FINAL REMEDIAL INVESTIGATION & RISK ASSESSMENT REPORT CENTRAL LANDFILL OPERABLE UNIT 2 JOHNSTON, RHODE ISLAND VOLUME III OF V

PREPARED FOR:
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Johnston, Rhode Island

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TABLES

TABLE 8.12-1

SUMMARY OF ANALYTICAL DATA FOR SURFICIAL SOIL SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Volatile Organic Compounds					
1,1,1-Trichloroethane	9 / 11	0.004	0.092	SS95-03	0.019
1,1-Dichloroethane	8 / 11	0.002	0.022	SS95-03	0.007
Methyl ethyl ketone	1 / 10	0.002	0.002	SS95-02	0.002
Toluene	3 / 10	0.001	0.002	SS95-07	0.001
Xylenes	2 / 9	0.002	0.003	SS95-05	0.003
Semivolatile Organic Compounds					
2-Methylphenol	1 / 11	0.13	0.13	SS95-03	0.13
Anthracene	1 / 11	0.073	0.073	SS95-01	0.073
Benzo(a)anthracene	7 / 11	0.042	0.29	SS95-01	0.16
Benzo(a)pyrene	6 / 11	0.043	0.28	SS95-01	0.17
Benzo(b)fluoranthene	10 / 11	0.056	0.59	SS95-01	0.19
Benzo(g,h,i)perylene	2 / 11	0.1	0.1515	SS95-09	0.13
Benzo(k)fluoranthene	4 / 11	0.071	0.18	SS95-01	0.12
bis(2-Ethylhexyl)phthalate	11 / 11	0.072	24	SS95-04	2.4
Carbazole	1 / 11	0.075	0.075	SS95-01	0.075
Chrysene	10 / 11	0.052	0.35	SS95-01	0.14
Di-n-butylphthalate	3 / 11	0.059	0.1685	SS95-09	0.11
Fluoranthene	11 / 11	0.064	0.63	SS95-01	0.21
Indeno(1,2,3-c,d)pyrene	3 / 11	0.056	0.11	SS95-01	0.076
Phenanthrene	9 / 11	0.048	0.42	SS95-01	0.17
Pyrene	10 / 11	0.076	0.77	SS95-01	0.25
Pesticides/PCBs					
4,4'-DDD	3 / 11	0.005	0.01	SS95-03	0.004
4,4'-DDE	6 / 11	0.005	0.037	SS95-01	0.010
4,4'-DDT	9 / 11	0.005	0.11	SS95-01	0.022
Aldrin	1 / 11	0.0037	0.0037	SS95-03	0.002
alpha-Chlordane	2 / 11	0.003	0.004	SS95-08	0.002
Endosulfan-sulfate	1 / 11	0.006	0.006	SS95-06	0.003
Metals					
Aluminum, total	15 / 15	2760	12900	SS95-10	6335
Arsenic, total	3 / 15	8.1	9.78	SS95-09	4.15
Barium, total	15 / 15	9.7	68.7	SS95-09	33
Beryllium, total	15 / 15	0.22	2.88	SS95-09	1.2
Cadmium, total	9 / 15	0.07	0.52	SS95-01	0.18
Calcium, total	15 / 15	252	3150	SS95-01	1050
Chromium, total	15 / 15	2	12.3	SS95-08	6.4
Cobalt, total	15 / 15	1.6	5.8	SS95-09	3.1
Copper, total	13 / 15	5.1	21.7	SS95-01	11
Cyanide, total	1 / 15	2.5	2.5	SS95-10	1.3
Iron, total	15 / 15	3940	20600	SS95-09	10567
Lead, total	15 / 15	13.5	145	SS95-01	66
Magnesium, total	15 / 15	166	1468	SS95-09	569
Manganese, total	15 / 15	24.3	556	SS95-09	194
Nickel, total	6 / 15	4	8.60	SS95-09B	4.3
Potassium, total	15 / 15	352	2620	SS95-09	741
Selenium, total	1 / 15	1.43	1.43	SS95-02	0.65
Sodium, total	2 / 15	289	405	SS95-09	97
Vanadium, total	15 / 15	4	38.9	SS95-11	23
Zinc, total	15 / 15	18.9	3393	SS95-02	298

Notes:

1 For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND), and one time the method detection limit was used to represent the concentrations of constituents reported as "BMQL".

TABLE 8.12-2

SUMMARY OF ANALYTICAL DATA FOR BACKGROUND SURFICIAL SOIL SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Volatile Organic Compounds					
1,1,1-Trichloroethane	1 / 2	0.017	0.017	SS95-12	0.012
1,1-Dichloroethane	1 / 2	0.006	0.006	SS95-12	0.006
Semivolatile Organic Compounds					
bis(2-Ethylhexyl)phthalate	2 / 2	0.051	0.098	SS95-13	0.075
Fluoranthene	1 / 2	0.055	0.055	SS95-13	0.055
Pyrene	1 / 2	0.067	0.067	SS95-13	0.067
Pesticides/PCBs					
4,4'-DDE	1 / 2	0.014	0.014	SS95-13	0.008
4,4'-DDT	1 / 2	0.009	0.009	SS95-13	0.006
Metals					
Aluminum, total	2 / 2	7,130	15,300	SS95-12	11,215
Arsenic, total	1 / 2	9.6	9.6	SS95-12	6.20
Barium, total	2 / 2	26.1	37.8	SS95-12	32.0
Beryllium, total	2 / 2	3.5	4.8	SS95-13	4.15
Cadmium, total	1 / 2	0.26	0.26	SS95-13	0.16
Calcium, total	2 / 2	349	513	SS95-13	431
Chromium, total	2 / 2	5.3	8.3	SS95-12	6.80
Cobalt, total	2 / 2	2.8	5	SS95-12	3.90
Copper, total	2 / 2	4.4	7.1	SS95-12	5.75
Iron, total	2 / 2	10,500	18,600	SS95-12	14,550
Lead, total	2 / 2	47	63.9	SS95-12	55.5
Magnesium, total	2 / 2	626	956	SS95-12	791
Manganese, total	2 / 2	85.7	215	SS95-12	150
Potassium, total	2 / 2	555	907	SS95-12	731
Vanadium, total	2 / 2	18.7	30	SS95-12	24.4
Zinc, total	2 / 2	85.2	85.9	SS95-12	85.6

Notes:

1 For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND), and one time the method detection limit was used to represent the concentrations of constituents reported as "BMQL".

TABLE 8.12-3

SUMMARY OF ANALYTICAL DATA FOR GROUNDWATER SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Volatile Organic Compounds					
1,1-Dichloroethane	4 / 24	0.0005	0.003	MW95-50	0.0007
1,2-Dichlorobenzene	4 / 24	0.001	0.0015	MW95-48S	0.0006
1,2-Dichloroethane	1 / 24	0.000525	0.000525	MW95-48S	0.0005
1,4-Dichlorobenzene	4 / 24	0.00065	0.004	MW95-48S	0.0007
2-Hexanone	1 / 24	0.003	0.003	MW95-ML9C	0.002
Benzene	7 / 24	0.0005	0.0115	MW95-48S	0.0017
Carbon Disulfide	7 / 24	0.0005	0.0013	MW95-ML9C	0.0006
Carbon Tetrachloride	1 / 24	0.007	0.007	RW31017	0.0008
Chlorobenzene	6 / 24	0.00725	0.118	MW95-48S	0.008
Chloroethane	3 / 24	0.0006	0.001	MW95-50	0.0006
Chloroform	4 / 24	0.0007	0.003	RW31017	0.0008
Chloromethane	2 / 24	0.001	0.001	MW9754	0.0005
cis-1,2-Dichloroethene	2 / 24	0.00295	0.004	MW95-48	0.0007
Methyl ethyl ketone	1 / 17	0.002	0.002	MW95-ML9C	0.002
Methylene Chloride	1 / 24	0.002	0.002	RW43167	0.001
Toluene	1 / 24	0.008	0.008	RW31002	0.0008
Trichloroethene	2 / 24	0.0006	0.005	MW95-48	0.0007
Vinyl Chloride	2 / 24	0.0009	0.002425	MW95-48S	0.0006
Xylenes	1 / 24	0.0008	0.0008	MW95-48S	0.0005
Semivolatile Organic Compounds					
Anthracene	1 / 24	0.0030	0.0030	RW43036	0.003
bis(2-Ethylhexyl)phthalate	5 / 24	0.0023	0.015	RW31002	0.003
Dibenzofuran	1 / 24	0.004	0.004	RW43036	0.003
Fluoranthene	1 / 24	0.00425	0.00425	MW9754	0.003
Naphthalene	1 / 24	0.002	0.00175	MW95-48S	0.002
Phenanthrene	2 / 24	0.002	0.00275	MW9754	0.002
Phenol	1 / 24	0.007	0.00725	MW95-50	0.003
Pyrene	1 / 24	0.00325	0.00325	MW9754	0.003
Pesticides/PCBs					
Aldrin	4 / 24	0.000008	0.00002	MW95-50	0.000006
delta-BHC	2 / 24	0.00001	0.000009	MW95-52	0.000005
Dieldrin	1 / 24	0.00002	0.00002	MW95-48S	0.00001
Endosulfan I	1 / 24	0.00001	0.00001	MW95-47S	0.000005

TABLE 8.12-3

SUMMARY OF ANALYTICAL DATA FOR GROUNDWATER SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Metal Total					
Aluminum, total	17 / 24	0.062	18.2	MW95-ML9B	2.3
Arsenic, total	14 / 24	0.002	0.028	RW31002	0.004
Barium, total	22 / 24	0.002	0.714	MW95-48S	0.12
Beryllium, total	20 / 24	0.0001	0.029	RW31002	0.004
Cadmium, total	9 / 24	0.0002	0.040	RW31002	0.002
Calcium, total	24 / 24	1.76	226	RW43036	38
Chromium, total	7 / 24	0.001	0.025	MW95-50	0.004
Cobalt, total	8 / 24	0.001	0.069	MW95-52	0.006
Copper, total	14 / 22	0.002	0.258	RW43167	0.03
Iron, total	22 / 24	0.070	183	RW31002	14
Lead, total	8 / 20	0.001	0.055	RW31002	0.009
Magnesium, total	24 / 24	0.545	70.4	RW43036	12
Manganese, total	22 / 24	0.033	12.4	RW43036	1.8
Mercury, total	5 / 24	0.0001	0.0003	MW95-ML9B	0.00007
Nickel, total	5 / 24	0.005	0.12225	MW95-48S	0.012
Potassium, total	24 / 24	0.474	230	MW95-48S	26
Selenium, total	13 / 24	0.002	0.009	RW31004	0.003
Silver, total	1 / 24	0.011	0.011	MW95-51	0.001
Sodium, total	23 / 24	2.93	551	MW95-48S	68
Thallium, total	9 / 24	0.002	0.037	RW31002	0.004
Vanadium, total	12 / 24	0.001	0.015	MW95-48S	0.003
Zinc, total	17 / 24	0.013	1.01	RW43167	0.16

TABLE 8.12-3

SUMMARY OF ANALYTICAL DATA FOR GROUNDWATER SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Metal Dissolved					
Aluminum (Al)	16 / 24	0.006	0.487	RW43167	0.086
Arsenic (As)	9 / 24	0.001	0.010	RW31004	0.002
Barium (Ba)	18 / 24	0.003	0.690	MW95-48S	0.09
Beryllium (Be)	15 / 24	0.0001	0.012	RW43007	0.002
Cadmium (Cd)	5 / 24	0.0003	0.002	RW31004	0.0004
Calcium (Ca)	20 / 24	0.864	230	RW43036	35
Chromium (Cr)	9 / 24	0.001	0.012	MW95-53	0.0021
Cobalt (Co)	6 / 24	0.001	0.070	MW95-52	0.0055
Copper (Cu)	6 / 21	0.003	0.226	RW43167	0.024
Iron (Fe)	14 / 24	0.025	32.05	MW95-52	4.3
Lead (Pb)	3 / 18	0.002	0.004	RW43167	0.0014
Magnesium (Mg)	21 / 24	0.377	80	RW43036	13
Manganese (Mn)	22 / 24	0.004	13	RW43036	1.7
Nickel (Ni)	5 / 24	0.006	0.125	MW95-48S	0.012
Potassium (K)	21 / 24	0.766	107.8195	MW95-48S	23
Selenium (Se)	9 / 24	0.003	0.011	RW43007	0.003
Sodium (Na)	21 / 24	4.89	740.75	MW95-48S	89
Thallium (Tl)	7 / 24	0.002	0.008	RW43036	0.002
Vanadium (V)	8 / 24	0.0003	0.016	MW95-48S	0.002
Zinc (Zn)	12 / 24	0.023	0.575	RW43167	0.07
Wet Chemistry					
Ammonia (N)	13 / 24	0.075	185	MW95-48S	19
Biochemical Oxygen Demand (5)	7 / 24	3.2	63	RW31002	5
Chemical Oxygen Demand (COD)	9 / 24	3.88	337.5	MW95-48S	40
Chloride (Cl)	18 / 24	5.5	813	MW95-48S	88
Coliform, total	14 / 21	1.25	70	RW31002	8.9
Hardness	24 / 24	7.5	850	RW43036	145
Nitrate (N)	18 / 24	0.036	10.5	RW31002	0.87
Nitrite (N)	7 / 24	0.006	0.06	RW31002	0.007
Phosphate, total	22 / 24	0.1	1.38	MW95-ML9B	0.48
Sulfate (So4)	18 / 24	7.25	260	MW95-53	50
Total Dissolved Solids (TDS)	21 / 24	30.8	2275	MW95-48S	458
Total Kjeldahl Nitrogen (TKN)	10 / 24	0.175	195	MW95-48S	22
Total Organic Carbon (TOC)	16 / 24	0.675	170.25	MW95-48S	16
Total Solids	22 / 24	117	16000	MW95-47S	1,417
Total Suspended Solids (TSS)	16 / 24	11	5400	RW31002	360

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND), and one time the method detection limit was used to represent the concentrations of constituents reported as "BMQL".

2. If a well was sampled more than once, the summary statistics are based on the average concentration over time at that particular well.

TABLE 8.12-4

SUMMARY OF ANALYTICAL DATA FOR BACKGROUND GROUNDWATER SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Volatile Organic Compounds					
Carbon Disulfide	2 / 4	0.002	0.006	WE87-8	0.002
Semivolatile Organic Compounds					
bis(2-Ethylhexyl)phthalate	2 / 4	0.002	0.002	WE87-8, WE87-16	0.002
Metal Total					
Aluminum, total	4 / 4	0.343	1.37	WE85-16	0.688
Arsenic, total	2 / 4	0.002	0.005	WE87-17	0.002
Barium, total	4 / 4	0.008	0.052	WE87-17	0.023
Beryllium, total	4 / 4	0.001	0.004	WE87-8	0.003
Cadmium, total	3 / 4	0.001	0.001	WE85-16	0.001
Calcium, total	4 / 4	3.14	8.98	WE85-16	6.09
Chromium, total	3 / 4	0.004	0.006	WE85-16	0.004
Cobalt, total	1 / 4	0.0005	0.0005	WE85-16	0.0003
Copper, total	2 / 4	0.002	0.009	WE85-16	0.005
Iron, total	2 / 4	0.017	1.45	WE85-16	0.440
Lead, total	3 / 4	0.003	0.010	WE85-16	0.006
Magnesium, total	4 / 4	1.03	2.40	WE85-16	1.55
Manganese, total	4 / 4	0.020	0.069	WE87-8	0.043
Mercury, total	2 / 4	0.0001	0.001	WE87-8	0.0003
Potassium, total	4 / 4	0.576	2.04	WE87-17	1.000
Selenium, total	1 / 4	0.002	0.002	WE87-8	0.002
Sodium, total	4 / 4	3.83	9.36	WE87-17	5.42
Vanadium, total	2 / 4	0.001	0.001	WE85-16	0.001
Zinc, total	4 / 4	0.035	0.135	WE87-8	0.063
Metal Dissolved					
Aluminum (Al)	4 / 4	0.166	0.404	WE87-17	0.28
Arsenic (As)	1 / 4	0.004	0.004	WE87-17	0.002
Barium (Ba)	4 / 4	0.006	0.049	WE87-17	0.019
Beryllium (Be)	4 / 4	0.001	0.004	WE87-8	0.002
Cadmium (Cd)	3 / 4	0.0004	0.001	WE87-8	0.001
Calcium (Ca)	4 / 4	2.76	8.32	WE87-17	5.44
Iron (Fe)	1 / 4	0.029	0.029	WE87-17	0.017
Lead (Pb)	2 / 4	0.002	0.008	WE87-8	0.003
Magnesium (Mg)	4 / 4	0.803	1.96	WE85-16	1.37
Manganese (Mn)	4 / 4	0.010	0.049	WE87-17	0.024
Mercury (Hg)	1 / 4	0.001	0.001	WE85-16	0.0003
Potassium (K)	3 / 4	0.524	2.18	WE87-17	0.960
Selenium (Se)	1 / 4	0.003	0.003	WE85-16	0.002
Sodium (Na)	4 / 4	3.12	8.76	WE87-17	4.87
Vanadium (V)	3 / 4	0.0004	0.001	WE85-16	0.001
Zinc (Zn)	4 / 4	0.023	0.093	WE87-8	0.054
Wet Chemistry					
Ammonia (N)	1 / 4	0.075	0.075	WE85-16	0.069
Chloride (Cl)	4 / 4	6.75	17.5	WE87-17	12.3
Coliform, total	4 / 4	1.50	25.5	WE87-8	15.0
Hardness	4 / 4	13.0	32.0	WE85-16	21.4
Nitrate (N)	4 / 4	0.063	0.250	WE87-8	0.139
Phosphate, total	4 / 4	0.163	0.308	WE85-16	0.218
Sulfate (So4)	4 / 4	12.5	37.0	WE87-17	21.8
Total Dissolved Solids (TDS)	4 / 4	25.0	53.0	WE87-17	41.4
Total Kjeldahl Nitrogen (TKN)	1 / 4	0.200	0.200	WE85-16	0.200
Total Organic Carbon (TOC)	1 / 4	1.19	1.19	WE87-17	0.673
Total Solids	4 / 4	44.0	145	WE85-16	73.7
Total Suspended Solids (TSS)	4 / 4	6.50	57.5	WE85-16	21.6

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND), and one time the method detection limit was used to represent the concentrations of constituents reported as "BMQL".

2. If a well was sampled more than once, the summary statistics are based on the average concentration over time at that particular well.

TABLE 8.12-5

SUMMARY OF ANALYTICAL DATA FOR SEDIMENT SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Volatile Organic Compounds					
1,1,1-Trichloroethane	1 / 34	0.002	0.002	SED95-15	0.002
1,1-Dichloroethane	1 / 45	0.004	0.004	SED93-26-O	0.004
2-Hexanone	1 / 45	0.057	0.057	SED93-26-O	0.014
Acetone	21 / 45	0.026	0.335	SED93-26-O	0.073
Benzene	3 / 45	0.006	0.021	SED93-29-ORE	0.010
Carbon Disulfide	3 / 45	0.007	0.114	SED93-26-O	0.016
Chlorobenzene	13 / 45	0.001	0.076	SED95-42	0.015
Chloromethane	2 / 34	0.003	0.004	SED98-53	0.004
Methyl ethyl Ketone	16 / 45	0.010	0.119	SED93-26-O	0.023
Methylene Chloride	10 / 45	0.010	0.046	SED93-23-O	0.016
Styrene	1 / 45	0.005	0.005	SED93-26-O	0.005
Tetrachloroethene	2 / 45	0.012	0.230	SED95-29	0.018
Toluene	5 / 45	0.002	0.016	SED93-21-O	0.009
Trichloroethene	1 / 45	0.003	0.003	SED93-22-O	0.003
Xylenes	1 / 45	0.020	0.020	SED93-26-O	0.010
Semivolatile Organic Compounds					
1,2,4-Trichlorobenzene	1 / 34	0.053	0.053	SED98-51	0.053
1,4-Dichlorobenzene	1 / 34	0.046	0.046	SED95-41	0.046
2-Methylnaphthalene	1 / 39	0.039	0.039	SED98-51	0.039
4-Methylphenol	7 / 34	0.056	0.380	SED95-40	0.237
Acenaphthene	3 / 39	0.055	0.100	SED95-40	0.078
Acenaphthylene	1 / 39	0.050	0.050	SED98-51	0.050
Anthracene	9 / 39	0.052	0.300	SED95-10	0.203
Benzo(a)anthracene	18 / 39	0.052	1.00	SED95-40	0.302
Benzo(a)pyrene	17 / 39	0.076	0.980	SED95-40	0.290
Benzo(b)fluoranthene	21 / 39	0.066	1.50	SED95-40	0.363
Benzo(g,h,i)perylene	13 / 39	0.058	0.340	SED95-40	0.209
Benzo(k)fluoranthene	11 / 39	0.051	0.230	SED95-25	0.153
bis(2-Ethylhexyl)phthalate	26 / 39	0.042	19	SED95-16	1.61
Butylbenzylphthalate	21 / 39	0.029	6.60	SED95-27	0.629
Carbazole	5 / 34	0.055	0.160	SED98-51	0.091
Chrysene	20 / 39	0.023	1.00	SED95-40	0.296
Di-n-butylphthalate	13 / 39	0.049	3.10	SED95-27	0.336
Di-n-octylphthalate	9 / 34	0.052	23.5	SED95-43	1.00
Dibenz(a,h)anthracene	1 / 34	0.065	0.065	SED95-42	0.065
Dibenzofuran	1 / 39	0.089	0.089	SED95-40	0.089
Diethylphthalate	6 / 39	0.028	0.200	SED93-21-O	0.136
Dimethylphthalate	1 / 39	0.510	0.51	SED98-51	0.294
Fluoranthene	28 / 39	0.012	1.70	SED98-51	0.342
Fluorene	5 / 39	0.059	0.120	SED95-40	0.086
Indeno(1,2,3-c,d)pyrene	11 / 39	0.051	0.310	SED95-29	0.195
Phenanthrene	19 / 39	0.053	1.000	SED98-51	0.301
Phenol	2 / 39	0.088	0.100	SED95-40	0.094
Pyrene	28 / 39	0.010	1.90	SED95-40	0.384

TABLE 8.12-5

SUMMARY OF ANALYTICAL DATA FOR SEDIMENT SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Pesticides/PCBs					
4,4'-DDD	8 / 36	0.004	0.036	SED95-32	0.005
4,4'-DDE	7 / 36	0.003	0.065	SED95-32	0.006
4,4'-DDT	5 / 36	0.002	0.047	SED98-50	0.005
Aldrin	6 / 36	0.003	0.012	SED95-37	0.002
alpha-Chlordane	5 / 36	0.004	0.008	SED95-40	0.002
delta-BHC	5 / 34	0.005	0.009	SED98-52	0.002
Endosulfan-sulfate	2 / 34	0.005	0.005	SED98-52	0.003
Endosulfan II	2 / 34	0.003	0.036	SED96-48	0.004
gamma-Chlordane	5 / 36	0.002	0.006	SED95-40	0.002
Methoxychlor	1 / 34	0.010	0.010	SED95-22	0.009
PCB 1232	2 / 34	0.041	0.064	SED98-52	0.029
PCB 1242	1 / 36	0.060	0.060	SED95-42	0.028
PCB 1254	2 / 36	0.042	0.087	SED98-52	0.030
Metals					
Aluminum, total	45 / 45	1410	22400	SED95-01	11,910
Antimony, total	6 / 19	1.3	1.3	SED95-02	0.35
Arsenic, total	31 / 39	0.5	16.3	SED95-01	5.0
Barium, total	45 / 45	8	287	SED95-01	97
Beryllium, total	38 / 39	0.1	34.3	SED95-27	10.1
Cadmium, total	28 / 35	0.06	6.9	SED96-48	2.0
Calcium, total	45 / 45	360	12700	SED93-27-O	3,765
Chromium, total	32 / 39	3.4	76.2	SED95-14	16
Cobalt, total	37 / 45	1.9	24.5	SED95-28	8.8
Copper, total	31 / 39	4.3	81.8	SED95-40	22
Cyanide, total	4 / 34	1.4	14.9	SED98-50	2.312
Iron, total	44 / 45	1920	37100	SED95-41	16,545
Lead, total	43 / 45	3	262	SED95-12	68
Magnesium, total	42 / 45	458	9310	SED95-14	1,902
Manganese, total	44 / 45	17	13900	SED95-02	1,509
Mercury, total	25 / 41	0.035	0.6	SED95-41	0.22
Nickel, total	28 / 43	1.625	24.7	SED95-37	8.1
Potassium, total	40 / 45	194	10100	SED95-37	2,125
Selenium, total	6 / 39	1	5.4	SED95-28	1.16
Silver, total	1 / 34	0.92	0.92	SED96-48	0.18
Sodium, total	24 / 45	24.5	1010	SED93-29-ORE	162
Thallium, total	6 / 34	1.4	26.4	SED95-02	2.9
Vanadium, total	44 / 45	1.3	70	SED95-01	24
Zinc, total	44 / 45	13	754	SED96-48	208

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND), and one time the method detection limit was used to represent the concentrations of constituents reported as "BMQL".
2. Summary statistics are based on the average concentration over time at that particular location.

TABLE 8.12-6

SUMMARY OF ANALYTICAL DATA FOR BACKGROUND SEDIMENT SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Volatile Organic Compounds					
Acetone	2 / 7	0.073	0.081	SED95-39	0.029
Carbon Disulfide	1 / 7	0.005	0.005	SED95-30	0.005
Methylene Chloride	1 / 7	0.019	0.019	SED95-39	0.013
Toluene	3 / 7	0.002	0.021	SED95-45	0.010
Semivolatile Organic Compounds					
4-Methylphenol	1 / 7	0.055	0.055	SED95-30	0.055
Benzo(a)anthracene	1 / 6	0.078	0.078	SED96-49	0.078
Benzo(a)pyrene	1 / 6	0.079	0.079	SED96-49	0.079
Benzo(b)fluoranthene	2 / 6	0.140	0.150	SED95-38	0.145
bis(2-Ethylhexyl)phthalate	1 / 7	0.230	0.230	SED95-30	0.230
Butylbenzylphthalate	4 / 7	0.088	2.60	SED95-39	0.755
Chrysene	1 / 6	0.140	0.140	SED96-49	0.140
Di-n-butylphthalate	2 / 6	0.120	0.650	SED95-38	0.323
Fluoranthene	3 / 6	0.060	0.220	SED96-49	0.150
Indeno(1,2,3-c,d)pyrene	1 / 6	0.070	0.070	SED96-49	0.070
Phenanthrene	1 / 6	0.120	0.120	SED96-49	0.120
Pyrene	3 / 6	0.200	0.210	SED96-49	0.203
Pesticides/PCBs					
4,4'-DDD	1 / 7	0.012	0.012	SED95-39	0.004
4,4'-DDE	1 / 7	0.017	0.017	SED95-39	0.005
Metals					
Aluminum, total	7 / 7	2160	16700	SED95-39	9,863
Arsenic, total	5 / 7	0.900	8.8	SED95-38	4.1
Barium, total	7 / 7	16	88	SED95-38	56
Beryllium, total	7 / 7	2.6	14.5	SED96-49	8.6
Cadmium, total	6 / 7	0.1	3.8	SED95-39	1.4
Calcium, total	7 / 7	681	5460	SED95-31	2,444
Chromium, total	6 / 7	1.6	14.1	SED95-39	7
Cobalt, total	6 / 7	1.4	7.4	SED95-38	3.8
Copper, total	3 / 7	4.7	14.7	SED96-49	7
Iron, total	7 / 7	1670	21500	SED95-39	10,570
Lead, total	6 / 7	34	209	SED95-39	102
Magnesium, total	6 / 7	189	1390	SED96-49	751
Manganese, total	7 / 7	10	654	SED95-38	209
Mercury, total	5 / 7	0.120	0.490	SED95-38	0.201
Nickel, total	6 / 6	1.3	16.3	SED95-39	8.9
Potassium, total	7 / 7	193	822	SED95-45	534
Sodium, total	2 / 7	171	993	SED96-49	184
Vanadium, total	7 / 7	2	40.5	SED95-39	17
Zinc, total	5 / 7	48	276	SED95-39	123
Wet Chemistry					
Cadmium	7 / 7	0.009	250	SED95-30	106
Copper	6 / 7	0.100	2100	SED95-39	859
Mercury	4 / 7	0.0001	204.2	SED95-39	30
Nickel	5 / 7	0.052	400	SED95-31	169
Zinc	7 / 7	0.6	21200	SED95-39	9,029
AVS	4 / 7	1800	56800	SED95-39	9,304
SEM/AVS ratio	4 / 7	0.420	11	SED95-38	2.8
Percent Organic Carbon	6 / 6	1.3	7.8	SED95-39	4.4
Percent Solids	7 / 7	16	61	SED95-44	28
Total Organic Carbon (TOC)	7 / 7	26800	256000	SED95-31	99,314
pH	7 / 7	5.6	7.2	SED95-39	6.2

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND), and one time the method detection limit was used to represent the concentrations of constituents reported as "BMQL".
2. Analytical results are based on samples SED95-30, SED95-31, SED95-38, SED95-39, SED95-44, and SED95-45 collected in December 1995 and SED96-49 collected in October 1996.

