APPENDIX II

TABLES

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TABLE 1

RI Objectives and Associated Tasks

Objective	RI Task
Identify source areas	• Surface geophysics • Soil gas survey • Test pits
Define contamination of soils, surface water, and sediment	• Topographic survey of site • Soil gas survey • Sample collection from surface soil, surface water, and sediment • Subsurface soil sample collection through soil borings and during well installation • Test pits
Characterize site hydrogeology and ground water contamination	• Fracture trace analysis • Soil borings • Borehole geophysics • Monitoring well installation • Packer testing • Sample collection from monitoring wells and residential wells
Identify cultural resources	• Stage 1-A historical survey
Determine risks to humans/ environment	• Human health and environmental assessment

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TABLE 2
Comparison of Ground Water Results to State and Federal Requirements

Compound	Maximum Concentration Detected (µg/l)	NJ GWQ Criteria[a] (µg/l)		New Jersey MCL[b] (µg/l)	Federal MCL[c] (µg/l)	Federal MCLG[c] (µg/l)
		Existing[d]	Proposed[e]			
VOLATILE ORGANICS						
Acetone	5.2	—	700	—	—	—
Benzene	1,200.0	—	0.2	1	5	0
Bromobenzene	1.4	—	—	—	—	—
Carbon disulfide	[illegible]	—	—	—	—	—
Carbon tetrachloride	3.3	—	0.4	2	5	0
Chlorobenzene	1,700.0	—	5	[illegible]	—	—
Chloroform	33.0	—	6	—	100	—
2-Chlorotoluene	3.5	—	—	—	—	—
4-Chlorotoluene	2.9	—	—	—	—	—
cis-1,2-Dichloroethene	36.0	—	10	10	70	70
1,1-Dichloroethane	3.0	—	70	—	—	—
1,2-Dichloroethane	320.0	—	0.3	2	5	0
1,1-Dichloroethene	10.0	—	1	2	7	7
1,2-Dichloropropane	0.56	—	0.5	—	5	0
1,1-Dichloropropene	4.3	—	—	—	—	—
Ethylbenzene	1.0	—	700	—	700	700
Trans-1,2-Dichloroethene	13.0	—	100	10	100	100
1,1,2,2-Tetrachloroethane	7.5	—	2	—	—	—
Tetrachloroethene	270.0	—	0.4	1	5	0
Toluene	1.9	—	1,000	—	1,000	1,000
1,1,1,2-Tetracloroethane	1.4	—	10	—	—	—
1,1,1-Trichloroethane	4.2	—	30	26	200	200
1,1,2-Trichloroethane	1,100.0	—	3	—	5	3
Trichloroethene	220.0	—	1.0	1	5	0
Trichlorofluoromethane	3.8	—	—	—	—	—
Vinyl Chloride	86.0	—	0.083	2	2	0
Xylenes (total)	13.8	—	—	44	10,000	10,000

TABLE 2
Comparison of Ground Water Results to State and Federal Requirements

Compound	Maximum Concentration Detected (µg/l)	NJ GWQ Criteria[a] (µg/l)		New Jersey MCL[b] (µg/l)	Federal MCL[c] (µg/l)	Federal MCLG[c] (µg/l)
		Existing[d]	Proposed[e]			
SEMIVOLATILE ORGANICS						
Bis(2-chloroethyl)ether	2.0	—	0.03	—	—	—
Bis(2-ethylhexyl)phthalate	10.0	—	3	—	—	—
2-Chlorophenol	6.0	—	40	—	—	—
1,2-Dichlorobenzene	48.0	—	600	600	600	600
1,3-Dichlorobenzene	5.0	—	600	600	600	600
1,4-Dichlorobenzene	2.0	—	75	—	75	75
Di-n-butylphthalate	0.9	—	900	—	—	—
Diethyl phthalate	1.0	—	5,000	—	—	—
Hexachlorobutadiene	5.3	—	1	—	—	—
Isopropylbenzene	4.6	—	—	—	—	—
Naphthalene	0.38	—	—	—	—	—
N-Butylbenzene	5.0	—	—	—	—	—
N-Propylbenzene	4.5	—	—	—	—	—
P-Isopropyltoluene	5.0	—	—	—	—	—
Phenol	9.0	3,500	4,000	—	—	—
Sec-Butylbenzene	4.9	—	—	—	—	—
Tert-Butylbenzene	4.9	—	—	—	—	—
1,2,3-Trichlorobenzene	1.4	—	—	8	—	—
1,2,4-Trichlorobenzene	1.7	—	9	8	9	9
1,2,4-Trimethylbenzene	3.2	—	—	—	—	—
1,3,5-Trimethylbenzene	3.9	—	—	—	—	—
INORGANICS						
Aluminum	304,000.0	—	50-200	—	—	—
Antimony	28.5	—	2	—	5-10	3
Barium	1,890.0	—	2,000	—	2,000	2,000
Beryllium	25.7	—	0.008	—	4	0
Cadmium	4.1	10	4	—	5	5
Chromium	403.0	50	100	—	100	100
Cobalt	826.0	—	—	—	—	—
Copper	8,750.0	1,000	1,000	—	1,300	1,300

TABLE 2

Comparison of Ground Water Results to State and Federal Requirements

Compound	Maximum Concentration Detected (µg/l)	NJ GWQ Criteria[a] (µg/l)		New Jersey MCL[b] (µg/l)	Federal MCL[c] (µg/l)	Federal MCLG[c] (µg/l)
		Existing[d]	Proposed[e]			
Iron	433,000.0	300	300	—	—	—
Lead	81.4	50	5	—	15	0
Magnesium	27,200.0	—	—	—	—	—
Manganese	24,800.0	50	50	—	—	—
Nickel	224.0	—	100	—	100	100
Vanadium	1,490.0	—	—	—	—	—
Zinc	811.0	5,000	5,000	—	—	—

Notes:

Metals results are total, not dissolved, concentrations.

[a]New Jersey Ground Water Quality Standards. Class GW2.
[b]New Jersey Drinking Water Regulations NJAC 7:10.
[c]Environmental Protection Agency Primary Drinking Water Regulations 40 CFR 141. Maximum Contaminant Levels and Maximum Contaminant Level Goals.
[d]Existing New Jersey Ground Water Quality Standards NJAC 7:9-6.
[e]Proposed New Jersey Ground Water Quality Standards. Bureau of Water Supply Planning. January 1992. Class IIA.

— Value not available.

■ Standards have been exceeded

TABLE 3
Comparison of Test Pit Results to Proposed NJDEPE Standards and EPA Risk-Based Standards

Station ID	Compound	Highest Detected Concentration	NJDEPE Proposed Soil Cleanup Standard (Residential Subsurface Soil)	EPA Risk-Based Standard[a]
VOLATILE ORGANICS				
TP-000X	1,2-Dichloroethane	30.00 ppb	6,000 ppb (1,000 ppb)	7,000 ppb
TP-002	1,1,2,2-Tetrachloroethane	56.00 ppb	1,000 ppb	2,145 ppb
TP-000X	1,1,2-Trichloroethane	4,400.00 ppb	1,000 ppb	11,100 ppb
TP-000YD	Acetone[b]	8,600.00 ppb	1,000,000 ppb (50,000 ppb)	26,988,000 ppb
TP-000X	Chloroform	15.00 ppb	19,000 ppb (1,000 ppb)	105,000 ppb
TP-000X	Tetrachloroethene	47,000.00 ppb	1,000 ppb	12,210 ppb
TP-000X	Carbon tetrachloride	2.00 ppb	2,000 ppb (1,000 ppb)	4,920 ppb
TP-000X	Trichloroethene	1,900.00 ppb	—	55,500 ppb
TP-000X	1,2-Dichloroethene (total)	55.00 ppb	79,000 ppb (50,000 ppb)	4,050,000 ppb
TP-000X	Toluene	63.00 ppb	1,000,000 ppb (500,000 ppb)	553,600,000 ppb
SEMIVOLATILE ORGANICS				
TP-001	1,2-Dichlorobenzene[c]	240.00 ppb	5,100,000 ppb	24,220,000 ppb
TP-000O	Benzoic acid[b]	6,700.00 ppb	— (—)	—
TP-000G	Bis(2-ethylhexyl)phthalate	490.00 ppb	100,000 ppb	44,400 ppb
TP-000A	Fluoranthene	170.00 ppb	500,000 ppb	10,726,000 ppb
TP-000O	Pentachlorophenol[b]	2,100,000.00 ppb	1,700,000 ppb (100,000) ppb	5,180 ppb
TP-000A	Phenanthrene	190.00 ppb	—	—
TP-000O	Phenol[b]	99.00 ppb	10,000,000 ppb	162,620,000 ppb
TP-000A	Pyrene	130.00 ppb	500,000 ppb	12,456 ppb
PESTICIDES/PCBs				
TP-000O	4,4'-DDT[b]	43.0 ppb	2,000 ppb (100,000 ppb)	1,850 ppb
TP-001	Heptachlor[c]	24.0 ppb	150 ppb	140.6 ppb
TP-001	Heptachlor epoxide[c]	11.0 ppb	—	—
DIOXINS/FURANS				
TP-000O	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	138.179 ppb	—	—
TP-000O	1,2,3,4,6,7,8-Heptachlorodibenzofuran	63.400 ppb	—	—
TP-000O	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.400 ppb	—	—
TP-000K	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.558 ppb	—	—
TP-000YD	1,2,3,4,7,8-Hexachlorodibenzofuran	1.359 ppb	—	—

TABLE 3

Comparison of Test Pit Results to Proposed NJDEPE Standards and EPA Risk-Based Standards

Station ID	Compound	Highest Detected Concentration	NJDEPE Proposed Soil Cleanup Standard (Residential Subsurface Soil)	EPA Risk-Based Standard[a]
TP-000Y	Sodium[b]	3,890.00 ppm	— (—)	—
TP-002	Vanadium	742.00 ppm	—	1,903 ppm
TP-002	Zinc	306.00 ppm	—	55,360 ppm

[a]OSWER Directive 9285.7-01B, Human Health Evaluation Part B: Development of Risk-Based Preliminary Remediation Goals, December 13, 1991.

[b]These pit samples were obtained at a depth of 1-3 feet. The NJDEPE proposed surface soil cleanup standards are applicable from a depth of 0-2 feet, whereas the subsurface soil standards are applicable from a depth of 2-4 feet. Due to the depth range of 1-3 feet, which overlaps depth ranges, both the surface and subsurface standards are presented. The subsurface standards are in parentheses.

