100      | 100      | 100      | 100      | 100      | 1J        |
|                                      | 5000                                 | 10U              | 10U        | 1J       | 100      | 100      | 100      | 100      | 100      | 100      | 100       |
|                                      |                                      | 100              | 100        | 100      | 100      | 100      | 100      | 100      | 100      | 1.1      | 100       |
| Dimethyl phinelate                   | 300                                  | 100              | 100        | 3J       | 2J       | 100      | ZJ       | 100      | 100      | 100      | 100       |
| Fluoranthena                         | 300                                  | 100              | 10U        | 6J       | 100      | 2J       | 100      | 100      | 2011     | 100      | 100       |
| Fluorene                             | 10                                   | 100              | 100        | 100      | 100      | 100      | 100      | 100      | 100      | 100      | 100       |
| Hexachlorobenzene                    | 10                                   | 100              | 100        | 100      | 100      | 100      | 100      | 100      | 100      | 100      | 100       |
| Hexachiorobutediene                  | 50                                   | 100              | 100        | 100      | 10U      | 10U      | 100      | 100      | 100      | 100      | 100       |
| Hexachlorocyclopentadiene            | 50                                   | 100              | 100        | 100      | 100      | 100      | 10U      | 100      | 100      | 100      | 100       |
| Hexachloroethane                     | 10                                   | 100              | 100        | 100      | 10U      | 100      | 100      | 100      | 100      | 100      | 100       |
| Indeno(1,2,3-cd)pyrene               |                                      | 100              | 100        | 100      | 100      | 10U      | 100      | 10U      | 100      | 100      | 100       |
| leophorone                           | 100                                  | 100              | 100        | 100      | 1003     | 10U      | 100      | 100      | 1003     | 100      | 100       |
| N-Nitroso-di-n-propylamine           | 20                                   | 100              | 100        | 100.1    | 1003     | 10U      | 100      | 100      | 10UJ     | 100      | 1005      |
| N-Nitrosodiphanylamine(1)            | 20                                   | 100              | 100        | 1000     | 100      | 16       | 100      | 5J       | 100      | 1J       | 100       |
| Naphthalene                          | 30 **                                | 100              | 100        | 100      | 100      | 100      | 100      | 100      | 100      | 100      | 100       |
| Nitrobenzene                         | 10                                   | 100              | 100        | 2511     | 250      | 250      | 25U      | 25U      | 25U      | 250      | <u>30</u> |
| Pentachiorophenol                    | 1                                    | 250              | 250        | 200      | 100      | 1.1      | 2J       | 100      | 100      | 2J       | 100       |
| Phenenthrens                         | 100 **                               | 100              | 100        | 1011     | 100      | 2.1      | 100      | 2J       | 10U      | 100      | 12        |
| Phenol                               | 4000                                 | 100              | 100        | 100      | 31       | 1.1      | 2J       | 100      | 100      | 2J       | 100       |
| Puteros                              | 200                                  | 100              | 100        | 30       | 1011     | 100      | 100      | 10U      | 10U      | 100      | 100       |
| Fyrene<br>his/2-Chloroethoxy)methene |                                      | 100              | 100        | 100      | 100      | 100      | 100      | 10U      | 100      | 100      | 100       |
| his (2 Chieroethy)ether              | 10                                   | 100              | 100        | 100      | 21       | 1000     | 8.1      | 3J       | 2.)      | 3J       | 6J        |
| Dist2-Chickeyd)nhthalata             | 30                                   | 10UJ             | 100        | an       | 35       | 1000     |          |          |          |          |           |
| Total SVOCe                          |                                      | 2                | o          | 53       | 19       | 25       | 17       | 18       | 6        | 18       | 31        |

Table 5-12. Semivolatile Organic Compound in Groundwater Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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GERAGHTY & MILLER, INC.

|                              | NJDEP *<br>Groundwater<br>Quality Standard | Sampla (D; GMMW21D | GMMW22D  | GMMW231       | GMMW23D  | GMMW23DFR | GMMW24I<br>01/24/95 | GMMW24IFR<br>01/24/95 | GMMW24D<br>01/24/ <u>9</u> 5 |
|------------------------------|--------------------------------------------|--------------------|----------|---------------|----------|-----------|---------------------|-----------------------|------------------------------|
| Analyte (ug/L)               | (Higher of PQLs)                           | Date: 01/24/95     | 01/27/95 | 01/26/95      | 01/20/95 | 01/20/03  | 0,12,100            |                       |                              |
| 1 3 4 Trichlorobenzene       | ė                                          | 100                | 100      | 100U          | 10U      | 10U       | 100                 | 100                   | 100                          |
| 1.2-Dichlorobenzene          | 600                                        | 100                | 100      | 100U          | 100      | 100       | 100                 | 3J                    | 100                          |
| 1.2-Dichlorobenzene          | 600                                        | 100                | 100      | 10 <b>0</b> U | 100      | 10U       | 100                 | 100                   | 100                          |
|                              | 75                                         | 100                | 100      | 1000          | 100      | 100       | 100                 | 100                   | 100                          |
| 2.2' avable/1-shloronronane) | 300                                        | 1000               | 100      | 100U          | 10UJ     | 1003      | 1000                | 1005                  | 250                          |
| A E Trichlerenhenel          | 700                                        | R                  | 25U      | 250U          | 25U      | 250       | 250                 | 250                   | 250                          |
|                              | 20                                         | R                  | 100      | 1000          | 10U      | 100       | 100                 | 100                   | 100                          |
| 2,4,0- (Activity)            | 20                                         | R                  | 10U      | 100U          | 10U      | 10U       | 100                 | 100                   | 100                          |
|                              | 100*                                       | R                  | 100      | 100U          | 100      | 100       | 100                 | 100                   | 250                          |
|                              | 40                                         | R                  | 25U      | 250U          | 25U      | 250       | 250                 | 250                   | 250                          |
|                              | 10                                         | 100                | 10U      | 1000          | 10U      | 100       | 100                 | 100                   | 100                          |
|                              | 10                                         | 100                | 100      | 100U          | 100      | 10U       | 100                 | 100                   | 100                          |
| 2,6-Dimitrotokuene           |                                            | 100                | 10U      | 100U          | 100      | 100       | 100                 | 100                   | 100                          |
| 2-Chioronaphinalana          | 40                                         | R                  | 100      | 1000          | 10U      | 100       | 100                 | 100                   | 100                          |
| 2-Chlorophenol               | 100 **                                     | 100                | 100      | 100U          | 100      | 100       | 13                  | <b>9</b> 1            | 100                          |
| 2-Methylnaphtnaiene          | 400 **                                     | R                  | 10U      | 100U          | 5J       | E1        | 2J                  | 2J                    | 100                          |
| 2-Methylphenol               | 400                                        | 250                | 250      | 250U          | 25U      | 25U       | 25U                 | 250                   | 250                          |
| 2-Nitroaniline               |                                            | R                  | 100      | 100U          | 10U      | 10U       | 100                 | 100                   | 100                          |
| 2-Nitrophenol                | 40                                         | 100                | TOU      | 100U          | 10U      | 100       | 10UJ                | 10UJ                  | 100J                         |
| 3,3'-Dichlorobenzidine       | 00                                         | 250                | 250      | 250U          | 25U      | 25U       | 25U                 | 250                   | 250                          |
| 3-Nitroaniline               | ••                                         | 8                  | 250      | 250U          | 25U      | 25U       | 25U                 | 250                   | 250                          |
| 4,6-Dinitro-2-methylphenol   | ••                                         | 100                | 100      | 100U          | 100      | 10U       | 100                 | 100                   | 100                          |
| 4-Bromophenyl phenyl ether   |                                            | R                  | 100      | 1000          | 10U      | 100       | 10U                 | 100                   | 100                          |
| 4-Chloro-3-methylphenol      |                                            | 1001               | 10UJ     | 1000J         | 10UJ     | 10UJ      | 10UJ                | 10UJ                  | 10UJ                         |
| 4-Chtoroaniline              |                                            | 100                | 100      | 1000          | 10U      | 10U       | 100                 | 100                   | 100                          |
| 4-Chlorophenyl phenyl ether  | 250.11                                     | R                  | 15       | 1000          | 100      | 100       | 180                 | 160                   | 100                          |
| 4-Methylphenol               | 350                                        | 2511               | 250      | 250U          | 25U      | 25U       | 250                 | 250                   | 250                          |
| 4-Nitroaniline               |                                            | 2<br>B             | 250      | 250U          | 25U      | 25U       | 25U                 | 250                   | 250                          |
| 4-Nitrophenol                |                                            | 100                | 100      | 1000          | 100      | 100       | 100                 | 100                   | 100                          |
| Acenaphthene                 | 400                                        | 100                | 100      | 100U          | 100      | 100       | 100                 | 100                   | 100                          |
| Acenaphthylene               |                                            | 100                | 100      | 1000          | 100      | 100       | 100                 | 100                   | 100                          |
| Anthracene                   | 2000                                       | 100                | 100      | 100U          | 100      | 10U       | 100                 | 10U                   | 100                          |
| Benzo(a)anthracene           |                                            | 100                | 100      | 1000          | 100      | 100       | 100                 | 100                   | 100                          |
| Benzo(a)pyrene               |                                            | 100                | 100      | 1000          | 100      | 10U       | 10U                 | 100                   | 10U                          |
| Benzo(b)fluoranthene         |                                            | 100                | 100      | 1000          | 100      | 100       | 100                 | 100                   | 100                          |
| Benzo(g,h,i)perviene         |                                            | 100                | 100      | 1000          | 101      | 100       | 100                 | 100                   | 10U                          |
| Renzo(k)fluoranthana         |                                            | 100                | 100      | 1000          | 100      |           |                     |                       |                              |

Table 5-12. Semivolatile Organic Compound in Groundwater Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jarsey.

See last page for footnotes.

|                            | NJDEP *<br>Groundwater               | Sample ID: GMMW21D | GMMW22D  | GMMW231  | GMMW23D  | GMMW23DFR | GMMW24I  | GMMW24IFR | GMMW24D  |
|----------------------------|--------------------------------------|--------------------|----------|----------|----------|-----------|----------|-----------|----------|
| Analyte (ug/L)             | Quality Standard<br>(Higher of PQLs) | Date: 01/24/95     | 01/27/95 | 01/26/95 | 01/26/95 | 01/26/95  | 01/24/95 | 01/24/95  | 01/24/95 |
|                            |                                      |                    |          | 10011    |          | 10111     | 1001     | 1000      | 10UJ     |
| Butyl benzyl phthalate     | 100                                  | 10UJ               | 100      | 1000     | 1003     | 1003      | 100      | 100       | 100      |
| Carbazole                  | ++                                   | 100                | 100      | 1000     | 100      | 100       | 100      | 100       | 100      |
| Chrysene                   |                                      | 100                | 100      | 1000     | 100      | 100       | 100      | 100       | 10U      |
| Di-n-butyl phtheiate       | 900                                  | 100                | 100      | 1000     | 1003     | 10111     | 1000     | 1001      | 1000     |
| Di-n-octyl phthalate       | 100*                                 | 1003               | 100      | 1000     | 100J     | 1003      | 1005     | 1005      | 100      |
| Dibenz(a,h)anthracene      |                                      | 100                | 100      | 1000     | 100      | 100       | 100      | 100       | 100      |
| Dibenzofuran               | 100 **                               | 10U                | 100      | 1000     | 100      | 100       | 100      | 100       | 100      |
| Disthyl phthaiata          | 5000                                 | 100                | 1J       | 1000     | 100      | 100       | 100      | 100       | 100      |
| Dimethyl phthalate         |                                      | 100                | 100      | 1000     | 10U      | 100       | 100      | 100       | 100      |
| Succenthene                | 300                                  | 100                | 100      | 100U     | 100      | 100       | 100      | 100       | 100      |
| Elucrene                   | 300                                  | 100                | 100      | 100U     | 100      | 100       | 100      | 100       | 100      |
| Hexachiorobentene          | 10                                   | 100                | 100      | 1000     | 10U      | 100       | 100      | 100       | 100      |
| Hexachierobutadiene        | 1                                    | 100                | 10U      | 100U     | 10U      | 100       | 100      | 100       | 100      |
| Hexactionobucations        | 50                                   | 100                | 10U      | 1000     | 100      | 10U       | 100      | 100       | 100      |
| Hexactionocyclopentaviene  | 10                                   | 100                | 100      | 100U     | 10U      | 10U       | 100      | 100       | 100      |
| Hexachioroethane           | 10                                   | 100                | 100      | 1000     | 10U      | 100       | 10U      | 100       | 100      |
| Indeno(1,2,3-cd)pyrene     | 100                                  | 100                | 100      | 1000     | 100      | 100       | 10U      | 100       | 100      |
| Isophorone                 | 100                                  | 100                | 1011     | 1000     | 100      | 10U       | 100      | 100       | 100      |
| N-Nitroso-di-n-propylamine | 20                                   | 1011               | 1011     | 100UJ    | 10UJ     | 10UJ      | 100      | 10U       | 100      |
| N-Nitrosodiphenylemine(1)  | 20                                   | 21                 | 100      | 1000     | 1J       | 1J        | 23       | 17        | 100      |
| Naphthalene                | 30 - 4                               | 1011               | 100      | 1000     | 100      | 10U       | 10U      | 100       | 100      |
| Nitrobenzene               | 10                                   | 100                | 2511     | 2500     | 250      | 250       | 25U      | <u>9J</u> | 25U      |
| Pentachlorophenol          | 1                                    | R 10U              | 100      | 1000     | 100      | 100       | 10U      | 100       | 10U      |
| Phenanthrene               | 100 • •                              | 100                | 71       | 101      | 49       | 48J       | 21       | 14        | 100      |
| Phenol                     | 4000                                 | n<br>1011          | 1011     | 100      | 100      | 100       | 100      | 100       | 100      |
| Pyrene                     | 200                                  | 100                | 100      | 1000     | 100      | 100       | 10U      | 100       | 100      |
| bis(2-Chlorosthoxy)methane |                                      | 100                | 100      | 1000     | 100      | 100       | 100      | 100       | 10U      |
| bis(2-Chloroethyl)ether    | 10                                   | 100                | 100      | 1000     | a.       | 111       | 100.0    | 12J       | 9J       |
| bis(2-Ethylhexyl)phthelate | 30                                   | ZJ                 | 11       | 1000     | 3J       |           |          |           |          |
| Total SVOCs                |                                      | 4                  | 34       | 10       | 54       | 133       | 239      | 226       | 9        |

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Table 5-12. Semivolatile Organic Compound in Groundwater Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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| A ( 4 )                      | NJDEP *<br>Groundwater<br>Quality Stendard | Semple ID: MW6 | MW9       | MW10       | PKMW-4            | FBA1-012395 | FBA2-012495 | FBA3-012595 | FBA4-012695 | FBA5-012795<br>01/27/95 |
|------------------------------|--------------------------------------------|----------------|-----------|------------|-------------------|-------------|-------------|-------------|-------------|-------------------------|
| Analyte (ug/L)               | (Higher of Face)                           | 0818. 01/4410  | 0 0112400 |            | •                 |             |             |             |             |                         |
| 1,2,4-Trichlorobenzene       | . 9                                        | 100            | 10U       | 100        | 10U               | 100         | 100         | 100         | 100         | 100                     |
| 1,2-Dichlorobenzene          | 800                                        | 100            | 10U       | 100        | 10U               | 100         | 100         | 100         | 100         | 100                     |
| 1,3-Dichlorobenzene          | 600                                        | 100            | 10U       | 1QU        | 100               | 100         | 100         | 100         | 100         | 100                     |
| 1,4-Dichlorobenzene          | 75                                         | 100            | 10U       | 100        | 100               | 100         | 100         | 100         | 100         | 100                     |
| 2,2'-oxybis(1-chloropropane) | 300                                        | 10UJ           | 10UJ      | 10UJ       | 100               | 100         | 100         | 100         | 100         | 251                     |
| 2,4,5-Trichlorophenol        | 700                                        | 25U            | 25U       | 25U        | 25U               | 250         | 250         | 250         | 250         | 250                     |
| 2,4,8-Trichlorophenol        | 20                                         | 100            | 100       | 100        | 100               | 100         | 10U         | 100         | 100         | 100                     |
| 2,4-Dichlorophanol           | 20                                         | 14             | 100       | 100        | 100               | 10U         | 100         | 100         | 100         | 100                     |
| 2.4-Dimethylphenol           | 100*                                       | 10U            | 10U       | <u>110</u> | 10U               | 100         | 100         | 100         | 100         |                         |
| 2.4-Dinitrophenol            | 40                                         | 25U            | 25U       | 25U        | 25U               | 25U         | 250         | 250         | 250         | 250                     |
| 2 4-Dinitrotoluene           | 10                                         | 100            | 100       | 100        | 100               | 100         | 100         | 100         | 100         | 100                     |
| 2.8-Dipitrotaluene           | 10                                         | 100            | 100       | 100        | 100               | 1 <b>0U</b> | 100         | 100         | 100         | 100                     |
| 2-Chloropenhthalene          |                                            | 100            | 100       | 10U        | 10U               | 100         | 100         | 100         | 100         | 100                     |
| 2-Chlorenhanol               | 40                                         | 100            | 10U       | 100        | 10U               | 10U         | 100         | 100         | 100         | 100                     |
| 2-Methylpenbthalane          | 100 **                                     | 22             | 81        | <u>310</u> | 15                | 100         | 100         | 100         | 100         | 100                     |
| 2-Methylobenol               | 400 **                                     | 100            | 100       | 10U        | 100               | 100         | 100         | 100         | 100         | 100                     |
| 2-Nitroapilina               |                                            | 25U            | 25U       | 25U        | 25U               | 25U         | 250         | 250         | 250         | 1011                    |
| 2-Nitrophenol                |                                            | 1 <b>0U</b>    | 100       | 10U        | 100               | 100         | 100         | 100         | 100         | 100                     |
| 3.3 Dioblorobenzidine        | 60                                         | 10UJ           | 10UJ      | 10UJ       | 100               | 100         | 100         | 100         |             | 2511                    |
| 3-Nitroapiline               |                                            | 250            | 25U       | 25U        | 25U               | 250         | 25U         | 250         | 250         | 250                     |
| 4 8-Dinitro-2-methylphenol   |                                            | 25U            | 25U       | 25U        | 25U               | 250         | 25U         | 250         | 250         | 100                     |
| 4.Bromonbenyl phenyl ether   |                                            | 100            | 100       | 100        | 100               | 100         | 100         | 100         | 100         | 100                     |
| 4-Chloro-3-methylphengi      |                                            | 10U            | 100       | 100        | 10U               | 100         | 100         | 100         | 100         | 100                     |
| 4-Chioroeniline              |                                            | 10UJ           | 10UJ      | 10UJ       | 10UJ <sup>-</sup> | 100         | 100         | 100         | 100         | 100                     |
| 4 Chlorophenyl phenyl sthat  |                                            | 10U            | 10U       | 100        | 100               | 100         | 100         | 100         | 100         | 100                     |
| 4-Mathylobanol               | 350 **                                     | 56             | 10U       | 100        | 100               | 100         | 100         | 100         | 100         | 250                     |
| 4 Nitroeniline               |                                            | 25U            | 25U       | 25U        | 25U               | 25U         | 250         | 250         | 250         | 250                     |
| 4-Nitrophanot                | -+                                         | 25U            | 25U       | 25U        | 25U               | 25U         | 250         | 250         | 250         | 100                     |
| a-lattophene                 | 400                                        | 100            | 8J        | 14         | 100               | 100         | 100         | 100         | 100         | 100                     |
| Acenaphthene                 |                                            | 100            | 100       | 10U        | 100               | 100         | 100         | 100         | 100         | 100                     |
| Action                       | 2000                                       | 100            | 10U       | 10U        | 10U               | 100         | 100         | 100         | 100         | 100                     |
|                              |                                            | 10U            | 100       | 1J         | 2J                | 10U         | 100         | 100         | 100         | 100                     |
|                              |                                            | 10U            | 10U       | 10U        | 2J                | 100         | 100         | 100         | 100         | 100                     |
| Benzo(b)fluorenthene         |                                            | 10U            | 100       | 1J         | 2J                | 100         | 100         | 100         | 100         | 100                     |
|                              |                                            | 10U            | 100       | 100        | 100               | 100         | 100         | 100         | 100         | 100                     |
| Benzo(k)fluoranthane         |                                            | 100            | 100       | 1J         | 2J                | 100         | 100         | 100         |             |                         |