TABLE 8.12-7

SUMMARY OF ANALYTICAL DATA FOR SURFACE WATER SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Volatile Organic Compounds					
1,1,1-Trichloroethane	1 / 43	0.00069	0.00069	SW95-41	0.0005
1,1,2-Trichloroethane	1 / 43	0.00055	0.00055	SW95-42	0.0005
1,2-Dichlorobenzene	1 / 43	0.0013	0.0013	SW95-42	0.00052
1,2-Dichloropropane	1 / 40	0.00065	0.00065	SW95-42	0.0005
1,4-Dichlorobenzene	1 / 43	0.003	0.003	SW95-42	0.00056
Acetone	5 / 43	0.002	0.004	SW95-10	0.0027
Benzene	3 / 43	0.00053	0.0015	SW95-42	0.00054
Carbon Disulfide	2 / 43	0.001	0.0023	SW95-28	0.00055
Carbon Tetrachloride	1 / 43	0.0006	0.0006	SW95-42	0.0005
Chlorobenzene	12 / 43	0.001	0.056	SW95-42	0.0025
Chloroethane	1 / 43	0.002	0.002	SW95-19	0.00053
Chloromethane	4 / 43	0.00063	0.0018	SW95-17	0.00065
cis-1,2-Dichloroethene	3 / 43	0.00065	0.0014	SW95-17	0.00053
Ethylbenzene	1 / 43	0.0013	0.0013	SW95-34	0.00052
Tetrachloroethene	2 / 43	0.00055	0.0098	SW95-28	0.00072
Toluene	3 / 43	0.00056	0.005	SW95-21	0.00071
Trichloroethene	2 / 43	0.001	0.0018	SW95-17	0.00055
Xylenes	1 / 43	0.001	0.001	SW98-54	0.0005
Semivolatile Organic Compounds					
4-Methylphenol	2 / 43	0.003	0.0053	SW95-22	0.0026
bis(2-Ethylhexyl)phthalate	5 / 43	0.001	0.0043	SW95-42	0.0024
Butylbenzylphthalate	8 / 43	0.002	0.01	SW95-24	0.0029
Di-n-butylphthalate	1 / 43	0.002	0.002	SW95-04	0.002
Diethylphthalate	1 / 43	0.002	0.002	SW98-52	0.002
N-Nitrosodiphenylamines	1 / 43	0.001	0.001	SW96-47	0.001
Phenol	2 / 43	0.011	0.015	SW95-22	0.003
Pesticides/PCBs					
4,4'-DDT	1 / 43	0.0001	0.0001	SW98-54	0.000018
Aldrin	3 / 43	0.000012	0.000025	SW96-47	0.0000087
delta-BHC	1 / 43	0.0000085	0.0000085	SW95-42	0.0000051
Endosulfan I	1 / 43	0.000011	0.000011	SW98-54	0.000009

TABLE 8.12-7

SUMMARY OF ANALYTICAL DATA FOR SURFACE WATER SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Total Metals					
Aluminum, total	30 / 38	0.023	1.6	SW95-37	0.37
Arsenic, total	17 / 37	0.0011	0.0035	SW95-24	0.0016
Barium, total	36 / 38	0.0069	0.19	SW95-42	0.047
Beryllium, total	34 / 38	0.00018	0.0036	SW95-22	0.00077
Cadmium, total	8 / 36	0.00017	0.00095	SW95-40	0.00017
Calcium, total	38 / 38	0.61	78	SW95-19	29
Chromium, total	22 / 38	0.00054	0.012	SW95-19	0.0016
Cobalt, total	20 / 38	0.00035	0.0067	SW96-47	0.0011
Copper, total	14 / 38	0.0025	0.0092	SW96-47	0.0042
Cyanide, total	4 / 41	0.0075	0.012	SW95-40	0.005
Iron, total	36 / 38	0.065	48	SW95-19	2.8
Lead, total	6 / 37	0.0014	0.0092	SW95-19	0.0018
Magnesium, total	38 / 38	0.55	45	SW95-42	7.9
Manganese, total	37 / 38	0.009	30	SW95-19	2.8
Mercury, total	15 / 38	0.00013	0.00098	SW95-21	0.00019
Nickel, total	15 / 38	0.0012	0.018	SW95-42	0.0037
Potassium, total	37 / 38	0.38	43	SW95-42	8.6
Selenium, total	5 / 38	0.0037	0.015	SW95-19	0.0026
Silver, total	2 / 38	0.0037	0.0055	SW95-28	0.00087
Sodium, total	38 / 38	1.5	181	SW95-42	33
Thallium, total	4 / 36	0.0021	0.029	SW95-19	0.0028
Vanadium, total	27 / 38	0.00049	0.0058	SW95-42	0.0022
Zinc, total	26 / 38	0.0065	0.39	SW95-37	0.034
Dissolved Metals					
Alimunum (Al)	7 / 41	0.0384	0.394	SW95-23	0.038
Antimony (Sb)	1 / 41	0.0054	0.0054	SW96-48	0.0017
Arsenic (As)	9 / 41	0.0025	0.0053	SW95-12	0.0018
Barium (Ba)	35 / 41	0.0112	0.167	SW95-42	0.046
Beryllium (Be)	12 / 41	0.00041	0.0035	SW95-22	0.00057
Cadmium (Cd)	3 / 41	0.00032	0.00053	SW95-28	0.00022
Calcium (Ca)	41 / 41	1.47	90.3	SW95-19	35.4
Chromium (Cr)	10 / 41	0.00062	0.0048	SW95-19	0.00087
Cobalt (Co)	11 / 41	0.0014	0.0035	SW95-13	0.0009
Copper (Cu)	12 / 41	0.0045	0.0148	SW95-09	0.0036
Iron (Fe)	19 / 41	0.0073	55.8	SW95-19	1.71
Lead (Pb)	3 / 41	0.0017	0.0028	SW95-27	0.00068
Magnesium (Mg)	41 / 41	1.27	37.8	SW95-42	9.44
Manganese (Mn)	41 / 41	0.0045	33.3	SW95-19	2.86
Nickel (Ni)	14 / 41	0.0019	0.0194	SW95-35	0.0035
Potassium (K)	33 / 41	1.4	15.2	SW95-19	7.54
Selenium (Se)	16 / 41	0.005	0.0287	SW95-19	0.0054
Sodium (Na)	31 / 41	7.94	141	SW95-42	37.3
Vanadium (V)	9 / 41	0.0031	0.011	SW95-42	0.0025
Zinc (Zn)	6 / 39	0.0055	0.0675	SW95-22	0.010

TABLE 8.12-7

SUMMARY OF ANALYTICAL DATA FOR SURFACE WATER SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Wet Chemistry					
Ammonia (N)	38 / 43	0.1	29.5	SW95-42	4.04
Hardness	43 / 43	7.55	354.5	SW95-42	124
Nitrate (N)	40 / 43	0.05	7.6	SW95-40	1.15
Nitrite (N)	33 / 43	0.005	0.23	SW95-41	0.033
Phosphate, total	40 / 41	0.045	0.62	SW98-52	0.21
Total Dissolved Solids (TDS)	40 / 41	3.8	490	SW96-47	197
Total Kjeldahl Nitrogen (TKN)	33 / 40	0.3	35.5	SW95-42	4.3
Total Suspended Solids (TSS)	24 / 43	6.5	530	SW95-26	33.3

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND), and one time the method detection limit was used to represent the concentrations of constituents reported as "BMQL".
2. If a location was sampled more than once, the summary statistics are based on the average concentration over time at that location.

TABLE 8.12-8

SUMMARY OF ANALYTICAL DATA FOR BACKGROUND SURFACE WATER SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Volatile Organic Compounds					
Carbon Disulfide	2 / 8	0.001	0.06	SW95-31	0.0084
Chloromethane	2 / 8	0.00175	0.003	SW96-46	0.0012
cis-1,2-Dichloroethene	1 / 8	0.0006	0.0006	SW95-44	0.00051
Trichloroethene	1 / 8	0.0005	0.0005	SW95-30	0.00050
Semivolatile Organic Compounds					
Butylbenzylphthalate	1 / 8	0.002	0.002	SW95-31	0.0020
Diethylphthalate	1 / 8	0.002	0.002	SW95-39	0.0020
Pesticides/PCBs					
Aldrin	1 / 8	0.000024	0.000024	SW95-30	0.000010
delta-BHC	1 / 8	0.000011	0.000011	SW95-30	0.0000062
Total Metals					
Aluminum, total	7 / 8	0.0457	0.3285	SW95-30	0.17
Antimony, total	1 / 8	0.003375	0.003375	SW95-39	0.0015
Arsenic, total	4 / 7	0.002225	0.0034	SW95-30	0.0020
Barium, total	5 / 8	0.0076	0.0274	SW95-31	0.010
Beryllium, total	8 / 8	0.00013	0.0024	SW95-30	0.0010
Cadmium, total	2 / 6	0.00014	0.000355	SW95-38	0.00015
Calcium, total	8 / 8	2.54	6.86	SW96-49	4.66
Chromium, total	3 / 8	0.0006375	0.001515	SW95-38	0.00049
Cobalt, total	3 / 8	0.00041	0.000795	SW95-39	0.00037
Copper, total	3 / 8	0.002475	0.003875	SW95-30	0.0024
Iron, total	6 / 8	0.0844	0.524625	SW95-45	0.25
Magnesium, total	8 / 8	0.576	1.97	SW96-49	1.26
Manganese, total	7 / 8	0.0119	0.0829	SW96-49	0.0324
Mercury, total	3 / 8	0.000185	0.00078	SW95-39	0.00021
Nickel, total	1 / 8	0.001	0.001	SW95-39	0.00066
Potassium, total	6 / 8	0.5185	1.1925	SW95-38	0.79
Silver, total	1 / 8	0.0014125	0.0014125	SW95-39	0.00076
Sodium, total	8 / 8	0.454	14.4	SW95-39	7.87
Vanadium, total	4 / 8	0.00045	0.0018725	SW95-39	0.00063
Zinc,total	6 / 7	0.0053	0.05375	SW95-38	0.024

TABLE 8.12-8

SUMMARY OF ANALYTICAL DATA FOR BACKGROUND SURFACE WATER SAMPLES (ppm)
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Frequency of Detection	Minimum Detected	Maximum Detected	Location of Maximum Detected Concentration	Arithmetic Mean Concentration
Dissolved Metals					
Alimunum (Al)	4 / 7	0.0799	0.394	SW95-30	0.14
Arsenic (As)	3 / 7	0.0026	0.0043	SW95-38	0.0025
Barium (Ba)	5 / 7	0.005	0.0315	SW95-30	0.012
Beryllium (Be)	4 / 7	0.00049	0.0028	SW95-30	0.0009
Calcium (Ca)	7 / 7	2.88	7.99	SW96-49	4.88
Chromium (Cr)	3 / 7	0.00069	0.0018	SW95-30	0.00069
Cobalt (Co)	3 / 7	0.0024	0.0222	SW95-38	0.0040
Copper (Cu)	3 / 7	0.004	0.0051	SW95-30	0.0027
Iron (Fe)	4 / 7	0.136	0.364	SW95-45	0.16
Lead (Pb)	3 / 7	0.0012	0.0019	SW95-30	0.0010
Magnesium (Mg)	7 / 7	0.647	2.25	SW96-49	1.42
Manganese (Mn)	7 / 7	0.0144	0.0968	SW95-45	0.040
Mercury (Hg)	1 / 7	0.00013	0.00013	SW95-39	0.0001
Nickel (Ni)	3 / 7	0.0019	0.0036	SW95-30	0.0014
Potassium (K)	3 / 7	1.61	1.81	SW95-39	1.04
Selenium (Se)	1 / 7	0.0077	0.0077	SW96-49	0.0032
Sodium (Na)	1 / 7	10.4	10.4	SW96-49	5.03
Wet Chemistry					
Ammonia (N)	3 / 8	0.1	0.2	SW95-31	0.11
Hardness	8 / 8	9	40	SW95-39	23.9
Nitrate (N)	8 / 8	0.04	1.6	SW96-49	0.58
Nitrite (N)	3 / 8	0.005	0.01	SW95-30	0.0042
Phosphate, total	6 / 6	0.09	0.16	SW95-31	0.14
Total Dissolved Solids (TDS)	8 / 8	29	150	SW96-49	79.1
Total Kjeldahl Nitrogen (TKN)	6 / 8	0.3	1.9	SW95-39	0.58
Total Suspended Solids (TSS)	3 / 8	7.5	25	SW96-49	8.44

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND), and one time the method detection limit was used to represent the concentrations of constituents reported as "BMQL".

2. If a location was sampled more than once, the summary statistics are based on the average concentration over time at that location.

TABLE 8.13-1

SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte	EPA Region III Risk-Based Concentrations Soil Ingestion (ppm)		MDL		EPA Region III Risk-Based Concentrations Tap Water + (ppm)		RI Groundwater Quality Standards	EPA Maximum Contaminant Levels	Minimum of Groundwater (Standards) RI or EPA	AWQC Consumption (ppm)	EPA Region III Risk-Based Concentrations Fish Tissue (ppm)	
	HI=1	HI=0.1	Soil/ Sediment	Groundwater/ Surface Water	HI=1	HI=0.1					HI=1	HI=0.1
Volatile Organic Compounds												
1,1,1-Trichloroethane	21900 N	2190	0.01	0.001	3.17 N	0.317	0.2	0.2	0.2	NA	379 N	37.9
1,1,2-Trichloroethane	11 C	11	0.01	0.001	0.00019 C	0.00019	0.005	0.005	0.005	0.042	0.055 C	0.055
1,1-Dichloroethane	7820 N	782	0.01	0.001	0.8 N	0.08	NA	NA	NA	NA	135 N	13.5
1,1-Dichloroethene	1.1 C	1.1	0.01	0.001	0.00004 C	0.00004	0.007	0.007	0.007	0.0032	0.0053 C	0.0053
1,2-Dichlorobenzene	7040 N	704	0.33	0.001	0.55 N	0.055	0.6	0.6	0.6	17	122 N	12.2
1,3-Dichlorobenzene	2350 N	235	0.33	0.001	0.18 N	0.018	0.6	0.6	0.6	2.6	41 N	4.1
1,4-Dichlorobenzene	27 C	27	0.33	0.001	0.00047 C	0.00047	0.075	0.075	0.075	2.6	0.13 C	0.13
cis-1,2-Dichloroethene	780 N	78	0.01	0.001	0.06 N	0.006	0.07	0.07	0.07	NA	14 N	1.4
1,2-Dichloropropane	9.4 C	9.4	0.01	0.001	0.00016 C	0.00016	0.005	0.005	0.005	0.039	0.046 C	0.046
2-Hexanone	3130 N	313	0.01	0.005	1.46 N	0.146	NA	NA	NA	NA	54 N	5.4
4-methyl-2-pentanone	6260 N	626	0.01	0.005	0.14 N	0.014	NA	NA	NA	NA	108 N	10.8
Acetone	7820 N	782	0.01	0.01	0.61 N	0.061	NA	NA	NA	NA	135 N	13.5
Benzene	12 C	12	0.01	0.001	0.00032 C	0.00032	0.005	0.005	0.005	0.071	0.057 C	0.057
Carbon Disulfide	7820 N	782	0.01	0.001	1.04 N	0.104	NA	NA	NA	NA	135 N	13.5
Carbon Tetrachloride	4.9 C	4.9	0.01	0.001	0.00016 C	0.00016	0.005	0.005	0.005	0.0044	0.024 C	0.024
Chlorobenzene	1560 N	156	0.01	0.001	0.11 N	0.011	0.1	NA	0.1	21	27 N	2.7
Chloroethane	220 C	220	0.01	0.001	0.0036 C	0.0036	NA	NA	NA	NA	1.09 C	1.09
Chloroform	105 C	105	0.01	0.001	0.00015 C	0.00015	NA	0.1	0.1	0.47	0.52 C	0.52
Chloromethane	49 C	49	0.01	0.001	0.0021 C	0.0021	NA	NA	NA	NA	0.24 C	0.24
Ethylbenzene	7820 N	782	0.01	0.001	1.34 N	0.134	0.7	0.7	0.7	29	135 N	13.5
Methyl Ethyl ketone	46930 N	4693	0.01	0.005	1.91 N	0.191	NA	NA	NA	NA	811 N	81.1
Methylene Chloride	85.0 C	85.0	0.01	0.01	0.0041 C	0.0041	0.005	NA	0.005	1.6	0.42 C	0.42
Tetrachloroethene	12 C	12	0.01	0.001	0.0011 C	0.0011	0.005	0.005	0.005	0.00885	0.061 C	0.061
Styrene	15,640 N	1564	0.01	0.001	1.62 N	0.162	0.1	0.1	0.1	NA	270 N	27
Toluene	15,640 N	1564	0.01	0.001	0.75 N	0.075	1	1	1	200	270 N	27
Trichloroethene	58 C	58	0.01	0.001	0.0016 C	0.0016	0.005	0.005	0.005	0.081	0.29 C	0.29
Vinyl Chloride	0.09 C	0.09	0.01	0.001	0.00002 C	0.00002	0.002	0.002	0.002	0.525	0.0044 C	0.0044
Xylenes	156430 N	15643	0.01	0.001	12 N	1.2	10	10	10	NA	2704 N	270

TABLE 8.13-1

SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte	EPA Region III Risk-Based Concentrations Soil Ingestion (ppm)		MDL		EPA Region III Risk-Based Concentrations Tap Water + (ppm)		RI Groundwater Quality Standards	EPA Maximum Contaminant Levels	Minimum of Groundwater (Standards) RI or EPA	AWQC Consumption (ppm)	EPA Region III Risk-Based Concentrations Fish Tissue (ppm)	
	HI=1	HI=0.1	Soil/ Sediment	Groundwater/ Surface Water	HI=1	HI=0.1					HI=1	HI=0.1
Semivolatile Organic Compounds												
1,2,4-Trichlorobenzene	782 N	78.2	0.33	0.001	0.19 N	0.019	0.07	0.07	0.07	0.94	14 N	1.4
2,4-Dichlorophenol	235 N	23.5	0.33	0.005	0.11 N	0.011	NA	NA	NA	0.79	4.06 N	0.41
2,4-Dimethylphenol	1560 N	156	0.33	0.005	0.73 N	0.073	NA	NA	NA	2.3	27 N	2.7
2-Chlorophenol	391 N	39.1	0.33	0.005	0.03 N	0.003	NA	NA	NA	0.4	6.76 N	0.68
2-Methylnaphthalene	1560 N	156	0.33	0.005	0.12 N	0.012	NA	NA	NA	NA	27 N	2.7
2-Methylphenol	3910 N	391	0.33	0.005	1.8 N	0.18	NA	NA	NA	NA	68 N	6.8
4-Chloro-3-methylphenol	NA	NA	0.33	0.005	NA	NA	NA	** NA	NA	NA	NA	NA
4-Methylphenol	391 N	39.1	0.33	0.005	0.18 N	0.018	NA	NA	NA	NA	6.76 N	0.68
Acenaphthene	4690 N	469	0.33	0.005	0.37 N	0.037	NA	NA	NA	2.7	81 N	8.1
Acenaphthylene	NA	NA	0.33	0.005	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	23460 N	2346	0.33	0.005	1.83 N	0.183	NA	NA	NA	110	406 N	40.6
Benzo[a]anthracene	0.87 C	0.87	0.33	0.005	0.000092 C	0.000092	NA	NA	NA	0.000049	0.0043 C	0.0043
Benzo[a]pyrene	0.087 C	0.087	0.33	0.005	0.000009 C	0.000009	0.0002	0.0002	0.0002	0.000049	0.0004 C	0.0004
Benzo[b]fluoranthene	0.87 C	0.87	0.33	0.005	0.000092 C	0.000092	NA	NA	NA	0.000049	0.0043 C	0.0043
Benzo[g,h,i]perylene	NA	NA	0.33	0.005	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	8.7 C	8.7	0.33	0.005	0.00092 C	0.00092	NA	NA	NA	0.000049	0.043 C	0.043
bis(2-Ethylhexyl)phthalate	46 C	46	0.33	0.005	0.0048 C	0.0048	NA	0.006	0.006	0.0059	0.23 C	0.23
Butylbenzylphthalate	15640 N	1564	0.33	0.005	7.3 N	0.73	NA	NA	NA	5.2	270 N	27
Carbazole	32 C	32	0.33	0.005	0.0033 C	0.0033	NA	NA	NA	NA	0.16 C	0.16
Chrysene	87 C	87	0.33	0.005	0.0092 C	0.0092	NA	NA	NA	0.000049	0.43 C	0.43
Di-n-butylphthalate	7820 N	782	0.33	0.005	3.7 N	0.37	NA	NA	NA	12	135 N	13.5
Di-n-octylphthalate	1560 N	156	0.33	0.005	0.73 N	0.073	NA	NA	NA	NA	27 N	2.7
Dibenzo[a,h]anthracene	0.087 C	0.087	0.33	0.005	0.000009 C	0.000009	NA	NA	NA	0.000049	0.00043 C	0.00043
Dibenzofuran	310 N	31	0.33	0.005	0.024 N	0.0024	NA	NA	NA	NA	5.41 N	0.5
Diethylphthalate	62570 N	6257	0.33	0.005	29.2 N	2.92	NA	NA	NA	120	1081 N	108
Dimethylphthalate	782140 N	78,214	0.33	0.005	365 N	36.5	NA	NA	NA	2900	13519 N	1,352
Fluoranthene	3130 N	313	0.33	0.005	1.5 N	0.15	NA	NA	NA	0.37	54 N	5.4
Fluorene	3130 N	313	0.33	0.005	0.24 N	0.024	NA	NA	NA	14	54 N	5.4
Indeno[1,2,3-c,d]pyrene	0.87 C	0.87	0.33	0.005	0.00009 C	0.00009	NA	NA	NA	0.000049	0.0043 C	0.0043
N-Nitrosodiphenylamines	130 C	130	0.33	0.005	0.014 C	0.014	NA	NA	NA	0.016	0.64 C	0.64
Naphthalene	1560 N	156	0.33	0.005	0.0065 N	0.00065	0.02	NA	0.02	NA	27 N	2.7
Phenanthrene	NA	NA	0.33	0.005	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	46930 N	4693	0.33	0.005	22 N	2.2	NA	NA	NA	4600	811 N	81.1
Pyrene	2350 N	235	0.33	0.005	0.18 N	0.018	NA	NA	NA	11	41 N	4.1

TABLE 8.13-1

SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte	EPA Region III Risk-Based Concentrations Soil Ingestion (ppm)		MDL		EPA Region III Risk-Based Concentrations Tap Water + (ppm)		RI Groundwater Quality Standards	EPA Maximum Contaminant Levels	Minimum of Groundwater (Standards) RI or EPA	AWQC Consumption (ppm)	EPA Region III Risk-Based Concentrations Fish Tissue (ppm)	
	HI=1	HI=0.1	Soil/ Sediment	Groundwater/ Surface Water	HI=1	HI=0.1					HI=1	HI=0.1
Pesticides/PCBs												
4,4'-DDD	2.7 C	2.7	0.0033	0.00002	0.00028 C	0.00028	NA	NA	NA	0.00000084	0.013 C	0.013
4,4'-DDE	1.9 C	1.9	0.0033	0.00002	0.0002 C	0.0002	NA	NA	NA	0.00000059	0.0093 C	0.0093
4,4'-DDT	1.9 C	1.9	0.0033	0.00002	0.0002 C	0.0002	NA	NA	NA	0.00000059	0.0093 C	0.0093
Aldrin	0.038 C	0.038	0.0017	0.00001	0.000004 C	0.000004	NA	NA	NA	0.00000014	0.00019 C	0.00019
alpha-Chlordane	1.82 C	1.82	0.0017	0.00001	0.000191 C	0.000191	NA	NA	NA	0.0000022	0.0090 C	0.0090
delta-BHC	0.1 C	0.1	0.0017	0.00001	0.000011 C	0.000011	NA	NA	NA	0.000013	0.00050 C	0.0005
Dieldrin	0.04 C	0.04	0.0033	0.00002	0.000004 C	0.000004	NA	NA	NA	0.00000014	0.00020 C	0.0002
Endosulfan-sulfate	470 N	47	0.0033	0.00002	0.22 N	0.022	NA	NA	NA	0.24	8.11 N	0.811
Endosulfan I	470 N	47	0.0017	0.00001	0.22 N	0.022	NA	NA	NA	0.24	8.11 N	0.811
Endosulfan II	470 N	47	0.0033	0.00002	0.22 N	0.022	NA	NA	NA	0.24	8.11 N	0.811
gamma-BHC	0.49 C	0.49	0.0017	0.00001	0.000052 C	0.000052	NA	0.0002	0.0002	0.000063	0.0024 C	0.0024
gamma-Chlordane	1.82 C	1.82	0.0017	0.00001	0.000191 C	0.000191	NA	0.002	0.002	0.0000022	0.0090 C	0.0090
Methoxychlor	391 N	39.1	0.017	0.0001	0.18 N	0.018	NA	NA	NA	NA	6.76 N	0.68
PCB 1232	0.32 C	0.32	0.033	0.0002	0.000033 C	0.000033	0.0005	0.0005	0.0005	0.00000017	0.0016 C	0.0016
PCB 1242	0.32 C	0.32	0.033	0.0002	0.000033 C	0.000033	0.0005	0.0005	0.0005	0.00000017	0.0016 C	0.0016
PCB 1254	0.32 C	0.32	0.033	0.0002	0.000033 C	0.000033	0.0005	0.0005	0.0005	0.00000017	0.0016 C	0.0016

TABLE 8.13-1

SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte	EPA Region III Risk-Based Concentrations Soil Ingestion (ppm)		MDL		EPA Region III Risk-Based Concentrations Tap Water + (ppm)		RI Groundwater Quality Standards	EPA Maximum Contaminant Levels	Minimum of Groundwater (Standards) RI or EPA	AWQC Consumption (ppm)	EPA Region III Risk-Based Concentrations Fish Tissue (ppm)	
	HI=1	HI=0.1	Soil/ Sediment	Groundwater/ Surface Water	HI=1	HI=0.1					HI=1	HI=0.1
Metals												
Aluminum, total	78210 N	7821	4	0.022	36.5 N	3.65	NA	*0.13* **	0.125	NA	1352 N	135
Antimony, total	31 N	3.1	1.2	0.003	0.015 N	0.0015	0.006	0.006	0.006	4.3	0.54 N	0.054
Arsenic, total	0.4 C	0.4	0.2	0.004	0.00004 C	0.00004	NA	0.05	0.05	0.00014	0.0021 C	0.0021
Barium, total	5480 N	548	4	0.002	2.6 N	0.26	2	2	2	NA	95 N	9.5
Beryllium, total	156 N	15.6	0.1	0.0001	0.073 N	0.0073	0.004	0.004	0.004	NA	2.70 N	0.27
Cadmium, total	39 N	3.9	0.1	0.0003	0.018 N	0.0018	0.005	0.005	0.005	NA	0.68 N	0.068
Calcium, total	NA	NA	100	0.014	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, total	117320 N	11732	0.2	0.0003	55 N	5.5	0.1	0.1	0.1	NA	2028 N	203
Cobalt, total	1560 N	156	1	0.0006	0.73 N	0.073	NA	NA	NA	NA	27 N	2.7
Copper, total	3130 N	313	0.5	0.001	1.5 N	0.15	NA	1.3	1.3	NA	54 N	5.4
Cyanide, total	1560 N	156	0.1	0.001	0.73 N	0.073	0.2	0.2	0.2	220	27 N	2.7
Iron, total	23460 N	2346	2	0.003	11 N	1.1	NA	*0.3* *	0.3	NA	406 N	40.6
Lead, total	150	150	0.06	0.0015	NA	NA	0.015	0.015	0.015	NA	NA	NA
Magnesium, total	NA	NA	100	0.011	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, total	1560 N	156	0.3	0.0004	0.73 N	0.073	NA	*0.05* *	0.05	NA	27 N	2.70
Mercury, total	23 N	2.3	0.01	0.00007	0.011 N	0.0011	0.002	0.002	0.002	0.000051	0.41 N	0.041
Nickel, total	1560 N	156	0.8	0.001	0.73 N	0.073	0.1	NA	0.1	4.6	27 N	2.70
Potassium, total	NA	NA	100	0.556	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, total	391 N	39.1	0.1	0.004	0.18 N	0.018	0.05	0.05	0.05	11	6.76 N	0.68
Silver, total	391 N	39.1	0.2	0.00015	0.18 N	0.018	NA	*0.1* *	0.1	NA	6.76 N	0.68
Sodium, total	NA	NA	100	0.176	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, total	5.5 N	0.55	0.2	0.002	0.0026 N	0.00026	0.002	0.002	0.002	0.0063	0.095 N	0.0095
Vanadium, total	550 N	55	1	0.0004	0.26 N	0.026	NA	NA	NA	NA	9.46 N	0.95
Zinc, total	23460 N	2346	0.4	0.002	11 N	1.1	NA	*5* *	5	69	406 N	40.6

* = Secondary MCL; ** = Average of Secondary MCL range (0.05 - 0.2 ppm) used.

NA = Not Available; + C = Carcinogen; N = Non-carcinogen; Lead = RBC from Providence.

Lead = RBC from Providence.

TABLE 8.13-2

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN SOIL TO SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Maximum Detected (ppm)	FOD[2]	Method Detection Limit[3] (ppm)	RBC[4] Soil Ingestion Residential (ppm)	Retain	Comments
Volatile Organic Compounds						
1,1,1-Trichloroethane	0.092	9 / 11	0.01	2190	No	Max. < guideline conc.
1,1-Dichloroethane	0.022	8 / 11	0.01	782	No	Max. < guideline conc.
Methyl Ethyl ketone	0.002	1 / 10	0.01	4693	No	Max. < guideline conc.
Toluene	0.002	3 / 10	0.01	1564	No	Max. < guideline conc.
Xylenes	0.003	2 / 9	0.01	15643	No	Max. < guideline conc.
Semivolatile Organic Compounds						
2-Methylphenol	0.13	1 / 11	0.33	391	No	Max. < guideline conc.
Anthracene	0.073	1 / 11	0.33	2346	No	Max. < guideline conc.
Benzo[a]anthracene	0.29	7 / 11	0.33	0.87	No	Max. < guideline conc.
Benzo[a]pyrene	**0.28**	**6 / 11**	**0.33**	**0.087**	**Yes**	
Benzo[b]fluoranthene	0.59	10 / 11	0.33	0.87	No	Max. < guideline conc.
Benzo[g,h,i]perylene	**0.15**	**2 / 11**	**0.33**	**NA**	**Yes**	
Benzo[k]fluoranthene	0.18	4 / 11	0.33	8.7	No	Max. < guideline conc.
bis(2-Ethylhexyl)phthalate	24	11 / 11	0.33	46	No	Max. < guideline conc.
Carbazole	0.075	1 / 11	0.33	32	No	Max. < guideline conc.
Chrysene	0.35	10 / 11	0.33	87	No	Max. < guideline conc.
Di-n-butylphthalate	0.17	3 / 11	0.33	782	No	Max. < guideline conc.
Fluoranthene	0.63	11 / 11	0.33	313	No	Max. < guideline conc.
Indeno[1,2,3-c,d]pyrene	0.11	3 / 11	0.33	0.87	No	Max. < guideline conc.
Phenanthrene	**0.42**	**9 / 11**	**0.33**	**NA**	**Yes**	
Pyrene	0.77	10 / 11	0.33	235	No	Max. < guideline conc.
Pesticides/PCBs						
4,4'-DDD	0.010	3 / 11	0.0033	2.7	No	Max. < guideline conc.
4,4'-DDE	0.037	6 / 11	0.0033	1.9	No	Max. < guideline conc.
4,4'-DDT	0.11	9 / 11	0.0033	1.9	No	Max. < guideline conc.
Aldrin	0.004	1 / 11	0.0017	0.038	No	Max. < guideline conc.
alpha-Chlordane	0.004	2 / 11	0.0017	1.82	No	Max. < guideline conc.
Endosulfan-sulfate	0.006	1 / 11	0.0033	47	No	Max. < guideline conc.