[c]The test pit was sampled at a depth between 0 and 2 feet and the existing surface soil standards were provided in these instances.

[d]Although test pit results are for total chromium, an exceedance is shown to be conservative. There are no results for the individual chromium species chromium VI and chromium III.

Note: "—" = Standard does not exist for this compound

= Standards have been exceeded

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Table 4
Comparison of Surface Soil Results to Proposed NJDEPE Standards and EPA Risk-Based Standards

Station ID	Compound	Highest Detected Concentration	NJDEPE Proposed Soil Cleanup Standard (Residential Surface Soil)	EPA Risk-Based Standard[a]
VOLATILE ORGANICS				
SS-061	Benzene	2.0 ppb	3,000 ppb	27,000 ppb
SS-061	Chlorobenzene	3.0 ppb	37,000 ppb	5,536,000 ppb
SS-061	Styrene	2.0 ppb	23,000 ppb	21,090 ppb
SS-032	Tetrachloroethene	100.0 ppb	9,000 ppb	12,210 ppb
SS-061	Toluene	2.0 ppb	1,000,000 ppb	553,600,000 ppb
SS-059	Trichloroethene	67.0 ppb	—	55,500 ppb
SS-061	Xylenes (Total)	5.0 ppb	360,000 ppb	553,600,000 ppb
SEMIVOLATILE ORGANICS				
SS-008	4-Methylphenol	41.0 ppb	—	—
SS-054	Anthracene	80.0 ppb	10,000,000 ppb	79,580,000 ppb
SS-052	Benzo(a)anthracene	290.0 ppb	660 ppb	740 ppb
SS-052	Benzo(a)pyrene	200.0 ppb	660 ppb	107.3 ppb
SS-052	Benzo(b)fluoranthene	260.0 ppb	660 ppb	777 ppb
SS-052	Benzo(ghi)perylene	160.0 ppb	660 ppb	4,810 ppb
SS-052	Benzo(k)fluoranthene	310.0 ppb	660 ppb	1,628 ppb
SS-005	Benzoic acid	240.0 ppb	—	—
SS-060	Bis(2-ethylhexyl)phthalate	3,800.0 ppb	49,000 ppb	44,400 ppb
SS-052	Chrysene	330.0 ppb	660 ppb	24,790 ppb
SS-054	Di-n-butyl phthalate	1,000.0 ppb	5,700,000 ppb	26,988,000 ppb
SS-059	Diethyl phthalate	300.0 ppb	10,000,000 ppb	217,980,000 ppb
SS-052	Fluoranthene	830.0 ppb	2,300,000 ppb	10,726,000 ppb
SS-052	Indeno(1,2,3-cd)pyrene	160.0 ppb	660 ppb	481 ppb
SS-002	Pentachlorophenol	210.0 ppb	1,700,000 ppb	5,180 ppb
SS-054	Phenanthrene	640.0 ppb	—	—
SS-052	Pyrene	690.0 ppb	1,700,000 ppb	12,456 ppb
PESTICIDES/PCBs				
SS-006	Dieldrin	170.0 ppb	42 ppb	40.7 ppb
SS-008	Endosulfan I	13.0 ppb	3,000 ppb	13,494 ppb
DIOXINS/FURANS				
SS-006	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1.100 ppb	—	—
SS-006	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.110 ppb	—	—

Table 4
Comparison of Surface Soil Results to Proposed NJDEPE Standards and EPA Risk-Based Standards

Station ID	Compound	Highest Detected Concentration	NJDEPE Proposed Soil Cleanup Standard (Residential Surface Soil)	EPA Risk-Based Standard[a]
SS-006	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.030 ppb	—	—
SS-006	1,2,3,4,7,8-Hexachlorodibenzofuran	0.040 ppb	—	—
SS-006	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.050 ppb	—	—
SS-049	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.100 ppb	—	—
SS-041B	Octachlorodibenzo-p-dioxin	25.200 ppb	—	—
SS-006	Octachlorodibenzofuran	0.720 ppb	—	—
SS-049	Tetrachlorodibenzo-p-dioxin (ITEF)	0.107 ppb	—	—
SS-006	Total-Heptachlorodibenzo-p-dioxin	1.600 ppb	—	—
SS-006	Total-Heptachlorodibenzofuran	0.510 ppb	—	—
SS-052	Total-Hexachlorodibenzo-p-dioxin	0.090 ppb	—	—
SS-006	Total-Hexachlorodibenzofuran	0.190 ppb	—	—
SS-054	Total-Pentachlorodibenzofuran	0.090 ppb	—	—
SS-045	Total-Tetrachlorodibenzo-p-dioxin	0.130 ppb	—	—
SS-043	Total-Tetrachlorodibenzofuran	0.040 ppb	—	—
INORGANICS				
SS-063	Aluminum	23,300.00 ppm	—	—
SS-063	Antimony	7.00 ppm	14 ppm	107.26 ppm
SS-063	Arsenic	12.40 ppm	20 ppm	0.3589 ppm
SS-040	Barium	397.00 ppm	600 ppm	19,030 ppm
SS-049	Beryllium	1.50 ppm	2 ppm	0.148 ppm
SS-002	Calcium	3,130.00 ppm	—	—
SS-063	Chromium	28.50 ppm	—	1,350 ppm (VI) 270,000 ppm (III)
SS-039	Cobalt	37.60 ppm	—	—
SS-059	Copper	193.00 ppm	600 ppm	10,034 ppm
SS-032	Cyanide	3.40 ppm	280 ppm	5,500 ppm
SS-058	Iron	48,200.00 ppm	—	—
SS-053	Lead	131.00 ppm	100 ppm	500 ppm
SS-063	Magnesium	3,220.00 ppm	—	—
SS-058	Manganese	1,270.00 ppm	—	—
SS-032	Mercury	0.62 ppm	14 ppm	79.58 ppm
SS-039	Nickel	21.90 ppm	250 ppm	592 ppm

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Table 4
Comparison of Surface Soil Results to Proposed NJDEPE Standards and EPA Risk-Based Standards

Station ID	Compound	Highest Detected Concentration	NJDEPE Proposed Soil Cleanup Standard (Residential Surface Soil)	EPA Risk-Based Standard[a]
SS-063	Potassium	946.00 ppm	—	—
SS-050	Selenium	3.20 ppm	63 ppm	1,349.4 ppm
SS-032	Silver	15.50 ppm	40 ppm	1,349.4 ppm
SS-002	Sodium	362.00 ppm	—	—
SS-029	Thallium	0.46 ppm	2 ppm	19.03 ppm
SS-053	Vanadium	193.00 ppm	380 ppm	1,903 ppm
SS-051	Zinc	210.00 ppm	1,500 ppm	55,360 ppm

[a]OSWER Directive 9285.7-01B, Human Health Evaluation Part B: Development of Risk-Based Preliminary Remediation Goals, December 13, 1991.

Note: "—" = Standard does not exist for this compound

= Standards have been exceeded

TABLE 5
Comparison of Soil Boring Results to Proposed NJDEPE Standards

Station ID	Compound	Highest Detected Concentration	NJDEPE Proposed Soil Cleanup Standard (Subsurface Soil)
VOLATILE ORGANICS			
SB-013	1,1,2-Trichloroethane	74.00 ppb	1,000 ppb
SB-006	1,2-Dichloroethane	0.50 ppb	1,000 ppb
SB-012	2-Butanone	2.00 ppb	50,000 ppb
SB-012	Acetone	49.00 ppb	50,000 ppb
SB-006	Benzene	69.00 ppb	1,000 ppb
SB-006	Chloroform	210.00 ppb	1,000 ppb
SB-004	Methylene chloride	9.00 ppb	10,000 ppb
SB-011	Tetrachloroethene	1,100.00 ppb	1,000 ppb
SB-005	Trichloroethene	4.00 ppb	—
SEMIVOLATILE ORGANICS			
SB-001	Benzyl butyl phthalate	1,100.00 ppb	100,000 ppb
SB-003	Bis(2-ethylhexyl)phthalate	1,400.00 ppb	100,000 ppb
PESTICIDES/PCBs			
SB-013	Aroclor-1260 (PCB)	5.20 ppb	100,000 ppb
DIOXINS/FURANS			
SB-003	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.230 ppb	—
SB-001	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.009 ppb	—
SB-001	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.008 ppb	—
SB-013	1,2,3,4,7,8-Hexachlorodibenzofuran	0.030 ppb	—
SB-013	1,2,3,6,7,8-Hexachlorodibenzofuran	0.030 ppb	—
SB-001	1,2,3,7,8,9-Hexachlorodibenzofuran	0.003 ppb	—
SB-001	1,2,3,7,8-Pentachlorodibenzofuran	0.005 ppb	—
SB-013	2,3,4,6,7,8-Hexachlorodibenzofuran	0.020 ppb	—
SB-013	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.030 ppb	—
SB-013	2,3,7,8-Tetrachlorodibenzofuran	0.020 ppb	—

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TABLE 5
Comparison of Soil Boring Results to Proposed NJDEPE Standards

Station ID	Compound	Highest Detected Concentration	NJDEPE Proposed Soil Cleanup Standard (Subsurface Soil)
SB-003	Octachlorodibenzo-p-dioxin	76.00 ppb	—
SB-001	Octachlorodibenzofuran	0.009 ppb	—
SB-003	Total-Heptachlorodibenzo-p-dioxin	0.480 ppb	—
SB-001	Total-Heptachlorodibenzofuran	0.010 ppb	—
SB-006	Total-Hexachlorodibenzo-p-dioxin	0.070 ppb	—
SB-013	Total-Hexachlorodibenzofuran	0.080 ppb	—
SB-006	Total-Pentachlorodibenzofuran	0.006 ppb	—
SB-006	Total-Tetrachlorodibenzo-p-dioxin	0.550 ppb	—
SB-006	Total-Tetrachlorodibenzofuran	0.030 ppb	—
METALS			
SB-003	Aluminum	54,100.00 ppm	—
SB-008	Antimony	12.70 ppm	—
SB-006	Arsenic	21.10 ppm	—
SB-002	Barium	298.00 ppm	—
SB-008	Beryllium	11.60 ppm	—
SB-004	Cadmium	1.30 ppm	—
SB-006	Calcium	9,680.00 ppm	—
SB-001	Chromium	21.80 ppm	—
SB-013	Cobalt	97.00 ppm	—
SB-006	Copper	1,830.00 ppm	—
SB-013D	Iron	136,000.00 ppm	—
SB-010	Lead	17.10 ppm	—
SB-013	Magnesium	8,490.00 ppm	—
SB-004	Manganese	922.00 ppm	—
SB-004	Mercury	0.10 ppm	—
SB-002	Nickel	47.40 ppm	—