Table 5-12. Semivolatile Organic Compound in Groundwater Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

|                                       | NJDEP *<br>Groundwater<br>Quelity Standard | Semple ID: MW | 6       | ММЭ      | MW10      | PKMW-4   | FBA1-012395 | FBA2-012495 | FBA3-012595 | FBA4-012695 | FBA5-012795 |
|---------------------------------------|--------------------------------------------|---------------|---------|----------|-----------|----------|-------------|-------------|-------------|-------------|-------------|
| Analyte (ug/L)                        | (Higher of PQLs)                           | Dete: 01/     | 24/95   | 01/24/95 | 01/23/95  | 01/27/95 | 01/23/95    | 01/24/95    | 01/25/95    | 01/26/95    | 01/27/95    |
| • • • • • • • • • • • • • • • • • • • | 100                                        | 101           | 41      | 100.1    | 10UJ      | 100      | 100         | 100         | 100         | 10U         | 10U         |
| Butyl Denzyl primalate                | 100                                        | 101           | 1       | 100      | 41        | 100      | 10U         | 10U         | 100         | 100         | 100         |
| Carbazole                             |                                            | 100           | ,       | 100      | 11        | 3.1      | 10U         | 100         | 100         | 100         | 100         |
| Chrysene                              |                                            | 100           | ,       | 100      | 100       | 100      | 100         | 100         | 100         | 100         | tQU         |
| Di-n-butyl phthalate                  | 900                                        | 100           |         | 100      | 1000      | 100      | 100         | 100         | 100         | 10U         | 100         |
| Di-n-octyl phthalate                  | 100*                                       | 100           | ,,<br>, | 1005     | 1005      | 100      | 100         | 100         | 100         | 100         | 100         |
| Dibenz(a,h)anthracene                 |                                            | 100           | ,<br>,  | 100      | 100       | 100      | 100         | 100         | 100         | 100         | 100         |
| Dibenzofuran                          | 100 **                                     | 100           |         | 100      | 100       | 100      | 100         | 1,1         | 10U         | 10U         | 100         |
| Diethyl phthalate                     | 5000                                       | 100           |         | 100      | 100       | 100      | 100         | 100         | 10U         | 100         | 10U         |
| Dimethyl phthelate                    |                                            | 100           | ,       | 100      | 100       | 100      | 100         | 100         | 100         | 100         | 100         |
| Fluorenthene                          | 300                                        | 100           | ,       | 100      | 3.1       | 1011     | 100         | 100         | 100         | 100         | 100         |
| Fluorene                              | 300                                        | 100           | ,       | 13       | 19        | 100      | 100         | 100         | 100         | 100         | 100         |
| Hexachiorobenzene                     | 10                                         | 100           | J       | 100      | 100       | 100      | 100         | 100         | 100         | 100         | 10U         |
| Hexachlorobutadiene                   | 1                                          | 100           | J       | 100      | 100       | 100      | 100         | 100         | tou         | 100         | 100         |
| Hexachlorocyclopentadiene             | 50                                         | 100           | J       | 100      | 100       | 100      | 100         | 100         | 100         | TOU         | 10U         |
| Hexachloroethane                      | 10                                         | 10            | J       | 100      | 100       | 100      | 100         | 100         | 100         | 100         | 100         |
| Indeno(1,2,3-cd)pyrene                | '                                          | 101           | J       | 100      | 100       | 100      | 100         | 100         | 100         | 10U         | 100         |
| Isophorone                            | 100                                        | 100           | J       | 100      | 100       | 100      | 100         | 100         | 100         | 100         | . 10U       |
| N-Nitroso-di-n-propviamine            | 20                                         | 101           | U I     | 100      | 100       | 1003     | 100         | 100         | 100         | 100         | 10U         |
| N-Nitrosodiphenviamine(1)             | 20                                         | 10            | J       | 100      | 100       | 1003     | 100         | 100         | 100         | 100         | 100         |
| Nenhthalens                           | 30 **                                      | <u>18</u>     | 0       | 100      | <u>73</u> | 100      | 100         | 100         | 100         | 100         | 100         |
| Nitrohentene                          | 10                                         | 10            | U       | 100      | 100       | 100      | 100         | 100         | 2511        | 250         | 25U         |
| Pantashiaranhandi                     | 1                                          | 25            | u       | 25U      | 25U       | 25U      | 250         | 290         | 100         | 100         | 100         |
| Pendechiorophono                      | 100 **                                     | 10            | υ       | 16       | 32        | 1J       | 100         | 100         | 100         | 100         | 100         |
|                                       | 4000                                       | 10            |         | 15       | 100       | 100      | 100         | 100         | 100         | 100         | 100         |
| Phenoi                                | 200                                        | 10            | U       | 1J       | 5J        | 2J       | 100         | 100         | 100         | 100         | 100         |
| Fyrono                                |                                            | 10            | U       | 100      | 100       | 100      | 100         | 100         | 100         | 100         | 100         |
| Dist2-Chioroschul)athar               | 10                                         | 10            | U       | 10U      | 100       | 100      | 100         | 100         | 100         | 100         | 100         |
| bis(2-Ethylhexyl)phthalate            | 30                                         | 10            | UJ      | 3J       | 16J       | 14       | 100         | 100         | 100         |             | -           |
| Total SVOCs                           |                                            | 28            | 2       | 64       | 590       | 44       | 0           | 1           | 0           | 0           | 0           |

Table 5-12. Semivolatife Organic Compound in Groundwater Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Analyte concentrations and New Jersey Department of Environmental Protection (NJDEP) criteria in micrograms per liter (ug/L) (equivalent to parts per billion [ppb]).

Analyses were performed by CompuChem Environmental Corporation, Research Triangle Park, North Carolina, using Contract Laboratory Program (CLP) protocols contained in the

Statement of Work (SOW) OLMO1.8.

Exceedances of NJDEP criteria are shown in bold and are underlined. Indicates a field blank associated with aqueous samples.

FBA

- Practical quantitation level. POL
- Field replicate of previous sample. FR
- The compound was analyzed for, but not detected at the specified detection limit. U
- Estimated result. J
- Rejected result. R

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No applicable criteria. ••

Semivolatile organic compound. SVOC

NJDEP Groundwater Standards, New Jersey Register, April 5, 1993. .

Interim generic groundwater quality criterion. ... .

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|                     | NJDEP*<br>Groundwater<br>Queilty Standard | Semple ID: EB1 | E829     | EB51     | E868     | EBR13    | EBR19    | GMMW2    | GMMW3    | GMMW4    | GMMW6    | GMMW8    |
|---------------------|-------------------------------------------|----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Analyte (ug/L)      | (Higher of PQLs)                          | Date: 01/26/95 | 01/26/95 | 01/25/95 | 01/24/95 | 01/27/95 | 01/24/95 | 01/25/95 | 01/25/95 | 01/25/95 | 01/25/95 | 01/23/95 |
| 4 4'-000            | 0.1                                       | 0.1UJ          | 0.12U    | 0.10     | 0.1UJ    | 0.1UJ    | 0.1UJ    | 0.1UJ    | R        | 0.1UJ    | 0.1U     | 0.1UJ    |
|                     | 0.1                                       | 0.1UJ          | 0.120    | 0.10     | 0,1UJ    | 0.1UJ    | 0.1UJ    | 0.1UJ    | R        | 0.1UJ    | 0.1U     | 0.1UJ    |
| 4 4'-DDT            | 0.1                                       | 0.1UJ          | 0.12U    | 0.1U     | 0.1UJ    | 0.1UJ    | 0.1UJ    | 0.1UJ    | R        | 0.1UJ    | 0.10     | 0,1UJ    |
|                     | 0.04                                      | 0.05UJ         | 0.06U    | .05U     | 0.05UJ   | 0.05UJ   | 0.05UJ   | 0.05UJ   | R        | 0.05UJ   | .05U     | ,05UJ    |
| Acceler 1018        | 0.5                                       | 10.1           | 1.20     | 10       | 1UJ      | 1UJ      | 1UJ      | 1UJ      | R        | 1UJ      | tU       | 1UJ      |
| Aracia: 1221        | 0.5                                       | 217.1          | 2.40     | 20       | 2UJ      | 2UJ      | 2UJ      | 2UJ      | R        | 2UJ      | 2U       | 2UJ      |
| Arocior-1221        | 0.5                                       | 1111           | 1.20     |          | 10,      | 103      | 1UJ      | 1UJ      | R        | 1 U J    | 1U       | 1UJ      |
| Arocior-1232        | 0.5                                       | 1111           | 1 20     | 10       | 101      | 100      | 1UJ      | 1UJ      | R        | 1UJ      | 10       | 1UJ      |
| Arocior-1242        | 0.5                                       | 101            | 1 20     | 10       | 10.1     | 103      | 1UJ      | 1UJ      | R        | 1UJ      | 10       | 1UJ      |
| Aroclor-1248        | 0.5                                       | 100            | 1.20     | 10       | 103      | 100      | 1UJ      | 1UJ      | R        | 1UJ      | 10       | 1UJ      |
| Aroclor-1254        | 0.5                                       | 105            | 1 211    | 111      | 10.1     | 10.1     | 100      | 1UJ      | R        | 10J      | 10       | 1UJ      |
| Aroclor-1260        | 0.5                                       | 100            | 0.120    | 0.11     | 0.101    | 0.101    | 0.10.    | 0.1UJ    | R        | 0.1UJ    | .10      | 0.1UJ    |
| Dieldrin            | 0.03                                      | 0.103          | 0.120    | 0.051    | 0.0501   | 0.0501   | 0.050.1  | 0.05UJ   | R        | 0.05UJ   | 0.05U    | 0.05UJ   |
| Endosulfan I        | 0.4                                       | 0.0500         | 0.000    | 0,050    | 0.0000   | 0.100    | 0.10.1   | 0.10J    | R        | 0.1UJ    | 0.1U     | 0.1UJ    |
| Endosulfan il       | 0.4                                       | 0.1UJ          | 0.120    | 0.10     | 0.100    | 0.105    | 0.110    | 0.10J    | R        | 0.1UJ    | 0.1U     | 0.1UJ    |
| Endosulfan sulfata  | 0.4                                       | 0.103          | 0.120    | 0.10     | 0.100    | 0.100    | 0.100    | 0.10.1   | R        | 0.1UJ    | 0.1U     | 0.1UJ    |
| Endrin              | 2                                         | 0,100          | 0.120    | 0.10     | 0.100    | 0.100    | 0.100    | 0.100    | R        | 0.1UJ    | 0.10     | 0.1UJ    |
| Endrin eldehyde     |                                           | 0.1UJ          | 0.120    | 0.10     | 0.100    | 0.100    | 0 1111   | 0.100    | R        | 0.1UJ    | 0.10     | 0.1UJ    |
| Endrin ketone       |                                           | 0.1UJ          | 0.120    | 0.10     | 0.100    | 0.100    | 0.0501   | 0.050.1  | R        | 0.05UJ   | 0.05U    | 0.05UJ   |
| Heptachlor          | 0.4                                       | 0.05UJ         | 0.060    | 0,050    | 0.0503   | 0.0500   | 0.0503   | 0.0500   | R        | 0.05UJ   | 0.05U    | 0.05UJ   |
| Haptachlor epoxida  | 0,2                                       | 0.05UJ         | 0.060    | 0.050    | 0.0503   | 0.0500   | 0.050J   | 00 501   | R        | 00.5UJ   | 0.50     | 00.5UJ   |
| Methoxychlor        | 40                                        | 00.5UJ         | 0.60     | 0.50     | 00.50J   | 00.500   | E111     | 5111     | R        | 50.1     | 50       | 5UJ      |
| Toxaphene           | 3                                         | 5UJ            | 6U       | 50       | 5UJ      | 50J      | 500      | 0.05111  |          | 0.05111  | 0.050    | 0.05UJ   |
| elpha-BHC           | 0.02                                      | , 0.05UJ       | 0.06U    | 0.05U    | 0.05UJ   | 0,0500   | 0.0500   | 0.0503   | n<br>P   | 0.050    | 0.050    | 0.05UJ   |
| alpha-Chlordane     | 0.5                                       | 0.05UJ         | 0.06U    | 0.05U    | 0.05UJ   | 0.05UJ   | 0.0500   | 0.0503   | n<br>B   | 0.0501   | 0.050    | 0.05UJ   |
| bata-BHC            | 0.2                                       | 0.05UJ         | 0.06U    | 0.050    | 0.05UJ   | 0.05UJ   | 0.0501   | 0.0300   | n<br>B   | 0.0500   | 0.050    | 0.05UJ   |
| delte-RHC           | -                                         | 0.05UJ         | 0.06U    | 0.05U    | 0.05UJ   | 0.05UJ   | 0.05UJ   | 0.050J   | 7        | 0.0500   | 0.050    | 0.050.1  |
| comme-BHC (Lindane) | 0.2                                       | 0.05UJ         | 0.06U    | 0.05U    | 0.05UJ   | 0.05UJ   | 0,05UJ   | 0,05UJ   | R D      | 0.0500   | 0.050    | 0.0500   |
| gamme-Chlordane     | 0.5                                       | 0.05UJ         | 0,06U    | 0.050    | 0.05UJ   | 0.05UJ   | 0.05UJ   | 0.05UJ   | к        | 0.0805   | 0.030    |          |

Table 5-13. Pesticide and Polychlorinated Biphenyl Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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See last page for footnotes.

|                        | NJDEP*<br>Groundwater<br>Quality Standard | Sampla ID: GMMW9 | GMMW10   | GMMW11   | GMMW13   | GMMW14   | GMMW15   | GMMW17   | GMMW19   | GMMW20   | GMMW211    |
|------------------------|-------------------------------------------|------------------|----------|----------|----------|----------|----------|----------|----------|----------|------------|
| Analyte (ug/L)         | (Higher of PQLs)                          | Date: 01/23/95   | 01/23/95 | 01/25/95 | 01/27/95 | 01/23/95 | 01/24/95 | 01/25/95 | 01/27/95 | 01/23/95 | 01/26/95   |
| 4.4'-DDD               | 0.1                                       | 0.1UJ            | 0.1UJ    | 0.12UJ   | 0.1UJ    | 0.1UJ    | 0.1UJ    | 0.1U     | 0.1UJ    | 0.1UJ    | 0.1UJ      |
| 4,4-000<br>4.4'-005    | 0.1                                       | 0.1UJ            | 0.1UJ    | 0.12UJ   | 0.1UJ    | 0.1UJ    | 0.1UJ    | 0.069J   | 0.1UJ    | 0.1W     | 0.1UJ      |
|                        | 0.1                                       | 0.1UJ            | 0.1UJ    | 0.12UJ   | 0.1UJ    | 0.1UJ    | 0.1UJ    | 0.12     | 0.1UJ    | 0,1UJ    | 0.1UJ      |
| 4,4 -001<br>Aldeb      | 0.04                                      | 0.05UJ           | 0.05UJ   | 0.059UJ  | 0.05UJ   | 0.05UJ   | 0.05UJ   | 0.050    | 0.05UJ   | 0.05UJ   | 0.05UJ     |
| Asigni<br>Asigni       | 0.5                                       | 10.1             | 1UJ      | 1.2UJ    | 1UJ      | 1ŲJ      | 103      | 10       | 1UJ      | 1UJ      | 103        |
| Arocion 1010           | 0.5                                       | 20.1             | 20.1     | 2.4UJ    | 2UJ      | 2UJ      | 2UJ      | 2U       | 2UJ      | 2UJ      | 2UJ        |
| Arocior-1441           | 0.5                                       | 101              | 10.1     | 1.2UJ    | 1UJ      | 1UJ      | 1UJ      | 10       | 1UJ      | 1UJ      | 1UJ        |
| Arocior-1232           | 0.5                                       | 103              | 103      | 1.203    | 103      | 1UJ      | 1UJ      | 10       | 1UJ      | 1UJ      | 1UJ        |
| Arocior-1242           | 0.5                                       | 103              | 10.1     | 1.2UJ    | 10,1     | 1UJ      | 1UJ      | 1U       | 1UJ      | 1UJ      | 103        |
| Arocior-1248           | 0.5                                       | 100              | 103      | 1 200    | 10.1     | 103      | 103      | 10       | 1UJ      | 1UJ      | 1UJ        |
| Aroclor-1254           | 0.5                                       | 105              | 100      | 1 2111   | 100      | 10.1     | 1UJ      | 10       | 1 U J    | 1UJ      | 1UJ        |
| Arocior-1260           | 0.5                                       | 105              | 0.111    | 0.1200   | 0 11.1   | 0.10J    | 0.1UJ    | 0.10     | 0.1UJ    | 0.1UJ    | 0.1UJ      |
| Dieldrin               | 0.03                                      | 0,100            |          | 0.1200   | 0.0500   | 0.050.1  | 0.05UJ   | 0.05U    | 0.05UJ   | 0.05UJ   | 0.05UJ     |
| Endosulfan I           | 0.4                                       | 0.05UJ           | 0.0500   | 0.05903  | 0.0303   | 0.0000   | 0.111.1  | 0.10     | 0.1UJ    | 0.1UJ    | 0.1UJ      |
| Endosulfan II          | 0.4                                       | 0.103            | 0.105    | 0.1203   | 0.105    | 0.100    | 0.100    | 0.10     | 0.1UJ    | 0.1UJ    | 0.1UJ      |
| Endosulfan sulfate     | 0.4                                       | 0.1UJ            | 0.103    | 0,1203   | 0.103    | 0.105    | 0.105    | 0.10     | 0.104    | 0.10     | 0.1UJ      |
| Endrin                 | 2                                         | 0.1UJ            | 0.1UJ    | 0.1200   | 0.103    | 0.105    | 0.105    | 0.10     | 0 103    | 0.1UJ    | 0.1UJ      |
| Endrin aldehyde        |                                           | 0.1UJ            | 0.1UJ    | 0.12UJ   | 0.103    | 0.103    | 0.103    | 0.10     | 0.100    | 0.10J    | 0.1UJ      |
| Endrin ketone          |                                           | 0.1UJ            | 0.1UJ    | 0.12UJ   | 0.103    | 0.105    | 0.105    | 0.10     | 0.0500   | 0.0501   | 0.05UJ     |
| Heptachlot             | 0.4                                       | 0.05UJ           | 0.05UJ   | 0.059UJ  | 0.050J   | 0.0503   | 0.0500   | 0.050    | 0.0500   | 0.0511   | 0.05UJ     |
| Heptechlor spoxida     | 0,2                                       | 0.05UJ           | 0.05UJ   | 0.059UJ  | 0.05UJ   | 0.0500   | 0.0503   | 0.050    | 0.0000   | 0.500    | 0.5UJ      |
| Methoxychlor           | 40                                        | 0.5UJ            | 0.5UJ    | 0.59UJ   | 0.5UJ    | 0.5UJ    | 0.501    | 0.50     | 5.505    | 50.1     | 5UJ        |
| Toxaphana              | 3                                         | 5ŲJ              | 5UJ      | 5.9UJ    | 5UJ      | 50J      | 503      | 0.0511   | 0.05111  | 0.050.1  | 5J         |
| elpha-BHC              | 0.02                                      | 0.05UJ           | 0.05UJ   | 0.059UJ  | 0.05UJ   | 0.05UJ   | 0.050J   | 0.050    | 0.0500   | 0.050.   | <br>0.05UJ |
| alpha-Chlordane        | 0.5                                       | 0.05UJ           | 0.05UJ   | 0.059UJ  | 0.05UJ   | 0.05UJ   | 0.0503   | 0.050    | 0,0500   | 0.0500   | 0.05UJ     |
| hate-RHC               | 0.2                                       | 0.05UJ           | 0.05UJ   | 0.059UJ  | 0.05UJ   | 0.05UJ   | 0.0503   | 0.050    | 0.0500   | 0.0500   | 3 8.1      |
| delte.BUC              |                                           | 0.05UJ           | 0.05UJ   | 0.059UJ  | 0.05UJ   | 0.05UJ   | 0.0501   | 0.050    | 0.0503   | 0.0500   | 0.05111    |
| cemme_BMC (Lindene)    | 0.2                                       | 0.05UJ           | 0.05UJ   | 0.059UJ  | 0.05UJ   | 0.05UJ   | 0.05UJ   | 0,050    | 0.0501   | 0.0503   | 0.0500     |
| yarrina-orio (cindeno) | 0.5                                       | 0.05UJ           | 0.05UJ   | 0.059UJ  | 0.05UJ   | 0.05UJ   | 0,05UJ   | 0.050    | 0.0503   | 0.0903   | 0.0000     |