TABLE 8.13-2

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN SOIL TO SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Maximum Detected (ppm)	FOD[2]	Method Detection Limit[3] (ppm)	RBC[4] Soil Ingestion Residential (ppm)	Retain	Comments
Metals						
Aluminum, total	**12,900**	**15 / 15**	**4**	**7821**	**Yes**	
Arsenic, total	**9.8**	**3 / 15**	**0.2**	**0.4**	**Yes**	
Barium, total	**69**	**15 / 15**	**4**	**548**	**Yes**	
Beryllium, total	2.9	15 / 15	0.1	15.6	No	Max. < guideline conc.
Cadmium, total	0.52	9 / 15	0.1	3.9	No	Max. < guideline conc.
Calcium, total	3,150	15 / 15	100	NA	No	Essential Nutrient[5]
Chromium, total	12	15 / 15	0.2	11732	No	Max. < guideline conc.
Cobalt, total	5.8	15 / 15	1	156	No	Max. < guideline conc.
Copper, total	22	13 / 15	0.5	313	No	Max. < guideline conc.
Cyanide, total	2.5	1 / 15	0.1	156	No	Max. < guideline conc.
Iron, total	20,600	15 / 15	2	2346	No	Essential Nutrient[5]
Lead, total[6]	145	15 / 15	0.06	150	No	Max. < standard
Magnesium, total	1,468	15 / 15	100	NA	No	Essential Nutrient[5]
Manganese, total	**556**	**15 / 15**	**0.3**	**156**	**Yes**	
Nickel, total	8.6	6 / 15	0.8	156	No	Max. < guideline conc.
Potassium, total	2,620	15 / 15	100	NA	No	Essential Nutrient[5]
Selenium, total	1.4	1 / 15	0.1	39.1	No	Max. < guideline conc.
Sodium, total	405	2 / 15	100	NA	No	Essential Nutrient[5]
Vanadium, total	39	15 / 15	1	55	No	Max. < guideline conc.
Zinc, total	**3,393**	**15 / 15**	**0.4**	**2346**	**Yes**	

Notes:

1. Compounds in Bold are COC.
2. FOD = Frequency of Detection.
3. MDLs reflect detection limits specified as Data Quality Objectives.
4. Values are 10% of RBC for non-carcinogens.
5. Essential Nutrient = no standards or toxicity information available.
6. Lead Criteria based on Rhode Island DEM Standard.

TABLE 8.13-3

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN GROUNDWATER TO SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Maximum Detected (ppm)	FOD[2]	Method Detection Limit[3] (ppm)	Tap Water Ingestion RBC (ppm)	Minimum Groundwater Quality Standards[4] (RI or EPA)	Retain	Comments
Volatile Organic Compounds							
1,1-Dichloroethane	0.003	4 / 24	0.001	0.08	NA	No	Max. < guideline conc.
1,2-Dichlorobenzene	0.0015	4 / 24	0.001	0.055	0.6	No	Max. < guideline conc.
1,2-Dichloroethane	0.0005	1 / 24	0.001	0.00012	0.005	No	Max. < guideline conc.
1,4-Dichlorobenzene	**0.004**	**4 / 24**	**0.001**	**0.00047**	**0.075**	**Yes**	
2-Hexanone	0.003	1 / 24	0.005	0.146	NA	No	Low FOD, low conc.
Benzene	**0.0115**	**7 / 24**	**0.001**	**0.00032**	**0.005**	**Yes**	
Carbon Disulfide	0.0013	7 / 24	0.001	0.104	NA	No	Max. < guideline conc.
Carbon Tetrachloride	**0.007**	**1 / 24**	**0.001**	**0.00016**	**0.005**	**Yes**	
Chlorobenzene	**0.118**	**6 / 24**	**0.001**	**0.011**	**0.1**	**Yes**	
Chloroethane	0.001	3 / 24	0.001	0.0036	NA	No	Max. < guideline conc.
Chloroform	**0.003**	**4 / 24**	**0.001**	**0.00015**	**0.1**	**Yes**	
Chloromethane	0.0009	2 / 24	0.001	0.0021	NA	No	Max. < guideline conc.
cis-1,2-Dichloroethene	0.004	2 / 24	0.001	0.006	0.07	No	Max. < guideline conc.
Methyl Ethyl ketone	0.002	1 / 17	0.005	0.191	NA	No	Max. < guideline conc.
Methylene Chloride	0.002	1 / 24	0.010	0.0041	0.005	No	Max. < guideline conc.
Toluene	0.008	1 / 24	0.001	0.075	1	No	Max. < guideline conc.
Trichloroethene	**0.005**	**2 / 24**	**0.001**	**0.0016**	**0.005**	**Yes**	
Vinyl Chloride	**0.0024**	**2 / 24**	**0.001**	**0.00002**	**0.002**	**Yes**	
Xylenes	0.0008	1 / 24	0.001	1.2	10	No	Max. < guideline conc.

TABLE 8.13-3

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN GROUNDWATER TO SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Maximum Detected (ppm)	FOD[2]	Method Detection Limit[3] (ppm)	Tap Water Ingestion RBC (ppm)	Minimum Groundwater Quality Standards[4] (RI or EPA)	Retain	Comments
Semivolatile Organic Compounds							
Anthracene	0.003	1 / 24	0.005	0.183	NA	No	Max. < guideline conc.
bis(2-Ethylhexyl)phthalate	**0.015**	**5 / 24**	**0.005**	**0.0048**	**0.006**	**Yes**	
Dibenzofuran	0.004	1 / 24	0.005	0.0024	NA	No	Low FOD, low conc. (<MDL)
Fluoranthene	0.0043	1 / 24	0.005	0.15	NA	No	Max. < guideline conc.
Naphthalene	0.0018	1 / 24	0.005	0.00065	0.02	No	Low FOD, low conc. (<MDL)
Phenanthrene	**0.0028**	**2 / 24**	**0.005**	**NA**	**NA**	**Yes**	
Phenol	0.0073	1 / 24	0.005	2.2	NA	No	Max. < guideline conc.
Pyrene	0.0033	1 / 24	0.005	0.018	NA	No	Low FOD, Max. < guideline conc.
Pesticides/PCBs							
Aldrin	**0.000019**	**4 / 24**	**0.00001**	**0.000004**	**NA**	**Yes**	
delta-BHC	0.000009	2 / 24	0.00001	0.000011	NA	No	Max. < guideline conc.
Dieldrin	**0.000017**	**1 / 24**	**0.00002**	**0.000004**	**NA**	**Yes**	
Endosulfan I	0.000014	1 / 24	0.00001	0.022	NA	No	Low FOD, Max. < guideline conc.

TABLE 8.13-3

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN GROUNDWATER TO SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Maximum Detected (ppm)	FOD[2]	Method Detection Limit[3] (ppm)	Tap Water Ingestion RBC (ppm)	Minimum Groundwater Quality Standards[4] (RI or EPA)	Retain	Comments
Metal Total							
Aluminum, total	**18.19**	**17 / 24**	**0.022**	**3.65**	**0.125**	**Yes**	
Arsenic, total	**0.028**	**14 / 24**	**0.004**	**0.00004**	**0.05**	**Yes**	
Barium, total	**0.71**	**22 / 24**	**0.002**	**0.26**	**2**	**Yes**	
Beryllium, total	**0.029**	**20 / 24**	**0.0001**	**0.0073**	**0.004**	**Yes**	
Cadmium, total	**0.040**	**9 / 24**	**0.0003**	**0.0018**	**0.005**	**Yes**	
Calcium, total	226	24 / 24	0.014	NA	NA	No	Essential Nutrient[5]
Chromium, total	0.025	7 / 24	0.0003	5.5	0.1	No	Max. < guideline conc.
Cobalt, total	0.069	8 / 24	0.0006	0.073	NA	No	Max. < guideline conc.
Copper, total	**0.26**	**14 / 22**	**0.001**	**0.15**	**1.3**	**Yes**	
Iron, total	**183**	**22 / 24**	**0.003**	**1.1**	**0.3**	**Yes**	
Lead, total	**0.055**	**8 / 20**	**0.0015**	**NA**	**0.015**	**Yes**	
Magnesium, total	70.4	24 / 24	0.011	NA	NA	No	Essential Nutrient[5]
Manganese, total	**12.4**	**22 / 24**	**0.0004**	**0.073**	**0.05**	**Yes**	
Mercury, total	0.0003	5 / 24	0.00007	0.0011	0.002	No	Max. < guideline conc.
Nickel, total	**0.12**	**5 / 24**	**0.001**	**0.073**	**0.1**	**Yes**	
Potassium, total	230	24 / 24	0.556	NA	NA	No	Essential Nutrient[5]
Selenium, total	0.0091	13 / 24	0.004	0.018	0.05	No	Max. < guideline conc.
Silver, total	0.011	1 / 24	0.00015	0.018	0.1	No	Max. < guideline conc.
Sodium, total	550.5	23 / 24	0.176	NA	NA	No	Essential Nutrient[5]
Thallium, total	**0.037**	**9 / 24**	**0.002**	**0.00026**	**0.002**	**Yes**	
Vanadium, total	0.015	12 / 24	0.0004	0.026	NA	No	Max. < guideline conc.
Zinc, total	1.01	17 / 24	0.002	1.1	5	No	Max. < guideline conc.

Notes:

1. Compounds in Bold are COC.
2. FOD = Frequency of Detection.
3. MDLs reflect detection limits specified as Data Quality Objectives.
4. Values are RI Groundwater Quality Standards or EPA MCLs; Secondary MCLs are shaded.
5. Essential Nutrient = no standards or toxicity information available.

TABLE 8.13-4

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN SEDIMENT TO SOIL SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Maximum Detected (ppm)	FOD[2]	Method Detection Limit[3] (ppm)	RBC[4] Soil Ingestion Residential (ppm)	Retain	Comments
Volatile Organic Compounds						
1,1,1-Trichloroethane	0.002	1 / 34	0.01	2190	No	Max. < guideline conc.
1,4-Dichlorobenzene	0.046	1 / 34	0.33	27	No	Max. < guideline conc.
1,1-Dichloroethane	0.004	1 / 45	0.01	782	No	Max. < guideline conc.
2-Hexanone	0.057	1 / 45	0.01	313	No	Low FOD
Acetone	0.335	21 / 45	0.01	782	No	Max. < guideline conc.
Benzene	0.021	3 / 45	0.01	12	No	Max. < guideline conc.
Carbon Disulfide	0.1135	3 / 45	0.01	782	No	Max. < guideline conc.
Chlorobenzene	0.076	13 / 45	0.01	156	No	Max. < guideline conc.
Chloromethane	0.004	2 / 34	0.01	49	No	Max. < guideline conc.
Methyl ethyl Ketone	0.1185	16 / 45	0.01	4693	No	Max. < guideline conc.
Methylene Chloride	0.046	10 / 45	0.01	85	No	Max. < guideline conc.
Styrene	0.005	1 / 45	0.01	1564	No	Max. < guideline conc.
Tetrachloroethene	0.23	2 / 45	0.01	12	No	Max. < guideline conc.
Toluene	0.016	5 / 45	0.01	1564	No	Max. < guideline conc.
Trichloroethene	0.003	1 / 45	0.01	58	No	Max. < guideline conc.
Xylenes	0.02	1 / 45	0.01	15643	No	Max. < guideline conc.

TABLE 8.13-4

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN SEDIMENT TO SOIL SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Maximum Detected (ppm)	FOD[2]	Method Detection Limit[3] (ppm)	RBC[4] Soil Ingestion Residential (ppm)	Retain	Comments
Semivolatile Organic Compounds						
1,2,4-Trichlorobenzene	0.053	1 / 34	0.33	78.2	No	Max. < guideline conc.
2-Methylnaphthalene	0.039	1 / 39	0.33	156	No	Max. < guideline conc.
4-Methylphenol	0.38	7 / 34	0.33	39.1	No	Max. < guideline conc.
Acenaphthene	0.1	3 / 39	0.33	469	No	Max. < guideline conc.
Acenaphthylene	0.05	1 / 39			No	Low FOD
Anthracene	0.3	9 / 39	0.33	2346	No	Max. < guideline conc.
Benzo[a]anthracene	**1**	**18 / 39**	**0.33**	**0.87**	**Yes**	
Benzo[a]pyrene	**0.98**	**17 / 39**	**0.33**	**0.087**	**Yes**	
Benzo[b]fluoranthene	**1.5**	**21 / 39**	**0.33**	**0.87**	**Yes**	
Benzo[g,h,i]perylene	**0.34**	**13 / 39**	**0.33**	**NA**	**Yes**	
Benzo[k]fluoranthene	0.23	11 / 39	0.33	8.7	No	Max. < guideline conc.
bis(2-Ethylhexyl)phthalate	19	26 / 39	0.33	46	No	Max. < guideline conc.
Butylbenzylphthalate	6.6	21 / 39	0.33	1564	No	Max. < guideline conc.
Carbazole	0.16	5 / 34	0.33	32	No	Max. < guideline conc.
Chrysene	1	20 / 39	0.33	87	No	Max. < guideline conc.
Di-n-butylphthalate	3.1	13 / 39	0.33	782	No	Max. < guideline conc.
Di-n-octylphthalate	23.5	9 / 34	0.33	156	No	Max. < guideline conc.
Dibenzo[a,h]anthracene	0.065	1 / 34	0.33	0.087	No	Max. < guideline conc.
Dibenzofuran	0.089	1 / 39	0.33	31	No	Max. < guideline conc.
Diethylphthalate	0.2	6 / 39	0.33	6257	No	Max. < guideline conc.
Dimethylphthalate	0.51	1 / 39	0.33	78214	No	Max. < guideline conc.
Fluoranthene	1.7	28 / 39	0.33	313	No	Max. < guideline conc.
Fluorene	0.12	5 / 39	0.33	313	No	Max. < guideline conc.
Indeno[1,2,3-c,d]pyrene	0.31	11 / 39	0.33	0.87	No	Max. < guideline conc.
Phenanthrene	**1**	**19 / 39**	**0.33**	**NA**	**Yes**	
Phenol	0.1	2 / 39	0.33	4693	No	Max. < guideline conc.
Pyrene	1.9	28 / 39	0.33	235	No	Max. < guideline conc.

TABLE 8.13-4

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN SEDIMENT TO SOIL SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Maximum Detected (ppm)	FOD[2]	Method Detection Limit[3] (ppm)	RBC[4] Soil Ingestion Residential (ppm)	Retain	Comments
Pesticides/PCBs						
4,4'-DDD	0.036	8 / 36	0.0033	2.7	No	Max. < guideline conc.
4,4'-DDE	0.065	7 / 36	0.0033	1.9	No	Max. < guideline conc.
4,4'-DDT	0.047	5 / 36	0.0033	1.9	No	Max. < guideline conc.
Aldrin	0.012	6 / 36	0.0017	0.038	No	Max. < guideline conc.
alpha-Chlordane	0.0081	5 / 36	0.0017	1.82	No	Max. < guideline conc.
delta-BHC	0.0093	5 / 34	0.0017	0.1 [6]	No	Max. < guideline conc.
Endosulfan-sulfate	0.0051	2 / 34	0.0033	47	No	Max. < guideline conc.
Endosulfan II	0.036	2 / 34	0.0033	47	No	Max. < guideline conc.
gamma-Chlordane	0.0062	5 / 36	0.0017	1.82	No	Max. < guideline conc.
Methoxychlor	0.01	1 / 34	0.017	39.1	No	Max. < guideline conc.
PCB 1232	0.064	2 / 34	0.033	0.32	No	Max. < guideline conc.
PCB 1242	0.06	1 / 36	0.033	0.32	No	Max. < guideline conc.
PCB 1254	0.087	2 / 36	0.033	0.32	No	Max. < guideline conc.

TABLE 8.13-4

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN SEDIMENT TO SOIL SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Maximum Detected (ppm)	FOD[2]	Method Detection Limit[3] (ppm)	RBC[4] Soil Ingestion Residential (ppm)	Retain	Comments
Metals						
Aluminum, total	**22400**	**45 / 45**	**4**	**7821**	**Yes**	
Antimony, total	1.3	6 / 19	1.2	3.1	No	Max. < guideline conc.
Arsenic, total	**16.3**	**31 / 39**	**0.2**	**0.4**	**Yes**	
Barium, total	287	45 / 45	4	548	No	Max. < guideline conc.
Beryllium, total	**34.3**	**38 / 39**	**0.1**	**15.6**	**Yes**	
Cadmium, total	**6.9**	**28 / 35**	**0.1**	**3.9**	**Yes**	
Calcium, total	12700	45 / 45	100	NA	No	Essential Nutrient[5]
Chromium, total	76.2	32 / 39	0.2	11732	No	Max. < guideline conc.
Cobalt, total	24.5	37 / 45	1	156	No	Max. < guideline conc.
Copper, total	81.8	31 / 39	0.5	313	No	Max. < guideline conc.
Iron, total	37100	44 / 45	2	2346	No	Essential Nutrient[5]
Lead, total[6]	**262**	**43 / 45**	**0.06**	**150**	**Yes**	
Magnesium, total	9310	42 / 45	100	NA	No	Essential Nutrient[5]
Manganese, total	**13900**	**44 / 45**	**0.3**	**156**	**Yes**	
Mercury, total	0.6	25 / 41	0.01	2.3	No	Max. < guideline conc.
Nickel, total	24.7	28 / 43	0.8	156	No	Max. < guideline conc.
Potassium, total	10100	40 / 45	100	NA	No	Essential Nutrient[5]
Selenium, total	5.4	6 / 39	0.1	39.1	No	Max. < guideline conc.
Silver, total	0.92	1 / 34	0.2	39.1	No	Max. < guideline conc., Low FOD
Sodium, total	1010	24 / 45	100	NA	No	Essential Nutrient[5]
Thallium, total	**26.4**	**6 / 34**	**0.2**	**0.55**	**Yes**	
Vanadium, total	**70**	**44 / 45**	**1**	**55**	**Yes**	
Zinc, total	754	44 / 45	0.4	2346	No	Max. < guideline conc.

Notes:

1. Compounds in Bold are COC.
2. FOD = Frequency of Detection
3. Values are 10% of RBC for non-carcinogens.
4. MDLs reflect Detection Limits specified as Data Quality Objectives (DQOs).
5. Essential Nutrient = no standards or toxicity information available or present at maximum concentrations resulting in intakes lower than required daily allowances (RDA).
6. The lowest available RBC for hexachlorocyclohexane(HCH) e.g. for alpha was conservatively used as a surrogate for delta-HCH also known as delta -"BHC."

TABLE 8.13-5

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN SURFACE WATER TO SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Maximum Detected (ppm)	FOD[2]	Method Detection Limit[3] (ppm)	Incidental[4] Ingestion Adjusted RBC (ppm)	AWQC[5] Fish Consumption (ppm)	Retain	Comments
Volatile Organic Compounds							
1,1,1-Trichloroethane	0.00069	1 / 43	0.001	6.34	NA	No	Max. < guideline conc.
1,1,2-Trichloroethane	0.00055	1 / 43	0.001	0.0038	0.042	No	Max. < guideline conc.
1,2-Dichlorobenzene	0.0013	1 / 43	0.001	1.1	17	No	Max. < guideline conc.
1,2-Dichloropropane	0.00065	1 / 40	0.001	0.0032	0.039	No	Max. < guideline conc.
1,4-Dichlorobenzene	0.003	1 / 43	0.001	0.0094	2.6	No	Max. < guideline conc.
Acetone	0.004	5 / 43	0.01	1.22	NA	No	Max. < guideline conc.
Benzene	0.0015	3 / 43	0.001	0.0064	0.071	No	Max. < guideline conc.
Carbon Disulfide	0.0023	2 / 43	0.001	2.08	NA	No	Max. < guideline conc.
Carbon Tetrachloride	0.0006	1 / 43	0.001	0.0032	0.0044	No	Max. < guideline conc.
Chlorobenzene	0.056	12 / 43	0.001	0.22	21	No	Max. < guideline conc.
Chloroethane	0.002	1 / 43	0.001	0.072	NA	No	Max. < guideline conc.
Chloromethane	0.0018	4 / 43	0.001	0.042	NA	No	Max. < guideline conc.
cis-1,2-Dichloroethene	0.0014	3 / 43	0.001	0.12	NA	No	Max. < guideline conc.
Ethylbenzene	0.0013	1 / 43	0.001	2.68	29	No	Max. < guideline conc.
Tetrachloroethene	**0.0098**	**2 / 43**	**0.001**	**0.022**	**0.00885**	**Yes**	
Toluene	0.005	3 / 43	0.001	1.5	200	No	Max. < guideline conc.
Trichloroethene	0.0018	2 / 43	0.001	0.032	0.081	No	Max. < guideline conc.
Xylenes	0.001	1 / 43	0.001	240000	NA	No	Max. < guideline conc.
Semivolatile Organic Compounds							
4-Methylphenol	0.0053	2 / 43	0.005	0.36	NA	No	Max. < guideline conc.
bis(2-Ethylhexyl)phthalate	0.0043	5 / 43	0.005	0.096	0.0059	No	Max. < guideline conc.
Butylbenzylphthalate	0.01	8 / 43	0.005	14.6	5.2	No	Max. < guideline conc.
Di-n-butylphthalate	0.002	1 / 43	0.005	0.37	12	No	Low FOD, Max. < guideline conc.
Diethylphthalate	0.002	1 / 43	0.005	2.92	120	No	Max. < guideline conc.
N-Nitrosodiphenylamines	0.001	1 / 43	0.005	0.28	0.016	No	Max. < guideline conc.
Phenol	0.015	2 / 43	0.005	44	4600	No	Max. < guideline conc.
Pesticides/PCBs							
4,4'-DDT	0.0001	1 / 43	0.00002	0.004	0.00000059	No	Low FOD, Max. < RBC
Aldrin	**0.000025**	**3 / 43**	**0.00001**	**0.00008**	**0.00000014**	**Yes**	
delta-BHC	0.0000085	1 / 43	0.00001	0.000011	0.000013	No	Low FOD, low conc.
Endosulfan I	0.000011	1 / 43	0.00001	0.022	0.24	No	Max. < guideline conc.

TABLE 8.13-5

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN SURFACE WATER TO SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Maximum Detected (ppm)	FOD[2]	Method Detection Limit[3] (ppm)	Incidental[4] Ingestion Adjusted RBC (ppm)	AWQC[5] Fish Consumption (ppm)	Retain	Comments
Total Metals							
Aluminum, total	1.6	30 / 38	0.022	73	NA	No	Max. < guideline conc.
Arsenic, total	**0.0035**	**17 / 37**	**0.004**	**0.0008**	**0.00014**	**Yes**	
Barium, total	0.19	36 / 38	0.002	5.2	NA	No	Max. < guideline conc.
Beryllium, total	0.0036	34 / 38	0.0001	0.146	NA	No	Max. < guideline conc.
Cadmium, total	0.00095	8 / 36	0.0003	0.036	NA	No	Max. < guideline conc.
Calcium, total	78	38 / 38	0.014	NA	NA	No	Essential Nutrient[6]
Chromium, total	**0.012**	**22 / 38**	**0.0003**	**110**	**NA**	**No**	**Max. < guideline conc.**
Cobalt, total	**0.0067**	**20 / 38**	**0.0006**	**1.46**	**NA**	**No**	**Max. < guideline conc.**
Copper, total	**0.0092**	**14 / 38**	**0.001**	**3**	**NA**	**No**	**Max. < guideline conc.**
Cyanide, total	0.012	4 / 41	0.001	1.46	220	No	Max. < guideline conc.
Iron, total	48	36 / 38	0.003	22	NA	No	Essential Nutrient[6]
Lead, total	**0.0092**	**6 / 37**	**0.0015**	**NA**	**NA**	**Yes**	
Magnesium, total	45	38 / 38	0.011	NA	NA	No	Essential Nutrient[6]
Manganese, total	**30**	**37 / 38**	**0.0004**	**1.46**	**NA**	**Yes**	
Mercury, total	**0.00098**	**15 / 38**	**0.00007**	**0.022**	**0.000051**	**Yes**	
Nickel, total	0.018	15 / 38	0.001	1.46	4.6	No	Max. < guideline conc.
Potassium, total	43	37 / 38	0.556	NA	NA	No	Essential Nutrient[6]
Selenium, total	0.015	5 / 38	0.004	0.36	11	No	Max. < guideline conc.
Silver, total	0.0055	2 / 38	0.00015	0.36	NA	No	Max. < guideline conc.
Sodium, total	181	38 / 38	0.176	NA	NA	No	Essential Nutrient[6]
Thallium, total	**0.029**	**4 / 36**	**0.002**	**0.00026**	**0.0063**	**Yes**	
Vanadium, total	0.0058	27 / 38	0.0004	0.52	NA	No	Max. < guideline conc.
Zinc, total	0.39	26 / 38	0.002	22	69	No	Max. < guideline conc.

Notes:

1. Compounds in Bold are COC.
2. FOD = Frequency of Detection
3. MDLs reflect Detection Limits specified as Data Quality Objectives (DQOs).
4. The tap water RBC was adjusted to reflect the amount of water incidentally ingested while swimming relative to the upper percentile of tap water ingested by a child. The resultant ratio is: 1 liter (per day) / 0.04 liter (per swimming event) = 20.
   The tap water RBCs were therefore adjusted upwards by a factor of 20.
5. AWQC is EPA's Ambient Water Quality Criteria for Ingestion of Fish.
6. Essential Nutrient = no standards or toxicity information available or present at maximum concentrations resulting in intakes lower than required daily allowances (RDA).

TABLE 8.13-6

COMPARISON OF ESTIMATED FISH TISSUE CONCENTRATIONS TO SCREENING CRITERIA
Central Landfill - OU2
Johnston, Rhode Island

Analyte[1]	Estimated Fish Tissue Concentration (ppm)	RBC[2] Fish Tissue (ppm)	Retain	Comments
Volatile Organic Compounds				
Acetone	0.00007	13.5	No	Max. < guideline conc.
Carbon disulfide	0.000002	13.5	No	Max. < guideline conc.
1,2-dichlorobenzene	0.10	0.2	No	Max. < guideline conc.
1,4-dichlorobenzene	**0.14**	**0.13**	**Yes**	
Chlorobenzene	0.074	2.70	No	Max. < guideline conc.
Styrene	0.000005	27.0	No	Max. < guideline conc.
Semivolatile Organic Compounds				
Acenaphthylene	0.000087	NA	No	Max. < surrogate conc[3].
Butylbenzylphthalate	2.67	27.0	No	Max. < guideline conc.
Benzo[a]anthracene	**0.036**	**0.0043**	**Yes**	
Benzo[a]pyrene	**0.061**	**0.00043**	**Yes**	
Benzo[b]fluoranthene	**0.076**	**0.0043**	**Yes**	
Carbazole	0.00016	0.16	No	Max. < guideline conc.
Pyrene	0.0099	4.06	No	Max. < guideline conc.
Pesticides/PCBs				
Aldrin	**0.00069**	**0.00019**	**Yes**	
delta-BHC	0.0029	0.00050	No	Not a Human Health COC
PCB 1232	0.00003	0.0016	No	Max. < guideline conc.
PCB 1242	0.0059	0.0016	No	Not a Human Health COC
PCB 1254	0.0264	0.0016	No	Not a Human Health COC
4,4'-DDD	0.0041	0.013	No	Max. < guideline conc.
4,4'-DDE	0.0046	0.0093	No	Max. < guideline conc.
4,4'-DDT	0.0049	0.0093	No	Max. < guideline conc.
Total Chlordanes	0.0029	0.009	No	Max. < guideline conc.
Methoxychlor	0.00024	0.68	No	Max. < guideline conc.
Total Endosulfans	0.000008	0.81	No	Max. < guideline conc.
Metals				
Aluminum, total	0.26	135	No	Max. < guideline conc.
Arsenic, total	**0.051**	**0.0021**	**Yes**	
Barium, total	0.075	9.46	No	Max. < guideline conc.
Beryllium, total	0.016	0.27	No	Max. < guideline conc.
Cadmium, total	0.018	0.068	No	Max. < guideline conc.
Chromium, total	0.032	203	No	Max. < guideline conc.
Copper, total	0.80	5.41	No	Max. < guideline conc.
Iron, total	1.53	40.6	No	Max. < guideline conc.
Manganese, total	**3.25**	**2.70**	**Yes**	
Mercury, total	**0.041**	**0.041**	**Yes**	
Nickel, total	0.38	2.70	No	Max. < guideline conc.
Selenium, total	0.035	0.68	No	Max. < guideline conc.
Thallium, total	0.0028	0.0095	No	Max. < guideline conc.
Vanadium, total	0.0033	0.95	No	Max. < guideline conc.
Zinc, total	5.00	40.6	No	Max. < guideline conc.

Notes:

1. Compounds in Bold are COC.
2. Values are 10% of RBC for non-carcinogens.
3. Estimated fish tissue concentration does not exceed the lowes RBC for PAH.