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TABLE 5
Comparison of Soil Boring Results to Proposed NJDEPE Standards

Station ID	Compound	Highest Detected Concentration	NJDEPE Proposed Soil Cleanup Standard (Subsurface Soil)
SB-009	Potassium	2,760.00 ppm	—
SB-001	Selenium	0.48 ppm	—
SB-003	Silver	18.40 ppm	—
SB-002	Sodium	257.00 ppm	—
SB-011	Thallium	0.91 ppm	—
SB-003	Vanadium	551.00 ppm	—
SB-013	Zinc	251.00 ppm	—

Note: "—" = Standard does not exist for this compound

= Standards have been exceeded

TABLE 6
Comparison of Sediment Sample Results to Proposed NJDEPE Standards and EPA Risk-Based Standards

Station ID	Compound	Highest Detected Concentration	NJDEPE Proposed Soil Cleanup Standard (Residential Surface Soil)	EPA Risk-Based Standard*
SD-008	Total-Heptachlorodibenzo-p-dioxin	2.100 ppb	—	—
SD-008	Total-Hexachlorodibenzo-p-dioxin	0.180 ppb	—	—
SD-008	Total-Pentachlorodibenzo-p-dioxin	0.060 ppb	—	—
SD-006	Total-Tetrachlorodibenzo-p-dioxin	0.080 ppb	—	—
INORGANICS				
SD-003	Aluminum*	24,700.000 ppm	—	—
SD-003	Antimony*	11.80 ppm	14 ppm	107.26 ppm
SD-004	Arsenic	5.70 ppm	20 ppm	0.3569 ppm
SD-003	Barium*	129.00 ppm	500 ppm	19,030 ppm
SD-006	Beryllium	2.00 ppm	2 ppm	0.146 ppm
SD-006	Calcium	4,280.00 ppm	—	—
SD-002	Chromium*	14.70 ppm	—	—
SD-006	Cobalt	46.90 ppm	—	—
SD-003	Copper*	163.00 ppm	600 ppm	10.034 ppm
SD-003	Iron*	67,600.00 ppm	—	—
SD-004	Lead	74.50 ppm	100 ppm	500 ppm
SD-001	Magnesium*	1,330.00 ppm	—	—
SD-008	Manganese	518.00 ppm	—	—
SD-004	Mercury	0.22 ppm	14 ppm	79.58 ppm
SD-003	Nickel*	16.50 ppm	250 ppm	592 ppm
SD-004	Potassium	810.00 ppm	—	—
SD-006	Selenium	1.60 ppm	60 ppm	1,349.4 ppm
SD-002	Sodium*	137.00 ppm	—	—
SD-003	Vanadium*	224.00 ppm	380 ppm	1,903 ppm
SD-004	Zinc	94.70 ppm	1,500 ppm	55,360 ppm

*OSWER Directive 9285.7-01B, Human Health Evaluation Part B: Development of Risk-Based Preliminary Remediation Goals, December 13, 1991.

Note: "—" = Standard does not exist for this compound

= Standards have been exceeded

* * * = Sediment sample taken from pond

TABLE 6
Comparison of Sediment Sample Results to Proposed NJDEPE Standards and EPA Risk-Based Standards

Station ID	Compound	Highest Detected Concentration	NJDEPE Proposed Soil Cleanup Standard (Residential Surface Soil)	EPA Risk-Based Standard*
VOLATILE ORGANICS				
SD-002	2-Butanone*	13.00 ppb	1,000,000 ppb	13,494,000 ppb
SD-006	Chloromethane	4.00 ppb	520,000 ppb	48,100 ppb
SD-006	Toluene	3.00 ppb	1,000,000 ppb	553,600,000 ppb
SEMIVOLATILE ORGANICS				
SD-004	2-Methylnaphthalene	80.00 ppb	—	—
SD-004	4-Methylphenol	660.00 ppb	—	—
SD-004	Acenaphthylene	37.00 ppb	3,400,000 ppb	16,500,000 ppb
SD-004	Anthracene	110.00 ppb	10,000,000 ppb	79,580,000 ppb
SD-004	Benzo(a)anthracene	580.00 ppb	660 ppb	740 ppb
SD-004	Benzo(a)pyrene	500.00 ppb	660 ppb	107.3 ppb
SD-004	Benzo(b)fluoranthene	830.00 ppb	660 ppb	377 ppb
SD-004	Benzo(ghi)perylene	320.00 ppb	660 ppb	4,810 ppb
SD-004	Benzo(k)fluoranthene	430.00 ppb	660 ppb	1,628 ppb
SD-003	Benzoic acid*	230.00 ppb	—	—
SD-004	Bis(2-ethylhexyl)phthalate	540.00 ppb	49,000 ppb	44,400 ppb
SD-004	Chrysene	750.00 ppb	660 ppb	24,790 ppb
SD-003	Di-n-butyl-phthalate*	25.00 ppb	5,700,000 ppb	26,988,000 ppb
SD-004	Dibenzofuran	84.00 ppb	—	—
SD-008	Diethyl phthalate	140.00 ppb	10,000,000 ppb	217,980,000 ppb
SD-004	Fluoranthene	900.00 ppb	2,300,000 ppb	10,726,000 ppb
SD-004	Indeno(1,2,3-CD)pyrene	390.00 ppb	660 ppb	481 ppb
SD-004	Naphthalene	79.00 ppb	230,000 ppb	11,000,000 ppb
SD-004	Phenanthrene	440.00 ppb	—	—
SD-004	Pyrene	950.00 ppb	1,700,000 ppb	12,456 ppb
DIOXINS/FURANS				
SD-008	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.740 ppb	—	—
SD-008	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.120 ppb	—	—
SD-008	Octachlorodibenzo-p-dioxin	107.000 ppb	—	—
SD-008	Total-Heptachlorodibenzo-p-dioxin	2.100 ppb	—	—

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TABLE 7

CHEMICALS OF POTENTIAL CONCERN: FINAL SELECTION LIST

HIGGINS FARM

CHEMICAL	GROUND WATER	SURFACE SOIL	SURFACE WATER	SEDIMENT
VOLATILES				
Benzene	X	●	ND	ND
Chlorobenzene	X	●	ND	ND
Chloroform	X	ND	ND	ND
1,2-Dichlorobenzene	X	ND	ND	ND
1,1-Dichloroethane	X	ND	ND	ND
1,2-Dichloroethane	X	ND	ND	ND
1,1-Dichloroethene	X	ND	ND	ND
1,2-Dichloroethene	X	ND	ND	ND
Isopropylbenzene	X	ND	ND	ND
1,1,2,2-Tetrachloroethane	X	ND	ND	ND
Tetrachloroethene	X	●	ND	ND
1,2,4-Trichlorobenzene	X	ND	ND	ND
1,1,2-Trichloroethane	X	ND	ND	ND
Trichloroethene	X	●	ND	ND
Vinyl Chloride	X	ND	ND	ND
Xylenes (total)	X	●	ND	ND
SEMI-VOLATILES				
Bis(2-chloroethyl)ether	X	ND	ND	ND
Bis(2-ethylhexyl)phthalate	●	X	●	X
Di-n-butylphthalate	●	X	●	X
Diethylphthalate	●	X	●	X
DIOXINS/FURANS				
PCDD/PCDFs	NA	X	NA	X
INORGANICS				
Arsenic	ND	X	ND	X
Beryllium	ND	X	ND	X

TABLE 7

CHEMICALS OF POTENTIAL CONCERN: FINAL SELECTION LIST

HIGGINS FARM

CHEMICAL	GROUND WATER	SURFACE SOIL	SURFACE WATER	SEDIMENT
Lead	•	X	•	X
Mercury	ND	X	ND	X

Notes:

X = selected as a chemical of potential concern.
ND = Not Detected.
• = Detected, but not selected as a chemical of potential concern.
NA = Not Analyzed.

TABLE 8

SUMMARY OF COMPLETE EXPOSURE PATHWAYS

HIGGINS FARM

Potentially Exposed Population	Exposure Route, Medium and Exposure Point	Pathway Selected for Evaluation?	Reason for Selection or Exclusion
Current Land Use			
Residents	Ingestion of and dermal contact with chemicals of potential concern in soil.	Yes	Contaminated soil is in an area potentially used by residents.
Residents	Ingestion of, dermal contact with, and inhalation of chemicals of potential concern in ground water.	Yes	Residents use ground water for drinking, bathing, cleaning and other home uses.
Workers	Ingestion of and dermal contact with chemicals of potential concern in soil.	Yes	Contaminated soil is in an area potentially used by workers.
Trespassers	Ingestion of and dermal contact with chemicals of potential concern in soil.	Yes	Contaminated soil may be encountered by trespassers.
Trespassers	Dermal contact with chemicals of potential concern in sediment.	Yes	Contaminated sediment may be encountered by trespassers.
Trespassers	Ingestion of and dermal contact with chemicals of potential concern in surface water.	No	No chemicals of potential concern have been identified in surface water.

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TABLE 9

SUMMARY OF COMPLETE EXPOSURE PATHWAYS

HIGGINS FARM

Potentially Exposed Population	Exposure Route, Medium and Exposure Point	Pathway Selected for Evaluation?	Reason for Selection or Exclusion
Future Land Use			
Residents	Ingestion of and dermal contact with chemicals of potential concern in soil.	No	While the site could be developed in the future as a residential area, the estimated exposures would be unlikely to exceed those estimated in the current use scenario.
Residents	Dermal contact with chemicals of potential concern in sediment.	Yes	A resident my have opportunity to contact sediment during recreational activities for a longer duration than a trespasser if the site were developed in the future as a residential area.
Consumers	Ingestion of farm products and produce.	No	While its plausible that the site could be developed in the future for livestock and/or agricultural product production, it is unlikely that such development would occur.