Table 5-13. Pesticide and Polychlorinated Biphenyl Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                     | NJDEP*<br>Groundwater<br>Quality Standard | Sample ID: GMMW21D | GMMW22D  | GMMW23I  | GMMW23D  | GMMW23DFR | GMMW24i  | GMMW24IFR | GMMW24D  | MW6     | MW9       |
|---------------------|-------------------------------------------|--------------------|----------|----------|----------|-----------|----------|-----------|----------|---------|-----------|
| Anelyte (ug/L)      | (Higher of PQLs)                          | Date: 01/24/95     | 01/27/95 | 01/28/95 | 01/26/95 | 01/26/95  | 01/24/95 | 01/24/95  | 01/24/95 | 01/24/9 | 501/24/35 |
| 4.41.000            |                                           | 0.111              | 0 101    | 0.1UJ    | 0.1UJ    | 0.1UJ     | 0.1UJ    | 0.1UJ     | 0.1UJ    | 0.1UJ   | 0.1UJ     |
| 4,4'-000            | 0.1                                       | 0.10               | 0.100    | 0.100    | 0.10.1   | 0.10J     | 0.1UJ    | 0.1UJ     | 0.1UJ    | 0.1UJ   | 0.1UJ     |
| 4,4'-DDE            | 0.1                                       | 0.10               | 0.100    | 0.100    | 0.104    | 0.1UJ     | 0.1UJ    | 0.1UJ     | 0.1UJ    | 0.1UJ   | 0.1UJ     |
| 4,4°-DDT            | 0.1                                       | 0.10               | 0.100    | 0.100    | 0.0501   | 0.0500    | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ  | 0.05UJ    |
| Aidrin              | 0.04                                      | 0.050              | 1111     | 101      | 1111     | 101       | 101      | 10J       | 103      | 1UJ     | 1UJ       |
| Aroclor-1016        | 0.5                                       | 10                 | 103      | 103      | 201      | 2111      | 211.1    | 201       | 2UJ      | 2UJ     | 2UJ       |
| Aroclor-1221        | 0.5                                       | 20                 | 203      | 203      | 203      | 1111      | 111.3    | 10.1      | 10.1     | 1UJ     | 1UJ       |
| Aroclor-1232        | 0.5                                       | 10                 | 103      | 105      | 105      | 100       | 1/11     | 100       | 10.1     | 1UJ     | 1UJ       |
| Aroclor-1242        | 0.5                                       | 10                 | 105      | 100      | 100      | 105       | 105      | 103       | 10.1     | 1UJ     | 1UJ       |
| Aroclor-1248        | 0.5                                       | 10                 | 101      | 103      | 103      | 103       | 100      | 100       | 10.1     | 10.0    | 103       |
| Aroclor-1254        | 0.5                                       | 10                 | 103      | 103      | 105      | 103       | 105      | 100       | 100      | 10.1    | 10.1      |
| Arcclor-1260        | 0.5                                       | 10                 | 1UJ      | 1UJ      | 103      | 103       | 101      | 0.111     | 0.101    | 0 10.1  | 0.10J     |
| Dieldrin            | 0.03                                      | 0.1U               | 0,1UJ    | 0.1UJ    | 0.103    | 0.10J     | 0.105    | 0.103     | 0.100    | 0.0501  | 0.050.1   |
| Endosulfan i        | 0.4                                       | 0.05U              | 0.05UJ   | 0.05UJ   | 0.05UJ   | 0.05UJ    | 0.0501   | 0.0503    | 0.0505   | 0.0000  | 0.1111    |
| Endosulfan II       | 0.4                                       | 0.10               | 0.1UJ    | 0.1UJ    | 0.1UJ    | 0.1UJ     | 0,1UJ    | 0.103     | 0.105    | 0.100   | 0.100     |
| Endosulfan suifste  | 0.4                                       | 0.1U               | 0.1UJ    | 0.1UJ    | 0.1UJ    | 0.1UJ     | Q.1UJ    | 0.1UJ     | 0.10J    | 0.100   | 0.105     |
| Endrin              | 2                                         | 0.10               | 0.1UJ    | 0.1UJ    | 0,1UJ    | 0.1UJ     | 0.1UJ    | 0,1UJ     | 0.1UJ    | 0,103   | 0.103     |
| Englin eldebude     | -                                         | 0.10               | 0.1UJ    | 0.1UJ    | 0,1UJ    | 0.1UJ     | 0.1UJ    | 0.1UJ     | 0.103    | 0,10J   | 0.103     |
| Endrin aldenyde     |                                           | 0.10               | 0.1UJ    | 0.1UJ    | 0.1UJ    | 0.1UJ     | 0.1UJ    | 0.1UJ     | 0.1UJ    | 0,1UJ   | 0.105     |
| Engrin Ketone       | 0.4                                       | 0.05U              | .05UJ    | 0.05UJ   | Q.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ  | 0.0500    |
| Heptechlor          | 0.7                                       | 0.050              | .05UJ    | 0.05UJ   | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ  | 0.05UJ    |
| Heptechlor epoxide  | 40                                        | 0.50               | 0.5UJ    | 0.5UJ    | 0.5UJ    | 0.5UJ     | 0.5UJ    | 0.5UJ     | 0.1UJ    | 0.5UJ   | 0.501     |
| Methoxychiof        | 40                                        | 5.00               | 50.1     | 5UJ      | SUJ      | 5UJ       | 5UJ      | 5UJ       | 5UJ      | 5UJ     | 5UJ       |
| Toxaphene           | 3                                         | 0.0511             | 0.050.0  | 0.05UJ   | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ  | 0.05UJ    |
| elpha-BHC           | 0.02                                      | 0.050              | 0.0500   | 0.0500   | 0.050.1  | 0.05UJ    | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ  | 0.05UJ    |
| alpha-Chlordane     | 0.5                                       | 0.050              | 0.0500   | 0.05111  | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ  | 0.05UJ    |
| beta-BHC            | 0.2                                       | 0.050              | 0.0503   | 0.05111  | 0.050.1  | 0.05UJ    | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ  | 0.05UJ    |
| delta-BHC           |                                           | 0.050              | 0.0503   | 0.0500   | 0.0500   | 0.05UJ    | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ  | 0.05UJ    |
| gamma-BHC (Lindane) | 0.2                                       | 0.050              | 0.0503   | 0.0503   | 0.0501   | 0.0501    | 0.05UJ   | 0.05UJ    | 0.05UJ   | 0.05UJ  | 0.05UJ    |
| gamma-Chiordane     | 0.5                                       | 0,050              | 0.0503   | 0.0505   | 0,0000   | 0.0000    |          |           |          |         |           |

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Table 5-13. Pesticide and Polychlorinated Biphenyl Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                     | NJDEP*<br>Groundweter<br>Quality Stenderd | Sample ID: MW10 | PKMW-4       | FBA1-012395 | FBA2-012495 | F8A3-012595 | FBA4-012695 | FBA5-012795 |
|---------------------|-------------------------------------------|-----------------|--------------|-------------|-------------|-------------|-------------|-------------|
| Analyte (ug/L)      | (Higher of PQLs)                          | Date: 01/23/95  | 01/2//95     | 01/23/95    | 01/24/35    | 01123/33    | 01/20/00    |             |
| 4.4'-000            | 0.1                                       | 0.1UJ           | 0.1UJ        | 0.1U        | 0.1U        | 0,1U        | 0.0066J     | 0.10        |
| 4.4'-DDE            | 0.1                                       | 0.1UJ           | 0,1UJ        | 0.1U        | 0.1U        | 0,1U        | 0.1U        | 0,10        |
| 4.4'-DDT            | 0.1                                       | 0.1UJ           | 0.1UJ        | 0.1U        | 0.1U        | 0.1U        | 0.0033J     | 0.10        |
| Aldrin              | 0.04                                      | 0.05UJ          | 0.05UJ       | 0.050       | 0.050       | 0.05U       | 0.05U       | 0.05U       |
| Aroolor-1018        | 0.5                                       | 1UJ             | 1UJ -        | 10          | 10          | 10          | 10          | 10          |
| Aroclar-1221        | 0.5                                       | 2UJ             | 2UJ          | 2U          | 20          | 2U          | 20          | 20          |
| Acodor-1232         | 0.5                                       | 1UJ             | 103          | 10          | 1U          | 1U          | 10          | 10          |
| Arealor-1247        | 0.5                                       | 10,1            | 1 <b>U</b> J | 10          | 10          | 10          | 10          | · 1U        |
| Aredor-1248         | 0.5                                       | 100             | 1UJ          | 1U          | 1U          | 10          | 10          | 10          |
| Arocion 1276        | 0.5                                       | 10,1            | 1UJ          | 10          | 1U          | 10          | 10          | 10          |
| Arocior-1280        | 0.5                                       | 101             | 1UJ          | 10          | 1U          | 10          | 10          | 10          |
| Afocior-120V        | 0.03                                      | 0.10.1          | 0.1UJ        | 0.10        | 0.10        | 0.10        | 0.10        | 0.10        |
|                     | 0.00                                      | 0.0500          | 0.05UJ       | 0.050       | 0.05U       | 0.05U       | 0.05U       | 0.05U       |
|                     | 0.4                                       | 0 100           | 0.1UJ        | 0.10        | 0.10        | 0.1U        | 0.1U        | 0.10        |
|                     | 0.4                                       | 0.100           | 0.1UJ        | 0.10        | 0.10        | 0.1U        | 0.1U        | 0.10        |
| Endosuitan suitate  |                                           | 0 100           | 0.100        | 0.10        | 0.10        | 0.1U        | 0.002J      | 0,10        |
| Endrin              | 4                                         | 0.100           | 0.10.1       | 0.10        | 0.10        | 0,034J      | 0.1U        | 0.10        |
| Endrin algenyge     | -                                         | 0.100           | 0.10.        | 0.1U        | 0.1U        | 0.1U        | 0.10        | 0.1U        |
| Endrin ketone       |                                           | 0.0501          | 0.0500       | 0.050       | 0.050       | 0.05U       | 0.05U       | 0.05U       |
| Heptechlor          | 0.4                                       | 0,0500          | 0.0500       | 0.050       | 0.05U       | 0.05U       | 0.05U       | 0.050       |
| Heptachlor epoxide  | 0.2                                       | 0.0505          | 0.0500       | 0.050       | 0.05U       | 0.05U       | 0.05U       | 0.05U       |
| Methoxychior        | 40                                        | 5.0505          | 5111         | 50          | 5U          | 5U          | 5U          | 5U ·        |
| Toxaphana           | 3                                         | 505             | 0.05111      | 0.050       | 0.050       | 0.050       | 0.050       | 0.05U       |
| alpha-8HC           | 0.02                                      | 0.0501          | 0.0500       | 0.050       | 0.050       | 0.050       | 0.050       | 0.05U       |
| alpha-Chiordana     | 0,5                                       | 0.050J          | 0.0500       | 0.050       | 0.050       | 0.05U       | 0.050       | 0.05U       |
| bete-BHC            | 0.2                                       | 0.0505          | 0.0503       | 0.050       | 0.050       | 0.050       | 0.050       | 0,05U       |
| delta-BHC           | -                                         | 0.05UJ          | 0.0501       | 0.050       | 0.050       | 0.050       | 0.050       | 0.05U       |
| gamma-BHC (Lindane) | 0.2                                       | 0.05UJ          | 0.05UJ       | 0.050       | 0.050       | 0.050       | 0.050       | 0.05U       |
| gamma-Chiordane     | 0,5                                       | 0.05UJ          | 0.05UJ       | 0.050       | 0.000       | V.VVV       |             |             |

Table 5-13. Pesticide and Polychlorinated Biphenyl Compounds in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Analyte concentrations and New Jersey Department of Environmental Protection (NJDEP) criteria in micrograms per liter (ug/L) (equivalent to parts per billion (ppb)).

Analyses were performed by CompuChem Environmental Corporation, Research Triangle Park, North Carolina, using Contract Laboratory Program (CLP) protocols contained

in the Statement of Work (SOW) OLMO1.8.

Exceedances of NJDEP criteria are shown in bold and are underlined.

Indicates a field blank associated with aqueous samples. FBA

Practical quantitation level, PQL

Field replicate of previous sample. FR

The compound was analyzed for, but not detected at the specific detection limit. U

Estimated result. J

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Rejected result. R

No applicable criteria. ---

NJDEP Groundwater Stendards, New Jersey Register, April 5, 1993. .

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| <u></u>                                                                                                                                                                                                                               | NJDEP *<br>Groundwater                                                                                                                              | Sample ID: EB1                                                                                                                                                                | E829                                                                                                                                                                                    | EB51                                                                                                                                                                                   | EB68                                                                                                                                                                     | EBR13                                                                                                                                                                     | EBR19                                                                                                                                                                                                | GMMW2                                                                                                                                                       | GMMW3                                                                                                                                                                       | GMMW4                                                                                                                                                       | GMMW6                                                                                                                                                        | GMMW8                                                                                                                                                                                    | GMMW9                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Analyte (ug/L)                                                                                                                                                                                                                        | Quality Standard<br>(Higher of PQLs)                                                                                                                | Date: 01/26/95                                                                                                                                                                | 01/26/95                                                                                                                                                                                | 01/25/95                                                                                                                                                                               | 01/24/95                                                                                                                                                                 | 01/27/95                                                                                                                                                                  | 01/24/95                                                                                                                                                                                             | 01/25/95                                                                                                                                                    | 01/25/95                                                                                                                                                                    | 01/25/95                                                                                                                                                    | 01/25/95                                                                                                                                                     | 01/23/95                                                                                                                                                                                 | 01/23/95                                                                                                                                                                |
| Analyte (ug/L)<br>Aluminum<br>Antimony<br>Arsenio<br>Barium<br>Beryllium<br>Celcium<br>Calcium<br>Chromium<br>Cobalt<br>Copper<br>Iron<br>Leed<br>Magnesium<br>Mangenese<br>Mercury<br>Molybdenum<br>Nickel<br>Pelledium<br>Potessium | (Higher of PQLs)<br>200<br>20<br>8<br>2000<br>20<br>4<br><br>100<br>100 **<br>1000<br>300<br>10<br><br>50<br>2<br><br>100<br><br>50<br>2<br><br>100 | Date: 01/26/95<br>110U<br>41,1U<br>11,3U<br>79J<br>0.2U<br>4.4UJ<br>179000<br>5.7U<br>12.6U<br>2.5U<br>899<br>1.6UJ<br>8490<br>48,3<br>0.2U<br>13U<br>17.8U<br>16.9UJ<br>5480 | 01/26/95<br>171U<br>41.1U<br>2.2U<br>62.8J<br>0.2U<br>4.4UJ<br>22000<br>5.7U<br>12.6U<br>12.5J<br>63.1J<br><u>17.8J</u><br>2590J<br><u>55.3</u><br>0.2U<br>13U<br>20J<br>16.9UJ<br>844U | 01/25/95<br>104U<br>41.1U<br>8.3U<br>8.3J<br>0.2U<br>4.4UJ<br>77200<br>5.7U<br>12.6U<br>2.5U<br><u>8160</u><br>1.6UJ<br>68500<br><u>498</u><br>0.2U<br>13U<br>17.8U<br>16.9UJ<br>20500 | 01/24/95<br>33.8UJ<br>41.1U<br>22UJ<br>9.9U<br>1.7U<br>4.4U<br>4570U<br>5.7U<br>12.6U<br>2.5U<br>566U<br>1.6UJ<br>2230U<br>16UJ<br>0:2<br>13U<br>17.8U<br>16.9UJ<br>943U | 1450U<br>411U<br>2.8U<br>36.7J<br>2U<br>44UJ<br>82600<br>57U<br>126U<br>25U<br><u>315J</u><br>1.6UJ<br>153000<br><u>83.4J</u><br>0.21J<br>13UJ<br>178U<br>16.9UJ<br>52900 | 119UJ<br><u>162</u><br>22UJ<br>144J<br><u>158</u><br><u>176</u><br>2150U<br><u>173</u><br><u>174</u><br>146<br>199U<br>16UJ<br>1780U<br><u>171J</u><br>0.2U<br>18.9J<br><u>16B</u><br>16.9UJ<br>810U | 361J<br>41.1U<br>35.8<br>16.3J<br>1.1U<br>4.4U<br>8110<br>67.7<br>12.6U<br>2.5U<br>415<br>1.6U<br>3080J<br>6.3UJ<br>0.2U<br>13U<br>17.8U<br>16.9UJ<br>19700 | 116J<br>41.1U<br>22.3<br>46.8J<br>0.2U<br>4.4UJ<br>56700<br>5.7U<br>14.4J<br>2.5U<br><u>5770</u><br>1.6UJ<br>24500<br><u>236J</u><br>0.2U<br>13U<br>17.8U<br>16.9UJ<br>8440 | 68.5U<br>41.1U<br>2.5U<br>6OJ<br>0.2U<br>4.4UJ<br>55300<br>5.7U<br>12.6U<br>2.5U<br>2480<br>1.6UJ<br>33900<br>206<br>0.2U<br>13U<br>17.8U<br>16.9UJ<br>8840 | 142U<br>41.1U<br>43.9<br>35.8J<br>0.2U<br>4.4UJ<br>46300<br>57.6<br>12.6U<br>2.5U<br>473<br>1.6UJ<br>53200<br>65.5<br>0.2U<br>13U<br>67.2<br>16.9UJ<br>3650J | 75.6UJ<br>41.1U<br>2.2UJ<br>508<br>0.2U<br>4.4U<br>128000<br>5.7U<br>12.6U<br>2.5U<br><u>17700</u><br>1.6UJ<br>26800<br><u>616J</u><br>0.2U<br>13U<br>17.8U<br>16.9UJ<br>16.9UJ<br>10200 | 51.8J<br>41.1U<br>2.2UJ<br>1230<br>0.2U<br>4.4U<br>127000<br>5.7U<br>12.6U<br>2.5U<br>27800<br>1.6UJ<br>99500<br><u>360J</u><br>0.2U<br>13U<br>17.8U<br>16.9UJ<br>27800 |
| Pocessium<br>Selenium<br>Silver<br>Sodium<br>Theilium<br>Vanadium<br>Zinc                                                                                                                                                             | 50<br>                                                                                                                                              | 2.7UJ<br>4.5UJ<br>16000<br>R<br>6.4J<br>8.3J                                                                                                                                  | 2.7UJ<br>4.5UJ<br>3190J<br>R<br>2.9U<br>360                                                                                                                                             | 27U<br>4.5UJ<br>93.8U<br>R<br>2.9U<br>3.1U                                                                                                                                             | 27UJ<br>4.5UJ<br>69300U<br>R<br>3.3U<br>3.1UJ                                                                                                                            | 27U<br>45UJ<br><u>1260000</u><br>R<br>29U<br>31U                                                                                                                          | 27UJ<br>9.8UJ<br>2270U<br>R<br><u>166</u><br>164                                                                                                                                                     | 27UJ<br>4.5UJ<br><u>376000</u><br>R<br><u>389</u><br>13.5J                                                                                                  | 27UJ<br>4.5UJ<br><u>122000</u><br>R<br>5.1U<br>17,5J                                                                                                                        | 2.7UJ<br>4.5UJ<br><u>126000</u><br>R<br>6.3J<br>3.1U                                                                                                        | 2.7UJ<br>4.5UJ<br><u>61000</u><br>R<br>2.9U<br>34.5                                                                                                          | 27UJ<br>4.5UJ<br><u>140000</u><br>R<br>2.9U<br>63U                                                                                                                                       | 27UJ<br>4.5UJ<br>3680000<br>R<br>2.9U<br>44.2<br>50UJ                                                                                                                   |
| Hexavalent chromium                                                                                                                                                                                                                   |                                                                                                                                                     | R                                                                                                                                                                             | R                                                                                                                                                                                       | R                                                                                                                                                                                      | 50UJ                                                                                                                                                                     | R                                                                                                                                                                         | 50UJ                                                                                                                                                                                                 | 900J                                                                                                                                                        | 2003                                                                                                                                                                        | n                                                                                                                                                           | n                                                                                                                                                            | 2000                                                                                                                                                                                     |                                                                                                                                                                         |