TABLE 8.14-1

SELECTION OF COMPARISON METHOD FOR IDENTIFICATION OF BACKGROUND CONSTITUENTS
Central Landfill - OU2
Johnston, Rhode Island

Analyte	Analytes of Concern						Analytes of Concern					
	Soil			Sediment			Groundwater			Surface Water		
	Site	Background	Decision	Site	Background	Decision	Site	Background	Decision	Site	Background	Decision
Volatile Organic Compounds												
1,1,1-Trichloroethane												
1,1,2-Trichloroethane												
1,1-Dichloroethane												
1,1-Dichloroethene												
cis-1,2-Dichloroethene												
1,2-Dichlorobenzene												
1,3-Dichlorobenzene												
1,4-Dichlorobenzene												
4-methyl-2-pentanone												
Acetone												
Benzene												
Carbon Tetrachloride												
Chlorobenzene												
Chloroform												
Ethylbenzene												
Methyl ethyl Ketone												
Tetrachloroethene												
Toluene												
Trichloroethene												
Vinyl Chloride												
Xylenes												
Semivolatile Organic Compounds												
2,4-Dichlorophenol												
2-Chlorophenol												
4-Methylphenol												
Benzo(a)anthracene				Maximum	Maximum	Maximum						
Benzo(a)pyrene				Maximum	Maximum	Maximum						
Benzo(b)fluoranthene				Maximum	Maximum	Maximum						
Benzo(g,h,i)perylene												
bis(2-Ethylhexyl)phthalate	Non-normal	Maximum	Maximum				Maximum	Maximum	Maximum			
Chrysene												
Di-n-butylphthalate												
Naphthalene												
Phenanthrene				Maximum	Maximum	Maximum						

TABLE 8.14-1

SELECTION OF COMPARISON METHOD FOR IDENTIFICATION OF BACKGROUND CONSTITUENTS
Central Landfill - OU2
Johnston, Rhode Island

Analyte	Analytes of Concern						Analytes of Concern					
	Soil			Sediment			Groundwater			Surface Water		
	Site	Background	Decision	Site	Background	Decision	Site	Background	Decision	Site	Background	Decision
Pesticides/PCBs												
Aldrin												
delta-BHC												
Dieldrin												
Metals												
Aluminum, total	Normal	Maximum	Maximum	Normal	Normal	t-test	Lognormal	Normal	Kruskal-wallis Test			
Arsenic, total	Maximum	Maximum	Maximum	Non-normal	Normal	Kruskal-wallis Test	Non-normal	Maximum	Maximum	Maximum	Normal	Maximum
Barium, total	Normal	Maximum	Maximum				Lognormal	Normal	Kruskal-wallis Test			
Beryllium, total	Normal	Maximum	Maximum	Lognormal	Normal	Kruskal-wallis Test	Lognormal	Normal	Kruskal-wallis Test	Lognormal	Normal	Kruskal-wallis Test
Cadmium, total				Non-normal	Normal	Kruskal-wallis Test	Maximum	Normal	Maximum			
Copper, total							Lognormal	Normal	Kruskal-wallis Test			
Iron, total							Lognormal	Maximum	Maximum			
Lead, total	Normal	Maximum	Maximum	Non-normal	Normal	Kruskal-wallis Test	Maximum	Normal	Maximum			
Manganese, total	Normal	Maximum	Maximum	Lognormal	Normal	Kruskal-wallis Test	Lognormal	Normal	Kruskal-wallis Test	Non-normal	Normal	Kruskal-wallis Test
Mercury, total										Maximum	Maximum	Maximum
Nickel, total												
Thallium, total												
Vanadium, total				Non-normal	Normal	Kruskal-wallis Test	Maximum	Maximum	Maximum			
Zinc, total	Non-normal	Maximum	Maximum									

Notes:

1. Check if >3 samples detected (if<3 use Maximum).
2. If >3 and >50% ND use Maximum.
3. If <50% ND see if normal or not (not = 'non-normal or lognormal).
4. If using maximum from both sets compare maximum values.
5. If using maximum from one set then use maximum from other set for comparison.
6. If not using maximum for either set then:

a. If both normally distributed, use T-Test.
b. If one or both not normally distributed, use Kruskal-Wallis Test.

TABLE 8.14-2

RESULTS OF COMPARISONS OF SITE DATA TO BACKGROUND DATA
Central Landfill - OU2
Johnston, Rhode Island

Analyte	Comparison of Maximum Concentrations			Comparison of Statistical Values[1]		
	Site	Background	Result	Calculated Value	Tabular Value	Result
I. Soil						
Semivolatile Organic Compounds						
Benzo(a)anthracene						
Benzo(a)pyrene						
Benzo(b)fluoranthene						
bis(2-Ethylhexyl)phthalate	24	0.098	Not Consistent			
Di-n-butylphthalate						
Phenanthrene						
Metals						
Aluminum, total	12900	15300	Consistent			
Arsenic, total	9.78	9.6	Not Consistent			
Barium, total	68.7	37.8	Not Consistent			
Beryllium, total	2.88	4.8	Consistent			
Cadmium, total						
Iron, total						
Lead, total	145	63.9	Not Consistent			
Manganese, total	556	215	Not Consistent			
Mercury, total						
Vanadium, total						
Zinc, total	3393	85.9	Not Consistent			
II. Sediment						
Semivolatile Organic Compounds						
Benzo(a)anthracene	0.13	0.078	Not Consistent			
Benzo(a)pyrene	0.12	0.079	Not Consistent			
Benzo(b)fluoranthene	0.17	0.15	Not Consistent			
bis(2-Ethylhexyl)phthalate						
Di-n-butylphthalate	0.245	0.65	Not Consistent			
Phenanthrene	0.15	0.12	Not Consistent			
Metals						
Aluminum, total				0.903	1.904	Consistent
Arsenic, total				0.043	3.841	Consistent
Barium, total						
Beryllium, total				0.203	3.841	Consistent
Cadmium, total				0.188	3.841	Consistent
Iron, total						
Lead, total				1.032	3.841	Consistent
Manganese, total				5.294	3.841	Not Consistent
Mercury, total						
Vanadium, total				1.415	3.841	Consistent
Zinc, total						

TABLE 8.14-2

RESULTS OF COMPARISONS OF SITE DATA TO BACKGROUND DATA
Central Landfill - OU2
Johnston, Rhode Island

Analyte	Comparison of Maximum Concentrations			Comparison of Statistical Values[1]		
	Site	Background	Result	Calculated Value	Tabular Value	Result
III. Groundwater						
Semivolatile Organic Compounds						
Benzo(a)anthracene						
Benzo(a)pyrene						
Benzo(b)fluoranthene						
bis(2-Ethylhexyl)phthalate	0.015	0.002	Not Consistent			
Di-n-butylphthalate						
Phenanthrene						
Metals						
Aluminum, total				1.344	3.841	Consistent
Arsenic, total	0.028	0.005	Not Consistent			
Barium, total				3.13	3.841	Consistent
Beryllium, total				0.411	3.841	Consistent
Cadmium, total	0.040	0.001	Not Consistent			
Copper				0.023	3.841	Consistent
Iron, total	183	1.45	Not Consistent			
Lead, total	0.055	0.010	Not Consistent			
Manganese, total				6.257	3.841	Not Consistent
Mercury, total						
Vanadium, total	0.015	0.001	Not Consistent			
Zinc, total						
IV. Surface Water						
Semivolatile Organic Compounds						
Benzo(a)anthracene						
Benzo(a)pyrene						
Benzo(b)fluoranthene						
bis(2-Ethylhexyl)phthalate						
Di-n-butylphthalate						
Phenanthrene						
Pesticides						
Aldrin						
Metals						
Aluminum, total						
Arsenic, total	0.001	0.003	Not Consistent			
Barium, total						
Beryllium, total				0.322	3.841	Consistent
Cadmium, total						
Iron, total						
Lead, total						
Manganese, total				11.108	3.841	Not Consistent
Mercury, total	0.0001	0.0008	Not Consistent			
Vanadium, total						
Zinc, total						

Consistent = Site concentrations consistent with background
Not Consistent = Site concentrations greater than background

1. Values are H-values from the Kruskal-Wallis test or t-values from the T-test, as appropriate. See Table A for a listing of compounds and comparison test.

TABLE 8.14-3

IDENTIFIED CONSTITUENTS OF CONCERN (COCs)
Central Landfill - OU2
Johnston, Rhode Island

Analyte	Analytes of Concern			
	Soil	Sediment	Groundwater	Surface Water
Volatile Organic Compounds				
1,4-Dichlorobenzene			X	X [2]
Benzene			X	X [2]
Carbon Tetrachloride			X	X [2]
Chlorobenzene			X	X [2]
Chloroform			X	X [2]
Tetrachloroethene				X
Trichloroethene			X	X [2]
Vinyl Chloride			X	X [2]
Semivolatile Organic Compounds				
Benzo(a)anthracene		X		
Benzo(a)pyrene	X	X		
Benzo(b)fluoranthene		X		
Benzo(g,h,i)perylene	X	X		
bis(2-Ethylhexyl)phthalate			X	X [2]
Phenanthrene	X	X	X	X [2]
Pesticides/PCBs				
Aldrin			X	X
Dieldrin			X	X [2]
Metals				
Aluminum, total	X	X	X	X [2]
Arsenic, total	X	X	X	X
Barium, total	X		X	X [2]
Beryllium, total		X	X	X [2]
Cadmium, total		X	X	X [2]
Copper			X	X [2]
Iron, total			X	X [2]
Lead, total	X	X	X	X
Manganese, total	X	X	X	X
Mercury, total				X
Nickel, total			X	X [2]
Thallium, total		X	X	X
Vanadium, total		X		
Zinc, total	X			

[1] Shading indicates that the site concentration is consistent with background concentrations.

[2] Although these analytes were not detected in surface water, they were retained as potential analytes of concern for future conditions because they were detected in groundwater.

TABLE 8.23-1

EXPOSURE ASSESSMENT SUMMARY
Central Landfill - OU2
Johnston, Rhode Island

Receptor	Exposure Point	Activity	Time Period	Medium	Exposure Route	Pathway Selected for Quantitative Evaluation?	Exposure Frequency and Duration	Exposure Period	Reason for Selection or Exclusion
Resident (Adults and Children)	Residence	Household water use	Current and Future	Groundwater	Ingestion, Inhalation, and Dermal Contact	Yes	350 days/year	30 years	Evaluated residences who currently use private wells for potable water supply. Used tap water data for EPCs if available. Otherwise, conservatively estimated EPCs based on monitoring well data immediately upgradient from selected residences.
	Yard	Recreational Activites	Future	Surficial and subsurface soils	Dermal Contact and Incidental Ingestion	No	NA	NA	Residential contact with landfill derived soils is not anticipated based on distance to non-RIRRC properties. However, soil contact by trespassers was evaluated.
	House	Indoor Activities	Future	Indoor Air	Inhalation	No	NA	NA	Low levels of volatile compounds in ground- water indicate that this is an insignificant exposure pathway. (See Table 8.23-2)
Local Residents (Recreators and Trespassers)	Upper Simmons and Almy Reservoirs	Swimming	Current and Future	Surface water	Dermal Contact and Incidental Ingestion	Yes	71 events/year 1 hour/event	7 years 30 years	Routine swimming was assumed during the summer months, based on the presence of cottages around these reservoirs.
				Sediments	Dermal Contact and Incidental Ingestion	Yes	71 events/year 1 day/event	7 years 30 years	See above
		Fishing	Current and Future	Fish	Ingestion	Yes	7 meals/year	7 years 30 years	Nearby residents may fish in surface water bodies downgradient of the site. Constituents of concern identified in sediment will be used to estimate the potential concentration of COCs in fish tissue. The local residents are expected to fish during the summer months.
	OU2 Upland Areas	Trespassing/Recreation	Current and Future	Surficial Soils	Dermal Contact and Incidental Ingestion	Yes	31 events/year 1 day/event	7 years 30 years	Due to presence of 24-hour security guard and "wild dogs" at the landfill, routine trespassing is not anticipated to occur. However, trespassing once per week during the non-winter months was conservatively evaluated.
				Fugitive Dust	Inhalation	Yes	31 events/year 1 day/event	7 years 30 years	Child trespassers may be exposed to fugitive dust while dirt biking or walking on Site.
	Cedar Swamp Brook, Quarry Stream and Sedimentation Ponds	Trespassing/Recreation	Current and Future	Sediments	Dermal Contact and Incidental Ingestion	Yes	31 events/year 1 day/event	7 years 30 years	Trespassers may incidentally contact sediments while dirtbiking or walking on-Site.
				Surface Water	Dermal contact	Yes	31 events/year 1 day/event	7 years 30 years	Surface water is too shallow for smimming and thus, only wading (dermal contact) was assumed.

TABLE 8.23-1

EXPOSURE ASSESSMENT SUMMARY
Central Landfill - OU2
Johnston, Rhode Island

Receptor	Exposure Point	Activity	Time Period	Medium	Exposure Route	Pathway Selected for Quantitative Evaluation?	Exposure Frequency and *Duration*	Exposure Period	Reason for Selection or Exclusion
Adult Facility Worker (at Landfill)	OU2 Upland Areas	Outside work activities	Current	Surficial soil	Dermal Contact and Incidental Ingestion	No	NA	NA	No site related contaminants are expected to be present in surfical soils in potential work areas.
	Sedimentation Ponds	Dredging of Ponds	Current	Sediments	Dermal Contact and Incidental Ingestion	Yes	10 days/year 1 day/event	25 years	Workers may contact sediments and surface water while dredging ponds, primarily while cleaning excavation equipment.
				Surface water	Dermal Contact	Yes	10 days/year 2 hours/event	25 years	
	Cedar Swamp Brook, Quarry Stream	Outside work activities	Current	Sediments	Dermal Contact and Incidental Ingestion	Yes	6 events/year 1 day/event	25 years	Workers may contact sediments and surface water while performing litter collection in these streams.
				Surface water	Dermal Contact	Yes	6 events/year 2 hours/event	25 years	

TABLE 8.23-2

METHOD 2 GB GROUNDWATER OBJECTIVES
Central Landfill - OU2
Johnston, Rhode Island

Analyte	C_w Water Concentration mg/l Calculated	C_a Air Concentration mg/l Chemical Specific	T Temperature of Groundwater °K = 293	WS Solubility mg/l-water Chemical Specific	VP Vapor Pressure mm Hg Chemical Specific	MW Molecular Weight g/mole Chemical Specific
Volatile Organic Compounds						
1,4-Dichlorobenzene	9.13	0.45	293	65.3	0.4	147
Chloroform	0.074	0.00978	293	7,950	160	119.38
Vinyl Chloride	0.00033	0.0026	293	1,100	2,531	62.5

Note:
1. Chemical specific values were obtained from Montgomery, John H. Groundwater Chemicals Desk Reference, 3rd ed. CRC Press. 2000.

TABLE 8.23-2 (CONT'D)

COMPARISON OF MAXIMUM DETECTED CONCENTRATION IN GROUNDWATER TO GB GROUNDWATER OBJECTIVE
Central Landfill - OU2
Johnston, Rhode Island

Constituent of Concern	Maximum Detected (ppm)	Frequency of Detection	Method Detection Limit[1] (ppm)	GB Groundwater Objective (mg/l)	Retain
Volatile Organic Compounds					
1,4-Dichlorobenzene	0.004	4 / 24	0.001	9.13	No
Benzene	0.0115	7 / 24	0.001	0.14	No
Carbon Tetrachloride	0.007	1 / 24	0.001	0.07	No
Chlorobenzene	0.118	6 / 24	0.001	3.2	No
Chloroform	0.003	4 / 24	0.001	0.074	No
Trichloroethene	0.005	2 / 24	0.001	0.54	No
Vinyl Chloride	0.0024	2 / 24	0.001	0.00033	No[2]

Notes:

1. MDLs reflect detection limits specified as Data Quality Objectives.
2. Both wells are located on-site on RIRRC property - no buildings will be built there in the future
   Those two wells (MW48 and 48S - well cluster) are located 175 feet directly downgradient of the top of the slope (HS) of the OU-1 plume. (Detects ranged from .8-4 ppb, both wells, both events - GW is about 10' bgs)

TABLE 8.24-1

EXPOSURE POINT CONCENTRATIONS
Central Landfill - OU2
Johnston, Rhode Island

Contaminants	Sediment				Surface Water					
	Almy Reservoir 95% UCL or Maximum Value [1] (mg/kg)	Upper Simmons 95% UCL or Maximum Value [1] (mg/kg)	Sedimentations Ponds 95% UCL or Maximum Value [1] (mg/kg)	Quarry and Cedar 95% UCL or Maximum Value [1] (mg/kg)	Almy Reservoir 95% UCL or Maximum Value [1] (mg/l)	Almy Reservoir Future[2] (mg/l)	Upper Simmons 95% UCL or Maximum Value [1] (mg/l)	Upper Simmons Future[2] (mg/l)	Sedimentation Ponds 95% UCL or Maximum Value [1] (mg/l)	Quarry and Cedar 95% UCL or Maximum Value [1] (mg/l)
Volatile Organic Compounds										
1,4-Dichlorobenzene	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC
Benzene	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC
Carbon Tetrachloride	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC
Chlorobenzene	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC
Chloroform	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC
Tetrachloroethene	NCC	NCC	NCC	NCC	NCC	NCC	0.00055	NCC	NCC	NCC
Trichloroethene	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC
Vinyl Chloride	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC
Semivolatile Organic Compounds										
Benzo(a)anthracene	0.066	0.78	0.92	0.25	NCC	NCC	NCC	NCC	NCC	NCC
Benzo(a)pyrene	0.084	0.57	0.62	0.22	NCC	NCC	NCC	NCC	NCC	NCC
Benzo(b)fluoranthene	0.12	1.1	1.16	0.31	NCC	NCC	NCC	NCC	NCC	NCC
Benzo(g,h,i)perylene	0.087	0.21	0.25	0.079	NCC	NCC	NCC	NCC	NCC	NCC
bis(2-Ethylhexyl)phthalate	NCC	NCC	NCC	NCC	NCC	1.7E-04	NCC	1.4E-03	NCC	NCC
Phenanthrene	0.067	1	0.92	0.28	NCC	NCC	NCC	NCC	NCC	NCC
Pesticides/PCBs										
Aldrin	NCC	NCC	NCC	NCC	NCC	NCC	NCC	9.4E-07	1.8E-05	NCC
Dieldrin	NCC	NCC	NCC	NCC	NCC	5.1E-07	NCC	1.9E-06	NCC	NCC
Metals										
Aluminum, total	17,336	14,193	15,959	12,458	NCC	2.2E-02	NCC	0.049	NCC	NCC
Arsenic, total	8.45	13.80	5.80	7.66	0.0021	NCC	0.0013	0.000	0.0035	0.0022
Barium, total	NCC	NCC	NCC	NCC	NCC	1.4E-03	NCC	0.018	NCC	NCC
Beryllium, total	28	19	2.83	2.41	0.00025	9.0E-05	0.00091	0.0001	0.0017	0.0025
Cadmium, total	4.87	2.58	0.89	0.14	NCC	4.0E-05	NCC	0.0001	NCC	NCC
Copper, total	NCC	NCC	NCC	NCC	NCC	1.3E-04	NCC	NCC	NCC	NCC
Iron, total	NCC	NCC	NCC	NCC	NCC	1.4E-01	NCC	0.55	NCC	NCC
Lead, total	194	53	110	37	NCC	2.6E-04	NCC	0.001	0.0035	0.0060
Manganese, total	8,670	643	753	762	0.030	5.8E-03	6.3	0.117	1.9	29.5
Mercury, total	NCC	NCC	NCC	NCC	NCC	5.0E-05	NCC	1.2E-05	0.00043	0.00098
Nickel, total	NCC	NCC	NCC	NCC	NCC	2.0E-04	NCC	0.003	NCC	NCC
Thallium, total	12	NCC	NCC	NCC	NCC	NCC	0.011	0.006	NCC	0.011
Vanadium, total	42	29	28	42	NCC	NCC	NCC	0.001	NCC	NCC
Zinc, total	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC	NCC

TABLE 8.24-1

EXPOSURE POINT CONCENTRATIONS
Central Landfill - OU2
Johnston, Rhode Island

Contaminants	Surficial Soil 95% UCL or Maximum Value[1] (mg/kg)	Estimated Fugitive Dust Concentration (mg/m³)	Measured Groundwater Concentration at Denney Residence (mg/l)	Estimated Fish Tissue Concentration (mg/kg)
Volatile Organic Compounds				
1,4-Dichlorobenzene	NCC	NCC	ND	0.139
Benzene	NCC	NCC	ND	NCC
Carbon Tetrachloride	NCC	NCC	ND	NCC
Chlorobenzene	NCC	NCC	ND	NCC
Chloroform	NCC	NCC	ND	NCC
Tetrachloroethene	NCC	NCC	ND	NCC
Trichloroethene	NCC	NCC	ND	NCC
Vinyl Chloride	NCC	NCC	ND	NCC
Semivolatile Organic Compounds				
Benzo(a)anthracene	NCC	NCC	ND	0.036
Benzo(a)pyrene	0.22	1.1E-09	ND	0.0607
Benzo(b)fluoranthene	NCC	NCC	ND	0.0765
Benzo(g,h,i)perylene	0.15	7.2E-10	ND	NCC
bis(2-Ethylhexyl)phthalate	11	5.2E-08	ND	NCC
Phenanthrene	0.24	1.1E-09	ND	NCC
Pesticides/PCBs				
Aldrin	NCC	NCC	ND	0.000689
Dieldrin	NCC	NCC	ND	NCC
Metals				
Aluminum, total	7,611	3.6E-05	ND	NCC
Arsenic, total	5.5	2.6E-08	ND	0.0513
Barium, total	40	1.9E-07	ND	NCC
Beryllium, total	1.5	7.3E-09	0.0052	NCC
Cadmium, total	NCC	NCC	ND	NCC
Copper, total	NCC	NCC	ND	NCC
Iron, total	NCC	NCC	ND	NCC
Lead, total	85	4.0E-07	ND	NCC
Manganese, total	260	1.2E-06	0.299	3.25
Mercury, total	NCC	NCC	ND	0.0409
Nickel, total	NCC	NCC	ND	NCC
Thallium, total	NCC	NCC	ND	NCC
Vanadium, total	NCC	NCC	ND	NCC
Zinc, total	425	2.0E-06	ND	NCC

Notes:

1. 95% UCL EPCs were calculated based on normal, lognormal or non-normal distribution. Refer to exposure point concentration section of the risk assessment text for more information.
2. Refer to Table 8.24-3 & 8.24-4 for calculation of future surface water EPC.
3. Shade indicates consistent with background.
4. NA = Not Analyzed; NCC = Not a Contaminant of Concern in this medium; ND = Not Detected.

TABLE 8.24-2

SAMPLE LOCATIONS USED TO CALCULATE EXPOSURE POINT CONCENTRATIONS
Central Landfill - OU2
Johnston, Rhode Island

Medium	Exposure Point	Sample Location and Identification		
Surface Soil	Site	SS95-01 SS95-02 SS95-02A SS95-02B SS95-03	SS95-04 SS95-05 SS95-06 SS95-07 SS95-08	SS95-09 SS95-09A SS95-09B SS95-10 SS95-11
Sediment	Almy Reservoir	SED95-10 SED95-11 SED95-12	SED95-13 SED95-27 SED95-28	SED95-29 SED95-32 SED96-48
	Upper Simmons	SED93-21-O SED93-22-O SED93-23-O SED93-24-O SED93-25-O	SED93-26-O SED93-27-O SED93-28-O SED93-29-ORE SED93-30-O	SED93-31-O SED95-42 SED95-43 SED98-50 SED98-51 SED98-52
	Sedimentation Ponds	SED95-24 SED95-25 SED95-26	SED95-34 SED95-35 SED95-37	SED95-40 SED95-41
	Cedar Swamp Brook and Quarry Stream	SED95-14 SED95-15 SED95-16	SED95-17 SED95-20 SED95-21	SED95-22 SED95-23
Surface Water	Almy Reservoir	SW95-10 SW95-11	SW95-12	SW95-13
	Upper Simmons	SW95-04 SW95-05 SW95-06	SW95-07 SW95-08 SW95-09 SW95-42	SW95-43 SW98-50 SW98-51 SW98-52
	Sedimentation Ponds	SW95-24 SW95-25 SW95-26	SW95-34 SW95-35 SW95-37	SW95-40 SW95-41
	Cedar Swamp Brook and Quarry Stream	SW95-14 SW95-15 SW95-16 SW95-17	SW95-19 SW95-20 SW95-21	SW95-22 SW95-23 SW96-47

TABLE 8.24-3

CALCULATED EPCs
ALMY RESERVOIR
FUTURE CONDITIONS
Central Landfill - OU2
Johnston, Rhode Island

Contaminants	Maximum	Minimum	Mean[1]	Dilution Factor[2]	EPC
Volatile Organic Compounds					
NA					
Semivolatile Organic Compounds (ug/L)					
bis(2-Ethylhexyl)phthalate	53.0	ND	17	99.5	0.17
Pesticides/PCBs (ug/L)					
Dieldrin	0.058	ND	0.051	99.5	0.00051
Metals (total- mg/L)					
Aluminum	13.8	ND	2.168	99.5	0.022
Barium	0.25	ND	0.14	99.5	0.0014
Beryllium	0.028	ND	0.009	99.5	0.00009
Cadmium	0.02	ND	0.004	99.5	0.00004
Copper	0.036	ND	0.013	99.5	0.00013
Iron	67	ND	13.724	99.5	0.13724
Lead	0.07	ND	0.026	99.5	0.00026
Manganese	1.2	ND	0.587	99.5	0.00587
Mercury	0.01	ND	0.005	99.5	0.00005
Nickel	0.055	ND	0.020	99.5	0.0002

Notes:
EPC: Exposure point concentrations.
NA: Not applicable.
ND: Not detected above Method detection limit.
1. Based on the average concentrations observed in samples collected from eight wells, see Sections 7.40 and 8.24.2 of text.
2. See Section 5.33 of text.

TABLE 8.24-4

CALCULATED EPCs
UPPER SIMMONS RESERVOIR
FUTURE CONDITIONS
Central Landfill - OU2
Johnston, Rhode Island

Contaminants	Maximum	Minimum	Mean[1]	Dilution Factor[2]	EPC
Volatile Organic Compounds					
NA					
Semivolatile Organic Compounds (ug/L)					
bis(2-Ethylhexyl)phthalate	200	ND	23.067	17	1.4
Pesticides/PCBs (ug/L)					
Aldrin	0.025	ND	0.016	17	0.00094
Dieldrin	0.05	ND	0.032	17	0.0019
Metals (total- mg/L)					
Aluminum	11.4	ND	0.825	17	0.049
Arsenic	0.028	ND	0.005	17	0.0003
Barium	1.11	ND	0.301	17	0.018
Beryllium	0.01	ND	0.002	17	0.0001
Cadmium	0.005	ND	0.002	17	0.0001
Iron	43	ND	9.343	17	0.55
Lead	0.071	ND	0.014	17	0.0008
Manganese	6.91	ND	1.984	17	0.117
Mercury	0.005	ND	0.0002	17	0.000012
Nickel	0.222	ND	0.056	17	0.003
Thallium	0.3	ND	0.097	17	0.006
Vanadium	0.27	ND	0.025	17	0.001

Notes:
EPC: Exposure point concentrations.
NA: Not applicable.
ND: Not detected above Method detection limits.
1. Based on the average concentrations observed in samples collected from 17 wells, see Section 7.40 of text.
2. See Section 5.33 of text.

TABLE 8.25-1

EXPOSURE ASSUMPTIONS FOR LOCAL RESIDENT - HIGH END EXPOSURE
Central Landfill - OU2
Johnston, Rhode Island

Exposure Pathway	Exposure Parameters								
	Chemical-specific Variables		Receptor-specific Exposure Variables						
	EPC	AAF	BW	IR	EF	ED	EP	AP	
								noncancer	cancer
Groundwater as Drinking Water	Detected Groundwater Concentration in Residential Wells [1]	Contaminant-Specific Oral AAF			350 events/year [5]	1 day/event [6]			
Child Resident (1 through 10 years of age):			22 kg [2]	1.3 l/day [3]			10 years [7]	10 years	70 years [8]
Child Resident (11 through 19 years of age):			56.8 kg [2]	1.7 l/day [3]			9 years [7]	NA	70 years [8]
Child/Adult Resident (20 through 30 years of age):			69.5 kg [2]	2 l/day [4]			11 years [7]	NA	70 years [8]

Notes:

Code for Exposure Parameters: EPC = Exposure Point Concentration; BW = Body Weight; IR = Ingestion Rate; EF = Exposure Frequency; ED = Exposure Duration; EP = Exposure Period; AP = Averaging Period; AAF = Absorption Adjustment Factor

1. The EPC for drinking water is based on the detected concentration of COCs in groundwater collected from residential taps or wells.
2. Body weight (BW) is based on the arithmetic mean body weight for males and females (all races) from EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997. The mean body weight for males and females within each age category was averaged to represent the body weight of that age category, and then an age-weighted value was calculated.
3. Daily drinking water ingestion rate (IR) is based on the 90th percentile tapwater intake rate for males and females within each age category from the Ershrow and Cantor (1989) data presented in the EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997.
4. Daily drinking water ingestion rate (IR) for adults is the default "high end" intake rate for adult males and females from US EPA, Risk Updates, No. 2, August 1994.
5. The frequency of exposure (EF) describes how often the exposure event occurs over a given period of time. The local resident was assumed to be exposed each day of the year excluding 2 weeks of vacation.
6. The duration of exposure (ED) describes how long each individual exposure event might last. For ingestion of drinking water, ED is by definition 1 day/event. The receptor is assumed to receive the daily intake of contaminants during this event.
7. The duration of the exposure period (EP) describes the length of time over which the receptor comes into contact with contaminants. Since chronic exposures for a young child (1 through 10 years of age) were evaluated, the EP for noncancer effects was set at 10 years. For cancer effects, a 30-year exposure, which incorporates the age groups which experience the highest rate of exposure (i.e., 1 through 30 years of age), was evaluated. The exposure period was set at 30 years based on the 90th percentile for years spent at a single residence (EPA, RAGS, December 1989).
8. For noncancer risk, the averaging period (AP) is set equal to the exposure period (EP). The averaging period is set equal to a lifetime (i.e., 70 years) when estimating cancer risk as discussed in EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997, p 8-1.
9. NA = Not Applicable.