TABLE 10

SUMMARY OF CHRONIC NONCARCINOGENIC HAZARD INDEX ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	RfD Adjusted for Absorption	RfD* (mg/kg-day)	Hazard Quotient	Pathway Hazard Index
CURRENT LAND USE						
ADOLESCENT TRESPASSERS: Ingestion of and dermal contact with chemicals in soil						
Ingestion	bis(2-ethylhexyl)phthalate	6.88E-08	NO	2.00E-02	3.44E-06	
	diethylphthalate	4.04E-08	—	—	—	
	di-n-butylphthalate	3.80E-08	NO	1.00E+00	3.80E-08	
	PCDDs/PCDFs	4.75E-12	—	—	—	
	arsenic	1.12E-06	NO	3.00E-04	3.73E-03	
	beryllium	3.32E-07	NO	5.00E-03	6.64E-05	
	lead	4.92E-06	—	—	—	
	mercury	1.80E-08	NO	3.00E-04	6.00E-05	3.86E-03
Dermal contact	bis(2-ethylhexyl)phthalate	4.11E-07	YES	2.00E-02	2.06E-05	
	diethylphthalate	2.41E-07	—	—	—	
	di-n-butylphthalate	2.27E-07	YES	1.00E+00	2.27E-07	
	PCDDs/PCDFs	2.84E-11	—	—	—	
	arsenic	1.33E-06	YES	2.40E-04	5.54E-03	
	beryllium	3.97E-07	YES	5.00E-05	7.94E-03	
	lead	5.96E-06	—	—	—	
	mercury	2.16E-08	YES	6.00E-06	3.60E-03	1.71E-02
ADOLESCENT TRESPASSERS: Dermal contact with chemicals in sediment						
	bis(2-ethylhexyl)phthalate	5.32E-07	YES	2.00E-02	2.66E-05	
	diethylphthalate	1.99E-07	—	—	—	
	di-n-butylphthalate	3.55E-08	YES	1.00E+00	3.55E-08	
	PCDDs/PCDFs	1.84E-10	—	—	—	
	arsenic	1.55E-06	YES	2.40E-04	6.46E-03	
	beryllium	5.19E-07	YES	5.00E-05	1.04E-02	
	lead	2.11E-05	—	—	—	
	mercury	6.24E-08	YES	6.00E-06	1.04E-02	2.73E-02
TOTAL EXPOSURE HAZARD INDEX FOR ADOLESCENT TRESPASSERS						4.82E-02

NOTE: *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

Where ABS = 1.0 for organic chemicals (default value)
0.5 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

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TABLE 10

SUMMARY OF CHRONIC NONCARCINOGENIC HAZARD INDEX ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	RfD Adjusted for Absorption	RfD* (mg/kg-day)	Hazard Quotient	Pathway Hazard Index
CURRENT LAND USE						
RESIDENT ADULTS: Ingestion of and dermal contact with chemicals in soil						
Ingestion	bis(2-ethylhexyl)phthalate	4.79E-07	NO	2.00E-02	2.40E-05	
	di-n-butylphthalate	4.11E-07	NO	1.00E+00	4.11E-07	
	PCDDs/PCDFs	5.48E-11	—	—	—	
	arsenic	6.58E-06	NO	3.00E-04	2.19E-02	
	beryllium	1.51E-06	NO	5.00E-03	3.02E-04	
	lead	1.64E-04	—	—	—	
	mercury	5.21E-07	NO	3.00E-04	1.74E-03	2.40E-02
Dermal contact	bis(2-ethylhexyl)phthalate	2.85E-07	YES	2.00E-02	1.43E-05	
	di-n-butylphthalate	2.44E-07	YES	1.00E+00	2.44E-07	
	PCDDs/PCDFs	3.26E-11	—	—	—	
	arsenic	7.82E-07	YES	2.40E-04	3.26E-03	
	beryllium	1.79E-07	YES	5.00E-05	3.58E-03	
	lead	1.05E-05	—	—	—	
	mercury	6.19E-08	YES	6.00E-06	1.03E-02	1.72E-02
RESIDENT ADULTS: Ingestion, dermal contact and inhalation of chemicals in ground water						
Ingestion	bis(2-chloroethyl)ether	5.71E-05	—	—	—	
	benzene	3.43E-02	—	—	—	
	chlorobenzene	3.14E-02	NO	2.00E-02	1.57E+00	
	chloroform	2.84E-04	NO	1.00E-02	2.84E-02	
	1,2-dichlorobenzene	1.08E-03	NO	9.00E-02	1.20E-02	
	1,1-dichloroethane	4.43E-05	NO	1.00E-01	4.43E-04	
	1,2-dichloroethane	4.60E-03	—	—	—	
	1,1-dichloroethene	1.25E-04	NO	9.00E-03	1.39E-02	
	1,2-dichloroethene	1.88E-03	NO	2.00E-02	9.40E-02	
	isopropyl benzene	4.29E-05	NO	4.00E-02	1.07E-03	
	1,1,2,2-tetrachloroethane	4.23E-05	—	—	—	
	tetrachloroethene	7.71E-03	NO	1.00E-02	7.71E-01	
	1,2,4-trichlorobenzene	4.86E-05	NO	1.30E-03	3.74E-02	
	1,1,2-trichloroethane	3.14E-02	NO	4.00E-03	7.85E+00	
	trichloroethene	6.29E-03	—	—	—	
	vinyl chloride	4.29E-04	—	—	—	
	xylenes (total)	1.08E-04	NO	2.00E+00	5.40E-05	1.04E+01

NOTE: *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

Where ABS = 1.0 for organic chemicals (default value)
0.8 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

TABLE 10

SUMMARY OF CHRONIC NONCARCINOGENIC HAZARD INDEX ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	RfD Adjusted for Absorption	RfD* (mg/kg-day)	Hazard Quotient	Pathway Hazard Index
Dermal contact	bis(2-chloroethyl)ether	2.00E-06	—	—	—	
	benzene	4.46E-03	—	—	—	
	chlorobenzene	2.00E-02	YES	2.00E-02	1.00E+00	
	chloroform	2.44E-05	YES	1.00E-02	2.44E-03	
	1,2-dichlorobenzene	9.94E-05	YES	9.00E-02	1.10E-03	
	1,1-dichloroethane	2.51E-06	YES	1.00E-01	2.51E-05	
	1,2-dichloroethane	4.23E-03	—	—	—	
	1,1-dichloroethene	1.55E-05	YES	9.00E-03	1.72E-03	
	1,2-dichloroethene	5.22E-05	YES	2.00E-02	2.61E-03	
	isopropyl benzene	3.94E-05	YES	4.00E-02	9.85E-04	
	1,1,2,2-tetrachloroethane	9.55E-08	—	—	—	
	tetrachloroethene	5.39E-05	YES	1.00E-02	5.39E-03	
	1,2,4-trichlorobenzene	3.24E-06	YES	1.30E-03	2.49E-03	
	1,1,2-trichloroethane	7.61E-03	YES	4.00E-03	1.90E+00	
	trichloroethene	1.52E-03	—	—	—	
	vinyl chloride	9.03E-06	—	—	—	
	xylenes (total)	9.94E-05	YES	2.00E+00	4.97E-05	2.92E+00
Inhalation	bis(2-chloroethyl)ether	2.29E-05	—	—	—	
	benzene	1.37E-02	—	—	—	
	chlorobenzene	1.26E-02	NO	5.00E-03	2.52E+00	
	chloroform	1.14E-04	—	—	—	
	1,2-dichlorobenzene	4.32E-04	NO	4.00E-02	1.08E-02	
	1,1-dichloroethane	1.77E-05	NO	1.00E-01	1.77E-04	
	1,2-dichloroethane	1.84E-03	—	—	—	
	1,1-dichloroethene	5.01E-05	—	—	—	
	1,2-dichloroethene	7.51E-04	—	—	—	
	isopropyl benzene	1.71E-05	—	—	—	
	1,1,2,2-tetrachloroethane	1.69E-05	—	—	—	
	tetrachloroethene	3.09E-03	—	—	—	
	1,2,4-trichlorobenzene	1.94E-05	NO	3.00E-03	6.47E-03	
	1,1,2-trichloroethane	1.26E-02	—	—	—	
	trichloroethene	2.51E-03	—	—	—	
	vinyl chloride	1.71E-04	—	—	—	
	xylenes (total)	4.32E-05	NO	8.60E-02	5.02E-04	2.54E+00
TOTAL EXPOSURE HAZARD INDEX FOR RESIDENT ADULTS						1.59E+01

NOTE: *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

Where ABS = 1.0 for organic chemicals (default value)
0.8 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

TABLE 10

SUMMARY OF CHRONIC NONCARCINOGENIC HAZARD INDEX ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	RfD Adjusted for Absorption	RfD* (mg/kg-day)	Hazard Quotient	Pathway Hazard Index
CURRENT LAND USE						
RESIDENT CHILDREN: Ingestion of and dermal contact with chemicals in soil						
Ingestion	bis(2-ethylhexyl)phthalate	4.54E-06	NO	2.00E-02	2.27E-04	
	di-n-butylphthalate	3.89E-06	NO	1.00E+00	3.89E-06	
	PCDDs/PCDFs	5.18E-10	—	—	—	
	arsenic	6.22E-05	NO	3.00E-04	2.07E-01	
	beryllium	1.43E-05	NO	5.00E-03	2.86E-03	
	lead	1.55E-03	—	—	—	
	mercury	4.92E-06	NO	3.00E-04	1.64E-02	2.27E-01
Dermal contact	bis(2-ethylhexyl)phthalate	5.24E-06	YES	2.00E-02	2.62E-04	
	di-n-butylphthalate	4.50E-06	YES	1.00E+00	4.50E-06	
	PCDDs/PCDFs	5.99E-10	—	—	—	
	arsenic	1.44E-05	YES	2.40E-04	6.00E-02	
	beryllium	3.30E-06	YES	5.00E-05	6.60E-02	
	lead	3.60E-04	—	—	—	
	mercury	1.14E-06	YES	6.00E-06	1.90E-01	3.16E-01
RESIDENT CHILDREN: Ingestion, dermal contact and inhalation of chemicals in ground water						
Ingestion	bis(2-chloroethyl)ether	1.35E-04	—	—	—	
	benzene	8.11E-02	—	—	—	
	chlorobenzene	7.43E-02	NO	2.00E-02	3.72E+00	
	chloroform	6.72E-04	NO	1.00E-02	6.72E-02	
	1,2-dichlorobenzene	2.55E-03	NO	9.00E-02	2.83E-02	
	1,1-dichloroethane	1.05E-04	NO	1.00E-01	1.05E-03	
	1,2-dichloroethane	1.09E-03	—	—	—	
	1,1-dichloroethene	2.96E-04	NO	9.00E-03	3.29E-02	
	1,2-dichloroethene	4.44E-03	NO	2.00E-02	2.22E-01	
	isopropyl benzene	1.01E-04	NO	4.00E-02	2.53E-03	
	1,1,2,2-tetrachloroethane	1.00E-04	—	—	—	
	tetrachloroethene	1.82E-02	NO	1.00E-02	1.82E+00	
	1,2,4-trichlorobenzene	1.15E-04	NO	1.30E-03	8.85E-02	
	1,1,2-trichloroethane	7.43E-02	NO	4.00E-03	1.86E+01	
	trichloroethene	1.49E-02	—	—	—	
	vinyl chloride	1.01E-03	—	—	—	
	xylenes (total)	2.55E-04	NO	2.00E+00	1.28E-04	2.46E+01