Table 5-14. Dissolved Metals in Groundwater Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                     | NJDEP *<br>Groundwater<br>Quality Standard | Sample ID: GMMW10 | GMMW11   | GMMW13   | GMMW14   | GMMW15   | GMMW17   | GMMW19        | GMMW20         | GMMW211       | GMMW21D       | GMMW22D     |
|---------------------|--------------------------------------------|-------------------|----------|----------|----------|----------|----------|---------------|----------------|---------------|---------------|-------------|
| Analyte (ug/L)      | (Higher of PQLs)                           | Date: 01/23/95    | 01/25/95 | 01/27/95 | 01/23/95 | 01/24/95 | 01/25/95 | 01/27/95      | 01/23/95       | 01/26/95      | 01/24/95      | 01/27/95    |
| Aluminum            | 200                                        | 33.8UJ            | 164U     | 122U     | 94.9UJ   | 94300J   | 129J     | 112U          | 1060J          | 1240U         | 908           | 1600        |
| Antimony            | 20                                         | 41.1U             | 41.1U    | 41.1U    | 79.4U    | 41.1U    | 41.1U    | 41.1U         | 4110           | 411U          | 41.10         | 41.1U       |
| Arsenic             | 8                                          | 5.1J              | 18.2U    | 3.6U     | 2970J    | 2.2UJ    | 2.2UJ    | 916           | 5.9J           | 10.20         | 3.10          | 2.2U        |
| Barium              | 2000                                       | 463               | 45.5J    | 75.1J    | 67.9J    | 1.8U     | 83J      | 106J          | 1780J          | 28J           | 32.6J         | 20.9J       |
| Bervilium           | 20                                         | 0.2U              | 0.20     | 0.20     | 74.6U    | 2.4U     | 0.20     | 0.20          | 2U             | 20            | 0.72U         | 0.2U        |
| Cadmium             | 4                                          | 4.4U              | 4,4UJ    | 4.4UJ    | 83.2U    | 4.4U     | 4.4U     | 4.4UJ         | 44UJ           | 44UJ          | 4.4UJ         | 4.4UJ       |
| Calcium             |                                            | 109000            | 7280     | 84900    | 1260U    | 114000   | 50900    | 176000        | 531000         | 55700         | 117000        | 78500       |
| Chromium            | 100                                        | 5.7U              | 5.70     | 5.7U     | 83.2U    | 5.9J     | 410      | 5.7U          | 57U            | 57U           | 5.9J          | 5.7U        |
| Cobalt              | 100 **                                     | 12.6U             | 12.6U    | 12.6U    | 83U      | 12,6U    | 12.60    | 12.6U         | 126U           | 126U          | 19.8J         | 12.60       |
| Conner              | 1000                                       | 2.5U              | 3.4J     | 2.5U     | 69,7U    | 2.7U     | 4.9U     | 2.5U          | 25U            | 25U           | 4.1J          | 2.5U        |
| lron                | 300                                        | 19400             | 52.6J    | 1590     | 120U     | 38900    | 36.1J    | <u>946</u>    | 89600          | 208U          | <u>7100</u>   | <u>1620</u> |
| Lead                | 10                                         | 1.6UJ             | 1.6UJ    | 1.6UJ    | 37,4     | 1.60     | 1.6UJ    | 1.6UJ         | 1.6UJ          | 1.6UJ         | 1.6UJ         | 1.6UJ       |
| Magnasium           | -                                          | 36800             | 6360     | 6440     | 9330     | 107000   | 39500    | 24300         | 116000         | 43300J        | 10600         | 7600        |
| Manganasa           | 50                                         | 525J              | 791      | 160      | 81.5UJ   | 10       | 30.5J    | <u>524</u>    | <u>1130J</u>   | <u>400</u>    | <u>1040</u>   | <u>234</u>  |
| Meteury             | 2                                          | 0.20              | 0.20     | 0.20     | 0.2U     | 0.2U     | 0.20     | 0.20          | 0.20           | 0.20          | 0.2U          | 0.2U        |
| Molyhdanum          | -<br>-                                     | 130               | 130      | 130      | 13U      | 13U      | 25.7J    | 13U           | 13UJ           | 24.4J         | 13U           | 13U         |
| Nickel              | 100                                        | 17.8U             | 17.8U    | 17.8U    | 81,4U    | 17.8U    | 84.2     | 17.8U         | 178U           | 178U          | 31.8J         | 17.80       |
| Palladium           | -                                          | 16.9UJ            | 16.9UJ   | 16.9UJ   | 16.9UJ   | 16.9UJ   | 16.9UJ   | 16.9UJ        | 20.1J          | 16.9UJ        | 16.9UJ        | 16.9UJ      |
| Potessium           | -                                          | 17100             | 10500    | 3550J    | 341U     | 341U     | 6230     | 13500J        | 46700J         | 38300J        | 49600         | 7530        |
| Selenium            | 50                                         | 27UJ              | 2.7UJ    | 2.7U     | 27UJ     | 27UJ     | 5.3J     | 2.7UJ         | 27UJ           | 27U           | 2.7UJ         | 2.70        |
| Silver              |                                            | 4.5UJ             | 4.5UJ    | 4,5ŲJ    | 7.4UJ    | 4.5UJ    | 4.5UJ    | 4.5UJ         | 45UJ           | 45UJ          | 4.5UJ         | 4.5UJ       |
| Sodium              | 50000                                      | 257000            | 197000   | 24500    | 1100U    | 279U     | 35800    | <u>144000</u> | <u>1230000</u> | <u>632000</u> | <u>159000</u> | 33600       |
| Thalium             | 10                                         | R                 | R        | R        | 8        | 8        | R        | R             | R              | R             | R             | R           |
| Vanadium            | 100 **                                     | 2.9U              | 28.8J    | 56,9     | 79.7U    | 7.70     | 2.9U     | 2.9U          | 29U            | 29U           | 8.7J          | 2.9U        |
| Zinc                | 5000                                       | 3.1UJ             | 3.1U     | 3.1U     | 77.2U    | 3.1W     | 64.7     | 3.1U          | 31UJ           | 310           | 186           | 56.1        |
| Hexavalent chromium | 50                                         | 50UJ              | R        | R        | 50UJ     | 50UJ     | 330J     | R             | 50UJ           | R             | R             | R           |

Table 5-14. Dissolved Metals in Groundwater Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                     | NJDEP *<br>Groundwater<br>Quality Standard | Sample ID: GMMW23I | GMMW23D      | GMMW23DFR | GMMW24i  | GMMW24IFR | GMMW24D  | MW6          | MWS           | MW10     |
|---------------------|--------------------------------------------|--------------------|--------------|-----------|----------|-----------|----------|--------------|---------------|----------|
| Analyte (ug/L)      | (Higher of PQLs)                           | Date: 01/26/95     | 01/26/95     | 01/26/95  | 01/24/95 | 01/24/95  | 01/24/95 | 01/24/95     | 01/24/95      | 01/23/95 |
| Aluminum            | 200                                        | 1720               | 387U         | 484U      | 50.3J    | 93.98J    | 33.8UJ   | 90.7J        | 512000J       | 33.8UJ   |
| Antimony            | 20                                         | 41.1U              | 41.1U        | 41.1U     | 121      | 167       | 41.1U    | 151          | 41.1U         | 41,1U    |
| Arsenio             | 8                                          | 32.5               | 2.20         | 2.20      | 2.8.     | 2.7J      | 2.2UJ    | <u>51.5J</u> | 2.2UJ         | 2,2UJ    |
| Redum               | 2000                                       | 341                | 34.8.1       | 33.5J     | 101J     | 132J      | 11.4U    | 118J         | 1.10          | 3.3U     |
| Bendium             | 20                                         | 0.20               | 0.20         | 0.20      | 110      | 146       | 2.30     | 129          | 0.2U          | 0.2U     |
| Cedmium             | 4                                          | 4 40.1             | 4.40.1       | 4.40.1    | 124      | 164       | 4.40     | 146          | 4.4U          | 4,4U     |
| Calainm             | -                                          | 28500              | 63900        | 74800     | 1370U    | 18800     | 4800U    | 18500        | 513000        | 10100    |
| Chromium            | 100                                        | 5.7U               | 5.70         | 5.70      | 119      | 161       | 5.70     | <u>142</u>   | 20.1          | 5,7U     |
| Cobelt              | 100 **                                     | 12.60              | 12.6U        | 12.6U     | 122      | 157       | 12.6U    | 140          | 12.6U         | 12.6U    |
| Copper              | 1000                                       | 5.9.1              | 7.1J         | 3.4J      | 102      | 134       | 3.8U     | 119          | R             | 6U       |
| Copper              | 300                                        | 3820               | 189          | 205       | 1020     | 138U      | 614U     | 144U         | <u>162000</u> | 765      |
| iron<br>t-ad        | 10                                         | 1.60.1             | 1.60.0       | 1.6UJ     | 1.6UJ    | 1.6UJ     | 4.2J     | 2J           | 1.6UJ         | 2.2J     |
| Magnasium           | 10                                         | 21900              | 8490         | 11300     | 1230U    | 1650U     | 2300U    | 1490U        | 547000        | 9180     |
| Magnesium           | 50                                         | 21000              | 41 81        | 1201      | 119.1    | 158J      | 17.5UJ   | 139J         | 1UJ           | 30.2UJ   |
| Manganose           |                                            | 0.211              | 0.20         | 0.20      | 0.25     | 0.20      | 0.20     | 0.20         | 0.2U          | 0.24     |
| Mercury             | 2                                          | 29.81              | 21 11        | 33.8      | 130      | 130       | 130      | 17.6J        | 13U           | 130      |
| Molybdenum          | -                                          | 25.65              | 17 01        | 17 21     | 118      | 155       | 17.8U    | 135U         | 17.8U         | 91U      |
| Nickel              | 100                                        | 17.60              | 14 0111      | 18 9111   | 16 90.1  | 16 9UJ    | 16.9UJ   | 16.9UJ       | 16.9UJ        | 16.9UJ   |
| Palladium           | ••                                         | 16,903             | 10.900       | 20200     | 57111    | 1100141   | 10700    | 767U         | 341U          | 8590     |
| Potassium           | -                                          | 10000              | 2 7111       | 2 711     | 2 7111   | 2.703     | 2.7UJ    | 2.7UJ        | 27UJ          | 27UJ     |
| Selenium            | 50                                         | 2.703              | 4.70J        | A 5111    | 8.200    | 10.90.1   | 4.5UJ    | 9.6UJ        | 4,5UJ         | 4.5UJ    |
| Silver              |                                            | 4.503              | 198000       | 183000    | 12800    | 18100     | 69800U   | 2140U        | 123U          | 473000   |
| Sodium              | 50000                                      | 313000             | 100000       | 8         | R        | R         | R        | R            | R             | R        |
| Thellium            | 10                                         | 2 011              | 41           | 2 911     | 117      | 154       | 40       | 136          | R             | 3.60     |
| Vanadium            | 100 - 4                                    | 2,90               | 4J<br>15 A I | 51        | 114      | 149       | 3.1UJ    | 136          | 3.1UJ         | 3,9V     |
| Zino                | 5000                                       | 22.0               | 10.40        |           |          |           |          |              |               |          |
| Hexavalent chromium | -                                          | R                  | R            | R         | 50UJ     | 50UJ      | 50UJ     | 50UJ         | 50UJ          | 50UJ     |

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Table 5-14. Dissolved Metels in Groundwater Samples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                     | NJDEP *<br>Groundwater<br>Quality: Standard | Sample ID: PKMW-4 | FBA1-012395  | FBA2-012495 | FBA3-012595 | FBA4-012695   | FBA5-012795 |
|---------------------|---------------------------------------------|-------------------|--------------|-------------|-------------|---------------|-------------|
| Analyte (ug/L)      | (Higher of PQLs)                            | Date: 01/27/95    | 01/23/95     | 01/24/95    | 01/25/95    | 01/28/95      | 01/27/95    |
| Aluminum            | 200                                         | 1160U             | 70.2J        | 33.8U       | 33.8U       | 115J          | 87.9J       |
| Antimony            | 20                                          | 411U              | 106          | 41.1U       | 41.1U       | 41.1U         | 41.1U       |
| Arsenic             | 8                                           | 70                | 2.2UJ        | 2,2U        | 2.2UJ       | 2.2U          | 2.20        |
| Barium              | 2000                                        | 148J              | 72.1J        | 11.2J       | 0.60        | 0,62J         | 0.69J       |
| Bervilium           | 20                                          | 0.20              | 80.7U        | 1.8J        | 0.2U        | 0,2U          | 0.2U        |
| Cedmium             | 4                                           | 44UJ              | 93, <u>4</u> | 4.4U        | 4.4U        | 4.4U          | 4.4U        |
| Celcium             | -                                           | 336000            | 1220J        | 5290        | 53.7U       | 61.2J         | 53.7U       |
| Chromium            | 100                                         | 57U               | 87.3         | 5.7U        | 5.7U        | 5.7U          | 5.70        |
| Cohelt              | 100 **                                      | 126U              | 91.3         | 12.6U       | 12.6U       | 12.6U         | 12.6U       |
| Copper              | 1000                                        | 250               | 73.5         | 2,5U        | 2.5U        | 2.50          | 2.50        |
| Coppe:              | 300                                         | 31 <b>5</b> J     | 108          | 638         | 20.8U       | 20.8U         | 20.8U       |
| Load                | 10                                          | 1.6UJ             | 1.6U         | 1.60        | 1.6U        | 1.6U          | 1.6U        |
| Locu                | 10                                          | 205000            | 962J         | 2620J       | 27.3U       | 27.3U         | 27.30       |
| Magnesium           | 50                                          | 1170              | 87           | 18.2        | 1U          | 10            | 10          |
| Manganese           | 20                                          | 0.20              | 0.20         | 0.20        | 0.2U        | 0.2U          | 0.2U        |
| Makadamum           | •                                           | 1303              | 130          | 13U         | 13U         | 130           | 13U         |
| Molybaenum          | 100                                         | 178U              | 86.4         | 17.8U       | 17.8U       | 17.8U         | 17.8U       |
| NICKO               | 100                                         | 16 90.0           | 16.90        | 16.9U       | 16,9U       | 1 <b>6.9U</b> | 16.9U       |
| Palladium           |                                             | 53500             | 3410         | 1080J       | 341U        | 341U          | 450J        |
| Potassium           | 50                                          | 2711              | 2.70         | 2.7U        | 2.7U        | 2.70          | 2.70        |
| Selenium            | 30                                          | 450.1             | 8.8J         | 4.5U        | 4,5U        | 4.5U          | 4,50        |
| Saver               | 50000                                       | 1410000           | 1070J        | 82700       | 364J        | 568J          | 334J        |
| Sodium              | 10                                          | 8                 | 2.7UJ        | 2.7UJ       | 2.7UJ       | 2.7U          | 2.70        |
| Inalium             | 100 +*                                      | 29U               | 85.5         | 3.3J        | 2.9U        | 2.9U          | 2.9U        |
| Zinc                | 5000                                        | 310               | 81           | 3.1U        | 3.1U        | 3.10          | 3,1U        |
| Hexavalent chromium | 50                                          | R                 | 50U          | 50U         | 50U         | 50U           | 50U         |

Table 5-14. Dissolved Metals in Groundwater Semples Collected During the Phase 1A Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Analyte concentrations and New Jersey Department of Environmental Protection (NJDEP) criteria in micrograms per liter (ug/L) (equivalent to parts per billion (ppb)). Analyses were performed by CompuChem Environmental Corporation, Research Triangle Park, North Carolina, using Contract Laboratory Program (CLP) protocols co

Statement of Work (SOW) ILM03.0.

Exceedances of NJDEP criteria are shown in bold and are underlined.

FBA Indicates a field blank associated with aqueous samples.

FR Field replicate of previous sample.

- U The compound was analyzed for but not detected at the specified detection limit.
- J Estimated result.

-- No applicabla criteria.

R Rejected result.

NJDEP Groundwater Standards, New Jersey Register, April 5, 1993.

•• Interim generic groundwater quality criterion.