TABLE 8.25-1 (Continued)

CALCULATION OF RECEPTOR-SPECIFIC EXPOSURE FACTORS: LOCAL RESIDENT - HIGH END EXPOSURE
Central Landfill - OU2
Johnston, Rhode Island

Ingestion of Groundwater as Drinking Water (Chronic Effects)

Average Daily Dose (mg/kg/day) = [OHM]water (mg/l) * 1/BW (1/kg) * ED (days/event) * EF (events/year) * 1 year/365 days * EP (years) * 1/AP (1/years) x IR (1/day) x oral AAF

Average Daily Dose (mg/kg/day) = [OHM]water (mg/l) * Receptor-Specific Exposure Factor (l/kg/day) * oral AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects 1 through 10 year-old child resident) = **5.63E-02** (l/kg-day)

Ingestion of Groundwater as Drinking Water (Carcinogenic Effects 1 through 30 year-old child/adult resident)

Average Daily Dose (mg/kg/day) = [OHM]water (mg/l) * 1/BW (child/adult) (1/kg) * ED (day/event) * EF (events/year) * 1 year/365 days * EP (years) * 1/AP (1/years) * IR (l/day) * oral AAF

Average Daily Dose (mg/kg/day) = [OHM]water (mg/l) * Receptor-Specific Exposure Factor (l/kg/day) * oral AAF

Receptor-Specific Exposure Factor (carcinogenic effects 1 through 10 year-old child/adult resident) = **8.04E-03** (l/kg-day)

Receptor-Specific Exposure Factor (carcinogenic effects 10 through 19 year-old child/adult resident) = **3.69E-03** (l/kg-day)

Receptor-Specific Exposure Factor (carcinogenic effects 20 through 30 year-old child/adult resident) = **4.33E-03** (l/kg-day)

Receptor-Specific Exposure Factor (carcinogenic effects 1 through 30 year-old child/adult resident) = **1.61E-02** (l/kg-day)

Notes:

1. Code for Exposure Parameters:
EPC = Exposure Point Concentration; BW = Body Weight; IR = Ingestion Rate; SA = Skin surface area in contact with soil on days exposed; AF = Soil Adherence Factor; EF = Exposure Frequency; ED = Exposure Duration; EP = Exposure Period; AP = Averaging Period; AAF = Absorption Adjustment Factor; Kp = Permeability Coefficient.

TABLE 8.25-2

EXPOSURE ASSUMPTIONS FOR LOCAL RESIDENT - CENTRAL TENDENCY EXPOSURE
Central Landfill - OU2
Johnston, Rhode Island

Exposure Pathway	Exposure Parameters								
	Chemical-specific Variables		Receptor-specific Exposure Variables						
	EPC	AAF	BW	IR	EF	ED	EP	AP	
								noncancer	cancer
Groundwater as Drinking Water Child Resident (1 through 9 years of age):	Detected Groundwater Concentrations in Wells [1]	Contaminant-Specific Oral AAF	20.5 kg [2]	0.7 l/day [3]	350 events/year [4]	1 day/event [5]	9 years [6]	9 years	70 years [7]

Notes:

Code for Exposure Parameters: EPC = Exposure Point Concentration; BW = Body Weight; IR = Ingestion Rate; EF = Exposure Frequency; ED = Exposure Duration; EP = Exposure Period; AP = Averaging Period; AAF = Absorption Adjustment Factor

1. The EPC for drinking water is based on the detected concentration of COCs in groundwater collected from residential taps or wells.
2. Body weight (BW) is based on the arithmetic mean body weight for males and females (all races) from EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997. The mean body weight for males and females within each age category was averaged to represent the body weight of that age category, and then an age-weighted value was calculated.
3. Daily drinking water ingestion rate (IR) is based on the 50th percentile tapwater intake rate for males and females within the 1 to 10 year age category from the Ershrow and Cantor (1989) data presented in the EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997.
4. The frequency of exposure (EF) describes how often the exposure event occurs over a given period of time. The local resident was assumed to be exposed each day of the year excluding 2 weeks of vacation.
5. The duration of exposure (ED) describes how long each individual exposure event might last. For ingestion of drinking water, ED is by definition 1 day/event. The receptor is assumed to receive the daily intake of contaminants during this event.
6. The duration of the exposure period (EP) describes the length of time over which the receptor comes into contact with contaminants. Since chronic exposures for a young child (1 through 9 years of age) were evaluated, the EP for noncancer and cancer effects was set at 9 years. The exposure period was set at 9 years based on the 50th percentile for years spent at a single residence. As indicated in the EPA Exposure Factors Handbook (US Bureau of the Census, 1993), Vol. III, EPA/600/P-95/002Fc, August 1997.
7. For noncancer risk, the averaging period (AP) is set equal to the exposure period (EP). The averaging period is set equal to a lifetime (i.e., 70 years) when estimating cancer risk as discussed in EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997, p 8-1.
8. NA = Not Applicable.

TABLE 8.25-2 (Continued)

CALCULATION OF RECEPTOR-SPECIFIC EXPOSURE FACTORS: LOCAL RESIDENT - CENTRAL TENDENCY EXPOSURE
Central Landfill - OU2
Johnston, Rhode Island

Ingestion of Groundwater as Drinking Water

Average Daily Dose (mg/kg/day) = [OHM]water (mg/l) * 1/BW (1/kg) * ED (days/event) * EF (events/year) * 1 year/365 days * EP (years) * 1/AP (1/years) x IR (1/day) x oral AAF

Average Daily Dose (mg/kg/day) = [OHM]water (mg/l) * Receptor-Specific Exposure Factor (l/kg/day) * oral AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects 1 through 9 year-old child resident) = **3.12E-02** (l/kg-day)

Receptor-Specific Exposure Factor (carcinogenic effects 1 through 9 year-old child resident) = **4.01E-03** (l/kg-day)

Notes:

1. Code for Exposure Parameters:
EPC = Exposure Point Concentration; BW = Body Weight; IR = Ingestion Rate;
SA = Skin surface area in contact with soil on days exposed; AF = Soil Adherence Factor:
EF = Exposure Frequency; ED = Exposure Duration; EP = Exposure Period; AP = Averaging Period;
AAF = Absorption Adjustment Factor; Kp = Permeability Coefficient.

TABLE 8.25-3

EXPOSURE ASSUMPTIONS FOR LOCAL RESIDENT - RECREATOR
Central Landfill - OU2
Johnston, Rhode Island

Exposure Pathway	Exposure Parameters											
	Chemical-specific Variables			Receptor-specific Exposure Variables								
	EPC	AAF	Kp	BW	IR	SA x AF	SA	EF	ED	EP	AP	
											noncancer	cancer
Dermal Contact with Sediment	95% UCL of the Arithmetic Mean Concentration in Sediment [1]	Chemical-Specific [2]	NA		NA		NA	71 events/year [8]	1 day/event [9]			
Child (1 through 7 years of age):				18 kg [4]		3,936 mg [6]				7 years [10]	7 years	NA
Child/Adult (1 through 30 years of age):				50 kg [4]		6,501 mg [6]				30 years [10]	NA	70 years [11]
Incidental Ingestion of Sediment	95% UCL of the Arithmetic Mean Concentration in Sediment [1]	Chemical-Specific [2]	NA			NA	NA	71 events/year [8]	1 day/event [9]			
Child (1 through 7 years of age):				18 kg [4]	171 mg/day [3]					7 years [10]	7 years	NA
Child/Adult (1 through 30 years of age):				50 kg [4]	117 mg/day [3]					30 years [10]	NA	70 years [11]
Dermal Contact with Surface Water	95% UCL of the Arithmetic Mean Concentration in Surface Water or (Future) Modeled Concentrations [1]	Chemical-Specific [2]	Chemical-Specific [2]		NA	NA		71 events/year [8]	1 hour/event [9]			
Child (1 through 7 years of age):				18 kg [4]			7,236 cm² [7]			7 years [10]	7 years	NA
Child/Adult (1 through 30 years of age):				50 kg [4]			14,415 cm² [7]			30 years [10]	NA	70 years [11]
Incidental Ingestion of Surface Water	95% UCL of the Arithmetic Mean Concentration in Surface Water or (Future) Modeled Concentrations [1]	Chemical-Specific [2]	NA		0.05 l/hour [5]	NA	NA	71 events/year [8]	1 hour/event [9]			
Child (1 through 7 years of age):				18 kg [4]						7 years [10]	7 years	NA
Child/Adult (1 through 30 years of age):				50 kg [4]						30 years [10]	NA	70 years [11]
Fish Ingestion	Estimated Concentrations	Chemical-Specific	NA			NA	NA	7 meals/year [8]	NA			
Child (1 through 7 years of age):				18 kg [4]	68 g/meal [3]					7 years [10]	7 years	NA
Child/Adult (1 through 30 years of age):				50 kg [4]	117 g/meal [3]					30 years [10]	NA	70 years [11]

TABLE 8.25-3 (Continued)

EXPOSURE ASSUMPTIONS FOR LOCAL RESIDENT - RECREATOR
Central Landfill - OU2
Johnston, Rhode Island

Notes:

Code for Exposure Parameters: EPC = Exposure Point Concentration; BW = Body Weight; IR = Ingestion Rate; SA = Skin surface area in contact with soil on days exposed; AF = Soil/Sediment Adherence Factor; EF = Exposure Frequency; ED = Exposure Duration; EP = Exposure Period; AP = Averaging Period; AAF = Absorption Adjustment Factor; Kp = Permeability Coefficient

1. The exposure point concentrations (EPCs) for sediment and surface water are based on the 95th percentile upper confidence limit on the arithmetic mean concentration of constituents detected in sediment and surface water samples collected from the Almy and Upper Simmons Reservoirs, respectively. The EPCs for fish were estimated in the ecological risk assessment.
2. Refer to Table 8.25-7 for contaminant-specific oral and dermal AAFs.
3. Refer to Table 8.25-6 for contaminant-specific permeability coefficients.
4. Body weight (BW) is based on the mean body weight for males and females from EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997, Tables 7-2 (children) and 7-1 (adults). The mean body weight for males and females within each age category was averaged to represent the body weight of that age category, and then an age-weighted value was calculated.
5. Daily sediment ingestion rate is age-weighted based on the mean soil ingestion rate recommended by Region I EPA for children up to age 6 years (200 mg/day) and older children and adults (100 mg/day). Surface water ingestion rate (IR) is from EPA Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A), 1989, Exhibit 6-12. The fish ingestion rates are based on mean quantity of fish consumed per eating occasion from Table 10-45 of the EPA Exposure Factors Handbook, EPA/600/P-95/002Fb, August 1997. The value for the child was from the mean intake for 1-2, 3-5, and 6-8 year old males and females, while the child/adult value is the overall mean.
6. Skin surface area x adherance factor is an age weighted factor based on the average surface area of males and females within each age category and an adherance factor. The skin surface area for adults is based on the mean surface area for males and females presented in Table 6-2 of EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997. The surface area for the individual body parts assumed exposed (i.e., hands, lower legs, and feet for adults) were presented. For children, the surface area for the whole body was presented in Tables 6-6 and 6-7. The percentage surface area of the individual body parts assumed to be exposed (i.e., hands, feet, and legs) was presented in Table 6-8. The average whole body surface area for male and female children was multiplied by the percentage surface area for each body part assumed exposed to calculate the surface area for the exposed body parts. For ages where the percentage surface area was not presented, the average percentage of the next highest and next lowest age group was used as the percentage concentration for that age. As no whole body surface area was presented for children age 1 < 2, the surface area for that age group was extrapolated assuming the same rate of growth for the 1 to 2 year as that for the 2 to 3 year. The adherance factor of 1.4 mg/cm² was based on the Driver et al., 1989 study presented in Table 6-17, pg 6-26 of EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997.
7. Skin surface area (SA) is based on the mean skin surface area for males and females from EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997, Table 6-2 (adult males), Table 6-3 (adult females), Table 6-6 (children males), and Table 6-7 (children females). The total body surface area (7236 cm² (child) and 14415 cm² (adult)) were used for dermal exposure to surface water during swimming. The mean surface area for males and females within each age category was averaged to represent the category. Refer to note 6.
8. We assumed that local residents who have summer cottages around or near the reservoirs may use the reservior areas for swimming, sport fishing or boating. Based on these activities the residents may have direct contact with reservoir sediments and surface water 5 days per week between Memorial Day and Labor Day (or approximately 71 days per year). In addition, the local residents were assumed to have the potential to engage in sport fishing in the vicinity of the Site one day per week throughout these summer months (i.e. 14 days), but are only successful in catching edible fish on fifty percent of their trips (i.e. 7 days).
9. The duration of exposure (ED) describes how long each individual exposure event might last. For dermal contact with and incidental ingestion of sediment, ED is by definition 1 day/event. The receptor is assumed to receive the daily intake of contaminants during this event. We assumed that recreators would be exposed to surface water for 1 hour per day, on each day of exposure (i.e., while swimming).
10. The duration of the exposure period (EP) describes the length of time over which the receptor comes into contact with contaminants. Since chronic exposures for a child (1 through 7 years of age) were evaluated, the EP for noncancer effects was set at 7 years. For cancer effects, a 30-year exposure, which incorporates the age groups which experience the highest rate of exposure (i.e., 1 through 30 years of age), was evaluated. The exposure period was set at 30 years based on the 90th percentile for years spent living at a single residence.
11. For noncancer risk, the averaging period (AP) is set equal to the exposure period (EP). The averaging period is set equal to a lifetime (i.e., 70 years) when estimating cancer risk as discussed in EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997, p 8-1.
12. NA = Not Applicable.

TABLE 8.25-3 (Continued)

CALCULATION OF RECEPTOR-SPECIFIC EXPOSURE FACTORS: LOCAL RESIDENT - RECREATOR
Central Landfill - OU2
Johnston, Rhode Island

Dermal Contact with Sediment

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * [SA * AF (mg)] * EF (events/year) * ED (days/event) * EP (years) * 1/AP (1/years) * 1 year/365 days * 1 kg/1000000 mg * dermal AAF

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor (kg/kg-day) * dermal AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **4.25E-05** kg/kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **1.08E-05** kg/kg-day

Incidental Ingestion of Sediment

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * IR (mg/day) * EF (events/year) * ED (days/event) * EP (years) * 1/AP (1/years) * 1 year/365 days * 1 kg/1000000 mg * oral AAF

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor (kg/kg-day) * oral AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **1.85E-06** kg/kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **1.95E-07** kg/kg-day

Dermal Contact with Surface Water

Average Daily Dose (mg/kg-day) = EPC (mg/l) * 1/BW (1/kg) * SA (cm^2) * EF (events/year) * ED (hours/event) * EP (years) * 1/AP (1/years) * 1 liter/1000 cm^3 * Kp (cm/hour) * 1 year/ 365 days * dermal AAF

Average Daily Dose (mg/kg-day) = EPC (mg/l) * Receptor-Specific Exposure Factor (l-hour/cm-kg-day) * Kp (cm/hour) * dermal AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **7.82E-02** l-hour/cm-kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **2.40E-02** l-hour/cm-kg-day

TABLE 8.25-3 (Continued)

CALCULATION OF RECEPTOR-SPECIFIC EXPOSURE FACTORS: LOCAL RESIDENT - RECREATOR
Central Landfill - OU2
Johnston, Rhode Island

Incidental Ingestion of Surface Water

Average Daily Dose (mg/kg-day) = EPC (mg/l) * 1/BW (1/kg) * IR (l/day) * EF (events/year) * ED (hours/event) * EP (years) * 1/AP (1/years) * 1 year/ 365 days * oral AAF

Average Daily Dose (mg/kg-day) = EPC (mg/l) * Receptor-Specific Exposure Factor (l/kg-day) * oral AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **5.40E-04** l/kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **8.34E-05** l/kg-day

Fish Ingestion (Chronic effects)

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * IR (g/meal) * EF (meals/year) * EP (years) * 1/AP (1/years) * 1 kg/1,000 g * 1 year/365 days * oral AAF

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor-adult (kg/kg-day) * oral AAF

Receptor-Specific Exposure Factor (1 - 7 years old) = **7.25E-05** (kg/kg-day)

Fish Ingestion (Carcinogenic effects)

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * IR (g/meal) * EF (meals/year) * EP (years) * 1/AP (1/years) * 1 kg/1,000 g * 1 year/365 days * oral AAF

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor-adult (kg/kg-day) * oral AAF

Receptor-Specific Exposure Factor (1 - 30 years old) = **1.92E-05** (kg/kg-day)

Notes:

1. Code for Exposure Parameters:
EPC = Exposure Point Concentration; BW = Body Weight; IR = Ingestion Rate; SA = Skin surface area in contact with soil on days exposed; AF = Soil Adherence Factor; EF = Exposure Frequency; ED = Exposure Duration; EP = Exposure Period; AP = Averaging Period; AAF = Absorption Adjustment Factor; Kp = Permeability Coefficient.

TABLE 8.25-4

EXPOSURE ASSUMPTIONS FOR LOCAL RESIDENT - TRESPASSER
Central Landfill - OU2
Johnston, Rhode Island

Exposure Pathway	Exposure Parameters												
	Chemical-specific Variables			Receptor-specific Exposure Variables									
	EPC	AAF	Kp	BW	IR	SA x AF	SA	AF	EF	ED	EP	AP	
												noncancer	cancer
Dermal Contact with Soil Child (7 through 15 years of age):	95% UCL of the Arithmetic Mean Concentration in Soil [1]	Chemical-Specific [2]	NA	41 kg [4]	NA	4,548 mg [7]	NA	0.51 mg/[8]	31 ever [8]	1 day/[9]	9 year [10]	9 years NA	NA 70 years [11]
Incidental Ingestion of Soil Child (7 through 15 years of age):	95% UCL of the Arithmetic Mean Concentration in Soil [1]	Chemical-Specific [2]	NA	41 kg [4]	50 mg/[5]	NA	NA	NA	31 ever [8]	1 day/[9]	9 year [10]	9 years NA	NA 70 years [11]
Dermal Contact with Sediment Child (7 through 15 years of age):	95% UCL of the Arithmetic Mean Concentration in Sediment [1]	Chemical-Specific [2]	NA	41 kg [4]	NA	4,548 mg [6]	NA	NA	31 ever [8]	1 day/[9]	9 year [10]	9 years NA	NA 70 years [11]
Incidental Ingestion of Sediment Child (7 through 15 years of age):	95% UCL of the Arithmetic Mean Concentration in Sediment [1]	Chemical-Specific [2]	NA	41 kg [4]	50 mg/[5]	NA	NA	NA	31 ever [8]	1 day/[9]	9 year [10]	9 years NA	NA 70 years [11]
Dermal Contact with Surface Water Child (7 through 15 years of age):	95% UCL of the Arithmetic Mean Concentration in Surface Water [1]	Chemical-Specific [2]	Chemical-Specific [3]	41 kg [4]	NA	NA	7,100 cm²/day [7]	NA	31 ever [8]	1 hour [9]	9 year [10]	9 years NA	NA 70 year [11]
Inhalation of Fugitive Dust Child (7 through 15 years of age):	Estimated Concentration of Fugitive Dust [1]	NA	NA	NA	NA	NA	NA	NA	31 ever [8]	1 hour [9]	9 year [10]	9 years NA	NA 70 year [11]

TABLE 8.25-4 (Continued)

EXPOSURE ASSUMPTIONS FOR LOCAL RESIDENT - TRESPASSER
Central Landfill - OU2
Johnston, Rhode Island

Notes:

Code for Exposure Parameters: EPC = Exposure Point Concentration; BW = Body Weight; IR = Ingestion Rate; SA = Skin surface area in contact with soil on days exposed; AF = Soil/Sediment Adherence Factor; EF = Exposure Frequency; ED = Exposure Duration; EP = Exposure Period; AP = Averaging Period; AAF = Absorption Adjustment Factor; Kp = Permeability Coefficient

1. The exposure point concentrations (EPCs) for soil, sediment, and surface water are based on the 95% upper concentration limit of the mean concentration of COCs present in soil, sediment, and surface water samples collected from the site. Fugitive dust concentrations are estimated from concentrations in soil using an emission model.
2. Refer to Table 8.25-7 for contaminant-specific oral and dermal AAFs.
3. Refer to Table 8.25-6 for contaminant-specific permeability coefficients.
4. Body weight (BW) is based on the mean body weights for males and females from EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997, Table 7-2. The mean body weight for males and females within each age category was averaged to represent the body weight of that age category, and then an age-weighted value was calculated.
5. Daily soil and sediment ingestion rate is based on the mean soil ingestion rate recommended by EPA for children 6 years and older (50 mg/day) obtained from the EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997, Table 4-23.
6. Skin surface area x adherance factor is an age weighted factor based on the surface area of males and females within each age category and an adherance factor of 1.4 mg/cm² of skin taken from the Driver et al., 1989 study presented in Table 6-17 and pg 6-26 of EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997. Body parts assumed exposed include the hands, arms, and feet. The surface area for the whole body was presented in Tables 6-6 and 6-7. The percentage surface area of the individual body parts assumed to be exposed (i.e., hands, feet, and arms) was presented in Table 6-8. The average whole body surface area for male and female children was multiplied by the percentage surface area for each body part assumed exposed to calculate the surface area for the exposed body parts. For ages where the percentage surface area was not presented, the average percentage of the next highest and next lowest age group was used as the percentage concentration for that age. Surface areas were calculated to be 673 cm^2 (hands), 948 cm2 (feet) and 1627 cm2 (arms).
7. Skin surface area (SA) is based on the 50th percentile skin surface area for males and females from EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997. Parts of the body assumed to be exposed include hands, arms, legs, and feet for children during dermal exposure to surface water. For each body part, the mean surface area for males and females within each age category was averaged to represent the surface area of that age category and then an age-weighted value was calculated. Refer to note 6.
8. We assumed that trespassers who trespass onto the site may do so on a weekly basis, i.e., one day per week, during the 7 non-winter months of April through October (or approximately 31 days per year).
9. The duration of exposure (ED) describes how long each individual exposure event might last. For dermal contact with and incidental ingestion of soil and sediment, ED is by definition 1 day/event. The receptor is assumed to receive the daily intake of contaminants during this event. We assumed that residents would be exposed to surface water for 1 hour per day, on each day of exposure. We assumed that trespassers would dirt bike and potentially inhale fugitive dust for one hour per day.
10. The duration of the exposure period (EP) describes the length of time over which the receptor comes into contact with contaminants. Since chronic exposures for an older child (7 through 15 years of age) were evaluated, the EP for noncancer effects was set at 9 years which is the 50th percentile for years at an individual residence obtained from EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997, Table 15-168.
11. For noncancer risk, the averaging period (AP) is set equal to the exposure period (EP). The averaging period is set equal to a lifetime (i.e., 70 years) when estimating cancer risk as discussed in EPA Exposure Factors Handbook EPA/600/P-95/002Fa, August 1997, p 8-1.
12. NA = Not Applicable.

TABLE 8.25-4 (Continued)

CALCULATION OF RECEPTOR-SPECIFIC EXPOSURE FACTORS: LOCAL RESIDENT - TRESPASSER
Central Landfill - OU2
Johnston, Rhode Island

Dermal Contact with Soil

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * SA (cm^2/day) * AF (mg/cm^2) * EF (events/year) * ED (days/event) * EP (years) * 1/AP (1/years) * 1 year/365 days * 1 kg/1000000 mg * dermal AAF

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor (kg/kg-day) * dermal AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **9.35E-06** kg/kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **1.20E-06** kg/kg-day

Incidental Ingestion of Soil

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * IR (mg/day) * EF (events/year) * ED (days/event) * EP (years) * 1/AP (1/years) * 1 year/365 days * 1 kg/1000000 mg * oral AAF

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor (kg/kg-day) * oral AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **1.03E-07** kg/kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **1.32E-08** kg/kg-day

Dermal Contact with Sediment

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * (SA * AF (mg)) * EF (events/year) * ED (days/event) * EP (years) * 1/AP (1/years) * 1 year/365 days * 1 kg/1000000 mg * dermal AAF

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor (kg/kg-day) * dermal AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **9.35E-06** kg/kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **1.20E-06** kg/kg-day

TABLE 8.25-4 (Continued)

CALCULATION OF RECEPTOR-SPECIFIC EXPOSURE FACTORS: LOCAL RESIDENT - TRESPASSER
Central Landfill - OU2
Johnston, Rhode Island

Incidental Ingestion of Sediment

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * IR (mg/day) * EF (events/year) * ED (days/event) * EP (years) * 1/AP (1/years) * 1 year/365 days * 1 kg/1000000 mg * oral AAF

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor (kg/kg-day) * oral AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **1.03E-07** kg/kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **1.32E-08** kg/kg-day

Dermal Contact with Surface Water

Average Daily Dose (mg/kg-day) = EPC (mg/l) * 1/BW (1/kg) * SA (cm^2) * EF (events/year) * ED (hours/event) * EP (years) * 1/AP (1/years) * 1 liter/1000 cm^3 * Kp (cm/hour) * 1 year/ 365 days * dermal AAF

Average Daily Dose (mg/kg-day) = EPC (mg/l) * Receptor-Specific Exposure Factor (l-hour/cm-kg-day) * Kp (cm/hour) * dermal AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **1.46E-02** l-hour/cm-kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **1.88E-03** l-hour/cm-kg-day

Inhalation of Fugitive Dust

Average Daily Exposure (mg/m^3) = EPC (mg/m3) * EF (events/year) * ED (hours/event) * EP (years) * 1/AP (1/years) * 1 day/24 hours * 1 year/365 days

Average Daily Exposure (mg/m^3) = EPC (mg/m^3) * Receptor-Specific Exposure Factor (Unitless)

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **3.54E-03** (Unitless)

Average Daily Exposure (mg/m^3) = EPC (mg/m^3) * Receptor-Specific Exposure Factor (Unitless)

Receptor-Specific Exposure Factor (carcinogenic effects) = **4.55E-04** (Unitless)

Notes:

1. Code for Exposure Parameters:
EPC = Exposure Point Concentration; BW = Body Weight; IR = Ingestion Rate; SA = Skin surface area in contact with soil on days exposed;
AF = Soil Adherence Factor; EF = Exposure Frequency; ED = Exposure Duration; EP = Exposure Period; AP = Averaging Period;
AAF = Absorption Adjustment Factor; Kp = Permeability Coefficient; RPair =.Respirable Particulates in Air.

TABLE 8.25-5

EXPOSURE ASSUMPTIONS FOR SITE FACILITY WORKER
Central Landfill - OU2
Johnston, Rhode Island

Exposure Pathway	Exposure Parameters											
	Chemical-specific Variables			Receptor-specific Exposure Variables								
											AP	
	EPC	AAF	Kp	BW	IR	SA x AF	SA	EF	ED	EP	noncancer	cancer
Dermal Contact with Sediment in Cedar Swamp Brook and Quarry Stream	95% UCL of the Arithmetic Mean Concentration in Sediment [2]	Chemical-Specific [3]	NA	72 kg [5]	NA	71.4 mg [7]	NA	6 events/year [9]	1 day/event [10]	25 years [11]	25 years	70 years [12]
Incidental Ingestion of Sediment in Cedar Swamp Brook and Quarry Stream	95% UCL of the Arithmetic Mean Concentration in Sediment [2]	Chemical-Specific [3]	NA	72 kg [5]	50 mg/day [6]	NA	NA	6 events/year [9]	1 day/event [10]	25 years [11]	25 years	70 years [12]
Dermal Contact with Surface Water in Cedar Swamp Brook and Quarry Stream	95% UCL of the Arithmetic Mean Concentration in Surface Water [2]	Chemical-Specific [3]	Chemical-Specific [4]	72 kg [5]	NA	NA	4,986 cm^2 [8]	6 events/year [9]	2 hours/event [10]	25 years [11]	25 years	70 years [12]
Dermal Contact with Sediment in the Sedimentation Ponds	95% UCL of the Arithmetic Mean Concentration in Sediment [2]	Chemical-Specific [3]	NA	72 kg [5]	NA	50.5 mg [7]	NA	10 events/year [9]	1 day/event [10]	25 years [11]	25 years	70 years [12]
Incidental Ingestion of Sediment in the Sedimentation Ponds	95% UCL of the Arithmetic Mean Concentration in Sediment [2]	Chemical-Specific [3]	NA	72 kg [5]	50 mg/day [6]	NA	NA	10 events/year [9]	1 day/event [10]	25 years [11]	25 years	70 years [12]
Dermal Contact with Surface Water in the Sedimentation Ponds	95% UCL of the Arithmetic Mean Concentration in Surface Water [2]	Chemical-Specific [3]	Chemical-Specific [4]	72 kg [5]	NA	NA	1,933 cm^2 [8]	10 events/year [9]	2 hours/event [10]	25 years [11]	25 years	70 years [12]

TABLE 8.25-5 (continued)

EXPOSURE ASSUMPTIONS FOR SITE FACILITY WORKER
Central Landfill - OU2
Johnston, Rhode Island

Notes:

1. Code for Exposure Parameters: EPC = Exposure Point Concentration; BW = Body Weight; IR = Ingestion Rate; SA = Skin surface area in contact with soil on days exposed; AF = Soil Adherence Factor; EF = Exposure Frequency; ED = Exposure Duration; EP = Exposure Period; AP = Averaging Period; AAF = Absorption Adjustment Factor; Kp = Permeability Coefficient.
2. The exposure point concentrations (EPCs) for sediment and surface water are based on the 95th percentile upper confidence limit concentration of constituents detected in sediment and surface water samples collected from Cedar Swamp and Quarry Stream and the Sedimentation Ponds, respectively.
3. Refer to Table 8.25-7 for contaminant-specific oral and dermal AAFs.
4. Refer to Table 8.25-6 for contaminant-specific permeability coefficients.
5. Body weight (BW) is based on the mean body weight for adult males and females age 18 to 65 years from EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997. The mean body weight for males and females within each age category was averaged to represent the body weight of that age category, and then an age-weighted value was calculated.
6. Daily sediment ingestion rate is based on the mean soil ingestion rate recommended by EPA for adults (50 mg/day) obtained from the EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997, Table 4-23.
7. Skin surface area x adherence factor is a weighted factor based on the average surface area of adult males and females 18 to 65 years of age and relevant adherence factors. The skin surface area for adults is based on the mean surface area for males and females presented in Tables 6-2 and 6-3 of EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997. The surface area for the individual body parts assumed exposed to sediments from cedar Swamp Brook and Quarry Stream (i.e., hands (793 cm^2), forearms (1140 cm^2), lower legs (2005 cm^2), and feet (1048 cm^2)) and for the sedimentation ponds (i.e., hands and forearms) were presented. The relative percent of the total arm surface area for forearms for males was applied to was not available. The adherence factor is taken from the "groundskeeper # 5" scenario except for adherence to feet, selected from "groundskeeper # 4" presented in EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997,Table 6-12. These factors are: hands (0.032 mg/cm^2), arms (0.022 mg/cm^2), legs (0.001 mg/cm^2) and feet (0.018 mg/cm^2).
8. Skin surface area (SA) is based on the mean skin surface area for males and females from EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997, Tables 6-4 as discussed in note 7. Parts of the body assumed to be exposed include hands, forearms, lower legs, and feet for dermal exposure to surface water in Cedar Swamp Brook and Quarry Stream and hands and forearms for dermal exposure to surface water in the sedimentation ponds. For each body part, the mean surface area for males and females within each age category was averaged to represent the surface area of that age category. The relative percent of the total arm surface area for forearms for males was applied to females, since this information was not available.
9. Frequency of exposure describes how often the exposure event occurs over a given period of time. Based on information provided by RIRNC, it was assumed that workers would be exposed to contaminants in sediement from Cedar Swamp Brook and Quarry Stream for 6 days throughout the year and to sediment and surface water in the sedimentation pond for 10 days throughout the year.
10. The duration of exposure describes how long each individual exposure event might last. For dermal contact and incidental ingestion of sediment, exposure duration is by definition 1 day/event. During this event, the worker is assumed to receive the daily intake of contaminants. For dermal contact with surface water, exposure duration was set at two hours per event.
11. The duration of the exposure period (EP) describes the length of time over which the receptor comes into contact with contaminants. The high end duration of occupational tenure is 25 years as presented in the EPA Exposure Factors Source Book, Attachment 3 - "Intermim default exposure parameters for high end exposure".
12. For noncancer risk, the averaging period (AP) is set equal to the exposure period (EP). The averaging period is set equal to a lifetime (i.e., 70 years) when estimating cancer risk as discussed in EPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997, p 8-1.
13. NA = Not Applicable.