NOTE. *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

When ABS = 1.0 for organic chemicals (default value)
0.8 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1992)
0.02 for mercury (ATSDR, 1989)

TABLE 10

SUMMARY OF CHRONIC NONCARCINOGENIC HAZARD INDEX ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	RfD Adjusted for Absorption	RfD* (mg/kg-day)	Hazard Quotient	Pathway Hazard Index
Dermal contact	bis(2-chloroethyl)ether	3.56E-06	—	—	—	
	benzene	7.94E-03	—	—	—	
	chlorobenzene	3.57E-02	YES	2.00E-02	1.79E+00	
	chloroform	4.35E-05	YES	1.00E-02	2.18E-03	
	1,2-dichlorobenzene	1.77E-04	YES	9.00E-02	1.97E-03	
	1,1-dichloroethane	4.48E-06	YES	1.00E-01	4.48E-05	
	1,2-dichloroethane	7.54E-03	—	—	—	
	1,1-dichloroethene	2.77E-05	YES	9.00E-03	3.08E-03	
	1,2-dichloroethene	9.30E-05	YES	2.00E-02	4.65E-03	
	isopropyl benzene	7.03E-05	YES	4.00E-02	1.76E-03	
	1,1,2,2-tetrachloroethane	1.07E-07	—	—	—	
	tetrachloroethene	9.60E-05	YES	1.00E-02	9.60E-03	
	1,2,4-trichlorobenzene	5.77E-06	YES	1.30E-03	4.44E-03	
	1,1,2-trichloroethane	1.36E-02	YES	4.00E-03	3.40E+00	
	trichloroethene	2.71E-03	—	—	—	
	vinyl chloride	1.61E-05	—	—	—	
	xylenes (total)	1.77E-04	YES	2.00E+00	8.85E-05	5.21E+00
Inhalation	bis(2-chloroethyl)ether	1.44E-04	—	—	—	
	benzene	8.65E-02	—	—	—	
	chlorobenzene	7.93E-02	NO	5.00E-03	1.59E+01	
	chloroform	7.16E-04	—	—	—	
	1,2-dichlorobenzene	2.72E-03	NO	4.00E-02	6.80E-02	
	1,1-dichloroethane	1.12E-04	NO	1.00E-01	1.12E-03	
	1,2-dichloroethane	1.16E-02	—	—	—	
	1,1-dichloroethene	3.16E-04	—	—	—	
	1,2-dichloroethene	4.74E-03	—	—	—	
	isopropyl benzene	1.08E-04	—	—	—	
	1,1,2,2-tetrachloroethane	1.07E-04	—	—	—	
	tetrachloroethene	1.95E-02	—	—	—	
	1,2,4-trichlorobenzene	1.23E-04	NO	3.00E-03	4.10E-02	
	1,1,2-trichloroethane	7.93E-02	—	—	—	
	trichloroethene	1.59E-02	—	—	—	
	vinyl chloride	1.08E-03	—	—	—	
	xylenes (total)	2.72E-04	NO	8.60E-02	3.16E-03	1.60E+01
TOTAL EXPOSURE HAZARD INDEX FOR RESIDENT CHILDREN						4.63E+01

NOTE: *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

Where ABS = 1.0 for organic chemicals (default value)
0.8 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

TABLE 10

SUMMARY OF CHRONIC NONCARCINOGENIC HAZARD INDEX ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	RfD Adjusted for Absorption	RfD* (mg/kg-day)	Hazard Quotient	Pathway Hazard Index
CURRENT LAND USE						
ADULT WORKERS: Ingestion of and dermal contact with chemicals in soil						
Ingestion	bis(2-ethylhexyl)phthalate	2.84E-07	NO	2.00E-02	1.42E-05	
	diethylphthalate	1.66E-07	—	—	—	
	di-n-butylphthalate	1.57E-07	NO	1.00E+00	1.57E-07	
	PCDDs/PCDFs	1.96E-11	—	—	—	
	arsenic	4.60E-06	NO	3.00E-04	1.53E-02	
	beryllium	1.37E-06	NO	5.00E-03	2.74E-04	
	lead	2.05E-05	—	—	—	
	mercury	7.44E-08	NO	3.00E-04	2.48E-04	1.59E-02
Dermal contact	bis(2-ethylhexyl)phthalate	1.69E-07	YES	2.00E-02	8.45E-06	
	diethylphthalate	9.89E-07	—	—	—	
	di-n-butylphthalate	9.31E-08	YES	1.00E+00	9.31E-08	
	PCDDs/PCDFs	1.16E-11	—	—	—	
	arsenic	5.47E-07	YES	2.40E-04	2.28E-03	
	beryllium	1.63E-07	YES	5.00E-05	3.26E-03	
	lead	2.44E-06	—	—	—	
	mercury	8.84E-09	YES	6.00E-06	1.47E-03	7.02E-03
TOTAL EXPOSURE HAZARD INDEX FOR ADULT WORKERS						2.29E-02

NOTE: *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

Where ABS = 1.0 for organic chemicals (default value)
0.8 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

TABLE 10

SUMMARY OF CHRONIC NONCARCINOGENIC HAZARD INDEX ESTIMATES

HIGGINS FARM

Chemical	CDI (mg/kg-day)	RfD Adjusted for Absorption	RfD* (mg/kg-day)	Hazard Quotient	Pathway Hazard Index
FUTURE LAND USE					
RESIDENT ADOLESCENTS: Dermal contact with chemicals in sediment					
bis(2-ethylhexyl)phthalate	5.32E-07	YES	2.00E-02	2.66E-05	
di-n-butylphthalate	[illegible]08	YES	1.00E+00	3.55E-08	
PCDDs/PCDFs	1.84E-10	—	—	—	
arsenic	1.55E-06	YES	2.40E-04	6.46E-03	
beryllium	5.19E-07	YES	5.00E-05	1.04E-02	
lead	2.11E-05	—	—	—	
mercury	6.24E-08	YES	6.00E-06	1.04E-02	2.73E-02
TOTAL ADDITIONAL EXPOSURE HAZARD INDEX FOR RESIDENT ADOLESCENTS					2.73E-02

NOTE: *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

When ABS = 1.0 for organic chemicals (default value)
0.1 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

TABLE 11

SUMMARY OF CANCER RISK ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	CDI Adjusted for Absorption	SF* (mg/kg-day)-1	Chemical-specific Risk	Total Pathway Risk
CURRENT LAND USE						
RESIDENT ADULTS: Ingestion of and dermal contact with chemicals in soil						
Ingestion	bis(2-ethylhexyl)phthalate	2.05E-07	NO	1.40E-02	2.87E-09	
	PCDDs/PCDFs	2.35E-11	NO	1.50E-05	3.53E-06	
	arsenic	2.82E-06	NO	1.80E+00	5.08E-06	
	beryllium	6.46E-07	NO	4.30E+00	2.78E-06	1.14E-05
Dermal contact	bis(2-ethylhexyl)phthalate	1.22E-07	YES	1.40E-02	1.71E-09	
	PCDDs/PCDFs	1.40E-11	YES	1.50E+05	2.10E-06	
	arsenic	3.35E-07	YES	2.25E+00	7.54E-07	
	beryllium	7.68E-08	YES	4.30E-02	3.30E-05	3.59E-05
RESIDENT ADULTS: Ingestion, dermal contact and inhalation of chemicals in ground water						
Ingestion	benzene	1.47E-02	NO	2.90E-02	4.26E-04	
	bis(2-chloroethyl)ether	2.45E-05	NO	1.10E+00	2.70E-05	
	chloroform	1.22E-04	NO	6.10E-03	7.44E-07	
	1,1-dichloroethane	1.90E-05	—	—	—	
	1,2-dichloroethane	1.97E-03	NO	9.10E-02	1.79E-04	
	1,1-dichloroethene	5.36E-05	NO	6.00E-01	3.22E-05	
	1,1,2,2-tetrachloroethane	1.81E-05	NO	2.00E-01	3.62E-06	
	tetrachloroethene	3.31E-03	NO	5.10E-02	1.69E-04	
	1,1,2-trichloroethane	1.35E-02	NO	5.70E-02	7.70E-04	
	trichloroethene	2.69E-03	NO	1.10E-02	2.96E-05	
	vinyl chloride	1.84E-04	NO	1.90E+00	3.50E-04	1.99E-03

NOTE: *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

Where ABS = 1.0 for organic chemicals (default value)
0.8 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

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TABLE 11

SUMMARY OF CANCER RISK ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	CDI Adjusted for Absorption	SF* (mg/kg-day)-1	Chemical-specific Risk	Total Pathway Risk
Dermal contact	benzene	1.91E-03	YES	2.90E-02	5.54E-05	
	bis(2-chloroethyl)ether	[illegible].57E-07	YES	1.10E+00	9.43E-07	
	chloroform	1.05E-05	YES	6.10E-03	6.41E-08	
	1,1-dichloroethane	1.08E-06	—	—	—	
	1,2-dichloroethane	1.81E-03	YES	9.10E-02	1.65E-04	
	1,1-dichloroethene	6.66E-06	YES	6.00E-01	4.00E-06	
	1,1,2,2-tetrachloroethane	4.09E-08	YES	2.00E-01	8.18E-09	
	tetrachloroethene	2.31E-05	YES	5.10E-02	1.18E-06	
	1,1,2-trichloroethane	3.26E-03	YES	5.70E-02	1.86E-04	
	trichloroethene	6.52E-04	YES	1.10E-02	7.17E-06	
	vinyl chloride	3.87E-06	YES	1.90E+00	7.35E-06	4.27E-04
Inhalation	benzene	5.88E-03	NO	2.90E-02	1.71E-04	
	bis(2-chloroethyl)ether	9.80E-06	NO	1.15E+00	1.13E-05	
	chloroform	4.87E-05	NO	8.50E-02	4.14E-06	
	1,1-dichloroethane	7.59E-06	—	—	—	
	1,2-dichloroethane	7.89E-04	NO	9.10E-02	7.18E-05	
	1,1-dichloroethene	2.15E-05	NO	1.20E+00	2.58E-05	
	1,1,2,2-tetrachloroethane	7.25E-06	NO	2.00E-01	1.45E-06	
	tetrachloroethene	1.32E-03	NO	1.80E-03	2.38E-06	
	1,1,2-trichloroethane	5.39E-03	NO	5.70E-02	3.07E-04	
	trichloroethene	1.08E-03	NO	1.70E-02	1.84E-05	
	vinyl chloride	7.35E-05	NO	2.90E-01	2.13E-05	6.34E-04
TOTAL EXPOSURE RISK RESIDENT ADULTS						3.09E-03