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|----------------------------------------|--------------------------------------------|------------|-------------|----------|---------------|---------------|-------------|--------------|--------------|--------------|----------|----------|--------------|-------------|------------|
|                                        | NJDEP *<br>Groundwater<br>Ouslity Standard | Sample ID: | EBO1        | E829     | EB51          | EB68          | EBR13       | EBR19        | GMMW2        | GMMW3        | GMMW4    | GMMW6    | GMMW8        | GMMW9       | GMMW1      |
| Analyta (ug/L)                         | (Higher of PQLs)                           | Date:      | 01/26/95    | 01/26/95 | 01/25/95      | 01/24/95      | 01/27/95    | 01/24/95     | 01/25/95     | 01/25/95     | 01/25/95 | 01/25/95 | 01/23/95     | 01/23/95    | 01/23/95   |
|                                        |                                            |            |             |          |               |               |             | A7.A         | N 4          | N1.A         | NA       | RI Å     | NA           | NA          | NA         |
| Aluminum                               | 200                                        |            | <u>6280</u> | NA       | NA            | NA            |             |              | NA<br>NA     | INA<br>NA    | NA       | NA       | NA           | NΔ          | NA         |
| Antimony                               | 20                                         |            | 8.9J        | NA       | NA            | NA            |             | NA           | NA           | NA           |          |          | NA           |             | NA         |
| Arsenic                                | 8                                          |            | <u>16,4</u> | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       |          | NA NA        | NA NA       | NA         |
| Barium                                 | 2000                                       |            | 84,1J       | NA       | NA            | NA            | NA          | NA           | NA           | NA<br>NA     | NA       |          | NA           | NA          | NA         |
| Beryliium                              | 20                                         |            | 0.10        | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
| Cadmium                                | 4                                          |            | 0.50        | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       |              |             | N/A        |
| Calcium                                |                                            |            | 147000      | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          |            |
| Chromium                               |                                            |            | 2.90        | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          |            |
| Cobalt                                 | 100**                                      |            | 1J          | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          |            |
| Copper                                 | 1000                                       |            | 26.5        | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
| Cvenide                                | 200                                        |            | 10U         | 10U -    | 10UJ          | 10UJ          | 10U         | 10UJ         | 10UJ         | 1001         | 100      | 100      | 1001         | 1003        | 17.25      |
| lron                                   | 300                                        |            | 2700        | 13700    | <u>9590J</u>  | <u>45400J</u> | <u>5610</u> | <u>46000</u> | <u>51700</u> | <u>62900</u> | NA       | NA       | <u>74800</u> | 146000      | 86300      |
| laari                                  | 10                                         |            | 66.9J       | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
| Magneelum                              |                                            |            | 7190        | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
| Magnoscan                              | 50                                         |            | 52.4        | 305      | 5 <u>09</u> J | <u>480J</u>   | <u>80.6</u> | 243          | 884          | <u>491</u>   | NA       | NA       | <u>849</u>   | <u>1140</u> | <u>874</u> |
| Mereury                                | 2                                          |            | 1.1         | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
| Niekel                                 | 100                                        |            | 15.4J       | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
| Retensition                            |                                            |            | 7080        | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
|                                        | 50                                         |            | 4 41        | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
| Solenium                               | 50                                         |            | 0.60        | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
| Silver<br>Sadissis                     | 50000                                      |            | 14200       | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
| Sodium                                 | 30000                                      |            | 5 50        | NA       | NA            | NA            | NA .        | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
| Thailium                               | 10                                         |            | 10 8 1      | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |
| Venedium<br>Zino                       | 5000                                       |            | 161J        | NA       | NA            | NA            | NA          | NA           | NA           | NA           | NA       | NA       | NA           | NA          | NA         |

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Table 5-15. Total Metals and Cyanide in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

| Anelyte (ug/L)                  | NJDEP •<br>Groundwater<br>Quality Standard<br>(Higher of PQLs) | Semple ID: GMMW1<br>Date: 01/25/95 | 1 GMMW13           | GMMW14             | GMMW15                  | GMMW17<br>01/25/95 | GMMW19<br>01/27/95 | GMMW20         | GMMW211<br>01/26/95         | GMMW21D<br>01/24/95    | GMMW22D<br>01/27/95 | GMMW231<br>01/26/95                  |
|---------------------------------|----------------------------------------------------------------|------------------------------------|--------------------|--------------------|-------------------------|--------------------|--------------------|----------------|-----------------------------|------------------------|---------------------|--------------------------------------|
| Aluminum<br>Antimony            | 200<br>20                                                      | NA<br>NA                           | NA<br>NA           | NA<br>NA           | NA<br>NA                | NA<br>NA           | NA<br>NA           | NA<br>NA       | <u>280J</u><br>1.9U         | <u>1200J</u><br>1.9U   | NA<br>NA            | <u>1300J</u><br>1.9J<br>29. <b>6</b> |
| Arsenic<br>Barium               | 8<br>2000                                                      | NA<br>NA                           | NA<br>NA           | NA<br>NA           | NA<br>NA                | NA<br>NA           | NA<br>NA           | NA<br>NA       | 26.3<br>27.8J               | 5.8J<br>30.4J<br>0.74U | NA<br>NA            | <u>23,0</u><br>332<br>0.1U           |
| Beryllium<br>Cadmium            | 20<br>4                                                        | NA<br>NA                           | NA<br>NA           | NA<br>NA           | NA<br>NA                | NA<br>NA           |                    |                | 0.5U<br>51 100              | 0.5U<br>99500          | NA                  | 0.5U<br>24400                        |
| Calcium<br>Chromium             |                                                                | NA<br>NA                           |                    | NA<br>NA           | NA<br>NA                | NA<br>NA           | NA<br>NA           | NA<br>NA       | 6.4U<br>3.7J                | 11U<br>15.8J           | NA<br>NA            | 5.5U<br>4.9J                         |
| Copper<br>Copper<br>Cvanida     | 1000                                                           | NA<br>10U                          | NA<br>10U          | NA<br>10UJ         | NA<br>10UJ              | NA<br>13.7J        | NA<br>10U          | NA<br>10U      | 103<br>10U                  | 49.1<br>10U            | NA<br>10U           | 20.3J<br>10U<br>5140                 |
| Iron<br>Lead                    | 300<br>10                                                      | <u>54500</u><br>Na                 | <u>38400</u><br>NA | <u>26200</u><br>NA | <u>85400J</u><br>NA     | <u>12800</u><br>NA | NA<br>NA           | NA<br>NA       | <u>/98</u><br>7.2J<br>39500 | 6730<br>7.6J<br>9180   | NA<br>NA            | <u>11,8J</u><br>18500                |
| Magnesium<br>Manganese          | 50                                                             | NA<br>2490                         | NA<br><u>340</u>   | NA<br><u>97.2</u>  | NA<br><u>725J</u><br>NA | NA<br>84,4<br>NA   | NA                 | NA<br>NA       | 402<br>0.2U                 | <u>907</u><br>0.2U     | <u>230</u><br>NA    | <u>662</u><br>0,2∪                   |
| Mercury<br>Nickel               | 2<br>100                                                       | NA<br>NA<br>NA                     |                    | NA                 | NA<br>NA                | NA<br>NA           | NA                 | NA<br>NA       | 11.6J<br>6560C              | 33.8J<br>51200         | NA<br>NA            | 7.5U<br>24500                        |
| Potassium<br>Selenium<br>Silver | 50                                                             | NA<br>NA                           | NA<br>NA           | NA<br>NA           | NA<br>NA                | NA<br>NA           | NA<br>NA           | NA<br>NA       | 4.4U<br>0.6U                | 5.7<br>0.6U            | NA<br>NA            | 4.40<br>0.60<br>250000               |
| Sodium<br>Thallum               | 50000<br>10                                                    | NA<br>NA                           | NA<br>NA           | NA<br>NA           | NA<br>NA                | NA<br>NA           | NA<br>NA           | NA<br>NA<br>NA | 5.5U<br>6.2J                | 5.5U<br>10J            | NA<br>NA            | 5.5U<br>5.1J                         |
| Vanadium<br>Zino                | 100**<br>5000                                                  | NA<br>NA                           | NA<br>NA           | NA<br>NA           | NA                      | NA                 | NA                 | NA             | 63.7J                       | 151J                   | NA                  | 30.8J                                |

Table 5-15. Total Metals and Cyanide in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|                | NJDEP *<br>Groundwater<br>Quality Standard | Sample ID: 0 | 3MMW23D            | GMMW23DFR     | GMMW24I     | GMMW24IFR    | GMMW24D     | MW6          | MW9      | MW10      | PKMW-4     | FBA001-012395 |
|----------------|--------------------------------------------|--------------|--------------------|---------------|-------------|--------------|-------------|--------------|----------|-----------|------------|---------------|
| Analyte (ug/L) | (Higher of PQLs)                           | Date: C      | 01/26/95           | 01/26/95      | 01/24/95    | 01/24/95     | 01/24/95    | 01/24/99     | 01/24/95 | 01123135  | 01/2//00   | 01120/00      |
| Aluminum       | 200                                        | 4            | 17400J             | 13300J        | NA          | NA           | NA          | NA           | NA       | NA        | NA         | NA            |
| Antimony       | 20                                         | 1            | 1.90               | 1.90          | NA          | NA           | NA          | NA           | NA       | NA        | NA         | NA            |
| Arsenio        | 8                                          | g            | 9.1J               | 10.4          | NA          | NA           | NA          | NA           | NA       | NA        | NA         | NA            |
| Berium         | 2000                                       |              | 296                | 275           | NA          | NA           | NA          | NA           | NA       | NA        | NA         | NA            |
| Bendlium       | 20                                         | 1            | 1.20               | 1.10          | NĂ          | NA           | NA          | NA           | NA       | NA        | NA         | NA            |
| Cadmium        | 4                                          | c            | 5.50               | Q.5U          | NA          | NA           | NA          | NA           | NA       | NA        | NA         | NA            |
| Calcium        | -+                                         | 1            | 1 1 2 0 0 0        | 100000        | NA          | NA           | NA          | NA           | NA       | NA        | NA         | NA            |
| Chromium       |                                            | 3            | 37.4               | 34.2          | NA          | NA           | NA          | NA           | NA       | NA        | NA         | NA            |
| Cobelt         | 100**                                      | 1            | 14.7J              | 13.4J         | NA          | NA           | NA          | NA           | NA       | NA        | NA         | NA            |
| Copper         | 1000                                       | 6            | 58.9               | 63.4          | NA          | NA           | NA          | NA           | NA       | NA        | NA         | NA            |
| Cvanide        | 200                                        | 1            | 100                | 10U           | 10UJ        | 10UJ         | 10UJ        | 10UJ         | 10UJ     | 1001      | 100        | 100           |
| Iron           | 300                                        | 2            | 22200              | <u>19200</u>  | <u>3920</u> | <u>3190J</u> | <u>1710</u> | <u>69700</u> | 10900    | 7620      | 2600       | 71J           |
| Lead           | 10                                         |              | 27, <del>5</del> J | <u>23.6J</u>  | NA          | NA           | NA          | NA           | NA       | NA        | NA         |               |
| Magnesium      |                                            | 1            | 17600              | 14800         | NA          | NA           | NA          | NA           | NA       | NA<br>To  | NA         | 111           |
| Manganese      | 50                                         | 5            | <u> 509</u>        | <u>398</u>    | <u>790</u>  | <u>817J</u>  | <u>90.4</u> | <u>760</u>   | 251      | <u>79</u> | <u>414</u> | NA            |
| Mercury        | 2                                          | c            | 0.2U               | 0.20          | NA          | NA           | NA          | NA           | NA       | NA        | INA<br>MA  | NA            |
| Nickel         | 100                                        | 3            | 26.9J              | 24.7J         | NA          | NA           | NA          | NA           | NA       | IN A      | NA<br>NA   | NA            |
| Potassium      |                                            |              | 62500              | 56900         | NA          | NA           | NA          | NA           | NA       | NA        |            | NA            |
| Selenium       | 50                                         |              | 6.6                | 7,9           | NA          | NA           | NA          | NA           |          | NA        | NA         | NA            |
| Silver         | ••                                         | (            | 0.60               | 0.6U          | NA          | NA           | NA          | NA           | NA<br>NA | NA        | NA         | NA            |
| Sodium         | 50000                                      | 2            | 212000             | <u>191000</u> | NA          | NA           | NA          | NA           |          | NA NA     | NA         | NA            |
| Thallium       | 10                                         | !            | 5.5U               | 5.50          | NA          | NA           | NA          |              | NA       | NA        | NA         | NA            |
| Venedium       | 100**                                      | :            | 38.3J              | 33.4J         | NA          | NA           | NA          |              | NA<br>NA | NA        | NA         | NA            |
| Zinc           | 5000                                       |              | 105J               | 109J          | NA          | NA           | NA          | NA           | INA .    |           |            |               |

Table 5-15. Total Metals and Cyanide in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

See last page for footnotes.

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|------------------|-----------------------------------------|---------------------------------------|-------------|------------------|---------------|
|                  |                                         |                                       |             |                  |               |
|                  | Groundwater                             | Semple ID: FBA002-012495              | FBA003-0125 | 95 FBA004-012695 | FBA005-012795 |
|                  | Ouelity Stendard                        |                                       |             |                  |               |
| Analyte (un/l.)  | (Higher of PQLs)                        | Date: 01/24/95                        | 01/25/95    | 01/28/95         | 01/27/95      |
| rition to tograi | (,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |                                       |             |                  |               |
| Aluminum         | 200                                     | NA                                    | NA          | 65.3J            | NA            |
| Antimony         | 20                                      | NA                                    | NA          | 1.9U             | NA            |
| Arsenic          | 8                                       | NA                                    | NA          | 3.50             | NA            |
| Berium           | 2000                                    | NA                                    | NA ·        | 0.38J            | NA            |
| Bendlium         | 20                                      | NA                                    | NA          | 0.10             | NA            |
| Cadmium          | 4                                       | NA                                    | NA          | 0.50             | NA            |
| Celcium          | **                                      | NA                                    | NA          | 35J              | NA            |
| Chromium         |                                         | NA                                    | NA          | 2.2U             | NA            |
| Cohalt           | 100**                                   | NA                                    | NA          | 0,50             | NA            |
| Conner           | 1000                                    | NA                                    | NA          | 0.8U             | NA            |
| Cypper           | 200                                     | 100                                   | 100         | 100              | 100           |
| kon              | 300                                     | 43.7J                                 | 137         | 38.9J            | 27.2U         |
| Lead             | 10                                      | NA                                    | NA          | 1.60             | NA            |
| Magneetum        |                                         | NA                                    | NA          | 18.4J            | NA            |
| Mandanese        | 50                                      | 10                                    | 10          | 0.4U             | 0.53J         |
| Marcunz          | 2                                       | NA                                    | NA          | 0.20             | NA            |
| Nickal           | 100                                     | NA                                    | NA          | 1.5U             | NA            |
| Potessium        |                                         | NA                                    | NA          | 108J             | NA            |
| Selenium         | 50                                      | NA                                    | NA          | 4.4U             | NA .          |
| Silver           |                                         | NA                                    | NA          | 0.6U             | NA            |
| Sodium           | 50000                                   | NA                                    | NA          | 544J             | NA            |
| Thellium         | 10                                      | NA                                    | NA          | 5.5U             | NA            |
| Venedium         | 100**                                   | NA                                    | NA          | 0.5U             | NA            |
| Zine             | 5000                                    | NA                                    | NA          | 1.3J             | NA            |
| Marris M         |                                         |                                       |             |                  |               |

Table 5-15. Total Metals and Cyanide in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Analyte concentrations and New Jersey Department of Environmental Protection (NJDEP) criteria in micrograms per liter (ug/L) (equivalent to parts per billion (ppb)). Analyses were performed by CompuChem Environmental Corporation, Research Triangle Park, North Carolina, using Contract Laboratory Program (CLP) protocols contained in the Statement of Work (SOW) ILM03.0.

Exceedances of NJDEP criteria are shown in bold and are underlined.

FBA Indicates a field blank associated with aqueous samples.

POL Practical quantitation level.

FR Field replicate of previous sample.

U The compound was enalyzed for, but not detected at the specified detection limit.

J Estimated result.

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-- No applicable criteria.

NA Not analyzed.

\* NJDEP Groundwater Standards, New Jersey Register, April 5, 1993.

Interim generic groundwater quality criterion.

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                             | NJDEP * S<br>Groundwater                                                      | emple ID: EB1                                                                                                                      | EB29                                                                                                                    | EB51                                                                                                                       | EB68                                                                                                                      | EBR13                                                                                                                          | EBR19                                                                                                                                                 | GMMW2                                                                                                                        | GMMW3                                                                                                                      | GMMW8                                                                                                              | GMMW9                                                                                                                      | GMMW10                                                                                                                | GMMW11                                                                                                                  |
| Analyte (mg/L)                                                                                                                                                                                                                                                                              | Quality Standards<br>(Higher of PQLs)                                         | Date: 01/26/95                                                                                                                     | 01/26/95                                                                                                                | 01/25/95                                                                                                                   | 01/24/95                                                                                                                  | 01/27/95                                                                                                                       | 01/24/95                                                                                                                                              | 01/25/95                                                                                                                     | 01/25/95                                                                                                                   | 01/23/95                                                                                                           | 01/23/95                                                                                                                   | 01/23/95                                                                                                              | 01/25/95                                                                                                                |
| Ammonia<br>BOD, 5-day totai<br>Carbon dioxide<br>Carbon monoxide<br>Chemical oxygen demand<br>Chloride<br>Methane<br>Nitrate-N<br>Nitrogen dioxide<br>Total organic carbon<br>Dissolved oxygen<br>Sulfate<br>Sulfide, low<br>Total dissolved solids<br>Total alkalinity<br>Total phosphorus | 0.5<br><br><br>250<br><br>10<br><br><br>250<br><br>250<br><br>500<br><br><br> | 0.1U<br>7.6<br>56.1<br>0.3U<br>86<br>12.4<br>0.3<br>0.33<br>12.2<br>28.7<br>2.4<br><u>300</u><br>0.2<br><u>2010</u><br>411<br>0.1U | 0.1U<br>7.8<br>13.1<br>0.3U<br>370<br>5.47<br>0.2U<br>3.2<br>12.6<br>9.4<br>7.0<br>24.6<br>0.1U<br>150<br>10.7<br>0.734 | 1.48<br>12<br>62.9<br>0.3U<br>91<br>1760J**<br>5.3<br>0.04U<br>9.9<br>15.4<br>1.1<br>62.9<br>0.2<br>204J**<br>490<br>0.371 | 2.88<br>70<br>37.8<br>0.3U<br>400<br>5580J**<br>2.5<br>0.04U<br>11.3<br>21.1<br>1.6<br>240<br>62<br>378J**<br>720<br>1.99 | 1.08<br>65<br>33.4<br>0.3U<br>190<br>2430<br>0.2U<br>0.04U<br>12.8<br>22.4<br>0.9<br>70.6<br>83<br><u>3320</u><br>393<br>0.321 | 0.205<br>15<br>1.6U<br>0.3U<br>790<br><u>11300J**</u><br>0.2U<br>0.04U<br>12.4<br>12.1<br>2.6<br><u>1840</u><br>16<br><u>3670J**</u><br>54.5<br>0.371 | 4.28<br>34<br>1.6U<br>0.3U<br>470<br>220J**<br>6.3<br>0.042<br>12,6<br>76.7<br>2.0<br>194J**<br>0.8<br>162J**<br>486<br>4.44 | 0.9<br>39<br>153.4<br>0.3U<br>430<br>204J**<br>9.3<br>0.04U<br>5.7<br>27.2<br>2.5<br>28.7<br>0.52<br>152J**<br>211<br>0.68 | 2.16<br>10<br>44.4<br>0.3U<br>203J**<br>2.7<br>0.048<br>11.9<br>32.2<br>1.6<br>38<br>5.1<br>4100UJ*<br>436<br>1.94 | 1.77<br>28<br>112.4<br>0.3U<br>800<br>782J**<br>10.4<br>0.4<br>5.2<br>21.3<br>1.1<br>28.8<br>7.8<br>4320UJ*<br>430<br>1.55 | 4.8<br>34<br>103<br>0.3U<br>710<br>431J**<br>13.2<br>0.04U<br>4.0<br>100<br>1.0<br>27.7<br>6<br>224J**<br>432<br>1.95 | 1.33<br>4.8<br>2.5<br>0.3U<br>140<br>65.7<br>0.2U<br>0.04U<br>11.2<br>28.8<br>2.6<br>29.9<br>0.59<br>202<br>427<br>8.71 |

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Table 5-16. Wet Chemistry, Intrinsic Biological Parameters, and Dissolved Gases in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey,