TABLE 8.25-5 (Continued)

CALCULATION OF RECEPTOR-SPECIFIC EXPOSURE FACTORS: SITE FACILITY WORKER
Central Landfill - OU2
Johnston, Rhode Island

Dermal Contact with Sediment in Cedar Swamp Brook and Quarry Stream

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * SA (cm^2) * AF (mg/cm^2-day) * EF (events/year) * ED (days/event) * EP (years) * 1/AP (1/years) 1 kg/1,000,000 mg * dermal AAF * 1 year/365 days

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor (kg/kg-day) * dermal AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **1.62E-08** kg/kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **5.79E-09** kg/kg-day

Incidental Ingestion of Sediment in Cedar Swamp Brook and Quarry Stream

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * IR (mg/day) * EF (events/year) * ED (days/event) * EP (year) * 1/AP (1/years) * 1 kg/1,000,000 mg * oral AAF * 1 year/365 days

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor (kg/kg-day) * oral AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **1.13E-08** kg/kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **4.05E-09** kg/kg-day

Dermal Contact with Surface Water in Cedar Swamp Brook and Quarry Stream

Average Daily Dose (mg/kg-day) = EPC (mg/l) * 1/BW (1/kg) * SA (cm^2) * EF (events/year) * ED (hours/event) * EP (years) * 1/AP (1/years) * 1 liter/1,000 cm^3 * Kp (cm/hour) * dermal AAF * 1 year/365 days

Average Daily Dose (mg/kg-day) = EPC (mg/l) * Receptor-Specific Exposure Factor (l-hour/cm-kg-day) * Kp (cm/hour) * dermal AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **2.26E-03** l-hour/cm-kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **8.08E-04** l-hour/cm-kg-day

Dermal Contact with Sediment in the Sedimentation Ponds

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * SA (cm^2) * AF (mg/cm^2-day) * EF (events/year) * ED (days/event) * EP (years) * 1/AP (1/years) 1 kg/1,000,000 mg * dermal AAF * 1 year/365 days

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor (kg/kg-day) * dermal AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **1.91E-08** kg/kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **6.82E-09** kg/kg-day

TABLE 8.25-5 (Continued)

CALCULATION OF RECEPTOR-SPECIFIC EXPOSURE FACTORS: SITE FACILITY WORKER
Central Landfill - OU2
Johnston, Rhode Island

Incidental Ingestion of Sediment in the Sedimentation Ponds

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * 1/BW (1/kg) * IR (mg/day) * EF (events/year) * ED (days/event) * EP (year) * 1/AP (1/years) * 1 kg/1,000,000 mg * oral AAF * 1 year/365 days

Average Daily Dose (mg/kg-day) = EPC (mg/kg) * Receptor-Specific Exposure Factor (kg/kg-day) * oral AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **1.89E-08** kg/kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **6.75E-09** kg/kg-day

Dermal Contact with Surface Water in the Sedimentation Ponds

Average Daily Dose (mg/kg-day) = EPC (mg/l) * 1/BW (1/kg) * SA (cm^2) * EF (events/year) * ED (hours/event) * EP (years) * 1/AP (1/years) * 1 liter/1,000 cm^3 * Kp (cm/hour) * dermal AAF * 1 year/365 days

Average Daily Dose (mg/kg-day) = EPC (mg/l) * Receptor-Specific Exposure Factor (l-hour/cm-kg-day) * Kp (cm/hour) * dermal AAF

Receptor-Specific Exposure Factor (noncarcinogenic effects) = **1.46E-03** l-hour/cm-kg-day

Receptor-Specific Exposure Factor (carcinogenic effects) = **5.22E-04** l-hour/cm-kg-day

Notes:

1. Code for Exposure Parameters:
   EPC = Exposure Point Concentration; BW = Body Weight; IR = Ingestion Rate; SA = Skin surface area in contact with soil on days exposed;
   AF = Soil Adherence Factor; EF = Exposure Frequency; ED =Exposure Duration; EP = Exposure Period; AP = Averaging Period;
   AAF = Absorption Adjustment Factor; Kp = Permeability Coefficient; NA = Not Applicable.

TABLE 8.25-6

CONTAMINANT-SPECIFIC PERMEABILITY COEFFICIENTS
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Permeability Coefficient Kp (cm/hour)	Notes
Volatile Organic Compounds		
1,4-Dichlorobenzene	6.2E-02	b
Benzene	1.1E-01	a
Carbon Tetrachloride	2.2E-02	b
Chlorobenzene	4.1E-02	b
Chloroform	1.3E-01	a
Tetrachloroethene	3.7E-01	a
Trichloroethene	2.3E-01	a
Vinyl Chloride	7.3E-03	b
Semivolatile Organic Compounds		
Benzo(a)anthracene	8.1E-01	b
Benzo(a)pyrene	1.2E+00	b
Benzo(b)fluoranthene	1.2E+00	b
Benzo(g,h,i)perylene	1.7E+00	c
bis(2-Ethylhexyl)phthalate	3.3E-02	b
Phenanthrene	2.3E-01	b
Pesticides/PCBs		
Aldrin	1.6E-03	b
Dieldrin	1.6E-02	b
Metals		
Aluminum, total	1.0E-03	d
Arsenic, total	1.0E-03	d
Barium, total	1.0E-03	d
Beryllium, total	1.0E-03	d
Cadmium, total	1.0E-03	d
Copper, total	1.0E-03	d
Iron, total	1.0E-03	d
Lead, total	1.0E-03	d
Manganese, total	1.0E-03	d
Mercury, total	1.0E-03	d
Nickel, total	1.0E-03	d
Thallium, total	1.0E-03	d
Vanadium, total	1.0E-03	d
Zinc, total	1.0E-03	d

Priority of Sources:

a. Experimentally measured Kp values obtained from US EPA, Dermal Exposure Assessment: Principals and Applications, Interim Report, Office of Research and Development, EPA/600/8-91/011B, Tables 5-3 and 5-8.
b. Estimated Kp values obtained from US EPA, Dermal Exposure Assessment: Principals and Applications, Interim Report, Office of Research and Development, EPA/600/8-91/011B, Tables 5-7 and 5-8.
c. Kp values calculated by GZA using Equation 5.8 from U.S. EPA, Dermal Exposure Assessment: Principles and Applications, Interim Report, Office of Research and Development, EPA/600/8-91/011B, January 1992.
d. A default value of 0.001 cm/hr was used to represent the Kp for inorganic compounds not tested as recommended in U.S. EPA, Dermal Exposure Assessment: Principles and Applications, Interim Report, Office of Research and Development, EPA/600/8-91/011B.

Notes:

e. Experimentally measured value for phenol was used. Sufficient data are not available to calculate a value for this compound.

TABLE 8.25-7

ABSORPTION ADJUSTMENT FACTORS
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Exposure Pathways							
	Oral Water		Oral Soil/Sediment		Dermal Water		Dermal Soil/Sediment	
	Carcinogen	Non-Carcinogen	Carcinogen	Non-Carcinogen	Carcinogen	Non-Carcinogen	Carcinogen	Non-Carcinogen
Volatile Organic Compounds								
1,4-Dichlorobenzene	1.00 a	1.00 a	1.00 a	1.00 a		1.00 a	NA c	NA c
Benzene	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	NA c	NA c
Carbon Tetrachloride	1.00 a	1.00 a	1.00 a	1.00 a			NA c	NA c
Chlorobenzene		1.00 a		1.00 a		1.00 a		NA c
Chloroform	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	NA c	NA c
Tetrachloroethene	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a		NA c	NA c
Trichloroethene	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a		NA c	NA c
Vinyl Chloride	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	NA c	NA c
Semivolatile Organic Compounds								
Benzo(a)anthracene	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	0.13 c	0.13 c
Benzo(a)pyrene	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	0.13 c	0.13 c
Benzo(b)fluoranthene	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	0.13 c	0.13 c
Benzo(g,h,i)perylene		1.00 a		1.00 a		1.00 a		0.10 c
bis(2-Ethylhexyl)phthalate	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	0.10 c	0.10 c
Phenanthrene		1.00 a		1.00 a		1.00 a		0.10 c

TABLE 8.25-7

ABSORPTION ADJUSTMENT FACTORS
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Exposure Pathways							
	Oral Water		Oral Soil/Sediment		Dermal Water		Dermal Soil/Sediment	
	Carcinogen	Non-Carcinogen	Carcinogen	Non-Carcinogen	Carcinogen	Non-Carcinogen	Carcinogen	Non-Carcinogen
Pesticides/PCBs								
Aldrin	1.00 a	1.00 a	1.00 a	1.00 a			NA c	NA c
Dieldrin	1.00 a	1.00 a	1.00 a	1.00 a			0.25 b	0.25 b
Metals								
Aluminum, total								0.01 c
Arsenic, total	1.00 a	1.00 a	0.48 b	0.48 b	1.00 a	1.00 a	0.03 c	0.03 c
Barium, total		1.00 a		1.00 a		1.00 a		0.01 c
Beryllium, total	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	0.01 c	0.01 c
Cadmium, total		1.00 a		1.00 a		1.00 a		0.001 c
Copper, total		1.00 a		1.00 a		1.00 a		0.017 b
Iron, total								0.01 c
Lead, total								
Manganese, total		1.00 a		1.00 a		1.00 a		0.01 c
Mercury, total		1.00 a		0.50 b		1.00 a		0.01 c
Nickel, total		1.00 a		1.00 a		1.00 a		0.01 c
Thallium, total		1.00 a		1.00 a		1.00 a		0.01 c
Vanadium, total		1.00 a		1.00 a		1.00 a		0.01 c
Zinc, total		1.00 a		1.00 a		1.00 a		0.01 c

Notes:

a - A default AAF of 1.00 was used.
b - GZA derived values.
c - Region I EPA recommended Dermal Absorption Factors were available only for the following COCs: arsenic, cadmium, and carcinogenic PAHs (Refer to attachment E for individual references). Generic defaults were also available for SVOCs and inorganics. In accordance with EPA guidance, no quantitative evaluation of the dermal contact with soil/sediment pathways was provided for the remaining COCs.

NA = Not Available.
A blank space indicates no value available from above-referenced sources.

TABLE 8.31-1

SUMMARY OF DOSE-RESPONSE INFORMATION - NONCARCINOGENIC EFFECTS - ORAL
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Oral Subchronic Reference Dose (mg/kg-day)		Oral Chronic Reference Dose (mg/kg-day)		Chronic Oral RfD UF X MF	Target Organ/Systen	Critical Effect	Study Animal	Study Method
Volatile Organic Compounds									
1,4-Dichlorobenzene									
Benzene	1.0E-03	d	1.0E-03	f	3000	blood	leukemia	rat	oral-gavage
Carbon Tetrachloride	7.0E-03	c	7.0E-04	a	1000 x 1	liver	lesions	rat	oral-gavage
Chlorobenzene	2.0E-01	c	2.0E-02	a	1000 x 1	liver	histopathologic changes	dog	oral-capsule
Chloroform	1.0E-02	b,d	1.0E-02	a	1000 x 1	liver	fatty cyst formation	dog	oral-capsule
Tetrachloroethene	1.0E-01	b	1.0E-02	a	1000 x 1	liver	hepatotoxicity, increased organ weights	mouse/rat	oral-gavage
Trichloroethene	2.0E-02	c	2.0E-03	c					
Vinyl Chloride	3.0E-03	d	3.0E-03	a	30 x 1	liver	liver cell polymorphism	rat	oral
Semivolatile Organic Compounds									
Benzo(a)anthracene	3.0E-01	j	3.0E-02	j					
Benzo(a)pyrene	3.0E-01	j	3.0E-02	j					
Benzo(b)fluoranthene	3.0E-01	j	3.0E-02	j					
Benzo(g,h,i)perylene	3.0E-01	j	3.0E-02	j					
bis(2-Ethylhexyl)phthalate	2.0E-02	d	2.0E-02	a	1000 x 1	liver	increased weight	guinea pig	oral-diet
Phenanthrene	3.0E-01	j	3.0E-02	j					
Pesticides/PCBs									
Aldrin	3.0E-05	b, d	3.0E-05	a	1000 x 1	liver	toxicity	rat	oral-diet
Dieldrin	5.0E-05	b, d	5.0E-05	a	100 x 1	liver	lesions	rat	feeding

TABLE 8.31-1

SUMMARY OF DOSE-RESPONSE INFORMATION - NONCARCINOGENIC EFFECTS - ORAL
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Oral Subchronic Reference Dose (mg/kg-day)		Oral Chronic Reference Dose (mg/kg-day)		Chronic Oral RfD UF X MF	Target Organ/Systen	Critical Effect	Study Animal	Study Method
Metals									
Aluminum, total	1.0E+00	d	1.0E+00	g					
Arsenic, total	3.0E-04	b, d	3.0E-04	a	3 x 1	skin	hyperpigmentation, keratosis, and possible vascular complications	human	oral-diet
Barium, total	7.0E-02	b, d	7.0E-02	a	3 x 1	CV	increased blood pressure	human	oral-drinking water
Beryllium, total	5.0E-03	b, d	2.0E-03	a	300 x 1	small intestine	lesions	dog	oral-diet
Cadmium, total	5E-4 water/1E-3 food	d	5E-4 water/1E-3 food	a	10 x 1	kidney	proteinuria	human	oral-drinking water
Copper, total	3.7E-02	b	3.7E-02	b		G.I.	irritation	human	oral-drinking water
Iron, total									
Lead, total		i		i					
Manganese, total	7.0E-2 oral, dermal soil; 1.4E-1 food ingestion; 2.4E-2 oral water	d	7.0E-2 oral, dermal soil; 1.4E-1 food ingestion; 2.4E-2 oral water	k	1 x 1	CNS	effects	human	oral-diet
Mercury, total	3.0E-04	c	3.0E-04	c					
Nickel, total	2.0E-02	b, h	2.0E-02	a, h	300 x 1	whole body	decreased body and organ weight	rat	oral-diet
Thallium, total	2.0E-01	e	2.0E-01	e					
Vanadium, total	7.0E-03	b	7.0E-03	b	100	NA	NA	rat	oral-drinking water
Zinc, total	3.0E-01	b, d	3.0E-01	a	3 x 1	liver	decrease in enzymes	human	oral-diet

NOTES:

1. Sources:
   a. US EPA Integrated Risk Information System (IRIS), National Library of Medicine, TOXNET Computer Communications Service, May 2001.
   b. US EPA, Health Effects Assessment Summary Tables (HEAST), Office of Solid Waste and Emergency Response/Office of Emergency and Remedial Response, FY-1997 Update.
   c. MA DEP derived values from "Documentation for the Risk Assessment ShortForm", MA DEP ORS, October 1992.
   d. To be conservative, in the absence of an agency approved subchronic RfD, the chronic value was used.
   e. RfD based on the molecular weight ratio of thallium chloride to thallium (240/204.4) for conversion. US EPA Integrated Risk Information System. July, 1997.
   f. US EPA Risk Assessment Issue Paper for: Derivation of a Provisional RfD for Benzene (93-27/06-09-93)
   g. EPA-NCEA Provisional Value.
   h. Since there is no information on inorganic nickel, the values presented are the values for nickel, soluble salts.
   i. As per EPA guidance, there was no quantitative evaluation of lead. Lead EPCs were compared to relevant EPA and Rhode Island guidelines.
   j. In lieu of toxicity information on this compound the RfD for pyrene was used.
   k. As per EPA guidance, the manganese RfD of 0.14 mg/kg/day was modified to reflect both the dietary intake of manganese (5 mg/day) and a modifying factor of 3 for oral exposures to water, resulting in an adjusted RfD of 0.024 mg/kg/day.
   Based on the absence of neonates (children < 12 months), the RfD was not modified for other routes of exposure.

   A blank space indicates no data found.

2. CNS=Central nervous system; CV=Cardiovascular system; RBC=Red blood cell; MF= Modifying Factor; PNS= Peripheral nervous system; UF= Uncertainty Factor; NA= Not Applicable; NQE = Not Quantitatively Evaluated; RfD = Reference Dose.

3. Unless otherwise stated, values presented for metals are for the elemental form of metals.

TABLE 8.31-2

SUMMARY OF DOSE-RESPONSE INFORMATION - NONCARCINOGENIC EFFECTS - INHALATION
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Inhalation Subchronic Reference Concentration (mg/m^3)		Inhalation Chronic Reference Concentration (mg/m^3)		Chronic Inhalation RfC UF x MF	Target Organ/System	Critical Effect	Study Animal	Study Method
Volatile Organic Compounds									
1,4-Dichlorobenzene	2.5E+00	b, e	8.0E-01	a	100 x 1	liver	increased organ weight	rat	inhalation
Benzene	9.0E-03	d	9.0E-03	h		body chemistry	impaired immune and lymphatic responses		
Carbon Tetrachloride	4.3E-01	c	4.3E-01	c					
Chlorobenzene	2.0E-01	c	2.0E-02	b	10000	liver, kidney	effect	rat	inhalation
Chloroform	6.6E-01	c	6.6E-01	c					
Tetrachloroethene	6.0E-01	d	6.0E-01	i					
Trichloroethene	1.8E-01	c	1.8E-01	c					
Vinyl Chloride	1.0E-01	d	1.0E-01	a	30 x 1	liver	liver cell polymorphism	rat	oral
Semivolatile Organic Compounds									
Benzo(a)anthracene									
Benzo(a)pyrene									
Benzo(b)fluoranthene									
Benzo(g,h,i)perylene									
bis(2-Ethylhexyl)phthalate	2.0E-01	f							
Phenanthrene									
Pesticides/PCBs									
Aldrin									
Dieldrin									

TABLE 8.31-2

SUMMARY OF DOSE-RESPONSE INFORMATION - NONCARCINOGENIC EFFECTS - INHALATION
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Inhalation Subchronic Reference Concentration (mg/m^3)		Inhalation Chronic Reference Concentration (mg/m^3)		Chronic Inhalation RfC UF x MF	Target Organ/System	Critical Effect	Study Animal	Study Method
Metals									
Aluminum, total									
Arsenic, total									
Barium, total	5.0E-03	b	5.0E-04	b	1000	fetus	fetotoxicity	rat	inhalation
Beryllium, total	2.0E-05	d	2.0E-05	a	10 x 1	lung	beryllium sensitization	human	inhalation, occupational
Cadmium, total									
Copper, total									
Iron, total									
Lead, total		g		g					
Manganese, total	5.0E-05	d	5.0E-05	a	1000 x 1	CNS	impairment of neurobehavioral function	human	inhalation, occupational
Mercury, total	3.0E-04	b	3.0E-04	a	30 x 1	CNS	neurotoxicity	human	inhalation, occupational
Nickel, total									
Thallium, total									
Vanadium, total									
Zinc, total									

NOTES:

Sources:

a. US EPA Integrated Risk Information System (IRIS), National Library of Medicine, TOXNET Computer Communications Service, May 2001.
b. US EPA, Health Effects Assessment Summary Tables (HEAST), Office of Solid Waste and Emergency Response/Office of Emergency and Remedial Response, FY-1997 Update.
c. MADEP Documentation for the Risk Assessment Shortform Residential Scenario, October 1992.
d. To be conservative, in the absence of an agency approved subchronic RfC, the chronic value was used.
e. The chronic inhalation RfC was modified to estimate the subchronic RfC.
f. US EPA Provisional Subchronic RfC for Di(2-ethylhexyl)phthalate, December 1993.
g. As per EPA guidance, there was no quantitative evaluation of lead. Lead EPCs were compared to relevant EPA and Rhode Island guidelines.
h. US EPA Risk Assessment Issue Paper for Derivation of a Provisional 30 Day Acute Inhalation Criterion (AIC) for Benzene (using subchronic value).
i. The Risk Assessment Program has contacted Superfund and been given provisional values which should be used for DOE-ORR projects. This value should be clearly documented as provisional. For other projects, Superfund Health Risk Technical Support Center should be contacted directly (513)569-7300.

A blank space indicates no data found.

2. CNS= Central nervous system; MF= Modifying Factor; PNS= Peripheral nervous system; BUN=Blood urea nitrogen; UF= Uncertainty Factor; RfC = Reference Concentration.

3. Unless otherwise stated, values presented for metals are for the elemental form of metals.

TABLE 8.32-1

SUMMARY OF DOSE-RESPONSE INFORMATION - CARCINOGENIC EFFECTS
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Weight of Evidence Class	Relative Potency Factor	Oral Cancer Slope Factor (CSF) $(mg/kg/day)^{-1}$	Adjusted Oral CSF	Target Organ/System (oral)	Study Animal	Study Method	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	Target Organ/System (Inhalation)	Study Animal	Study Method
Volatile Organic Compounds											
1,4-Dichlorobenzene	C b		2.4E-02 b		liver	mouse	oral-gavage				
Benzene	A a		2.9E-02 a		leukemia	human	occupational inhalation	7.8E-06 a	leukemia	human	occupational inhalation
Carbon Tetrachloride	B2 a		1.3E-01 a		liver	rodents	oral-gavage	1.5E-05 a	liver	rodents	oral-gavage
Chlorobenzene	D a										
Chloroform	B2 a		6.1E-03 a		kidney	rat	drinking water	2.3E-05 a	liver	mouse	oral-gavage
Tetrachloroethene	C-B2 c		5.2E-02 d					5.8E-07 d			
Trichloroethene	C-B2 d		1.1E-02 d					1.7E-06 d			
Vinyl Chloride	A b		1.4E+00 a		liver, lung	rat	oral-diet	8.8E-06 a	liver	rat	inhalation
Semivolatile Organic Compounds											
Benzo(a)anthracene	B2 a	0.1	7.3E+00 c	7.3E-01							
Benzo(a)pyrene	B2 a	1	7.3E+00 a	7.3E+00	forestomach, squamous cell cancers	mouse	oral-diet	8.8E-04 g			
Benzo(b)fluoranthene	B2 a	0.1	7.3E+00 c	7.3E-01							
Benzo(g,h,i)perylene	D a										
bis(2-Ethylhexyl)phthalate	B2 a		1.4E-02 a		liver	mouse	oral-diet				
Phenanthrene	D a										
Pesticides/PCBs											
Aldrin	B2 a		1.7E+01 a		liver	mouse	oral-diet	4.9E-03 a	liver	mouse	oral-diet
Dieldrin	B2 a		1.6E+01 a		liver	mouse	oral-diet	4.6E-03 a	liver	mouse	oral-diet

TABLE 8.32-1

SUMMARY OF DOSE-RESPONSE INFORMATION - CARCINOGENIC EFFECTS
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Weight of Evidence Class	Relative Potency Factor	Oral Cancer Slope Factor (CSF) $(mg/kg/day)^{-1}$	Adjusted Oral CSF	Target Organ/System (oral)	Study Animal	Study Method	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	Target Organ/System (Inhalation)	Study Animal	Study Method
Metals											
Aluminum, total											
Arsenic, total	A a		1.5E+00 a		skin	human	drinking water	4.3E-03 a	lung	human	inhalation, occupational
Barium, total	D a										
Beryllium, total	B1 a		4.3E+00 h		all sites	rat	drinking water	2.4E-03 a	lung	human	inhalation, occupational
Cadmium, total	B1 a							1.8E-03 a	lung	human	inhalation, occupational
Copper, total	D a										
Iron, total											
Lead, total	B2 a										
Manganese, total	D a										
Mercury, total	D a										
Nickel, total	A a							2.4E-04 a, e	lung, nasal	human	inhalation, occupational
Thallium, total	D a, f										
Vanadium, total											
Zinc, total	D a										

Notes:

1. Sources:
   a. US EPA, Integrated Risk Information System (IRIS), National Library of Medicine TOXNET Computer Communication Service, May 2001.
   b. US EPA, Health Effects Assessment Summary Tables (HEAST), Office of Solid Waste and Emergency Response/Office of Emergency and Remedial Response, FY-1997 Update.
   c. MADEP Documentation for the Risk Assessment Shortform Residential Scenario, October 1992.
   d. U.S. EPA Script for Carcinogenicity Questions on PCE and TCE, June 1992.
   e. Since there is no information on inorganic nickel, the value for nickel, refinery dust was used.
   f. There is no information on inorganic thallium, however, all thallium-based compounds on IRIS were noncarcinogens. Thus, thallium is assumed to be noncarcinogenic.
   g. Provisional inhalation toxicity values have been developed by the National Center for Environmental Assessment (NCEA). RAGS: Region 4 Bulletins, Human Health Risk Assessment (Interim Guidance) (November 1995).
   h. This value has been withdrawn from IRIS or HEAST.
2. Weight of evidence classification:
   A: Human carcinogen
   B: Probable human carcinogen
   B1: Limited evidence of carcinogenicity in humans from epidemiological studies
   B2: Sufficient evidence of carcinogenicity in animals, inadequate evidence in humans
   C: Possible human carcinogen
   D: Not classified
   E: No evidence of carcinogenicity
3. Inhalation unit risk is defined as the risk per concentration unit in air, e.g. risk per $\mu g/m^3$.
4. Unless otherwise stated, values presented for metals are for the elemental form of metals.