NOTE: *-R/Ds for dermal exposure pathways are adjusted for absorption as follows:

R/D x ABS = AdjR/D

Where ABS = 1.0 for organic chemicals (default value)
0.8 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

TABLE 11

SUMMARY OF CANCER RISK ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	CDI Adjusted for Absorption	SF* (mg/kg-day)-1	Chemical-specific Risk	Total Pathway Risk
CURRENT LAND USE						
RESIDENT CHILDREN: Ingestion of and dermal contact with chemicals in soil						
Ingestion	bis(2-ethylhexyl)phthalate	4.54E-07	NO	1.40E-02	6.36E-09	
	PCDDs/PCDFs	5.18E-11	NO	1.50E+05	7.77E-06	
	arsenic	6.22E-06	NO	1.80E+00	1.12E-05	
	beryllium	1.43E-06	NO	4.30E+00	6.15E-06	2.51E-05
Dermal contact	bis(2-ethylhexyl)phthalate	5.24E-07	YES	1.40E-02	7.34E-09	
	PCDDs/PCDFs	5.99E-11	YES	1.50E+05	8.99E-06	
	arsenic	1.44E-06	YES	2.25E+00	3.24E-06	
	beryllium	3.30E-07	YES	4.30E+02	1.42E-04	1.54E-04
RESIDENT CHILDREN: Ingestion, dermal contact and inhalation of chemicals in ground water						
Ingestion	benzene	8.11E-03	NO	2.90E-02	2.35E-04	
	bis(2-chloroethyl)ether	1.35E-05	NO	1.10E+00	1.49E-05	
	chloroform	6.72E-05	NO	6.10E-03	4.10E-07	
	1,1-dichloroethane	1.05E-05	—	—	—	
	1,2-dichloroethane	1.09E-03	NO	9.10E-02	9.92E-05	
	1,1-dichloroethene	2.96E-05	NO	6.00E-01	1.78E-05	
	1,1,2,2-tetrachloroethane	1.00E-05	NO	2.00E-01	2.00E-06	
	tetrachloroethene	1.82E-03	NO	5.10E-02	9.28E-05	
	1,1,2-trichloroethane	7.43E-03	NO	5.70E-02	4.24E-04	
	trichloroethene	1.49E-03	NO	1.10E-02	1.64E-05	
	vinyl chloride	1.01E-04	NO	1.90E+00	1.92E-04	1.09E-03

NOTE: *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

Where ABS = 1.0 for organic chemicals (default value)
0.8 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

TABLE 11

SUMMARY OF CANCER RISK ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	CDI Adjusted for Absorption	SF* (mg/kg-day)-1	Chemical-specific Risk	Total Pathway Risk
Dermal contact	benzene	7.94E-04	YES	2.90E-02	2.30E-05	
	bis(2-chloroethyl)ether	3.56E-07	YES	1.10E+00	3.92E-07	
	chloroform	4.35E-06	YES	6.10E-03	2.65E-08	
	1,1-dichloroethane	4.48E-07	—	—	—	
	1,2-dichloroethane	7.54E-04	YES	9.10E-02	6.86E-05	
	1,1-dichloroethene	2.77E-06	YES	6.00E-01	1.66E-06	
	1,1,2,2-tetrachloroethane	1.07E-08	YES	2.00E-01	2.14E-09	
	tetrachloroethene	9.60E-06	YES	5.10E-02	4.90E-07	
	1,1,2-trichloroethane	1.36E-03	YES	5.70E-02	7.75E-05	
	trichloroethene	2.71E-04	YES	1.10E-02	2.98E-06	
	vinyl chloride	1.61E-06	YES	1.90E+00	3.06E-06	1.78E-04
Inhalation	benzene	8.65E-03	NO	2.90E-02	2.51E-04	
	bis(2-chloroethyl)ether	1.44E-05	NO	1.15E+00	1.66E-05	
	chloroform	7.16E-05	NO	8.50E-02	6.09E-06	
	1,1-dichloroethane	1.12E-05	—	—	—	
	1,2-dichloroethane	1.16E-03	NO	9.10E-02	1.06E-04	
	1,1-dichloroethene	3.16E-05	NO	1.20E+00	3.79E-05	
	1,1,2,2-tetrachloroethane	1.07E-05	NO	2.00E-01	2.14E-06	
	tetrachloroethene	1.95E-03	NO	1.80E-03	3.51E-06	
	1,1,2-trichloroethane	7.93E-03	NO	5.70E-02	4.52E-04	
	trichloroethene	1.59E-03	NO	1.70E-02	2.70E-05	
	vinyl chloride	1.08E-04	NO	2.90E-01	3.13E-05	9.33E-04
TOTAL EXPOSURE RISK FOR RESIDENT CHILDREN						2.38E-03
FUTURE LAND USE						
RESIDENT ADOLESCENTS: Dermal contact with chemicals in sediment						
	bis(2-ethylhexyl)phthalate	4.56E-08	YES	1.40E-02	6.38E-10	
	PCDDs/PCDFs	1.58E-11	YES	1.50E+05	2.37E-06	
	arsenic	1.33E-07	YES	2.25E+00	2.99E-07	
	beryllium	4.45E-08	YES	4.30E+02	1.91E-05	2.18E-05
TOTAL ADDITIONAL EXPOSURE RISK FOR RESIDENT ADOLESCENTS						2.18E-05

NOTE: *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

When ABS = 1.0 for organic chemicals (default value)
0.8 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

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TABLE 11

SUMMARY OF CANCER RISK ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	CDI Adjusted for Absorption	SF* (mg/kg-day)-1	Chemical-specific Risk	Total Pathway Risk
CURRENT LAND USE						
ADULT WORKERS: Ingestion of and dermal contact with chemicals in soil						
Ingestion	bis(2-ethylhexyl)phthalate	1.01E-07	NO	1.40E-02	1.41E-09	
	PCDDs/PCDFs	6.99E-12	NO	1.50E+05	1.05E-06	
	arsenic	1.64E-06	NO	1.80E+00	2.95E-06	
	beryllium	4.89E-07	NO	4.30E+00	2.10E-06	6.10E-06
Dermal contact	bis(2-ethylhexyl)phthalate	6.02E-08	YES	1.40E-02	8.43E-10	
	PCDDs/PCDFs	4.16E-12	YES	1.50E+05	6.24E-07	
	arsenic	1.95E-07	YES	2.25E+00	4.39E-07	
	beryllium	5.82E-08	YES	4.30E+02	2.50E-05	2.61E-05
TOTAL EXPOSURE RISK FOR ADULT WORKERS						3.22E-05

NOTE *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

Where ABS = 1.0 for organic chemicals (default value)
0.8 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

TABLE 11

SUMMARY OF CANCER RISK ESTIMATES

HIGGINS FARM

	Chemical	CDI (mg/kg-day)	CDI Adjusted for Absorption	SF* (mg/kg-day)-1	Chemical-specific Risk	Total Pathway Risk
CURRENT LAND USE						
ADOLESCENT TRESPASSERS: Ingestion of and dermal contact with chemicals in soil						
Ingestion	bis(2-ethylhexyl)phthalate	2.95E-09	NO	1.40E-02	4.13E-11	
	PCDDs/PCDFs	2.03E-13	NO	1.50E+05	3.05E-08	
	arsenic	4.78E-08	NO	1.80E+00	8.60E-08	
	beryllium	1.42E-08	NO	4.30E+00	6.11E-08	1.78E-07
Dermal contact	bis(2-ethylhexyl)phthalate	1.76E-08	YES	1.40E-02	2.46E-10	
	PCDDs/PCDFs	1.22E-12	YES	1.50E+05	1.83E-07	
	arsenic	5.71E-08	YES	2.25E+00	1.28E-07	
	beryllium	1.70E-08	YES	4.30E+02	7.31E-06	7.62E-06
ADOLESCENT TRESPASSERS: Dermal contact with chemicals in sediment						
	bis(2-ethylhexyl)phthalate	2.28E-08	YES	1.40E-02	3.19E-10	
	PCDDs/PCDFs	7.90E-12	YES	1.50E+05	1.19E-06	
	arsenic	6.64E-08	YES	2.25E+00	1.49E-07	
	beryllium	2.22E-08	YES	4.30E+02	9.55E-06	1.09E-05
TOTAL EXPOSURE RISK FOR ADOLESCENT TRESPASSERS						1.87E-05

NOTE: *-RfDs for dermal exposure pathways are adjusted for absorption as follows:

RfD x ABS = AdjRfD

Where ABS = 1.0 for organic chemicals (default value)
0.8 for arsenic (USEPA, 1984)
0.01 for beryllium (ATSDR, 1988)
0.02 for mercury (ATSDR, 1989)

TABLE 12

ALTERNATIVE 1 COSTS

CAPITAL COSTS	$ 0
OPERATION AND MAINTENANCE (O&M) COSTS	
Labor @ $25/hr	2,000
Ground water monitoring: Analytical (32 samples @ $1,800/sample for TCL/TAL)	57,600
SUBTOTAL	59,600
CONTINGENCY (20%)	11,900
O&M SUBTOTAL	71,500
PRESENT WORTH O&M COSTS (30 YEARS AT 5%)	1,099,100
TOTAL PRESENT WORTH VALUE (Capital and O&M Costs)	$1,099,100

TABLE 13
SENSITIVITY ANALYSIS OF O & M COSTS FOR ALTERNATIVES 1-3

Treatment Time Frame	Present Worth O & M Costs		
	Alternative 1	Alternative 2	Alternative 3
Annual O & M Costs	$ 71,500	$ 262,100	$ 384,000
5 Years	$ 309,500	$ 1,134,600	$ 1,662,300
10 Years	$ 552,100	$ 2,023,900	$ 2,965,200
15 Years	$ 742,200	$ 2,720,600	$ 3,985,900
20 Years	$ 891,000	$ 3,266,300	$ 4,785,400
25 Years	$ 1,007,700	$ 3,694,000	$ 5,412,100
30 Years	$ 1,099,100	$ 4,029,000	$ 5,902,800

Note:
5% discount rate assumed for all present worth calculations.