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|                                                                                                                                                                                                                      | NJDEP • S<br>Groundwater                                   | ample ID; GMMW13                                                                              | GMMW14                                                                                         | GMMW15                                                                                        | GMMW17                                                                                        | GMMW21I                                                                                         | GMMW21D                                                                                                        | GMMW22D                                                                                                              | GMMW23I                                                                                         | GMMW23D                                                                                                         | GMMW23DFR                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Analyte (mg/L)                                                                                                                                                                                                       | Quality Standards<br>(Higher of PQLs)                      | Date: 01/27/95                                                                                | 01/23/95                                                                                       | 01/24/95                                                                                      | 01/25/95                                                                                      | 01/26/95                                                                                        | 01/24/95                                                                                                       | 01/27/95                                                                                                             | 01/28/95                                                                                        | 01/26/95                                                                                                        | 01/26/95                                                                                                                       |
| Ammonia<br>BOD, 5-day total<br>Carbon dioxide<br>Carbon monoxide<br>Chemical oxygen demand<br>Chloride<br>Methane<br>Nitrate-N<br>Nitrogen dioxide<br>Total organic carbon<br>Dissolved oxygen<br>Sulfate<br>Sulfate | 0.5<br><br><br>250<br><br>10<br><br><br>250<br><br>250<br> | 1.08<br>33<br>82<br>0,3U<br>200<br>27,8<br>2,4<br>0.04U<br>12,9<br>98,6<br>0,9<br>12,5<br>4,1 | 1.90<br>43<br>114.5<br>0.3U<br>240<br>242<br>10.9<br>0.04U<br>7.2<br>27.6<br>1.1<br>87.7<br>13 | 5.01<br>74<br>80.2<br>0.3U<br>720<br>1750<br>5.4<br>0.04U<br>8,4<br>42.2<br>0.6<br>78.4<br>20 | 0.1U<br>8.4<br>2.2<br>0.3U<br>91<br>17.1<br>1.5<br>0.45<br>12.7<br>15.2<br>2.9<br>117<br>0.43 | 0.1U<br>240<br>35<br>0.3U<br>250<br>159<br>3<br>0.04U<br>8.1<br>98.8<br>1.3<br><u>364</u><br>11 | 0.1U<br>1600<br>151.8<br>0.3U<br>2200<br>211J**<br>0.2U<br>0.04U<br>9.9<br>719<br>1.7<br><u>427J**</u><br>0.17 | 0.1U<br>420<br>38.8<br>0.3U<br>6 <del>6</del> 0<br>49.6<br>0.2U<br>0.04U<br>14.1<br>235<br>1.0<br><u>701</u><br>0.1U | 0.1U<br>700<br>228.4<br>0.3U<br>850<br>185<br>0.6<br>0.04U<br>4.6<br>345<br>1.0<br>33.3<br>0.1U | 0.136<br>430<br>1.6U<br>0.3U<br>1700<br><u>302</u><br>0.2U<br>0.063<br>13.5<br>515<br>0.9<br><u>396</u><br>0.1U | 0.1U<br>430<br>1.6U<br>0.3U<br>1600<br><u>298J**</u><br>0.2U<br>0.087<br>12.7<br>563<br>1.0<br><u>473J**</u><br>0.1U<br>280J** |
| Total dissolved solids<br>Total elkalinity<br>Total phosphorus                                                                                                                                                       | <b>500</b>                                                 | 182<br>233<br>1.86                                                                            | 492<br>425<br>2.25                                                                             | <u>4240</u><br>991<br>3.99                                                                    | 14 <del>8</del><br>20 <del>6</del><br>0.154                                                   | <u>4060</u><br>1210<br>0.647                                                                    | 322J ••<br>221<br>0.527                                                                                        | <u>900</u><br>73<br>0.275                                                                                            | <u>2020</u><br>440<br>0.495                                                                     | 33.6<br>0.982                                                                                                   | 44.7<br>0.894                                                                                                                  |

Table 5-16. Wet Chemistry, Intrinsic Biological Parameters, and Dissolved Gases in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey,

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|                                                                                                                                                                                                | NJDEP *<br>Groundwater                           | Sample ID: GMMW24I                                                                      | GMMW24IFR                                                                                   | GMMW24D                                                                            | MW6                                                                                    | MW9                                                                                     | MW10                                                                                   | PKMW-4                                                                                               | FBA1-012395                                                                   | FBA2-012495                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Analyte (mg/L)                                                                                                                                                                                 | Quality Standards<br>(Higher of PQLs)            | Date: 01/24/95                                                                          | 01/24/95                                                                                    | 01/24/95                                                                           | 01/24/95                                                                               | 01/24/95                                                                                | 01/23/95                                                                               | 01/27/95                                                                                             | 01/23/95                                                                      | 01/24/95                                                                   |
| Ammonia<br>BOD, 5-day total<br>Carbon dioxide<br>Carbon monoxide<br>Chemicai oxygen demand<br>Chloride<br>Methane<br>Nitrate-N<br>Nitrogen dioxide<br>Total organic carbon<br>Dissolved oxygen | 0.5<br><br><br><br>250<br><br>10<br><br><br><br> | 0.1U<br>710<br>153<br>0.3U<br>3600<br><u>2280</u><br>0.3<br>0.04U<br>9.2<br>1220<br>1.5 | 0.1U<br>1900<br>175.6<br>0.3U<br>3700<br><u>1270</u><br>0.4<br>0.04U<br>10.7<br>1290<br>1.3 | 0.1U<br>18<br>1.6U<br>0.3U<br>87<br>154J**<br>0.2U<br>0.04U<br>15.1<br>15.2<br>4.0 | 4.15<br>65<br>103.3<br>0.3U<br>390<br><u>346</u><br>4.9<br>0.08<br>13.1<br>83.7<br>2.5 | 3.44<br>14<br>131.7<br>0.3U<br>140<br>99.7<br>10.1<br>0.04U<br>7.2<br>20.2<br>2.8<br>20 | 0.1U<br>37<br>23.7<br>0.3U<br>270<br>23.5<br>13.4<br>0.04U<br>8.8<br>43.8<br>2.7<br>14 | 2.92<br>76<br>54.6<br>0.3U<br>430<br><u>3310J**</u><br>2.6<br>0.04U<br>10.6<br>77.1<br>0.7<br>582J** | 0,1U<br>9,1<br>NA<br>NA<br>20U<br>3U<br>NA<br>0.04U<br>NA<br>4.13<br>NA<br>2U | 0.1U<br>4U<br>NA<br>NA<br>20U<br>3U<br>NA<br>0.04U<br>NA<br>1U<br>NA<br>2U |
| Sulfate<br>Sulfide, low<br>Total dissolved solids<br>Total alkalinity<br>Total phosphorus                                                                                                      | 250<br><br>500<br>                               | 81.5<br>2.9<br><u>4340</u><br>451<br>0.713                                              | 29.3<br>1.3<br><u>6430</u><br>369<br>0.839                                                  | 34.9<br>0.1U<br>106J**<br>58.5<br>0.227                                            | 87.7<br>1.7<br><u>2680</u><br>322<br>3.78                                              | 20<br>0.16<br><u>4630</u><br>185<br>0.321                                               | 0.1U<br>210<br>1060<br>0.328                                                           | 97<br>178J**<br>736<br>0.789                                                                         | 0.1U<br>3570U<br>10U<br>0.122                                                 | 0.1U<br><u>592.1**</u><br>10U<br>0.168                                     |

Table 5-16. Wet Chemistry, Intrinsic Biological Parameters, and Dissolved Gases in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

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|                        | NJDEP •                          | Sample ID: FBA3-012595 | FBA4-012695 | FBA5-012795 |
|------------------------|----------------------------------|------------------------|-------------|-------------|
|                        | Groundwater<br>Quality Standards |                        |             |             |
| Analyte (mg/L)         | (Higher of PQLs)                 | Date: 01/25/95         | 01/26/95    | 01/27/95    |
| Ammonia                | 0.5                              | 0,10                   | 0,10        | 0.10        |
| BOD, 5-day total       |                                  | 4U                     | 4.0U        | 4U          |
| Carbon dioxide         |                                  | NA                     | NA          | NA          |
| Carbon monoxide        |                                  | NA                     | NA          | NA          |
| Chemical oxygen demand | ••                               | 200                    | 20U         | 20U         |
| Chloride               | 250                              | 30                     | 3U          | 3U          |
| Methane                | -                                | NA                     | NA          | NA          |
| Nitrate-N              | 10                               | 0.04U                  | 0.04U       | 0.04U       |
| Nitrogen dioxide       | **                               | NA                     | NA          | NA          |
| Total organic carbon   |                                  | 10                     | 10          | 10          |
| Dissolved oxygen       |                                  | NA                     | NA          | NA          |
| Sulfate                | 250                              | 20                     | 20          | 20          |
| Sulfide, low           | -                                | 0.1U                   | 0.10        | 0.10        |
| Total dissolved solids | 500                              | 138J**                 | 4U          | 2110J**     |
| Total alkalinity       |                                  | 100                    | 100         | 100         |
| Totel phosphorus       |                                  | 0.1U                   | 0,10        | 0.10        |

Table 5-16. Wet Chemistry, Intrinsic Biological Parameters, and Dissolved Gases in Groundwater Samples Collected During the Phase IA Remedial Investigation, Bayonne Plant, Bayonne, New Jersey.

Analyte concentrations and New Jersey Department of Environmental Protection (NJDEP) criteria in milligrams per liter (mg/L) (equivalent to parts per million [ppm]).

Analyses were performed by Compuchem Environmental Corporation of Research Park Triangle, North Carolina, using standard United States Environmental Protection Agency (USEPA) methodology. Exceedances of the NJDEP criteria are shown in bold and are underlined.

FBA Indicates a field blank associated with aqueous samples.

- PQL Practical quantitation level,
- FR Field replicate of previous sample.
- U The compound was analyzed for, but not detected at the specified detection limit.
- J Estimated result.
- NA Not analyzed.
- -- No applicable criteria.
- NJDEP Groundwater Standards, New Jersey Register, April 5, 1993.
- \*\* Indicates a value reported by the laboratory where concentrations of chlorides and/or sulfates exceed the reported TDS concentration. These values are considered suspect.

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| Constituent                           | Minimum<br>Quantifiable<br>Concentration | Geometric<br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | A<br>Percent of<br>Samples with<br>Quantifiable<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Groundwater Quality<br>Criteria | Percent of Samples<br>Exceeding NJDEP<br>Groundwater Quality<br>Criteria |
|---------------------------------------|------------------------------------------|----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Volatile Organic Compounds (ug/L)     | <del>.</del>                             |                                                    |                                          |                                             |                                  |                                                                   |                                                                         |                                                                          |
| 1.1-Dichioroathane                    | 62.00                                    | 63.00                                              | 64.00                                    | 2                                           | 44                               | 5                                                                 | 0                                                                       | 0                                                                        |
| 1. 2-Dichloroethens(Total)            | 7.00                                     | 2961.00                                            | 11000,00                                 | 4                                           | 44                               | 9                                                                 | 2                                                                       | 5                                                                        |
| 1-Butenol                             | 24000.00                                 | 24000.00                                           | 24000.00                                 | 1                                           | 44                               | 2                                                                 | 0                                                                       | 0                                                                        |
| 2-Butanol                             | 26000.00                                 | 26000.00                                           | 26000.00                                 | 1                                           | 44                               | 2                                                                 | 0                                                                       | 0                                                                        |
| 2-patente                             | 2800.00                                  | 2800.00                                            | 2800.00                                  | 1                                           | 44                               | 2                                                                 | 1                                                                       | 2                                                                        |
| 2-Outonvild                           | 19.00                                    | 1127.00                                            | 4300.00                                  | 4                                           | 44                               | 9                                                                 | 1                                                                       | 2                                                                        |
| Acetone                               | 2.00                                     | 77944.00                                           | 710.00                                   | 18                                          | 44                               | 41                                                                | 18                                                                      | 41                                                                       |
| Benzene                               | 2.00                                     | 6.00                                               | 10.00                                    | 2                                           | 44                               | 5                                                                 | 2                                                                       | 5                                                                        |
| Bromodicniorometnane                  | 2.00                                     | 2836.50                                            | 14000.00                                 | 8                                           | 44                               | 18                                                                | 6                                                                       | 14                                                                       |
| Chlorobenzene,                        | 2.00                                     | 85.00                                              | 65.00                                    | 1                                           | 44                               | 2                                                                 | 0                                                                       | 0                                                                        |
| Chloroethane                          | 65.00                                    | 17.50                                              | 40.00                                    | Å                                           | 44                               | 9                                                                 | 3                                                                       | 7                                                                        |
| Chiereform                            | 2.00                                     | 17.50                                              | 1 2000 00                                | 6                                           | 44                               | 18                                                                | 1                                                                       | 2                                                                        |
| Ethylbanzone                          | 2.00                                     | 1550.25                                            | 12000.00                                 | 9                                           | 44                               | 20                                                                | 0                                                                       | 0                                                                        |
| Hexane                                | <del>\$</del> ,00                        | 1323./8                                            | 4700.00                                  | <i>3</i>                                    | 44                               | 5                                                                 | 0                                                                       | 0                                                                        |
| Methyl-t-butyl ether                  | 260.00                                   | 390.00                                             | 520.00                                   | 2                                           | 44                               | 2                                                                 | 1                                                                       | 2                                                                        |
| Mathylene chloride                    | 69.00                                    | 69.00                                              | 69.00                                    |                                             | 44                               | -<br>,                                                            | 1                                                                       | 2                                                                        |
| Tetrachioroethene                     | 820,00                                   | 820.00                                             | 820.00                                   | ,                                           | 44                               | 23                                                                | ò                                                                       | 0                                                                        |
| Toluene                               | 1.00                                     | 54.40                                              | 510,00                                   | 10                                          | 44                               | 23                                                                | 1                                                                       | 2                                                                        |
| Trichloroethene                       | 1.00                                     | 550.50                                             | 1100.00                                  | 2                                           | 44                               |                                                                   | 2                                                                       | 5                                                                        |
| Vinvi chloride                        | 3.00                                     | 1357.67                                            | 3700,00                                  | 3                                           | 44                               | 22                                                                | -<br>-                                                                  | 9                                                                        |
| Xvienes (Total)                       | 2.00                                     | 2909.36                                            | 38000.00                                 | 14                                          | . 44                             | 32                                                                | 0                                                                       | 0                                                                        |
| n-Propyibanzene                       | 2.00                                     | 387.13                                             | 2800.00                                  | 15                                          | 44                               | 34                                                                |                                                                         | -                                                                        |
| Semivolatile Organic Compounds (ug/L) |                                          |                                                    |                                          |                                             |                                  |                                                                   |                                                                         | -                                                                        |
|                                       | 1.00                                     | 8.00                                               | 19.00                                    | 4                                           | 31                               | 13                                                                | 0                                                                       | U<br>A                                                                   |
| 1,2-Dichlorobenzene                   | 18.00                                    | 18.00                                              | 18.00                                    | 1                                           | 31                               | 3                                                                 | 0                                                                       | 0                                                                        |
| 1,3-Dichlorobenzene                   | 2 00                                     | 34.75                                              | 130.00                                   | 4                                           | 31                               | 13                                                                | 1                                                                       | 3                                                                        |
| 1,4-Dichlorobenzene                   | 14.00                                    | 14.00                                              | 14.00                                    | 1                                           | 31                               | 3                                                                 | 0                                                                       | 0                                                                        |
| 2,4-Dichlorophenoi                    | 1.00                                     | 55 50                                              | 110.00                                   | 2                                           | 31                               | 6                                                                 | 1                                                                       | 3                                                                        |
| 2,4-Dimethylphenol                    | 1.00                                     | 17.00                                              | 17.00                                    | 1                                           | 31                               | 3 .                                                               | 0                                                                       | 0                                                                        |
| 2-Chlorophenol                        | 17.00                                    | AE 25                                              | 310.00                                   | 12                                          | 31                               | 39                                                                | 2                                                                       | 6                                                                        |
| 2-Methyinaphthalene                   | 1.00                                     | 43.23                                              | 5,0,00                                   | 2                                           | 31                               | 7                                                                 | 0                                                                       | 0                                                                        |
| 2-Methylphenol                        | 2.00                                     | 3.50                                               | 190.00                                   | - 7                                         | 31                               | 23                                                                | 0                                                                       | 0                                                                        |
| 4-Methylphenol                        | 2.00                                     | 37.00                                              | 160.00                                   | á                                           | 31                               | 29                                                                | 0                                                                       | 0                                                                        |
| Acenaphthene                          | 1.00                                     | 5.89                                               | 10.00                                    | 3                                           | 31                               | 6                                                                 | 0                                                                       | 0                                                                        |
| Anthracene                            | 2.00                                     | 2.00                                               | 2.00                                     | 2<br>9                                      | 31                               | 26                                                                | 0                                                                       | 0                                                                        |
| Benzo(a)anthracene                    | 1.00                                     | 2.13                                               | 5.00                                     | 0                                           | 31                               |                                                                   | -                                                                       |                                                                          |

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| Constituent                                       | Minimum<br>Quantifiable<br>Concentration | Geometric<br>Mean<br>Quantifiable<br>Concentretion | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | Percent of<br>Samples with<br>Quantifiable<br>Concentrations | Number of Samples<br>Exceeding NJDEP<br>Groundwater Quelity<br>Criteria | Percent of Semples<br>Exceeding NJDEP<br>Groundwater Quelity<br>Criteria |
|---------------------------------------------------|------------------------------------------|----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Semivolatile Organic Compounds (continued) (ug/L) |                                          |                                                    |                                          |                                             |                                  |                                                              |                                                                         |                                                                          |
| Benzníalovréňě                                    | 1.00                                     | 2.17                                               | 5.00                                     | 6                                           | 31                               | 19                                                           | 0                                                                       | 0                                                                        |
| Benzolb)fluorenthene                              | 1.00                                     | 2.11                                               | 8.00                                     | 9                                           | 31                               | 29                                                           | 0                                                                       | 0                                                                        |
| Benzo(a, h.i)nerviene                             | 2.00                                     | 2.00                                               | 2.00                                     | 1                                           | 31                               | 3                                                            | 0                                                                       | 0                                                                        |
| Benzolk)fluorenthene                              | 1.00                                     | 2.22                                               | 9,00                                     | 9                                           | 31                               | 29                                                           | 0                                                                       | 0                                                                        |
| Certezole                                         | 2.00                                     | 3.00                                               | 4.00                                     | 3                                           | 31                               | 10                                                           | 0                                                                       | 0                                                                        |
| Chrysens                                          | 1.00                                     | 2.18                                               | 4.00                                     | 11                                          | 31                               | 35                                                           | 0                                                                       | 0                                                                        |
| Dim-butul obthelete                               | 1.00                                     | 1.50                                               | 2.00                                     | 2                                           | 31                               | 6                                                            | 0                                                                       | 0                                                                        |
|                                                   | 2.00                                     | 4,25                                               | 9.00                                     | 4                                           | 31                               | 13                                                           | 0                                                                       | 0                                                                        |
| District antheiste                                | 1.00                                     | 1.00                                               | 1.00                                     | 4                                           | 31                               | 13                                                           | 0                                                                       | 0                                                                        |
| Dietry piniero                                    | 1.00                                     | 2,40                                               | 6,00                                     | 10                                          | 31                               | 32                                                           | 0                                                                       | 0                                                                        |
| Pluorantine ne                                    | 1.00                                     | 6.10                                               | 19.00                                    | 10                                          | 31 <sup>.</sup>                  | 32                                                           | 0                                                                       | 0                                                                        |
| riuorene                                          | 1.00                                     | 1.00                                               | 1.00                                     | 1                                           | 31                               | 3                                                            | 0                                                                       | 0                                                                        |
| Indeno(1,2,3-cd)pyrene                            | 1.00                                     | 30.07                                              | 180.00                                   | 14                                          | 31                               | 45                                                           | 4                                                                       | 13                                                                       |
| Nephinelene                                       | 3.00                                     | 3.00                                               | 3.00                                     | 1                                           | 31                               | 3                                                            | 1                                                                       | 3                                                                        |
| Pentachiorophenol                                 | 1.00                                     | 7.54                                               | 32.00                                    | 13                                          | 31                               | 42                                                           | 0                                                                       | 0                                                                        |
| Phenanthrone                                      | 2.00                                     | 14.22                                              | 49.00                                    | 9                                           | 31                               | 29                                                           | 0                                                                       | 0                                                                        |
| Phenol                                            | 1.00                                     | 2.88                                               | 8.00                                     | 16                                          | 31                               | 52                                                           | 0                                                                       | 0                                                                        |
| Pyrene<br>bis(2-Ethylhexyl)phthelate              | 1.00                                     | 5.54                                               | 16.00                                    | 24                                          | 31                               | 77                                                           | . 0                                                                     | 0                                                                        |
| Pesticides/PCBs (ug/L)                            |                                          |                                                    |                                          |                                             |                                  |                                                              | _                                                                       |                                                                          |
|                                                   | 0.07                                     | 0.07                                               | 0.07                                     | T                                           | 31                               | 3                                                            | 0                                                                       | 0                                                                        |
|                                                   | 0.12                                     | 0.12                                               | 0.12                                     | 1                                           | 31                               | . 3                                                          | 1                                                                       | 3                                                                        |
|                                                   | 5.00                                     | 5.00                                               | 5.00                                     | 1                                           | 31                               | 3                                                            | 1                                                                       | 3                                                                        |
| alpha-brig                                        | 0.05                                     | 0.05                                               | 0.05                                     | 1                                           | 31                               | 3                                                            | 0                                                                       | 0                                                                        |
| delta-BHC                                         | 3.80                                     | 3.80                                               | 3.80                                     | 1                                           | 31                               | 3                                                            | 0                                                                       | U                                                                        |
| Inorganics - Total (ug/L)                         |                                          |                                                    |                                          |                                             |                                  |                                                              | _                                                                       | 100                                                                      |
| A 1. (                                            | 280.00                                   | 4141.60                                            | 17400.00                                 | 5                                           | 5                                | 100                                                          | 5                                                                       | 100                                                                      |
|                                                   | 1.90                                     | 5.40                                               | 8,90                                     | 2                                           | 5                                | 40                                                           | U                                                                       | 0                                                                        |
| Anumony                                           | 5.80                                     | 17.44                                              | 29.60                                    | 5                                           | 5                                | 100                                                          | 4                                                                       | 80                                                                       |
| Arsenio                                           | 27.80                                    | 154.06                                             | 332.00                                   | 5                                           | 5                                | 100                                                          | U                                                                       | 0                                                                        |
| Barlum                                            | 24400.00                                 | 86800.00                                           | 147000.00                                | 5                                           | 5                                | 100                                                          | 0                                                                       | 0                                                                        |
|                                                   | 37,40                                    | 37.40                                              | 37.40                                    | 1                                           | 5                                | 20                                                           | 0                                                                       | 0                                                                        |
| Cobalt                                            | 1.00                                     | 8.02                                               | 15.80                                    | 5                                           | 5                                | 100                                                          | 0                                                                       | 0                                                                        |