TABLE 8.43-1

SUMMARY OF CUMULATIVE HAZARD INDICES AND RISK ESTIMATES
Central Landfill - OU2
Johnston, Rhode Island

RECEPTOR	AREA	EXPOSURE MEDIA/ROUTE	RISK TABLE REFERENCE	NONCARCINOGENIC HAZARD INDEX			INCREMENTAL LIFETIME CANCER RISK ESTIMATE		
				Total	Site Related	Background	Total	Site Related	Background
Resident (Current)	Denney Residence	Ingestion of Groundwater	TABLE 8.44-1	**Total: 8.5E-01**	**7.0E-01**	**1.5E-01**	**4E-04**	**NC**	**4E-04**
High End Exposure			**EPA Risk Limits/Range:**	**1.0**	**1.0**	**1.0**	**1E-04 - 1E-06**	**1E-04 - 1E-06**	**1E-04 - 1E-06**
			Below/Within EPA Limits/Range?	**YES**	**YES**	**YES**	**NO**	**YES**	**NO**
Resident (Current)	Denney Residence	Ingestion of Groundwater	TABLE 8.44-2	**Total: 4.7E-01**	**3.9E-01**	**8.1E-02**	**9E-05**	**NC**	**9E-05**
Central Tendency Exposure			**EPA Risk Limits/Range:**	**1.0**	**1.0**	**1.0**	**1E-04 - 1E-06**	**1E-04 - 1E-06**	**1E-04 - 1E-06**
			Below/Within EPA Limits/Range?	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Local Resident [1] (Recreator/Trespasser) Current Conditions	Almy Reservoir	**Dermal Contact with Sediment**	TABLE 8.44-12	Subtotal: 1.0E-01	5.3E-02	5.2E-02	2E-05	1E-06	2E-05
		Incidental Ingestion of Sediment	TABLE 8.44-13	Subtotal: 3.3E-01	2.3E-01	1.0E-01	2E-05	1E-07	2E-05
		Dermal Contact with Surface Water Current Conditions	TABLE 8.44-14	Subtotal: 5.9E-04	5.8E-04	9.7E-06	1E-07	8E-08	3E-08
		Incidental Ingestion of Surface Water Current Conditions	TABLE 8.44-15	Subtotal: 4.5E-03	4.4E-03	6.7E-05	4E-07	3E-07	9E-08
	On-Site	Dermal Contact with Surface Soil	TABLE 8.44-3	Subtotal: 7.0E-03	6.3E-03	7.8E-04	7E-07	6E-07	8E-08
		Incidental Ingestion of Surficial Soil	TABLE 8.44-4	Subtotal: 2.4E-03	1.6E-03	8.6E-04	2E-07	8E-08	9E-08
		Inhalation of Fugitive Dust	TABLE 8.44-5	Subtotal: 9.0E-05	8.8E-05	1.3E-06	6E-11	5E-11	8E-12
	Sedimentation Pond	Dermal Contact with Sediment	TABLE 8.44-6	Subtotal: 8.6E-03	1.2E-03	7.4E-03	1E-06	9E-07	5E-07
		Incidental Ingestion of Sediment	TABLE 8.44-7	Subtotal: 4.4E-03	1.1E-03	3.2E-03	3E-07	8E-08	2E-07
		Dermal Contact with Surface Water	TABLE 8.44-8	Subtotal: 6.1E-04	5.9E-04	1.3E-05	2E-08	1E-08	1E-08
	Cedar Swamp Brook and Quarry Stream	Dermal Contact with Sediment	TABLE 8.44-9	Subtotal: 1.0E-02	1.1E-03	9.0E-03	9E-07	3E-07	5E-07
		Incidental Ingestion of Sediment	TABLE 8.44-10	Subtotal: 4.4E-03	1.1E-03	3.3E-03	2E-07	3E-08	2E-07
		Dermal Contact with Surface Water	TABLE 8.44-11	Subtotal: 6.3E-03	6.3E-03	1.9E-05	3E-08	6E-09	2E-08
		Total for Local Resident (Recreator/Trespasser) - Current:			**4.9E-01**	**3.1E-01**	**1.8E-01**	**5E-05**	**4E-06**	**4E-05**
		EPA Risk Limits/Range:			**1.0**	**1.0**	**1.0**	**1E-04 - 1E-06**	**1E-04 - 1E-06**	**1E-04 - 1E-06**
		Below/Within EPA Limits/Range?			**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

TABLE 8.43-1

SUMMARY OF CUMULATIVE HAZARD INDICES AND RISK ESTIMATES
Central Landfill - OU2
Johnston, Rhode Island

RECEPTOR	AREA	EXPOSURE MEDIA/ROUTE	RISK TABLE REFERENCE	NONCARCINOGENIC HAZARD INDEX			INCREMENTAL LIFETIME CANCER RISK ESTIMATE		
					Total	Site Related	Background	Total	Site Related	Background
Local Resident ' (Recreator/Trespasser) Future Conditions	Almy Reservoir	Dermal Contact with Sediment	TABLE 8.44-12	Subtotal:	1.0E-01	5.3E-02	5.2E-02	2E-05	1E-06	2E-05
		Incidental Ingestion of Sediment	TABLE 8.44-13	Subtotal:	3.3E-01	2.3E-01	1.0E-01	2E-05	1E-07	2E-05
		Dermal Contact with Surface Water Future Conditions	TABLE 8.44-16	Subtotal:	6.5E-05	6.2E-05	3.5E-06	1E-08	5E-09	9E-09
		Incidental Ingestion of Surface Water Future Conditions	TABLE 8.44-17	Subtotal:	3.3E-04	3.0E-04	2.4E-05	3E-08	9E-10	3E-08
	On-Site	Dermal Contact with Surface Soil	TABLE 8.44-3	Subtotal:	7.0E-03	6.3E-03	7.8E-04	7E-07	6E-07	8E-08
		Incidental Ingestion of Surficial Soil	TABLE 8.44-4	Subtotal:	2.4E-03	1.6E-03	8.6E-04	2E-07	8E-08	9E-08
		Inhalation of Fugitive Dust	TABLE 8.44-5	Subtotal:	9.0E-05	8.8E-05	1.3E-06	6E-11	5E-11	8E-12
	Sedimentation Pond	Dermal Contact with Sediment	TABLE 8.44-6	Subtotal:	8.6E-03	1.2E-03	7.4E-03	1E-06	9E-07	5E-07
		Incidental Ingestion of Sediment	TABLE 8.44-7	Subtotal:	4.4E-03	1.1E-03	3.2E-03	3E-07	8E-08	2E-07
		Dermal Contact with Surface Water	TABLE 8.44-8	Subtotal:	6.1E-04	5.9E-04	1.3E-05	2E-08	1E-08	1E-08
	Cedar Swamp Brook and Quarry Stream	Dermal Contact with Sediment	TABLE 8.44-9	Subtotal:	1.0E-02	1.1E-03	9.0E-03	9E-07	3E-07	5E-07
		Incidental Ingestion of Sediment	TABLE 8.44-10	Subtotal:	4.4E-03	1.1E-03	3.3E-03	2E-07	3E-08	2E-07
		Dermal Contact with Surface Water	TABLE 8.44-11	Subtotal:	6.3E-03	6.3E-03	1.9E-05	3E-08	6E-09	2E-08
		Total for Local Resident (Recreator/Trespasser) - Future:			**4.8E-01**	**3.0E-01**	**1.8E-01**	**5E-05**	**3E-06**	**4E-05**
		EPA Risk Limits/Range:			**1.0**	**1.0**	**1.0**	**1E-04 - 1E-06**	**1E-04 - 1E-06**	**1E-04 - 1E-06**
		Below/Within EPA Limits/Range?			**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

TABLE 8.43-1

SUMMARY OF CUMULATIVE HAZARD INDICES AND RISK ESTIMATES
Central Landfill - OU2
Johnston, Rhode Island

RECEPTOR	AREA	EXPOSURE MEDIA/ROUTE	RISK TABLE REFERENCE	NONCARCINOGENIC HAZARD INDEX			INCREMENTAL LIFETIME CANCER RISK ESTIMATE		
				Total	Site Related	Background	Total	Site Related	Background
Local Resident [1] (Recreator/Trespasser) Current Conditions	Upper Simmons Reservoir	Dermal Contact with Sediment	TABLE 8.44-18	Subtotal: 7.5E-02	4.5E-03	7.1E-02	2E-05	8E-06	2E-05
		Incidental Ingestion of Sediment	TABLE 8.44-19	Subtotal: 1.1E-01	1.7E-02	9.8E-02	2E-05	1E-06	2E-05
		Dermal Contact with Surface Water Current Conditions	TABLE 8.44-20	Subtotal: 9.0E-03	9.0E-03	3.6E-05	4E-07	3E-07	9E-08
		Incidental Ingestion of Surface Water Current Conditions	TABLE 8.44-21	Subtotal: 1.4E-01	1.4E-01	2.5E-04	5E-07	2E-07	3E-07
		Fish Consumption	TABLE 8.44-30	Subtotal: 2.6E-02	2.6E-02	NC	1E-05	1E-05	NC
	On-Site	Dermal Contact with Surface Soil	TABLE 8.44-3	Subtotal: 7.0E-03	6.3E-03	7.8E-04	7E-07	6E-07	8E-08
		Incidental Ingestion of Surficial Soil	TABLE 8.44-4	Subtotal: 2.4E-03	1.6E-03	8.6E-04	2E-07	8E-08	9E-08
		Inhalation of Fugitive Dust	TABLE 8.44-5	Subtotal: 9.0E-05	8.8E-05	1.3E-06	6E-11	5E-11	8E-12
	Sedimentation Pond	Dermal Contact with Sediment	TABLE 8.44-6	Subtotal: 8.6E-03	1.2E-03	7.4E-03	1E-06	9E-07	5E-07
		Incidental Ingestion of Sediment	TABLE 8.44-7	Subtotal: 4.4E-03	1.1E-03	3.2E-03	3E-07	8E-08	2E-07
		Dermal Contact with Surface Water	TABLE 8.44-8	Subtotal: 6.1E-04	5.9E-04	1.3E-05	2E-08	1E-08	1E-08
	Cedar Swamp Brook and Quarry Stream	Dermal Contact with Sediment	TABLE 8.44-9	Subtotal: 1.0E-02	1.1E-03	9.0E-03	9E-07	3E-07	5E-07
		Incidental Ingestion of Sediment	TABLE 8.44-10	Subtotal: 4.4E-03	1.1E-03	3.3E-03	2E-07	3E-08	2E-07
		Dermal Contact with Surface Water	TABLE 8.44-11	Subtotal: 6.3E-03	6.3E-03	1.9E-05	3E-08	6E-09	2E-08
		Total for Local Resident (Recreator/Trespasser) - Current:		**4.1E-01**	**2.2E-01**	**1.9E-01**	**6E-05**	**2E-05**	**4E-05**
		EPA Risk Limits/Range:		**1.0**	**1.0**	**1.0**	**1E-04 - 1E-06**	**1E-04 - 1E-06**	**1E-04 - 1E-06**
		Below/Within EPA Limits/Range?		**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

TABLE 8.43-1

SUMMARY OF CUMULATIVE HAZARD INDICES AND RISK ESTIMATES
Central Landfill - OU2
Johnston, Rhode Island

RECEPTOR	AREA	EXPOSURE MEDIA/ROUTE	RISK TABLE REFERENCE	NONCARCINOGENIC HAZARD INDEX			INCREMENTAL LIFETIME CANCER RISK ESTIMATE		
				Total	Site Related	Background	Total	Site Related	Background
Local Resident [1] (Recreator/Trespasser) Future Conditions	Upper Simmons Reservoir	Dermal Contact with Sediment	TABLE 8.44-18	Subtotal: 7.5E-02	4.5E-03	7.1E-02	2E-05	8E-06	2E-05
		Incidental Ingestion of Sediment	TABLE 8.44-19	Subtotal: 1.1E-01	1.7E-02	9.8E-02	2E-05	1E-06	2E-05
		Dermal Contact with Surface Water Future Conditions	TABLE 8.44-22	Subtotal: 5.1E-04	5.0E-04	4.6E-06	5E-08	4E-08	1E-08
		Incidental Ingestion of Surface Water Future Conditions	TABLE 8.44-23	Subtotal: 3.8E-03	3.7E-03	3.2E-05	8E-08	4E-08	4E-08
	On-Site	Dermal Contact with Surface Soil	TABLE 8.44-3	Subtotal: 7.0E-03	6.3E-03	7.8E-04	7E-07	6E-07	8E-08
		Incidental Ingestion of Surficial Soil	TABLE 8.44-4	Subtotal: 2.4E-03	1.6E-03	8.6E-04	2E-07	8E-08	9E-08
		Inhalation of Fugitive Dust	TABLE 8.44-5	Subtotal: 9.0E-05	8.8E-05	1.3E-06	6E-11	5E-11	8E-12
	Sedimentation Pond	Dermal Contact with Sediment	TABLE 8.44-6	Subtotal: 8.6E-03	1.2E-03	7.4E-03	1E-06	9E-07	5E-07
		Incidental Ingestion of Sediment	TABLE 8.44-7	Subtotal: 4.4E-03	1.1E-03	3.2E-03	3E-07	8E-08	2E-07
		Dermal Contact with Surface Water	TABLE 8.44-8	Subtotal: 6.1E-04	5.9E-04	1.3E-05	2E-08	1E-08	1E-08
	Cedar Swamp Brook and Quarry Stream	Dermal Contact with Sediment	TABLE 8.44-9	Subtotal: 1.0E-02	1.1E-03	9.0E-03	9E-07	3E-07	5E-07
		Incidental Ingestion of Sediment	TABLE 8.44-10	Subtotal: 4.4E-03	1.1E-03	3.3E-03	2E-07	3E-08	2E-07
		Dermal Contact with Surface Water	TABLE 8.44-11	Subtotal: 6.3E-03	6.3E-03	1.9E-05	3E-08	6E-09	2E-08
		Total for Local Resident (Recreator/Trespasser) - Future:		**2.4E-01**	**4.5E-02**	**1.9E-01**	**5E-05**	**1E-05**	**4E-05**
		EPA Risk Limits/Range:		**1.0**	**1.0**	**1.0**	**1E-04 - 1E-06**	**1E-04 - 1E-06**	**1E-04 - 1E-06**
		Below/Within EPA Limits/Range?		**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

TABLE 8.43-1

SUMMARY OF CUMULATIVE HAZARD INDICES AND RISK ESTIMATES
Central Landfill - OU2
Johnston, Rhode Island

RECEPTOR	AREA	EXPOSURE MEDIA/ROUTE	RISK TABLE REFERENCE	NONCARCINOGENIC HAZARD INDEX			INCREMENTAL LIFETIME CANCER RISK ESTIMATE		
				Total	Site Related	Background	Total	Site Related	Background
Facility Worker	Cedar Swamp Brook and Quarry Stream	Dermal Contact with Sediment	TABLE 8.44-24	Subtotal: 1.7E-05	1.8E-06	1.6E-05	4E-09	2E-09	3E-09
		Incidental Ingestion of Sediment	TABLE 8.44-25	Subtotal: 4.9E-04	1.2E-04	3.6E-04	7E-08	8E-09	6E-08
		Dermal Contact with Surface Water	TABLE 8.44-26	Subtotal: 9.8E-04	9.8E-04	2.9E-06	1E-08	3E-09	9E-09
	Sedimentation Pond	Dermal Contact with Sediment	TABLE 8.44-27	Subtotal: 1.8E-05	2.4E-06	1.5E-05	8E-09	5E-09	3E-09
		Incidental Ingestion of Sediment	TABLE 8.44-28	Subtotal: 8.0E-04	2.1E-04	6.0E-04	2E-07	4E-08	1E-07
		Dermal Contact with Surface Water	TABLE 8.44-29	Subtotal: 6.2E-05	5.9E-05	1.3E-06	7E-09	3E-09	4E-09
		Total for Facility Worker :		**2.4E-03**	**1.4E-03**	**1.0E-03**	**3E-07**	**6E-08**	**2E-07**
		EPA Risk Limits/Range:		**1.0**	**1.0**	**1.0**	**1E-04 - 1E-06**	**1E-04 - 1E-06**	**1E-04 - 1E-06**
		Below/Within EPA Limits/Range?		**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

1. It was assumed that recreators that are present either at the Almy Reservoir or Upper Simmons Reservoir may also trespass onto the site. Thus, risks for the current recreator at the Almy Reservoir, the future recreator at the Almy Reservoir, the current recreator at the Upper Simmons Reservoir, and the future recreator at the Upper Simmons Reservoir, were summed with risks for the trespasser.

2. The Denney residence is the only residential with VOC's (based on modeling not on sampled) in accordance with EPA Guidance, risks via inhalation of volatiles in GW is considered to be approximately equal to risks via ingestion.

TABLE 8.43-2

RELATIVE CONTRIBUTION OF EXPOSURE PATHWAYS AND KEY CONSTITUENTS TO CUMULATIVE RISK
Central Landfill - OU2
Johnston, Rhode Island

RECEPTOR	AREA	EXPOSURE MEDIA/ROUTE	NONCARCINOGENIC HAZARD INDEX Site Related	Pathway Percent Contribution to HI	COCs Contributing Most to the HI, the HI, and Exposure Point Concentration (in applicable units)			INCREMENTAL LIFETIME CANCER RISK ESTIMATE Site Related	Pathway Percent Contribution to Risk	COCs Contributing Most to the ELCR and Exposure Point Concentration (in applicable units)		
					Contributing COCs	HI	EPC			Contributing COCs	ELCR	EPC
Resident (Current) High End Exposure	Denney Residence	Ingestion of Groundwater	**Total: 7.0E-01**	100%	Manganese	7.0E-01	3.0E-01 mg/l	NC	NC	Beryllium	4.E-04	5.2E-03 mg/l
Resident (Current) Central Tendency Exposure	Denney Residence	Ingestion of Groundwater	**Total: 3.9E-01**	100%	Manganese	3.9E-01	3.0E-01 mg/l	NC	NC	Beryllium	9.E-05	5.2E-03 mg/l
Local Resident (Recreator/Trespasser) Current Conditions	Almy Reservoir	Dermal Contact with Sediment	Subtotal: 5.3E-02	17%	Manganese	5.3E-02	8.7E+03 mg/kg	1E-06	30%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	9.E-07 1.E-07 7.E-08	8.4E-02 mg/kg 1.2E-01 mg/kg 6.6E-02 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 2.3E-01	75%	Manganese	2.3E-01	8.7E+03 mg/kg	1E-07	4%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	1.E-07 2.E-08 9.E-09	8.4E-02 mg/kg 1.2E-01 mg/kg 6.6E-02 mg/kg
		Dermal Contact with Surface Water Current Conditions	Subtotal: 5.8E-04	0%	Manganese Arsenic	3.3E-05 5.5E-04	3.0E-02 mg/l 2.1E-03 mg/l	8E-08	2%	Arsenic	8.E-08	2.1E-03 mg/l
		Incidental Ingestion of Surface Water Current Conditions	Subtotal: 4.4E-03	1%	Arsenic Manganese	3.8E-03 6.6E-04	2.1E-03 mg/l 3.0E-02 mg/l	3E-07	7%	Arsenic	3.E-07	2.1E-03 mg/l
	On-Site	Dermal Contact with Surface Soil	Subtotal: 6.3E-03	2%	Arsenic	5.2E-03	5.5E+00 mg/kg	6E-07	16%	Arsenic Benzo(a)pyrene	3.E-07 3.E-07	5.5E+00 mg/kg 2.2E-01 mg/kg
		Incidental Ingestion of Surficial Soil	Subtotal: 1.6E-03	1%	Arsenic Manganese	9.1E-04 3.8E-04	5.5E+00 mg/kg 2.6E+02 mg/kg	8E-08	2%	Arsenic Benzo(a)pyrene	5.E-08 2.E-08	5.5E+00 mg/kg 2.2E-01 mg/kg
		Inhalation of Fugitive Dust	Subtotal: 8.8E-05	0%	Manganese	8.7E-05	1.2E-06 mg/m³	5E-11	0%	Arsenic	5.E-11	2.6E-05 mg/m³
	Sedimentation Pond	Dermal Contact with Sediment	Subtotal: 1.2E-03	0%	Manganese	1.0E-03	7.5E+02 mg/kg	9E-07	26%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	7.E-07 1.E-07 1.E-07	6.2E-01 mg/kg 1.2E+00 mg/kg 9.2E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 1.1E-03	0%	Manganese	1.1E-03	7.5E+02 mg/kg	8E-08	2%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	2.E-06 4.E-06 3.E-06	6.2E-01 mg/kg 1.2E+00 mg/kg 9.2E-01 mg/kg
		Dermal Contact with Surface Water	Subtotal: 5.9E-04	0%	Manganese	4.0E-04	1.9E+00 mg/l	1E-08	0%	Arsenic	1.E-08	3.5E-03 mg/l
	Cedar Swamp Brook and Quarry Stream	Dermal Contact with Sediment	Subtotal: 1.1E-03	0%	Manganese	1.0E-03	7.6E+02 mg/kg	3E-07	9%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	3.E-07 4.E-08 3.E-08	2.2E-01 mg/kg 3.1E-01 mg/kg 2.5E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 1.1E-03	0%	Manganese	1.1E-03	7.6E+02 mg/kg	3E-08	1%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	2.E-08 3.E-09 2.E-09	2.2E-01 mg/kg 3.1E-01 mg/kg 2.5E-01 mg/kg
		Dermal Contact with Surface Water	Subtotal: 6.3E-03	2%	Manganese	6.2E-03	3.0E+01 mg/kg	6E-09	0%	Arsenic	6.E-09	2.2E-03 mg/l
		Total for Local Resident (Recreator/Trespasser) - Current:	**3.1E-01**	100%				**4E-06**	100%			

TABLE 8.43-2

RELATIVE CONTRIBUTION OF EXPOSURE PATHWAYS AND KEY CONSTITUENTS TO CUMULATIVE RISK
Central Landfill - OU2
Johnston, Rhode Island

RECEPTOR	AREA	EXPOSURE MEDIA/ROUTE	NONCARCINOGENIC HAZARD INDEX Site Related	Pathway Percent Contribution to HI	COCs Contributing Most to the HI, the HI, and Exposure Point Concentration (in applicable units)			INCREMENTAL LIFETIME CANCER RISK ESTIMATE Site Related	Pathway Percent Contribution to Risk	COCs Contributing Most to the ELCR and Exposure Point Concentration (in applicable units)		
					Contributing COCs	HI	EPC			Contributing COCs	ELCR	EPC
Local Resident (Recreator/Trespasser) Future Conditions	Almy Reservoir	Dermal Contact with Sediment	Subtotal: 5.3E-02	17%	Manganese	5.3E-02	8.7E+03 mg/kg	1E-06	33%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	9.E-07 1.E-07 7.E-08	8.4E-02 mg/kg 1.2E-01 mg/kg 6.6E-02 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 2.3E-01	76%	Manganese	2.3E-01	8.7E+03 mg/kg	1E-07	5%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	1.E-07 2.E-08 9.E-09	8.4E-02 mg/kg 1.2E-01 mg/kg 6.6E-02 mg/kg
		Dermal Contact with Surface Water Future Conditions	Subtotal: 6.2E-05	0%	Manganese Cadmium Mercury	6.5E-06 3.1E-06 1.3E-05	5.8E-03 mg/l 4.0E-05 mg/l 5.0E-05 mg/l	5E-09	0%	bis(2-Ethylhexyl)phthalate	2.E-09	1.7E-04 mg/l
		Incidental Ingestion of Surface Water Future Conditions	Subtotal: 3.0E-04	0%	Mercury Manganese Cadmium	9.0E-05 1.3E-04 4.3E-05	4.0E-05 mg/l 5.8E-03 mg/l 2.2E-02 mg/l	9E-10	0%	bis(2-Ethylhexyl)phthalate	2.E-10	1.7E-04 mg/l
	On-Site	Dermal Contact with Surface Soil	Subtotal: 6.3E-03	2%	Arsenic	5.2E-03	5.5E+00 mg/kg	6E-07	18%	Arsenic Benzo(a)pyrene	3.E-07 3.E-07	5.5E+00 mg/kg 2.2E-01 mg/kg
		Incidental Ingestion of Surficial Soil	Subtotal: 1.6E-03	1%	Arsenic Manganese	9.1E-04 3.8E-04	5.5E+00 mg/kg 2.6E+02 mg/kg	8E-08	2%	Arsenic Benzo(a)pyrene	5.E-08 2.E-08	5.5E+00 mg/kg 2.2E-01 mg/kg
		Inhalation of Fugitive Dust	Subtotal: 8.8E-05	0%	Manganese	8.7E-05	1.2E-06 mg/m³	5E-11	0%	Arsenic	5.E-11	2.6E-05 mg/m³
	Sedimentation Pond	Dermal Contact with Sediment	Subtotal: 1.2E-03	0%	Manganese	1.0E-03	7.5E+02 mg/kg	9E-07	29%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	7.E-07 1.E-07 1.E-07	6.2E-01 mg/kg 1.2E+00 mg/kg 9.2E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 1.1E-03	0%	Manganese	1.1E-03	7.5E+02 mg/kg	8E-08	2%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	6.E-08 1.E-08 9.E-09	6.2E-01 mg/kg 1.2E+00 mg/kg 9.2E-01 mg/kg
		Dermal Contact with Surface Water	Subtotal: 5.9E-04	0%	Manganese	4.0E-04	1.9E+00 mg/l	1E-08	0%	Arsenic	1.E-08	3.5E-03 mg/l
	Cedar Swamp Brook and Quarry Stream	Dermal Contact with Sediment	Subtotal: 1.1E-03	0%	Manganese	1.0E-03	7.6E+02 mg/kg	3E-07	10%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	3.E-07 4.E-08 3.E-08	2.2E-01 mg/kg 3.1E-01 mg/kg 2.5E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 1.1E-03	0%	Manganese	1.1E-03	7.6E+02 mg/kg	3E-08	1%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	2.E-08 3.E-09 2.E-09	2.2E-01 mg/kg 3.1E-01 mg/kg 2.5E-01 mg/kg
		Dermal Contact with Surface Water	Subtotal: 6.3E-03	2%	Manganese	6.2E-03	3.0E+01 mg/kg	6E-09	0%	Arsenic	6.E-09	2.2E-03 mg/l
		Total for Local Resident (Recreator/Trespasser) - Future:	**3.0E-01**	100%				**3E-06**	100%			

TABLE 8.43-2

RELATIVE CONTRIBUTION OF EXPOSURE PATHWAYS AND KEY CONSTITUENTS TO CUMULATIVE RISK
Central Landfill - OU2
Johnston, Rhode Island

RECEPTOR	AREA	EXPOSURE MEDIA/ROUTE	NONCARCINOGENIC HAZARD INDEX Site Related	Pathway Percent Contribution to HI	COCs Contributing Most to the HI, the HI, and Exposure Point Concentration (in applicable units)			INCREMENTAL LIFETIME CANCER RISK ESTIMATE Site Related	Pathway Percent Contribution to Risk	COCs Contributing Most to the ELCR and Exposure Point Concentration (in applicable units)		
					Contributing COCs	HI	EPC			Contributing COCs	ELCR	EPC
Local Resident (Recreator/Trespasser) Current Conditions	Upper Simmons Reservoir	Dermal Contact with Sediment	Subtotal: 4.5E-03	2.1%	Manganese	3.9E-03	6.4E+02 mg/kg	8E-06	34%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	1.E-06 NC 6.E-06	1.1E+00 mg/kg 2.1E-01 mg/kg 5.7E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 1.7E-02	8%	Manganese	1.7E-02	6.4E+02 mg/kg	1E-06	4.6%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	1.E-07 8.E-07 NC	7.8E-01 mg/kg 5.7E-01 mg/kg NCC mg/kg
		Dermal Contact with Surface Water Current Conditions	Subtotal: 9.0E-03	4%	Manganese	7.0E-03	6.3E+00 mg/l	3E-07	1.3%	Tetrachloroethene Arsenic	3.E-07 5.E-08	5.5E-04 mg/l 1.3E-03 mg/l
		Incidental Ingestion of Surface Water Current Conditions	Subtotal: 1.4E-01	65%	Manganese	1.4E-01	6.3E+00 mg/l	2E-07	0.7%	Arsenic	2.E-07	1.3E-03 mg/l
		Fish Consumption	Subtotal: 2.6E-02	12%	Arsenic Mercury	1.2E-02 9.9E-03	5.1E-02 mg/kg 4.1E-02 mg/kg	1E-05	51%	Benzo(a)pyrene Arsenic	9.E-06 1.E-06	6.1E-02 mg/kg 5.1E-02 mg/kg
	On-Site	Dermal Contact with Surface Soil	Subtotal: 6.3E-03	3%	Arsenic	5.2E-03	5.5E+00 mg/kg	6E-07	2.5%	Arsenic Benzo(a)pyrene	3.E-07 3.E-07	5.5E+00 mg/kg 2.2E-01 mg/kg
		Incidental Ingestion of Surficial Soil	Subtotal: 1.6E-03	0.7%	Arsenic Manganese	9.1E-04 3.8E-04	5.5E+00 mg/kg 2.6E+02 mg/kg	8E-08	0.3%	Arsenic Benzo(a)pyrene	5.E-08 2.E-08	5.5E+00 mg/kg 2.2E-01 mg/kg
		Inhalation of Fugitive Dust	Subtotal: 8.8E-05	0.04%	Manganese	8.7E-05	1.2E-06 mg/m³	5E-11	0.0002%	Arsenic	5.E-11	2.6E-05 mg/m³
	Sedimentation Pond	Dermal Contact with Sediment	Subtotal: 1.2E-03	0.5%	Manganese	1.0E-03	7.5E+02 mg/kg	9E-07	4%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	7.E-07 1.E-07 1.E-07	6.2E-01 mg/kg 1.2E+00 mg/kg 9.2E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 1.1E-03	0.5%	Manganese	1.1E-03	7.5E+02 mg/kg	8E-08	0.3%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	6.E-08 1.E-08 9.E-09	6.2E-01 mg/kg 1.2E+00 mg/kg 9.2E-01 mg/kg
		Dermal Contact with Surface Water	Subtotal: 5.9E-04	0.3%	Manganese	4.0E-04	1.9E+00 mg/l	1E-08	0.04%	Arsenic	1.E-08	3.5E-03 mg/l
	Cedar Swamp Brook and Quarry Stream	Dermal Contact with Sediment	Subtotal: 1.1E-03	0.5%	Manganese	1.0E-03	7.6E+02 mg/kg	3E-07	1.4%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	3.E-07 4.E-08 3.E-08	2.2E-01 mg/kg 3.1E-01 mg/kg 2.5E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 1.1E-03	0.5%	Manganese	1.1E-03	7.6E+02 mg/kg	3E-08	0.12%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	2.E-08 3.E-09 2.E-09	2.2E-01 mg/kg 3.1E-01 mg/kg 2.5E-01 mg/kg
		Dermal Contact with Surface Water	Subtotal: 6.3E-03	2.9%	Manganese	6.2E-03	3.0E+01 mg/kg	6E-09	0.03%	Arsenic	6.E-09	2.2E-03 mg/l
		Total for Local Resident (Recreator/Trespasser) - Current:	**2.2E-01**	100%				**2E-05**	100%			

TABLE 8.43-2

RELATIVE CONTRIBUTION OF EXPOSURE PATHWAYS AND KEY CONSTITUENTS TO CUMULATIVE RISK
Central Landfill - OU2
Johnston, Rhode Island