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CAPITAL COSTS	
Ground Water Extraction	$137,000
Extraction System Monitoring Wells (3)	45,000
Treatment System Building	50,000
Equalization	7,000
Aeration	49,000
Chemical Precipitation, Flocculation, Clarification, and Filtration (includes chemical feed systems)	98,000
Intermediate/Final pH Adjustment	16,000
Ion Exchange	72,000
Discharge to Surface Water	50,000
SUBTOTAL	524,000
SITE WORK (20%)	104,800
ELECTRICAL, I&C, AND MECHANICAL (30%)	157,200
SUBTOTAL	786,000
Transporation and disposal of RI and past removal wastes	87,200
SUBTOTAL	873,200
CONTINGENCY (20%)	174,600
SUBTOTAL	1,047,800
ENGINEERING AND ADMINISTRATION (20%)	209,600
OVERHEAD & PROFITS (15%)	157,200
TOTAL CAPITAL COSTS	1,414,600
OPERATION AND MAINTENANCE (O&M) COSTS	
Labor (@ $25/hour)	52,000
System influent/effluent monitoring (24 samples @ $1,800/sample for TCL/TAL)	43,200
Extraction System Monitoring (12 samples @ $1,800/sample for TCL/TAL)	21,600
Power (@ $0.10/k W-hr)	40,000
Chemicals	13,000
Resin disposal and replacement	25,000
Metal hydroxide sludge disposal	23,600
SUBTOTAL	218,400
CONTINGENCY (20%)	43,700
TOTAL ANNUAL O&M	262,100
PRESENT WORTH O&M COSTS (30 YEARS AT 5%)	4,029,000
TOTAL PRESENT WORTH VALUE (Capital and O&M Costs)	$5,443,600

CAPITAL COSTS	
Ground Water Extraction	$365,300
Extraction System Monitoring Wells (3)	45,000
Treatment System Building	50,000
Equalization	14,000
Aeration	58,000
Chemical Precipitation, Flocculation, Clarification, and Filtration (includes chemical feed systems)	150,000
Intermediate/Final pH Adjustment	25,000
Ion Exchange	175,000
Discharge to Surface Water	133,000
SUBTOTAL	1,015,300
SITE WORK (20%)	203,100
ELECTRICAL, I&C, AND MECHANICAL (30%)	304,600
SUBTOTAL	1,523,000
Transportation and disposal of RI and past removal wastes	87,200
SUBTOTAL	1,610,200
CONTINGENCY (20%)	322,000
SUBTOTAL	1,932,200
ENGINEERING AND ADMINISTRATION (20%)	386,400
OVERHEAD & PROFITS (15%)	289,800
TOTAL CAPITAL COSTS	2,608,400
OPERATION AND MAINTENANCE (O&M) COSTS	
Labor (@ $25/hour)	52,000
System influent/effluent monitoring (24 samples @ $1,800/sample for TCL/TAL)	43,200
Extraction System Monitoring (12 samples @ $1,800/sample for TCL/TAL)	21,600
Power (@ $0.10/k W-hr)	80,000
Chemicals	26,000
Resin disposal and replacement	50,000
Metal hydroxide sludge disposal	47,200
SUBTOTAL	320,000
CONTINGENCY (20%)	64,000
TOTAL ANNUAL O&M	384,000
PRESENT WORTH O&M COSTS (30 YEARS AT 5%)	5,902,800
TOTAL PRESENT WORTH VALUE (Capital and O&M Costs)	$8,511,200

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Table 16
CHEMICAL-SPECIFIC ARARs & TBCs
FOR REMEDIATION OF GROUND WATER

Compound	Maximum Concentration Detected (µg/l)	Frequency of Detection	NJ GWQ Criteria[a] (µg/l) (ARAR)	NJ Proposed Cleanup Standards[b] (µg/l) (TBC)	New Jersey MCL[c] (µg/l) (ARAR)	Federal MCL[d] (µg/l) (ARAR)	Federal MCLG[d] (µg/l) (ARAR/TBC)[e]	Selected Remedial Requirement (µg/l)
Volatile Organics								
Acetone	5.2	2/2	—	700	—	—	—	—
Benzene	1,200.0	12/22	—	1	1	5	0	1
Bromobenzene	1.4	4/22	—	—	—	—	—	—
Carbon Disulfide	2.1	1/1	—	—	—	—	—	—
Carbon Tetrachloride	3.3	1/22	—	2	2	5	0	2
Chlorobenzene	1,100.0	14/22	—	5	4	100	100	4
Chloroform	33.0	3/22	—	6	—	100	—	100
2-Chlorotoluene	3.5	1/22	—	—	—	—	—	—
4-Chlorotoluene	2.9	2/22	—	—	—	—	—	—
cis-1,2-Dichloroethene	76.0	10/22	—	10	10	70	70	10
1,1-Dichloroethane	3.0	8/22	—	70	—	—	—	—
1,2-Dichloroethane	320.0	8/22	—	2	2	5	0	2
1,1-Dichloroethene	10.0	7/22	—	2	2	7	7	2
1,2-Dichloropropane	0.56	1/22	—	1	—	5	0	5
1,1-Dichloropropene	4.3	1/22	—	—	—	—	—	—
Ethylbenzene	1.0	2/22	—	700	—	700	700	700
Trans-1,2-Dichloroethene	13.0	6/22	—	100	10	100	100	10
1,1,2,2-Tetrachloroethane	7.5	7/22	—	2	—	—	—	—
Tetrachloroethene	270.0	18/22	—	1	1	5	0	1
Toluene	1.9	2/22	—	1,000	—	1,000	1,000	1,000
1,1,1,2-Tetracloroethane	1.4	1/22	—	10	—	—	—	—
1,1,1-Trichloroethane	4.2	4/22	—	30	26	200	200	26
1,1,2-Trichloroethane	1,100.0	8/22	—	3	—	5	3	3
Trichloroethene	220.0	16/22	—	1	1	5	0	1
Trichlorofluoromethane	3.8	1/22	—	—	—	—	—	—
Vinyl Chloride	86.0	3/22	—	2	2	2	0	2
Xylenes (total)	13.8	9/22	—	40	44	10,000	10,000	44

Table 16
CHEMICAL-SPECIFIC ARARs & TBCs
FOR REMEDIATION OF GROUND WATER

Compound	Maximum Concentration Detected (µg/l)	Frequency of Detection	NJ GWQ Criteria[a] (µg/l) (ARAR)	NJ Proposed Cleanup Standards[b] (µg/l) (TBC)	New Jersey MCL[c] (µg/l) (ARAR)	Federal MCL[d] (µg/l) (ARAR)	Federal MCLG[d] (µg/l) (ARAR/TBC)[e]	Selected Remedial Requirement (µg/l)
Semivolatile Organics								
Bis(2-chloroethyl)ether	2.0	2/22	—	10	—	—	—	—
Bis(2-ethylhexyl)phthalate	10.0	1/22	—	30	—	6	0	6
2-Chlorophenol	6.0	2/22	—	40	—	—	—	—
1,2-Dichlorobenzene	48.0	3/22	—	600	600	600	600	600
1,3-Dichlorobenzene	5.0	5/22	—	600	600	600	600	600
1,4-Dichlorobenzene	2.0	1/22	—	70	—	75	75	75
Di-n-butylphthalate	0.9	2/22	—	900	—	—	—	—
Diethyl phthalate	1.0	1/22	—	5,000	—	—	—	—
Hexachlorobutadiene	5.3	1/22	—	1	—	—	—	—
Isopropylbenzene	4.6	6/22	—	—	—	—	—	—
Naphthalene	0.38	2/22	—	30	—	—	—	—
N-Butylbenzene	5.0	2/22	—	—	—	—	—	—
N-Propylbenzene	4.5	2/22	—	—	—	—	—	—
P-Isopropyltoluene	5.0	2/22	—	—	—	—	—	—
Phenol	9.0	3/22	3,500	4,000	—	—	—	—
Sec-Butylbenzene	4.9	2/22	—	—	—	—	—	—
Tert-Butylbenzene	4.9	4/22	—	—	—	—	—	—
1,2,3-Trichlorobenzene	1.4	2/22	—	—	8	—	—	8
1,2,4-Trichlorobenzene	1.7	5/22	—	9	8	9	9	8
1,2,4-Trimethylbenzene	3.2	4/22	—	—	—	—	—	—
1,3,5-Trimethylbenzene	3.9	3/22	—	—	—	—	—	—
Inorganic Compounds								
Aluminum	304,000.0	27/42	—	—	—	—	—	—
Antimony	28.5	4/44	—	20	—	6	6	6
Barium	1,890.0	38/42	1,000	2,000	—	2,000	2,000	2,000
Beryllium	25.7	7/44	—	20	—	4	4	4
Cadmium	4.1	3/44	10	4	—	5	5	5
Chromium	403.0	20/44	50	100	—	100	100	100
Cobalt	826.0	25/42	—	—	—	—	—	—
Copper	8,750.0	29/39	1,000[f]	—	—	1,300	1,300	1,300
Iron	433,000.0	41/44	300[f]	—	—	—	—	—

Table 16
CHEMICAL-SPECIFIC ARARs & TBCs
FOR REMEDIATION OF GROUND WATER

Compound	Maximum Concentration Detected (µg/l)	Frequency of Detection	NJ GWQ Criteria[a] (µg/l) (ARAR)	NJ Proposed Cleanup Standards[b] (µg/l) (TBC)	New Jersey MCL[c] (µg/l) (ARAR)	Federal MCL[d] (µg/l) (ARAR)	Federal MCLG[d] (µg/l) (ARAR/ TBC)[e]	Selected Remedial Requirement (µg/l)
Lead	81.4	20/31	50	10	—	15	0	15
Magnesium	27,200.0	44/44	—	—	—	—	—	—
Manganese	24,800.0	42/42	50[f]	—	—	—	—	—
Nickel	224.0	18/43	—	100	—	100	100	100
Vanadium	1,490.0	14/44	—	—	—	—	—	—
Zinc	811.0	32/32	5,000[f]	5,000	—	—	—	—

Notes:

[a]New Jersey Ground Water Quality Standards for Class GW2, NJAC 7:9-6, adopted effective March 4, 1981; readopted June 3, 1988.
[b]New Jersey Proposed Cleanup Standards, NJAC 7:26D-4 for Class IIA Ground Water.
[c]New Jersey Drinking Water Regulations NJAC 7:10.
[d]Environmental Protection Agency Primary Drinking Water Regulations 40 CFR 141. Maximum Contaminant Levels (MCL) and Maximum Contaminant Level Goals (MCLG), April 1992 and May 1992 (Phave V Rule).
[e]MCLGs that are set above zero are ARARs. Zero values are TBCs. (Federal Register, Vol. 55, No. 46, March 8, 1990).
[f]New Jersey Ground Water Quality Secondary Standards, NJAC 7:9-6.