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| <u></u>                               |                                          |                                                    |                                          |                                             |                                  |                                                              |                                                                         |                                                                          |
|---------------------------------------|------------------------------------------|----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Constituent                           | Minimum<br>Quantifiable<br>Concentration | Geometric<br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantifiable<br>Concentration | Number of<br>Quentifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | Percent of<br>Samples with<br>Quantifiable<br>Concentrations | Number of Semples<br>Exceeding NJDEP<br>Groundwater Quality<br>Criteria | Percent of Samples<br>Exceeding NJDEP<br>Groundwater Quality<br>Criteria |
| Inorganics - Total (ug/L) (continued) |                                          |                                                    |                                          |                                             |                                  |                                                              |                                                                         |                                                                          |
| Copper                                | 20.30                                    | 53,58                                              | 103.00                                   | 5                                           | 5                                | 100                                                          | 0                                                                       | 0                                                                        |
| Cvanide                               | 13.70                                    | 15.45                                              | 17.20                                    | 2                                           | 31                               | 6                                                            | 0                                                                       | 0                                                                        |
| Iron                                  | 798.00                                   | 33212.15                                           | 146000.00                                | 27                                          | 27                               | 100                                                          | 27                                                                      | 96                                                                       |
| Lead                                  | 7.20                                     | 24.20                                              | 66.90                                    | 5                                           | 5                                | 100                                                          | 3                                                                       | 60                                                                       |
| Magnesium                             | 7190.00                                  | 18394.00                                           | 39500.00                                 | 5                                           | 5                                | 100                                                          | 0                                                                       | 0                                                                        |
| Mangenese                             | 52.40                                    | 545.89                                             | 2490.00                                  | 27                                          | 27                               | 100                                                          | 27                                                                      | 96                                                                       |
| Mercury                               | 1.10                                     | 1.10                                               | 1.10                                     | 1                                           | 5                                | 20                                                           | 0                                                                       | σ                                                                        |
| Nickel                                | 11.60                                    | 21.93                                              | 33,80                                    | 4                                           | 5                                | 80                                                           | 0                                                                       | 0                                                                        |
| Potessium                             | 7080.00                                  | 42176.00                                           | 65600.00                                 | 5                                           | 5                                | 100                                                          | 0                                                                       | 0                                                                        |
| Selenium                              | 5,70                                     | 6.15                                               | 6.60                                     | 2                                           | 5                                | 40                                                           | 0                                                                       | 0                                                                        |
| Sodium                                | 14200.00                                 | 230440.00                                          | 545000.00                                | 5                                           | 5                                | 100                                                          | 4                                                                       | 80                                                                       |
| Vanadium                              | 5.10                                     | 14.08                                              | 38.30                                    | 5                                           | 5                                | 100                                                          | 0                                                                       | 0                                                                        |
| Zinc                                  | 30.80                                    | 102.30                                             | 161.00                                   | 5                                           | 5                                | 100                                                          | 0                                                                       | 0                                                                        |
| Inorgenics - Dissolved (ug/L)         |                                          |                                                    |                                          |                                             |                                  |                                                              | _                                                                       |                                                                          |
| Aluminum                              | 50,30                                    | 60906.68                                           | 512000.00                                | 10                                          | 31                               | 32                                                           | 5                                                                       | 16                                                                       |
| Antimony                              | 121.00                                   | 144.67                                             | 162.00                                   | 3                                           | 31                               | 10                                                           | 3                                                                       | 10                                                                       |
| Arsenic                               | 2.80                                     | 408.58                                             | 2970.00                                  | 10                                          | 31                               | 32                                                           | 7                                                                       | 23                                                                       |
| Berium                                | 16.30                                    | 221.05                                             | 1780.00                                  | 26                                          | 31                               | 84                                                           | 0                                                                       | 0                                                                        |
| Beryilium                             | 110.00                                   | 132.33                                             | 158.00                                   | 3                                           | 31                               | 10                                                           | 4                                                                       | 13                                                                       |
| Cedmium                               | 124.00                                   | 148.33                                             | 175.00                                   | 3                                           | 31                               | 10                                                           | 3                                                                       | 10                                                                       |
| Calcium                               | 7280.00                                  | 122319.60                                          | 53 1000.00                               | 25                                          | 31                               | 81                                                           | 0                                                                       | 0                                                                        |
| Chromium                              | 5.90                                     | 111.24                                             | 410.00                                   | 9                                           | 31                               | 29                                                           | 4                                                                       | 13                                                                       |
| Cobalt                                | 14.40                                    | 94.04                                              | 174.00                                   | 5                                           | 31                               | 16                                                           | 3                                                                       | 10                                                                       |
| Copper                                | 3.40                                     | 50.00                                              | 146.00                                   | 8                                           | 31                               | 26                                                           | 0                                                                       | v<br>1                                                                   |
| Hexavalent chromium                   | 330.00                                   | 330.00                                             | 330.00                                   | 1                                           | 31                               | 3                                                            | 10                                                                      | 5<br>61                                                                  |
| iron                                  | 36.10                                    | 16635.17                                           | 182000.00                                | 23                                          | 31                               | /4                                                           | 13                                                                      | 6                                                                        |
| Leed                                  | 2.00                                     | 12.72                                              | 37.40                                    | . 5                                         | 31                               | 10                                                           | 2                                                                       | 0                                                                        |
| Megnesium                             | 2590.00                                  | 66441.20                                           | 547000.00                                | 25                                          | 31                               | 15                                                           | 21                                                                      | 83                                                                       |
| Manganese                             | 30.50                                    | 393.62                                             | 1170.00                                  | 24                                          | 31                               | 17                                                           | 21                                                                      | 0                                                                        |
| Mercury                               | 0,20                                     | 0.23                                               | 0.25                                     | 4                                           | 31                               | 13                                                           | 0                                                                       | ŏ                                                                        |
| Molybdenum                            | 17.60                                    | 24.58                                              | 31.10                                    | 6                                           | 31                               | 19                                                           | 2                                                                       | 6                                                                        |
| Nickel                                | 20.00                                    | 78.20                                              | 168.00                                   | 6                                           | 31                               | 13                                                           | 2                                                                       | ñ                                                                        |
| Palladium                             | 20.10                                    | 20.10                                              | 20.10                                    | 1                                           | 31                               | 3<br>71                                                      | õ                                                                       | õ                                                                        |
| Potassium                             | 3550,00                                  | 21082.27                                           | 53500,00                                 | 44                                          | 31                               | 71                                                           | ~                                                                       | -                                                                        |

See last page for footnotes.

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| Constituent                                      | Minimum<br>Quantifiable<br>Concentration | Geometric<br>Mean<br>Quantifiable<br>Concentration | Maximum<br>Quantiflable<br>Concentration | Number of<br>Quantifiable<br>Concentrations | Number of<br>Samples<br>Analyzed | Percent of<br>Samples with<br>Quantifieble<br>Concentratione | Number of Samples<br>Exceeding NJDEP<br>Groundwater Quality<br>Criteria | Percent of Samples<br>Exceeding NJDEP<br>Groundwater Quality<br>Criteria |
|--------------------------------------------------|------------------------------------------|----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Inorganica - Dissolved (ug/L) (continued)        |                                          |                                                    |                                          |                                             |                                  |                                                              |                                                                         |                                                                          |
| Selenium                                         | 5.30                                     | 5.30                                               | 5.30                                     | 1                                           | 31                               | 3                                                            | 0                                                                       | 0                                                                        |
| Sodium                                           | 3190.00                                  | 342432.86                                          | 1410000.00                               | 21                                          | 31                               | 68                                                           | 16                                                                      | 52                                                                       |
| Venedium                                         | 4.00                                     | 91.91                                              | 389.00                                   | 10                                          | 31                               | 32                                                           | 0                                                                       | 0                                                                        |
| Zinc                                             | 8.30                                     | 88,36                                              | 360.00                                   | 14                                          | 31                               | 45                                                           | 0                                                                       | 0                                                                        |
| <u>Miscellaneous inorganic Parameters (mg/L)</u> |                                          |                                                    |                                          |                                             |                                  |                                                              |                                                                         |                                                                          |
| Ammonia                                          | 0.14                                     | 2.32                                               | 5.01                                     | 17                                          | 27                               | 63                                                           | 0                                                                       | 0                                                                        |
| ROD E Day Tatel                                  | 4.80                                     | 177.50                                             | 1600.00                                  | 27                                          | 27                               | 100                                                          | 0                                                                       | 0                                                                        |
| Bob, o Day Iota                                  | 2.20                                     | 79.05                                              | 228.40                                   | 23                                          | 27                               | 85                                                           | · 0                                                                     | 0                                                                        |
| Cerpon Dioxide                                   | 86.00                                    | 616.48                                             | 3600.00                                  | 27                                          | 27                               | 100                                                          | 0                                                                       | 0                                                                        |
| Chemical Oxygen Demand                           | 5.47                                     | 1190.75                                            | 11300.00                                 | 27                                          | 27                               | 100                                                          | . 11                                                                    | 41                                                                       |
| Chioride                                         | 0.30                                     | 5 53                                               | 13.40                                    | 19                                          | 27                               | 70                                                           | 0                                                                       | 0                                                                        |
| Methane                                          | 0.04                                     | 0.58                                               | 3.20                                     | 8                                           | 27                               | 30                                                           | 0                                                                       | 0                                                                        |
| Nitrate-N                                        | 4.00                                     | 10.19                                              | 15.10                                    | 27                                          | 27                               | 100                                                          | 0                                                                       | 0                                                                        |
| Nitrogen Dioxide                                 | 9,00                                     | 146.40                                             | 1220.00                                  | 27                                          | 27                               | 100                                                          | 0                                                                       | 0                                                                        |
| Organic Carbon                                   | 0.60                                     | 193                                                | 7.00                                     | 27                                          | 27                               | 100                                                          | 0                                                                       | 0                                                                        |
| Dissolved Oxygen                                 | 12 50                                    | 219.34                                             | 1840.00                                  | 27                                          | 27                               | 100                                                          | 7                                                                       | 26                                                                       |
| Sulfate                                          | 0.16                                     | 15.84                                              | 97.00                                    | 21                                          | 27                               | 78                                                           | 0                                                                       | Q                                                                        |
| Sulfide, Low                                     | 106.00                                   | 1678.44                                            | 4630.00                                  | 27                                          | 27                               | 100                                                          | 11                                                                      | 41                                                                       |
| Total Dissolved Solids                           | 10 70                                    | 412.83                                             | 1210.00                                  | 27                                          | 27                               | 100                                                          | 0                                                                       | 0                                                                        |
| Total Alkalinity<br>Total Phosphorus             | 0.15                                     | 1.58                                               | 8.71                                     | 26                                          | 27                               | 96                                                           | 0                                                                       | 0                                                                        |

Ranges of concentrations and exceedances do not inicude quality assurance/quality control samples such as replicates, field blanks, and matrix spike/matrix spike duplicates.

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NJDEP New Jersey Department of Environmental Protection.

PCBs Polychlorinated biphenyis.

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mg/L Milligrams per liter (equivalent to parts per million (ppm)).

ug/L Micrograms per liter (equivalent to parts per billion (ppb)).

Page 4 of 4
| Well Designation       | Date             | Temperature<br>(*F) | Specific<br>Conductance<br>(umhos/cm) | рН<br>(s.u.) | Dissolved<br>Oxygen<br>(mg/L) | Oxidation-Reduction<br>Potential<br>(mV) |
|------------------------|------------------|---------------------|---------------------------------------|--------------|-------------------------------|------------------------------------------|
| Phase IA Monitoring W  | elis             |                     |                                       |              | -                             |                                          |
| Shallow                |                  |                     |                                       |              |                               |                                          |
| CAMMA/2                | 1/25/95          | 56 12               | 1670                                  | 9.63         | 2.52                          | -252                                     |
| GMMW3                  | 1/25/95          | 62.81               | 998                                   | 6.23         | 4.11                          | -150                                     |
| GMMW4                  | 1/25/95          | 55.74               | 1409                                  | 6.66         | 1.52                          | 25                                       |
| GMMW6                  | 1/25/95          | 55.34               | 744                                   | 7.06         | 4.66                          | -107                                     |
| GMMW8                  | 1/23/95          | 58.33               | 1100                                  | 7.64         | 9.08                          | 195                                      |
| GMMW9                  | 1/23/95          | 54.50               | 1300                                  | 7.63         | 8.83                          | 207                                      |
| GMMW10                 | 1/23/95          | 60.90               | 2254                                  | 6.55         | 2.04                          | -74                                      |
| GMMW11*                | 1/25/95          | 56.55               | 1028                                  | 8,61         | 1.12                          | 1.0                                      |
| GMMW13                 | 1/27/95          | 51.33               | 284                                   | 6,39         | 2.8                           | -20                                      |
| GMMW14                 | 1/23/95          | 59.91               | 2122                                  | 6.94         | 1.08                          | -158                                     |
| GMMW15                 | 1/24/95          | 60.49               | 5240                                  | 6.82         | 1.17                          | -244                                     |
| GMMW17                 | 1/25/95          | 50.09               | 624                                   | 7.92         | 4.3                           | -72                                      |
| GMMW19                 | 1/27 <i>1</i> 95 | 54.33               | 234                                   | 6.67         | 3.09                          | 101                                      |
| GMMW20                 | 1/23/95          | 55.79               | 9185                                  | 6.39         | 2.03                          | -54                                      |
| Intermediate           |                  |                     |                                       |              |                               |                                          |
| GMMW211                | 1/26/95          | 58.10               | 3130                                  | 7.08         | 0.83                          | -50                                      |
| GMMW231                | 1/26/95          | 60.69               | 272                                   | 6.94         | 0.97                          | -64                                      |
| GMMW241*               | 1/26/95          | 60.13               | ••                                    | 6.23         | 0.64                          | -184                                     |
| Deep                   |                  |                     |                                       |              |                               |                                          |
| GMMW21D                | 1/26/95          | 58.29               | ••                                    | 4.4          | 1.09                          | 139                                      |
| GMMW22D                | 1/27/95          | 60,40               | 3000                                  | 4.91         | 1.19                          | 163                                      |
| GMMW23D                | 1/26/95          | 61.26               | 4320                                  | 7.29         | 1.06                          | -81                                      |
| GMMW24D                | 1/26 <i>/</i> 95 | 57.07               | ••                                    | 6.69         | 0.44                          | -174                                     |
| Existing Monitoring We | stie             |                     |                                       |              |                               |                                          |
| <u>Shallow</u>         | •                |                     |                                       |              |                               |                                          |
| EB1                    | 1/26/95          | 51.15               | 676                                   | 6.66         | 3.5                           | -30                                      |
| EB29                   | 1/26/95          | 44.49               | 165                                   | 6.15         | 11.73                         | 421                                      |
| EB51                   | 1/25/95          | 55.07               | 7360                                  | 6,95         | 0.93                          | 46                                       |
| EB68                   | 1/24/95          | 58.89               | ••                                    | 6.91         | 4.09                          | -259                                     |
| EB90*                  | 1/27/95          | 51.45               | 926                                   | 6.97         | 8.0                           | 300                                      |
| EBR13*                 | 1/27/95          | 55.40               | 100                                   | 6.77         | 0.45                          | -133                                     |
| EBR19                  | 1/24/95          | 49.49               | ••                                    | 8.1          | 3.73                          | -171                                     |
| MW 6                   | 1/24/95          | 56.15               | 1107                                  | 6.42         | 1.82                          | -10                                      |
| MW 9                   | 1/24/95          | 55.77               | 659                                   | 6.23         | 5.72                          | -44                                      |
| MW 10                  | 1/23/95          | 52.62               | 1731                                  | 7.86         | 1.8                           | -109                                     |
| PKMW4*                 | 1/27/95          | 55,65               | 9280                                  | 7.11         | 0,39                          | -164                                     |

Table 5-18. Summary of Field Parameter Measurements of Groundwater Samples Collected During the Phase IA Remedial Investigation at the Bayonne Plant, Bayonne, New Jersey.

NOTE: Unless otherwise noted, field parameter measurements were recorded downhole at the base of the water column after well purging and prior to groundwater sampling.

umhos/cm Micromhos per centimeter,

s.u. Standard unit.

mg/L Milligram per liter.

mV Millivolt.

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- Value obtained prior to well purging.
- \*\* Value out of instrument range.

°F Degrees Fahrenheit.