— Value not available.

Source of selected remedial requirement

HRM 001 1951

Table 17
CHEMICAL-SPECIFIC ARARs & TBCs
FOR DISCHARGE TO SURFACE WATER

Compound	Maximum Concentration Detected in Ground Water (µg/l)	Maximum Concentration Detected in Surface Water (µg/l)	NJ SWQ[a] (µg/l) (TBC)	NJPDES[b] (µg/l)		FAWQC[c] (µg/l) (ARAR)	Method Detection Limit[d] (µg/l) (MDL)	Anti-Degradation Goal[e] (µg/l)
				Aquatic[f] (ARAR)	Potable[g] (ARAR)			
Volatile Organics								
Acetone	5.2	—	—	—	—	—	1.0	ND (1.0)
Benzene	1,200.0	—	—	5,300	—	1.2	1.0	ND (1.0)
Bromobenzene	1.4	—	—	—	—	—	1.0	ND (1.0)
Carbon Disulfide	2.1	5.0	—	—	—	—	1.0	5.0
Carbon Tetrachloride	3.3	1.4	—	35,200	—	0.25	1.0	1.4
Chlorobenzene	1,100.0	—	—	250	488	680.0	1.0	ND (1.0)
Chloroform	33.0	—	—	28,900	—	5.7	1.0	ND (1.0)
2-Chlorotoluene	3.5	—	—	—	—	—	1.0	ND (1.0)
4-Chlorotoluene	2.5	—	—	—	—	—	1.0	ND (1.0)
Cis-1,2-Dichloroethene	76.0	—	—	11,600	—	—	1.0	ND (1.0)
1,1-Dichloroethane	3.0	—	—	—	—	—	1.0	ND (1.0)
1,2-Dichloroethane	320.0	—	—	20,000	—	0.38	1.0	ND (1.0)
1,1-Dichloroethene	10.0	—	—	11,600	—	0.057	1.0	ND (1.0)
1,2-Dichloropropane	0.56	—	—	5,700	—	0.52	1.0	ND (1.0)
1,1-Dichloropropene	4.3	—	—	244	87	—	1.0	ND (1.0)
Ethylbenzene	1.0	—	—	32,000	1,400	3,100.0	1.0	ND (1.0)
Trans-1,2-Dichloroethene	13.0	—	—	11,600	—	700.0	1.0	ND (1.0)
1,1,2,2-Tetrachloroethane	7.5	—	—	2,400	—	0.17	1.0	ND (1.0)
Tetrachloroethene	270.0	—	—	840	—	0.8	1.0	ND (1.0)
Toluene	1.9	1.3	—	17,500	14,300	6,800.0	1.0	1.3
1,1,1,2-Tetrachloroethane	1.4	—	—	9,320	—	—	1.0	ND (1.0)
1,1,1-Trichloroethane	4.2	—	—	18,000	18,400	3,100.0	1.0	ND (1.0)
1,1,2-Trichloroethane	1,100.0	—	—	9,400	—	0.6	1.0	ND (1.0)
Trichloroethene	220.0	—	—	45,000	—	2.7	1.0	ND (1.0)
Trichlorofluoromethane	3.8	—	—	11,000	—	—	1.0	ND (1.0)
Vinyl chloride	86.0	—	—	—	—	2.0	1.0	ND (1.0)
Xylenes (total)	13.8	—	—	—	—	—	1.0	ND (1.0)
Semivolatile Organics								
Bis(2-chloroethyl)ether	2.0	—	—	—	—	0.031	5.0	ND (5.0)
Bis(2-ethylhexyl)phthalate	10.0	—	—	3	—	1.8	5.0	ND (5.0)
2-Chlorophenol	6.0	—	—	4,380	—	—	5.0	ND (5.0)

HFM 001 1992

Table 17
CHEMICAL-SPECIFIC ARARs & TBCs
FOR DISCHARGE TO SURFACE WATER

Compound	Maximum Concentration Detected in Ground Water (µg/l)	Maximum Concentration Detected in Surface Water (µg/l)	NJ SWQ[a] (µg/l) (TBC)	NJPDES[b] (µg/l)		FAWQC[c] (µg/l) (ARAR)	Method Detection Limit[d] (µg/l) (MDL)	Anti-Degradation Goal[e] (µg/l)
				Aquatic[f] (ARAR)	Potable[g] (ARAR)			
1,2-Dichlorobenzene	48.0	—	—	763	400	2,700.0	10.0	ND (10.0)
1,3-Dichlorobenzene	5.0	—	—	763	400	400.0	10.0	ND (10.0)
1,4-Dichlorobenzene	20.0	—	—	763	400	400.0	10.0	ND (10.0)
Di-n-butylphthalate	0.9	—	—	3	34,000	—	5.0	ND (5.0)
Di-n-octylphthalate	ND	1.0	—	3	—	—	5.0	ND (5.0)
Diethyl phthalate	1.0	42.0	—	3	350,000	23,000.0	5.0	42.0
Hexachlorobutadiene	5.3	—	—	9.3	—	0.44	1.0	ND (1.0)
Isopropylbenzene	4.6	—	—	—	—	—	1.0	ND (1.0)
Naphthalene	0.38	—	—	620	—	—	1.0	ND (1.0)
N-Butylbenzene	5.0	—	—	—	—	—	1.0	ND (1.0)
N-Propylbenzene	4.5	—	—	—	—	—	1.0	ND (1.0)
P-Isopropyltoluene	5.0	—	—	—	—	—	1.0	ND (1.0)
Phenol	9.0	—	—	2,560	3,500	—	5.0	ND (5.0)
Sec-Butylbenzene	4.9	—	—	—	—	—	1.0	ND (1.0)
Tert-Butylbenzene	4.9	—	—	—	—	—	1.0	ND (1.0)
1,2,3-Trichlorobenzene	1.4	—	—	250	—	—	1.0	ND (1.0)
1,2,4-Trichlorobenzene	1.7	—	—	250	—	—	10.0	ND (10.0)
1,2,4-Timethylbenzene	3.2	—	—	—	—	—	1.0	ND (1.0)
1,3,5-Trimethylbenzene	3.9	—	—	—	—	—	1.0	ND (1.0)
Inorganic Compounds								
Aluminum	304,000.0	2,310.0	—	—	—	87.0[h,i]	100.0	2,310.0
Antimony	28.5	—	—	1,600	146	14.0	5.0	ND (5.0)
Barium	1,890.0	27.5	1,000	—	—	—	20.0	27.5
Beryllium	25.7	—	—	5.3	—	0.0077	1.0	ND (1.0)
Cadmium	4.1	—	10	0.012	10	0.25[j]	1.0	ND (1.0)
Chromium	403.0	—	50	0.29	50	11.0	10.0	ND (10.0)
Cobalt	826.0	5.2	—	—	—	—	10.0	ND (10.0)
Copper	8,750.0	6.4	—	5.6	—	2.32[j]	10.0	ND (10.0)
Iron	433,000.0	4,950	—	—	—	300.0[h]	100.0	4,950
Lead	81.4	12.0	50	.75	50	0.28[j]	0.3	12.0
Magnesium	27,200.0	3,780	—	—	—	—	5,000.0	ND (5,000.0)
Manganese	24,800.0	325	—	—	—	50.0[h]	10.0	325

Table 17
CHEMICAL-SPECIFIC ARARs & TBCs
FOR DISCHARGE TO SURFACE WATER

Compound	Maximum Concentration Detected in Ground Water (µg/l)	Maximum Concentration Detected in Surface Water (µg/l)	NJ SWQ[a] (µg/l) (TBC)	NJPDES[b] (µg/l)		FAWQC[c] (µg/l) (ARAR)	Method Detection Limit[d] (µg/l) (MDL)	Anti-Degradation Goal[e] (µg/l)
				Aquatic[f] (ARAR)	Potable[g] (ARAR)			
Nickel	224.0	—	—	56	13.4	31.45[j]	20.0	ND (20.0)
Vanadium	1,490.0	14.4	—	—	—	—	10.0	14.4
Zinc	811.0	292	—	47	—	—	20.0	292

Note:

The following conventional parameter limits must also be considered:

Parameter	Maximum Detected In Ground Water	Maximum Detected In Surface Water	Limit	Rationale
BOD	—	2.1 ppm	25 ppm	NJAC 7:9-5.1.
COD	—	15 ppm	31 ppm	Assume BOD:COD ratio is 0.8.
TDS	—	74 ppm	95 ppm	133% of natural background concentration. NJAC 7:9-4.
pH	8.4	6.9	6.5-8.5	NJAC 7:9-4.
TSS	25,900 ppm	—	40 ppm	NJAC 7:9-4.
Whole effluent toxicity	—	—	L_c = 100	No observed effects using 100% effluent. NJAC 7:9-4.

Treatability testing will determine the ability of a treatment system to meet these limits.

[a]New Jersey Surface Water Quality Standards NJAC 7:9-4 for FW2-NT Waters.
[b]New Jersey Pollutant Discharge Elimination System Regulations NJAC 7:14A, Appendix F, Values for Determination of NJPDES Permit Toxic Effluent Limitations.
[c]Federal Ambient Water Quality Criteria. Quality Criteria for Water. May 1, 1987. EPA 440/5-86-001. From "Toxics Rule".
[d]MDLs are best available Contract Laboratory Program analytical method detection limit. [From Superfund Analytical Methods for Low Concentration Water for Organics Analysis (6/91) and Superfund Analytical Methods for Low Concentration Water for Inorganics Analysis (10/91)].
[e]Anti-degradation goal is based on the maximum concentration detected in surface water. If contaminant was not detected in surface water or if detected below the method detection limit, the MDL is the anti-degradation goal.
[f]Maximum Values for Protection of Aquatic Life.
[g]Maximum Values for Protection of Potable Water Supplies.
[h]Federal Ambient Water Quality Criteria; non-priority pollutants.
[i]pH dependent criterion. Value given based on a pH of 6.5 to 9.0.
[j]Hardness dependent criterion. Value given based on an assumed total hardness of 15 mg/l.

— Value not available.
ND = Not Detected