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|                          | Malandar Ma |                 |          | Venor              | Heary's                   |                        |                     |             | Groundwater<br>T 1/2 |        | Soil<br>T 1/2 |       |
|--------------------------|-------------|-----------------|----------|--------------------|---------------------------|------------------------|---------------------|-------------|----------------------|--------|---------------|-------|
| Constituent              | Weight      | Solubility      | Specific | Pressure           | (atm-m <sup>3</sup> /mol) | Diffusivity            | Kœ                  | Log         | Low                  | High   | Low           | Higb  |
|                          | (g/mol)     | (mg/L 25 °C)    | Gravity  | (mm Hg 25 °C)      | (25 °C)                   | (cm <sup>3</sup> /scc) | (mL/g)              | Kow         | (days)               | )      | (days)        | )<br> |
| VOC                      |             |                 |          |                    |                           |                        | A 77                | 0.74        | •                    | 14     |               | 7     |
| Acetone                  | 58          | miscible        | 0.79     | 2.7E+02            | 3.97E-05                  | 0.11498                | 0.37                | -0.24       | 10                   | 770    | 5             | 16    |
| Benzene                  | 78          | 1,780           | 0.88     | 9,5E+01            | 5.48E-03                  | 0.09320                | 49 - 100            | 1.30 - 2.13 | 10 -                 | 14     | 1.            | 7     |
| 2-Butanone               | 72          | 239,000         | 0.80     | 1.0E+02            | 4.66E-05                  | 0.08944                | 1.4                 | 0.20 - 0.27 | 176                  | 200    | 68 .          | 150   |
| Chlorobenzene            | 1 <b>13</b> | 295 - 500       | 1.1      | 1.2E+01            | 4.45E-03                  | 0,07193                | 48 - 331            | 2.71 - 2.98 | 130 -                | 1 9 25 | 78 -          | 190   |
| Chloroform               | 119         | 7,222 - 9,600   | 1.48     | 2.0E+02            | 3.20E-03                  | 0.08868                | 44                  | 1.90 - 1.97 |                      | 1,022  | 20 V          | 100   |
| Dichlorobromomethane     | 164         | 4,700           | 1.99     | 5.0E+01 (20 °C)    | 2.12E-04                  | 0.08966                | 62                  | 1.86        |                      | 2 860  | 78            | 180   |
| cis-1.2-Dichloroethene   | 97          | 3,500           | 1,28     | 2.0E+02            | 3.37E-03                  | 0.09980                | 49                  | 1.80        |                      | 2,820  | 70 -          | 180   |
| trans-1.2-Dichloroethene | 97          | 6,300           | 1.25     | 2.7E+02 (20 °C)    | 6,74E-03                  | 0.09980                | 59                  | 2.09        | - <del>2</del> 0     | 2,830  | 20 -          | 100   |
| Ethylbenzene             | 106         | 152 - 208       | 0.87     | 9.5E+00            | 8,68E-03                  | 0.06667                | 95 - 260            | 3.03 - 3.15 | <br>-                | 449    | 3.            | 74    |
| Methylens chloride       | 85          | 13,000 - 16,700 | 1.32     | 4.4E+02 - 4.6E+02  | 2.69E-03                  | 0.08500                | 8.7                 | 1.25 - 1.30 | 14 -                 | 770    | 180           | 145   |
| Tetrachlorosibens        | 166         | 150 - 485       | 1.6      | 1.9E+01            | 2.87E-03                  | 0.07404                | 210 - 363           | 2,1 - 2.88  | 300 -                | 130    | 160 -         | 345   |
| Trichlometheae           | 131         | 1.100 - 1.500   | 1.46     | 7.3E+01            | 9.90E-03                  | 0.08116                | 65 -126             | 2,29 - 3.30 | 321 •                | 1,043  | 100 -         | 190   |
| Vinyl chloride           | 63          | 1,100 - 2,700   | 0.91     | 2.7E+03            | 5.60E-02                  | 0.10726                | 2.5                 | 0.60        |                      | 2,830  | 20 -          | 100   |
| Xylenes (total)          | 106         | 162 - 200       | 0.87     | 6.6E+00 - 8.8E+00  | 6.30E-03                  | 0.07164                | 128 - 1,580         | 2.77 - 3.20 | 14 -                 | 300    | / -           | 20    |
| Semi-VOCA                |             |                 |          |                    |                           |                        |                     |             | 204                  | 1 161  | 107           | 679   |
| Benzo(a)anthracene       | 228         | 0.0094 - 0.014  | 1.27     | 1.1E-07            | 8.00E-06                  | 0.04564                | 1,400,000           | 3.01 - 3.91 | 204 -                | 1,301  | 160           | 610   |
| Benzo(b)fluormthene      | 252         | 0.0012          | ND       | 5.0E-07            | 1.20E-05                  | 0.04392                | 550,000             | 6.57        | 719.1 -              | 1,219  | 300 •         | 1 120 |
| Benzo(k)/hormthene       | 252         | 0.00055         | ND       | 9.6E-11            | 1.04E-03                  | 0.04392                | 4,400,000           | 6.85        | 1,821 -              | 4,2/1  | 507 -         | 529   |
| Deero(a)avrent           | 752         | 0.0038 - 0.004  | 1.35     | 5.5E-09            | 2.40E-06                  | 0.04653                | 398,000 - 1,900,000 | 5.81 - 6.50 | 114 -                | 1,039  | - 16          | 001   |
| Charlen                  | 228         | 0.0018 - 0.006  | 1.27     | 6.3E-09            | 3.15E-07                  | 0.04531                | 240,000             | 5.60 - 5.91 | /44,0 +              | 2,000  | 3/2 -         | 973   |
| Dihenzo(a h)enthracene   | 278         | 0.00249 - 0.005 | 1.28     | 10E-10 (20 °C)     | 7.33E-09                  | 0.05707                | 1,700,000           | 5.97 - 6.50 | 122.7 -              | 1,880  | - 100         | 792   |
| 1 7 Dichlomberzene       | 147         | 92.7 - 156      | 1.3      | 1.5E+00            | 2.40E-03                  | 0.07113                | 180 - 1,700         | 3.38 - 3.55 | <b>36</b> -          | 300    | 20 -          | 180   |
| 1,1 Dichlorohenzent      | 147         | 65.3 - 90.6     | 1.25     | 4.0E-01            | 4.45E-03                  | 0.07134                | 158                 | 3.37 - 3.62 | <b>30</b> -          | 300    | 28 -          | 100   |
| 2.4 Dimethylohenol       | 122         | 7,868           | 0.96     | 9.8E-02            | 6.55E-06                  | 0.06938                | 117                 | 2.4         | 2 -                  | 14     | (OQ           | 710   |
| Z, 4-1/11/04/ protect    | 276         | 0.062           | ND       | 1.08-09            | 2.96E-20                  | 0.05728                | 31,000,000          | 5.91 - 7.70 | 1.201 -              | 1,400  |               | , ,30 |
| 2 Mathylasphthalana      | 147         | 25              | 1.00     | 4,5E-02            | 3.36E-04                  | 0.06196                | 7,400 - 8,500       | 3.86 - 4.11 | ND                   |        | 14.4          | , 49  |
| Z-MCBy amplitude cut     | 178         | 30 - 34         | 1.16     | 2.3E-01 - 8.7E-01  | 4.60E-04                  | 0,08205                | 550 - 3,160         | 3.2 - 4.7   |                      | 236    | 10.0 -        | 40    |
| Naphinactic              | 198         | 35.1            | ND       | 1.0E-01            | 2.33E-08                  | 0.06710                | 575                 | 3.13        | 20 -                 | 05     | 10 -          |       |
| N-Murokoupheny and       | 266         | 20 - 25         | 1.98     | 1.7E-05            | 3,40E-06                  | 0.05528                | 891                 | 5,01 - 5.86 | 40 -                 | 1335   | 23 -          | 1/6   |
| Pentaciporopolasos       | 202         | 0.013 - 0.171   | 1.27     | 6.85E-07 - 2.5E-06 | 1.10E-05                  | 0.05039                | 46,000 - 135,000    | 4.88 - 5.32 | 420 •                | 3,790  | 210 -         | 1,896 |
|                          |             |                 |          |                    |                           |                        |                     |             |                      |        |               |       |
| Pesticides               | 201         | 20              | 1 87     | 2.5E-05 (20 °C)    | 5.30E-06                  | 0.05198                | 1,901               | 3.46 - 3.89 | 13.8 -               | 270    | 13.8 -        | 135   |
| aipha-BHC                | 471         | 0.02 - 0.14     | 1 48     | 1.02E-6 (30 °C)    | 2.16E-05                  | 0.04742                | 44,000 - 80,500     | 5.99        | 70 -                 | 11,425 | 730 •         | 5,694 |
| 4,4'-DDD                 | 320         | 0.02 - 0.10     | 1 56     | 1.9E-07            | 5.20E-05                  | 0.04467                | 140,000 - 1,800,000 | 4,89 - 6.44 | 16 -                 | 11,425 | 2 •           | 5,694 |
| 4,4'-DDT                 | 354         | 0.105           | 1.75     | 1.8E-07            | 5.80E-05                  | 0.04875                | 12,000 - 35,000     | 3.69 - 5.48 | 1 -                  | 2,190  | 175 -         | 1,095 |
| Dieldrin                 | 381         | 0.193           | 1.75     |                    |                           |                        |                     |             |                      |        |               |       |

## Table 6-1. Physical and Chemical Properties of Organic Constituents of Concern, Bayonne, New Jersey.

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References: Hazardous Substances Databank, 1993; Howard et al., 1991; Howard, 1990 and 1989; Lugg, 1968; Lyman et al., 1990; Montgomery and Welkom, 1990; Shen, 1982; and Verschueren, 1983.

| aim-m <sup>3</sup> /mol<br>°C<br>cm <sup>3</sup> /sec<br>g/mol<br>Koc | Aimospheres-cubic meters per mole.<br>Degrees Celsius.<br>Square continueters per second.<br>Grams per mole.<br>Organic earbon partition coefficient.<br>Organic earbon partition coefficient. | mg/L<br>mL/g<br>mm Hg<br>ND<br>T <sup>1</sup> /2 | Milligrams per liter.<br>Milliliters per gram.<br>Millimeters of mercury.<br>No data.<br>Half-life. |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| KOW                                                                   | Occumptential Parallel Construction                                                                                                                                                            |                                                  |                                                                                                     |

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| Area                                                                                             | Soil Surface<br>{0- to 2-fast below grade)<br>Exceedances '                                                                                                        | Subsurface<br>(greater than 2-feet below grade)<br>Exceedances <sup>1</sup>                                                                                                | NAPL *<br>Plume No.<br>(see Table 5-10) | Groundwater <sup>2</sup> **<br>Exceedances<br>[b]<br>VOC: 2-Butanone, Benzene,<br>Bromodichloromethane, Chlorobenzene,<br>Chloroform, Xylenes (totei); Al, Be, Cd,<br>Co, Cr Fe, Mn, Na, Ni, Sb, V, Cl, SO4         |  |
|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Piers and East Side<br>Treatment Plant Ares,<br>and MDC Building Ares                            | NA                                                                                                                                                                 | трн                                                                                                                                                                        | 1, 2, 3                                 |                                                                                                                                                                                                                     |  |
| Low Sulfur and Solvent<br>Tenk Fields                                                            | ТРН, Аз, Си                                                                                                                                                        | TPH, SVOC: Benzo(a}pyrene,<br>Naphthalene                                                                                                                                  | 4                                       | TPH, VOC: Benzene, Ethylbenzene,<br>Xylenes (total), 1,2-Dichlorosthene (total),<br>Vinyl chloride; SVOC: 2,4-Dimethylphenol,<br>2-Mathylnaphthalene, naphthalene; Al, As,<br>Be, Cd, Co, Cr, Fe, Mn, Na, Pb, V, Cl |  |
| General Tenk Field                                                                               | TPH, SVOC: Benzo(s)pyrene;<br>As, Be, Cu, Pb, Zn,                                                                                                                  | TPH, VOC: Xylenes (Totel),<br>SVOC: Benzo(s)pyrene;<br>As, Cu, Pb, Zn                                                                                                      | 5, 6                                    | TPH, VOC: 8enzene;<br>Al, Fe, Mn, Na, C!                                                                                                                                                                            |  |
| AV-Gas Tank Field<br>and Domestio Trade<br>Area(Includes Southern<br>Part of Interceptor Tranch) | ТРН,<br>SVOC: Dibenz(s,h)enthrecene<br>Benzo(a)pyrene;<br>As, Be, Pb                                                                                               | TPH, SVOC: Benzo(a)pyrene,<br>Benzo(b)fluoranthene,<br>Benzo(k)fluoranthene,<br>Dibenz(a,h)enthracene,<br>Indeno(1,2,3-od)pyrene;<br>As, Pb, Tl                            | 7                                       | TPH, Mn, Na                                                                                                                                                                                                         |  |
| Asphalt Plent and<br>Chemicals Plent<br>(Includes Utility Area)                                  | TPH, SVOC: Benzo(a)enthracene,<br>Benzo(a)pyrene,<br>Benzo(b)fluoranthene,<br>Benzo(k)fluoranthene,<br>Dibenz(a,h)anthracene,<br>indeno(1,2,3-cd)pyrene;<br>As, Cu | TPH, VOC: Chlorobenzene,<br>Xylenes (Totel);<br>SVOC: Benzo(a)pyrene,<br>Dibenz(a,h)enthrecene,<br>1,2-Dichlorobenzene,<br>1,4-Dichlorobenzene,<br>Naphthalene; As, Pb, Tl | 6, 9                                    | TPH, VOC: Benzens, Chlorobenzens,<br>Chloroform; SVOC: 1,4-Dichlorobenzens,<br>Naphthälens; As, Fe, Mn, Ns, Cl, SO4                                                                                                 |  |
| No. 3 Tenk Field                                                                                 | TPH, VOC: Benzene, Chlorobenzene,<br>Xylenes (total); SVOC: Benzo(s)pyrene,<br>Dibenz(s,h)enthracene,<br>n-Nitrosodiphenylemine,<br>As, Be, Pb, Cr <sup>+8</sup>   | TPH, VOC: Chlorobenzene,<br>Benzo(a)anthracene;<br>SVOC: Benzo(a)pyrene;<br>Aa, Cu, Ni                                                                                     | 10                                      | TPH, VOC: Benzene, Chlorobenzene;<br>Peet/PCB: 4,4'-DDT<br>As, Cr, Fe, Mn, Na                                                                                                                                       |  |

Table 7-1. Summary of Ri Analytical Findings and NAPL Observations by Area, Bayonne Plant, Bayonne, New Jersey,

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Table 7-1. Summary of RI Analytical Findings and NAPL Observations by Area, Bayonne Plant, Bayonne, New Jereey.

| Area                                                                                         | Soil Surface<br>(O- to 2-feet below grade)<br>Exceedances !           | Subsurface<br>(greater than 2-feet below grade)<br>Exceedances <sup>1</sup>                                                                                                              | NAPL *<br>Piume No.<br>(see Table 5-10) | Groundwater <sup>z</sup> + •<br>Exceedancea<br>[b]                                                                                                                                                 |  |  |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| No. 2 Tank Field and Main Building Area<br>(Includes Northern Part of<br>Interceptor Trench) | ТРН, Аэ                                                               | TPH, VOC: Xylanes (Totsi);<br>SVOC: Benzo(s)enthracene,<br>Benzo(s)pyrene,<br>Dibenzo(s,h)anthracene;<br>As, Cu, Pb, Tl, Cr <sup>+8</sup>                                                | 11, 12                                  | TPH, VOC: Benzene, Xylenes (total),<br>Methylene chloride;<br>SVOC: 2-Methylnsphthalene, Nsphthalene;<br>Al, As, Fe, Ns, V                                                                         |  |  |
| "A"-Hill Tank Field                                                                          | TPH, As                                                               | TPH, As                                                                                                                                                                                  | 13                                      | TPH, Pb, Mn                                                                                                                                                                                        |  |  |
| Lube Oil Area and Stockpile<br>Area (Includes Platty<br>Kill)                                | TPH, SVOC: Dibenz(a,h)anthracene,<br>Benzo(a)pyrene; Pest/PCB, As, Pb | TPH, SVOC: Benzo(a)anthracene,<br>Benzo(a)pyrene,<br>Benzo(i)fluoranthene,<br>Benzo(k)fluoranthene, Chrysene,<br>Dibenz(a,h)enthracene,<br>Indeno(1,2,3-od)pyrene, Pyrene;<br>As, Pb, Ti | 14, 15, 18                              | TPH, VOC: Benzene, Bromodichloromethene,<br>Chloroform; As, Fe, Mn, Ne, Cl, SO4                                                                                                                    |  |  |
| Pier No. 1 Area<br>(Includes Haliped)                                                        | NA                                                                    | TPH, SVOC: Benzo(s)anthracene,<br>Benzo(a)pyrene,<br>Benzo(a)fluoranthene,<br>Benzo(k)fluoranthene,<br>Dibenz(a,h)anthracene; As                                                         | 17                                      | TPH, VOC; 1,2-Dichloroethene (total), Acetone,<br>Benzene, Tetrachloroethene, Trichloroethene,<br>Vinyi chloride; SVOC: Pentechlorophenol;<br>Pest/PCB: alpha-BHC; AI, Fe, Mn, Na, SO <sup>4</sup> |  |  |

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| ft<br>•<br>••<br>NAPL | Feet.<br>NAPL plumes as enumerated on Figure 5-5.<br>Metal exceedences are for dissolved metals only.<br>Non-aqueous phase liquid.                                                                                                                                              |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                     | Soil constituents listed are detected in concentrations either above the NJDEP non-residential direct contact soil cleanup criteria.                                                                                                                                            |
| 2                     | Groundwater constituents listed are detected in concentrations either above the New Jersey Department of Environmental Protection (NJDEP) groundwater quality standards or above the interim generic groundwater quality criteria (IGGWQC) established for the Bayway Refinery. |
| TPH                   | Total petroleum hydrocarbons - detected in soil by Mathod 418.10 (NJ modified) above 10,000 mg/kg) or in groundwatar<br>above 1 mg/L.                                                                                                                                           |
| NA                    | Arse not analyzed during the RI; these arsee heve undergone extensive IRM investigations.                                                                                                                                                                                       |
| Ai                    | Atuminium                                                                                                                                                                                                                                                                       |
| Å.                    | Arsenic                                                                                                                                                                                                                                                                         |
| Be                    | Berylium                                                                                                                                                                                                                                                                        |
| Cd                    | Cedmium                                                                                                                                                                                                                                                                         |
| Co                    | Cobelt                                                                                                                                                                                                                                                                          |
| Cr                    | Chromium                                                                                                                                                                                                                                                                        |
| Çu                    | Coper                                                                                                                                                                                                                                                                           |
| Fe                    | Iron                                                                                                                                                                                                                                                                            |
| Mn                    | Manganese                                                                                                                                                                                                                                                                       |
| Ne                    | Sodium                                                                                                                                                                                                                                                                          |
| NI                    | Nickel                                                                                                                                                                                                                                                                          |
| Pb                    |                                                                                                                                                                                                                                                                                 |
| TI                    |                                                                                                                                                                                                                                                                                 |
| V                     | Venedium                                                                                                                                                                                                                                                                        |
| CI                    |                                                                                                                                                                                                                                                                                 |
| 504<br>Cr.            | Herevelent Chromium                                                                                                                                                                                                                                                             |
| VOC                   | Velatile Ordenic Compound                                                                                                                                                                                                                                                       |
| SVOC                  | Semivolatile Organic Compound                                                                                                                                                                                                                                                   |
| Pest/PCB              | Pesticide and Polychiorinated Biphenyl                                                                                                                                                                                                                                          |
|                       |                                                                                                                                                                                                                                                                                 |
|                       |                                                                                                                                                                                                                                                                                 |

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Table 7-1. Summery of RI Analytical Findings and NAPL Observations by Area, Bayonne Plant, Bayonne, New Jersey.

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