RECEPTOR	AREA	EXPOSURE MEDIA/ROUTE	NONCARCINOGENIC HAZARD INDEX Site Related	Pathway Percent Contribution to HI	COCs Contributing Most to the HI, the HI, and Exposure Point Concentration (in applicable units)			INCREMENTAL LIFETIME CANCER RISK ESTIMATE Site Related	Pathway Percent Contribution to Risk	COCs Contributing Most to the ELCR and Exposure Point Concentration (in applicable units)		
					Contributing COCs	HI	EPC			Contributing COCs	ELCR	EPC
Local Resident (Recreator/Trespasser) Future Conditions	Upper Simmons Reservoir	Dermal Contact with Sediment	Subtotal: 4.5E-03	10%	Manganese	3.9E-03	6.4E+02 mg/kg	8E-06	71%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	1.E-06 NC 6.E-06	1.1E+00 mg/kg 2.1E-01 mg/kg 5.7E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 1.7E-02	38%	Manganese	1.7E-02	6.4E+02 mg/kg	1E-06	10%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	1.E-07 8.E-07 NC	7.8E-01 mg/kg 5.7E-01 mg/kg NCC mg/kg
		Dermal Contact with Surface Water Future Conditions	Subtotal: 5.0E-04	1%	Manganese	1.3E-04	1.2E-01 mg/l	4E-08	0%	bis(2-Ethylhexyl)phthalate Arsenic	2.E-08 1.E-08	1.4E-03 mg/l 2.9E-04 mg/l
		Incidental Ingestion of Surface Water Future Conditions	Subtotal: 3.7E-03	8%	Manganese Arsenic	2.6E-03 5.3E-04	1.2E-01 mg/l 2.9E-04 mg/l	4E-08	0%	Arsenic	4.E-08	2.9E-04 mg/l
	On-Site	Dermal Contact with Surface Soil	Subtotal: 6.3E-03	14%	Arsenic	5.2E-03	5.5E+00 mg/kg	6E-07	5%	Arsenic Benzo(a)pyrene	6.E+00 3.E-07	3.0E-07 mg/kg 2.2E-01 mg/kg
		Incidental Ingestion of Surficial Soil	Subtotal: 1.6E-03	3%	Arsenic Manganese	9.1E-04 3.8E-04	5.5E+00 mg/kg 2.6E+02 mg/kg	8E-08	1%	Arsenic Benzo(a)pyrene	5.E-08 2.E-08	5.5E+00 mg/kg 2.2E-01 mg/kg
		Inhalation of Fugitive Dust	Subtotal: 8.8E-05	0%	Manganese	8.7E-05	1.2E-06 mg/m³	5E-11	0%	Arsenic	5.E-11	2.6E-05 mg/m³
	Sedimentation Pond	Dermal Contact with Sediment	Subtotal: 1.2E-03	3%	Manganese	1.0E-03	7.5E+02 mg/kg	9E-07	9%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	7.E-07 1.E-07 1.E-07	6.2E-01 mg/kg 1.2E+00 mg/kg 9.2E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 1.1E-03	2%	Manganese	1.1E-03	7.5E+02 mg/kg	8E-08	1%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	6.E-08 1.E-08 9.E-09	6.2E-01 mg/kg 1.2E+00 mg/kg 9.2E-01 mg/kg
		Dermal Contact with Surface Water	Subtotal: 5.9E-04	1%	Manganese	4.0E-04	1.9E+00 mg/l	1E-08	0%	Arsenic	1.E-08	3.5E-03 mg/l
	Cedar Swamp Brook and Quarry Stream	Dermal Contact with Sediment	Subtotal: 1.1E-03	2%	Manganese	1.0E-03	7.6E+02 mg/kg	3E-07	3%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	3.E-07 4.E-08 3.E-08	2.2E-01 mg/kg 3.1E-01 mg/kg 2.5E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 1.1E-03	2%	Manganese	1.1E-03	7.6E+02 mg/kg	3E-08	0%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	2.E-08 3.E-09 2.E-09	2.2E-01 mg/kg 3.1E-01 mg/kg 2.5E-01 mg/kg
		Dermal Contact with Surface Water	Subtotal: 6.3E-03	14%	Manganese	6.2E-03	3.0E+01 mg/kg	6E-09	0%	Arsenic	6.E-09	2.2E-03 mg/l
		Total for Local Resident (Recreator/Trespasser) - Future:	**4.5E-02**	100%				**1E-05**	100%			

TABLE 8.43-2

RELATIVE CONTRIBUTION OF EXPOSURE PATHWAYS AND KEY CONSTITUENTS TO CUMULATIVE RISK
Central Landfill - OU2
Johnston, Rhode Island

RECEPTOR	AREA	EXPOSURE MEDIA/ROUTE	NONCARCINOGENIC HAZARD INDEX Site Related	Pathway Percent Contribution to HI	COCs Contributing Most to the HI, the HI, and Exposure Point Concentration (in applicable units)			INCREMENTAL LIFETIME CANCER RISK ESTIMATE Site Related	Pathway Percent Contribution to Risk	COCs Contributing Most to the ELCR and Exposure Point Concentration (in applicable units)		
					Contributing COCs	HI	EPC			Contributing COCs	ELCR	EPC
Facility Worker	Cedar Swamp Brook and Quarry Stream	Dermal Contact with Sediment	Subtotal: 1.8E-06	0%	Manganese	1.8E-06	7.6E+02 mg/kg	2E-09	2%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	1.E-09 2.E-10 1.E-10	2.2E-01 mg/kg 3.1E-01 mg/kg 2.5E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 1.2E-04	9%	Manganese	1.2E-04	7.6E+02 mg/kg	8E-09	13%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	7.E-09 9.E-10 7.E-10	2.2E-01 mg/kg 3.1E-01 mg/kg 2.5E-01 mg/kg
		Dermal Contact with Surface Water	Subtotal: 9.8E-04	71%	Manganese	9.5E-04	3.0E+01 mg/l	3E-09	4%	Arsenic	3.E-09	2.2E-03 mg/l
	Sedimentation Ponds	Dermal Contact with Sediment	Subtotal: 2.4E-06	0%	Manganese	2.1E-06	7.5E+02 mg/kg	5E-09	9%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	4.E-09 7.E-10 6.E-10	6.2E-01 mg/kg 1.2E+00 mg/kg 9.2E-01 mg/kg
		Incidental Ingestion of Sediment	Subtotal: 2.1E-04	15%	Manganese	2.0E-04	7.5E+02 mg/kg	4E-08	67%	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene	3.E-08 6.E-09 5.E-09	6.2E-01 mg/kg 1.2E+00 mg/kg 9.2E-01 mg/kg
		Dermal Contact with Surface Water	Subtotal: 5.9E-05	4%	Manganese	4.0E-05	1.9E+00 mg/l	3E-09	4%	Arsenic	3.E-09	3.5E-03 mg/l
		Total for Facility Worker :	**1.4E-03**	100%				**6E-08**	100%			

Notes:

1. The Denney residence is the only residential with VOC's (based on modeling not on sampled) in accordance with EPA Guidance, risks via inhalation of volatiles in GW is considered to be approximately equal to risks via ingestion.

TABLE 8.44-1

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INGESTION OF GROUNDWATER (DENNEY RESIDENCE)
HIGH END EXPOSURE

RECEPTOR: Resident - Current
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	Oral x Absorption x Adjustment Factor	Receptor-Specific Exposure Factor (l/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	ND	1.00	5.6E-02	NC	NA	NC
Benzene	ND	1.00	5.6E-02	NC	1.0E-03	NC
Carbon Tetrachloride	ND	1.00	5.6E-02	NC	7.0E-04	NC
Chlorobenzene	ND	1.00	5.6E-02	NC	2.0E-02	NC
Chloroform	ND	1.00	5.6E-02	NC	1.0E-02	NC
Tetrachloroethene	ND	1.00	5.6E-02	NC	1.0E-02	NC
Trichloroethene	ND	1.00	5.6E-02	NC	2.0E-03	NC
Vinyl Chloride	ND	1.00	5.6E-02	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	ND	1.00	5.6E-02	NC	3.0E-02	NC
Benzo(a)pyrene	ND	1.00	5.6E-02	NC	3.0E-02	NC
Benzo(b)fluoranthene	ND	1.00	5.6E-02	NC	3.0E-02	NC
Benzo(g,h,i)perylene	ND	1.00	5.6E-02	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	ND	1.00	5.6E-02	NC	2.0E-02	NC
Phenanthrene	ND	1.00	5.6E-02	NC	3.0E-02	NC
Pesticides/PCBs						
Aldrin	ND	1.00	5.6E-02	NC	3.0E-05	NC
Dieldrin	ND	1.00	5.6E-02	NC	5.0E-05	NC
Metals						
Aluminum, total	**ND**	**1.00**	**5.6E-02**	**NC**	**1.0E+00**	**NC**
Arsenic, total	ND	1.00	5.6E-02	NC	3.0E-04	NC
Barium, total	**ND**	**1.00**	**5.6E-02**	**NC**	**7.0E-02**	**NC**
Beryllium, total	**5.2E-03**	**1.00**	**5.6E-02**	**2.9E-04**	**2.0E-03**	**1.5E-01**
Cadmium, total	ND	1.00	5.6E-02	NC	5.0E-04	NC
Copper, total	**ND**	**1.00**	**5.6E-02**	**NC**	**3.7E-02**	**NC**
Iron, total	ND	1.00	5.6E-02	NC	NA	NC
Lead, total	ND	1.00	5.6E-02	NC	NA	NC
Manganese, total	3.0E-01	1.00	5.6E-02	1.7E-02	2.4E-02	7.0E-01
Mercury, total	ND	1.00	5.6E-02	NC	3.0E-04	NC
Nickel, total	ND	1.00	5.6E-02	NC	2.0E-02	NC
Thallium, total	ND	1.00	5.6E-02	NC	2.0E-01	NC
Vanadium, total	ND	1.00	5.6E-02	NC	7.0E-03	NC
Zinc, total	ND	1.00	5.6E-02	NC	3.0E-01	NC
					SUBTOTAL:	**8.5E-01**
					SITE RELATED RISK:	**7.0E-01**
					BACKGROUND RISK:	**1.5E-01**

TABLE 8.44-1 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INGESTION OF GROUNDWATER (DENNEY RESIDENCE)
HIGH END EXPOSURE

RECEPTOR: Resident - Current
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Oral Absorption x Adjustment Factor	Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Cancer Slope Factor (mg/kg-day)-1	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	ND	1.00	1.6E-02	NC	2.4E-02	NA
Benzene	ND	1.00	1.6E-02	NC	2.9E-02	NA
Carbon Tetrachloride	ND	1.00	1.6E-02	NC	1.3E-01	NA
Chlorobenzene	ND	1.00	1.6E-02	NC	NA	NA
Chloroform	ND	1.00	1.6E-02	NC	6.1E-03	NA
Tetrachloroethene	ND	1.00	1.6E-02	NC	5.2E-02	NA
Trichloroethene	ND	1.00	1.6E-02	NC	1.1E-02	NA
Vinyl Chloride	ND	1.00	1.6E-02	NC	1.4E+00	NA
Semivolatile Organic Compounds						
Benzo(a)anthracene	ND	1.00	1.6E-02	NC	7.3E-01	NA
Benzo(a)pyrene	ND	1.00	1.6E-02	NC	7.3E+00	NA
Benzo(b)fluoranthene	ND	1.00	1.6E-02	NC	7.3E-01	NA
Benzo(g,h,i)perylene	ND	1.00	1.6E-02	NC	NA	NA
bis(2-Ethylhexyl)phthalate	ND	1.00	1.6E-02	NC	1.4E-02	NA
Phenanthrene	ND	1.00	1.6E-02	NC	NA	NA
Pesticides/PCBs						
Aldrin	ND	1.00	1.6E-02	NC	1.7E+01	NA
Dieldrin	ND	1.00	1.6E-02	NC	1.6E+01	NA
Metals						
Aluminum, total	**ND**	**1.00**	**1.6E-02**	**NC**	**NA**	**NA**
Arsenic, total	ND	1.00	1.6E-02	NC	1.5E+00	NA
Barium, total	**ND**	**1.00**	**1.6E-02**	**NC**	**NA**	**NA**
Beryllium, total	**5.2E-03**	**1.00**	**1.6E-02**	**8.4E-05**	**4.3E+00**	**3.6E-04**
Cadmium, total	ND	1.00	1.6E-02	NC	NA	NA
Copper, total	**ND**	**1.00**	**1.6E-02**	**NC**	**NA**	**NA**
Iron, total	ND	1.00	1.6E-02	NC	NA	NA
Lead, total	ND	1.00	1.6E-02	NC	NA	NA
Manganese, total	3.0E-01	1.00	1.6E-02	4.8E-03	NA	NA
Mercury, total	ND	1.00	1.6E-02	NC	NA	NA
Nickel, total	ND	1.00	1.6E-02	NC	NA	NA
Thallium, total	ND	1.00	1.6E-02	NC	NA	NA
Vanadium, total	ND	1.00	1.6E-02	NC	NA	NA
Zinc, total	ND	1.00	1.6E-02	NC	NA	NA
					SUBTOTAL:	**3.6E-04**
					SITE RELATED RISK:	**NC**
					BACKGROUND RISK:	**3.6E-04**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-2

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INGESTION OF GROUNDWATER (DENNEY RESIDENCE)
CENTRAL TENDENCY EXPOSURE

RECEPTOR: Resident - Current
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	Oral x Absorption x Adjustment Factor	Receptor-Specific Exposure Factor (l/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	ND	1.00	3.1E-02	NC	NA	NC
Benzene	ND	1.00	3.1E-02	NC	1.0E-03	NC
Carbon Tetrachloride	ND	1.00	3.1E-02	NC	7.0E-04	NC
Chlorobenzene	ND	1.00	3.1E-02	NC	2.0E-02	NC
Chloroform	ND	1.00	3.1E-02	NC	1.0E-02	NC
Tetrachloroethene	ND	1.00	3.1E-02	NC	1.0E-02	NC
Trichloroethene	ND	1.00	3.1E-02	NC	2.0E-03	NC
Vinyl Chloride	ND	1.00	3.1E-02	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	ND	1.00	3.1E-02	NC	3.0E-02	NC
Benzo(a)pyrene	ND	1.00	3.1E-02	NC	3.0E-02	NC
Benzo(b)fluoranthene	ND	1.00	3.1E-02	NC	3.0E-02	NC
Benzo(g,h,i)perylene	ND	1.00	3.1E-02	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	ND	1.00	3.1E-02	NC	2.0E-02	NC
Phenanthrene	ND	1.00	3.1E-02	NC	3.0E-02	NC
Pesticides/PCBs						
Aldrin	ND	1.00	3.1E-02	NC	3.0E-05	NC
Dieldrin	ND	1.00	3.1E-02	NC	5.0E-05	NC
Metals						
Aluminum, total	**ND**	**1.00**	**3.1E-02**	**NC**	**1.0E+00**	**NC**
Arsenic, total	ND	1.00	3.1E-02	NC	3.0E-04	NC
Barium, total	**ND**	**1.00**	**3.1E-02**	**NC**	**7.0E-02**	**NC**
Beryllium, total	**5.2E-03**	**1.00**	**3.1E-02**	**1.6E-04**	**2.0E-03**	**8.1E-02**
Cadmium, total	ND	1.00	3.1E-02	NC	5.0E-04	NC
Copper, total	**ND**	**1.00**	**3.1E-02**	**NC**	**3.7E-02**	**NC**
Iron, total	ND	1.00	3.1E-02	NC	NA	NC
Lead, total	ND	1.00	3.1E-02	NC	NA	NC
Manganese, total	3.0E-01	1.00	3.1E-02	9.3E-03	2.4E-02	3.9E-01
Mercury, total	ND	1.00	3.1E-02	NC	3.0E-04	NC
Nickel, total	ND	1.00	3.1E-02	NC	2.0E-02	NC
Thallium, total	ND	1.00	3.1E-02	NC	2.0E-01	NC
Vanadium, total	ND	1.00	3.1E-02	NC	7.0E-03	NC
Zinc, total	ND	1.00	3.1E-02	NC	3.0E-01	NC
					SUBTOTAL:	**4.7E-01**
					SITE RELATED RISK:	**3.9E-01**
					BACKGROUND RISK:	**8.1E-02**

TABLE 8.44-2 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INGESTION OF GROUNDWATER (DENNEY RESIDENCE)
CENTRAL TENDENCY EXPOSURE

RECEPTOR: Resident - Current
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Cancer Slope Factor (mg/kg-day)-1	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	ND	1.00	4.0E-03	NC	2.4E-02	NA
Benzene	ND	1.00	4.0E-03	NC	2.9E-02	NA
Carbon Tetrachloride	ND	1.00	4.0E-03	NC	1.3E-01	NA
Chlorobenzene	ND	1.00	4.0E-03	NC	NA	NA
Chloroform	ND	1.00	4.0E-03	NC	6.1E-03	NA
Tetrachloroethene	ND	1.00	4.0E-03	NC	5.2E-02	NA
Trichloroethene	ND	1.00	4.0E-03	NC	1.1E-02	NA
Vinyl Chloride	ND	1.00	4.0E-03	NC	1.4E+00	NA
Semivolatile Organic Compounds						
Benzo(a)anthracene	ND	1.00	4.0E-03	NC	7.3E-01	NA
Benzo(a)pyrene	ND	1.00	4.0E-03	NC	7.3E+00	NA
Benzo(b)fluoranthene	ND	1.00	4.0E-03	NC	7.3E-01	NA
Benzo(g,h,i)perylene	ND	1.00	4.0E-03	NC	NA	NA
bis(2-Ethylhexyl)phthalate	ND	1.00	4.0E-03	NC	1.4E-02	NA
Phenanthrene	ND	1.00	4.0E-03	NC	NA	NA
Pesticides/PCBs						
Aldrin	ND	1.00	4.0E-03	NC	1.7E+01	NA
Dieldrin	ND	1.00	4.0E-03	NC	1.6E+01	NA
Metals						
Aluminum, total	ND	1.00	4.0E-03	NC	NA	NA
Arsenic, total	ND	1.00	4.0E-03	NC	1.5E+00	NA
Barium, total	ND	1.00	4.0E-03	NC	NA	NA
Beryllium, total	5.2E-03	1.00	4.0E-03	2.1E-05	4.3E+00	9.0E-05
Cadmium, total	ND	1.00	4.0E-03	NC	NA	NA
Copper, total	ND	1.00	4.0E-03	NC	NA	NA
Iron, total	ND	1.00	4.0E-03	NC	NA	NA
Lead, total	ND	1.00	4.0E-03	NC	NA	NA
Manganese, total	3.0E-01	1.00	4.0E-03	1.2E-03	NA	NA
Mercury, total	ND	1.00	4.0E-03	NC	NA	NA
Nickel, total	ND	1.00	4.0E-03	NC	NA	NA
Thallium, total	ND	1.00	4.0E-03	NC	NA	NA
Vanadium, total	ND	1.00	4.0E-03	NC	NA	NA
Zinc, total	ND	1.00	4.0E-03	NC	NA	NA
					SUBTOTAL:	9.0E-05
					SITE RELATED RISK:	NC
					BACKGROUND RISK:	9.0E-05

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-3

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFICIAL SOIL

RECEPTOR: Local Resident (Trespassers)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	9.4E-06	NC	NA	NC
Benzene	NCC	NA	9.4E-06	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	NA	9.4E-06	NC	7.0E-04	NC
Chlorobenzene	NCC	NA	9.4E-06	NC	2.0E-02	NC
Chloroform	NCC	NA	9.4E-06	NC	1.0E-02	NC
Tetrachloroethene	NCC	NA	9.4E-06	NC	1.0E-02	NC
Trichloroethene	NCC	NA	9.4E-06	NC	2.0E-03	NC
Vinyl Chloride	NCC	NA	9.4E-06	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	0.13	9.4E-06	NC	3.0E-02	NC
Benzo(a)pyrene	2.2E-01	0.13	9.4E-06	2.7E-07	3.0E-02	9.0E-06
Benzo(b)fluoranthene	NCC	0.13	9.4E-06	NC	3.0E-02	NC
Benzo(g,h,i)perylene	1.5E-01	0.10	9.4E-06	1.4E-07	3.0E-02	4.7E-06
bis(2-Ethylhexyl)phthalate	1.1E+01	0.10	9.4E-06	1.0E-05	2.0E-02	5.2E-04
Phenanthrene	2.4E-01	0.10	9.4E-06	2.3E-07	3.0E-02	7.5E-06
Pesticides/PCBs						
Aldrin	NCC	NA	9.4E-06	NC	3.0E-05	NC
Dieldrin	NCC	0.25	9.4E-06	NC	5.0E-05	NC
Metals						
Aluminum, total	**7.6E+03**	**0.01**	**9.4E-06**	**7.1E-04**	**1.0E+00**	**7.1E-04**
Arsenic, total	5.5E+00	0.03	9.4E-06	1.6E-06	3.0E-04	5.2E-03
Barium, total	4.0E+01	0.01	9.4E-06	3.7E-06	7.0E-02	5.3E-05
Beryllium, total	**1.5E+00**	**0.01**	**9.4E-06**	**1.4E-07**	**2.0E-03**	**7.2E-05**
Cadmium, total	NCC	0.001	9.4E-06	NC	1.0E-03	NC
Copper, total	NCC	0.017	9.4E-06	NC	3.7E-02	NC
Iron, total	NCC	0.01	9.4E-06	NC	NA	NC
Lead, total	8.5E+01	1.00	9.4E-06	8.0E-04	NA	NC
Manganese, total	2.6E+02	0.01	9.4E-06	2.4E-05	7.0E-02	3.5E-04
Mercury, total	NCC	0.01	9.4E-06	NC	3.0E-04	NC
Nickel, total	NCC	0.01	9.4E-06	NC	2.0E-02	NC
Thallium, total	NCC	0.01	9.4E-06	NC	2.0E-01	NC
Vanadium, total	NCC	0.01	9.4E-06	NC	7.0E-03	NC
Zinc, total	4.2E+02	0.01	9.4E-06	4.0E-05	3.0E-01	1.3E-04
					SUBTOTAL:	**7.0E-03**
					SITE RELATED RISK:	**6.3E-03**
					BACKGROUND RISK:	**7.8E-04**

TABLE 8.44-3 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFICIAL SOIL

RECEPTOR: Local Resident (Trespassers)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption x Adjustment Factor	Receptor-Specific Exposure Factor (kg/kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	1.2E-06	NC	2.4E-02	NC
Benzene	NCC	NA	1.2E-06	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	NA	1.2E-06	NC	1.3E-01	NC
Chlorobenzene	NCC	NA	1.2E-06	NC	NA	NC
Chloroform	NCC	NA	1.2E-06	NC	6.1E-03	NC
Tetrachloroethene	NCC	NA	1.2E-06	NC	5.2E-02	NC
Trichloroethene	NCC	NA	1.2E-06	NC	1.1E-02	NC
Vinyl Chloride	NCC	NA	1.2E-06	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	0.13	1.2E-06	NC	7.3E-01	NC
Benzo(a)pyrene	2.2E-01	0.13	1.2E-06	3.5E-08	7.3E+00	2.5E-07
Benzo(b)fluoranthene	NCC	0.13	1.2E-06	NC	7.3E-01	NC
Benzo(g,h,i)perylene	1.5E-01	NA	1.2E-06	NC	NA	NC
bis(2-Ethylhexyl)phthalate	1.1E+01	0.10	1.2E-06	1.3E-06	1.4E-02	1.9E-08
Phenanthrene	2.4E-01	NA	1.2E-06	NC	NA	NC
Pesticides/PCBs						
Aldrin	NCC	NA	1.2E-06	NC	1.7E+01	NC
Dieldrin						
Metals						
Aluminum, total	**7.6E+03**	**NA**	**1.2E-06**	**NC**	**NA**	**NC**
Arsenic, total	5.5E+00	0.03	1.2E-06	2.0E-07	1.5E+00	3.0E-07
Barium, total	4.0E+01	NA	1.2E-06	NC	NA	NC
Beryllium, total	**1.5E+00**	**0.01**	**1.2E-06**	**1.8E-08**	**4.3E+00**	**7.9E-08**
Cadmium, total	NCC	1.00	1.2E-06	NC	NA	NC
Copper, total	NCC	1.00	1.2E-06	NC	NA	NC
Iron, total	NCC	NA	1.2E-06	NC	NA	NC
Lead, total	8.5E+01	NA	1.2E-06	NC	NA	NC
Manganese, total	2.6E+02	NA	1.2E-06	NC	NA	NC
Mercury, total	NCC	NA	1.2E-06	NC	NA	NC
Nickel, total	NCC	NA	1.2E-06	NC	NA	NC
Thallium, total	NCC	NA	1.2E-06	NC	NA	NC
Vanadium, total	NCC	NA	1.2E-06	NC	NA	NC
Zinc, total		NA	1.2E-06	NC	NA	NC
					SUBTOTAL:	**6.5E-07**
					SITE RELATED RISK:	**5.7E-07**
					BACKGROUND RISK:	**7.9E-08**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-4

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SURFICIAL SOIL

RECEPTOR: Local Resident (Trespassers)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	1.0E-07	NC	NA	NC
Benzene	NCC	1.00	1.0E-07	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	1.0E-07	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	1.0E-07	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.0E-07	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	1.0E-07	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	1.0E-07	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	1.0E-07	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	1.00	1.0E-07	NC	3.0E-02	NC
Benzo(a)pyrene	2.2E-01	1.00	1.0E-07	2.3E-08	3.0E-02	7.6E-07
Benzo(b)fluoranthene	NCC	1.00	1.0E-07	NC	3.0E-02	NC
Benzo(g,h,i)perylene	1.5E-01	1.00	1.0E-07	1.6E-08	3.0E-02	5.2E-07
bis(2-Ethylhexyl)phthalate	1.1E+01	1.00	1.0E-07	1.1E-06	2.0E-02	5.7E-05
Phenanthrene	2.4E-01	1.00	1.0E-07	2.5E-08	3.0E-02	8.3E-07
Pesticides/PCBs						
Aldrin	NCC	1.00	1.0E-07	NC	3.0E-05	NC
Dieldrin	NCC	1.00	1.0E-07	NC	5.0E-05	NC
Metals						
Aluminum, total	**7.6E+03**	**1.00**	**1.0E-07**	**7.8E-04**	**1.0E+00**	**7.8E-04**
Arsenic, total	5.5E+00	0.48	1.0E-07	2.7E-07	3.0E-04	9.1E-04
Barium, total	4.0E+01	1.00	1.0E-07	4.1E-06	7.0E-02	5.9E-05
Beryllium, total	**1.5E+00**	**1.00**	**1.0E-07**	**1.6E-07**	**2.0E-03**	**7.9E-05**
Cadmium, total	NCC	1.00	1.0E-07	NC	1.0E-03	NC
Copper, total	NCC	1.00	1.0E-07	NC	3.7E-02	NC
Iron, total	NCC	1.00	1.0E-07	NC	NA	NC
Lead, total	8.5E+01	1.00	1.0E-07	8.8E-06	NA	NC
Manganese, total	2.6E+02	1.00	1.0E-07	2.7E-05	7.0E-02	3.8E-04
Mercury, total	NCC	0.50	1.0E-07	NC	3.0E-04	NC
Nickel, total	NCC	1.00	1.0E-07	NC	2.0E-02	NC
Thallium, total	NCC	1.00	1.0E-07	NC	2.0E-01	NC
Vanadium, total	NCC	1.00	1.0E-07	NC	7.0E-03	NC
Zinc, total	4.2E+02	1.00	1.0E-07	4.4E-05	3.0E-01	1.5E-04
					SUBTOTAL:	**2.4E-03**
					SITE RELATED RISK:	**1.6E-03**
					BACKGROUND RISK:	**8.6E-04**

TABLE 8.44-4 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SURFICIAL SOIL

RECEPTOR: Local Resident (Trespassers)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)-1	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	1.3E-08	NC	2.4E-02	NC
Benzene	NCC	1.00	1.3E-08	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	1.3E-08	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	1.3E-08	NC	NA	NC
Chloroform	NCC	1.00	1.3E-08	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	1.3E-08	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	1.3E-08	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	1.3E-08	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	1.00	1.3E-08	NC	7.3E-01	NC
Benzo(a)pyrene	2.2E-01	1.00	1.3E-08	2.9E-09	7.3E+00	2.1E-08
Benzo(b)fluoranthene	NCC	1.00	1.3E-08	NC	7.3E-01	NC
Benzo(g,h,i)perylene	1.5E-01	1.00	1.3E-08	2.0E-09	NA	NC
bis(2-Ethylhexyl)phthalate	1.1E+01	1.00	1.3E-08	1.5E-07	1.4E-02	2.0E-09
Phenanthrene	2.4E-01	1.00	1.3E-08	3.2E-09	NA	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	1.3E-08	NC	1.7E+01	NC
Dieldrin	NCC	1.00	1.3E-08	NC	1.6E+01	NC
Metals						
Aluminum, total	**7.6E+03**	**1.00**	**1.3E-08**	**1.0E-04**	**NA**	**NC**
Arsenic, total	5.5E+00	0.48	1.3E-08	3.5E-08	1.5E+00	5.3E-08
Barium, total	4.0E+01	1.00	1.3E-08	5.3E-07	NA	NC
Beryllium, total	**1.5E+00**	**1.00**	**1.3E-08**	**2.0E-08**	**4.3E+00**	**8.7E-08**
Cadmium, total	NCC	1.00	1.3E-08	NC	NA	NC
Copper, total	NCC	1.00	1.3E-08	NC	NA	NC
Iron, total	NCC	1.00	1.3E-08	NC	NA	NC
Lead, total	8.5E+01	1.00	1.3E-08	1.1E-06	NA	NC
Manganese, total	2.6E+02	1.00	1.3E-08	3.4E-06	NA	NC
Mercury, total	NCC	1.00	1.3E-08	NC	NA	NC
Nickel, total	NCC	1.00	1.3E-08	NC	NA	NC
Thallium, total	NCC	1.00	1.3E-08	NC	NA	NC
Vanadium, total	NCC	1.00	1.3E-08	NC	NA	NC
Zinc, total	4.2E+02	1.00	1.3E-08	5.6E-06	NA	NC
					SUBTOTAL:	**1.6E-07**
					SITE RELATED RISK:	**7.6E-08**
					BACKGROUND RISK:	**8.7E-08**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-5

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INHALATION OF FUGITIVE DUST

RECEPTOR: Local Resident (Trespassers)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminant	Exposure Point Concentration (mg/m^3)	x Receptor-Specific Exposure Factor (unitless)	= Chronic Average Daily Exposure (mg/m^3)	/ Inhalation Chronic Reference Concentration (mg/m^3)	= Hazard Index
Volatile Organic Compounds					
1,4-Dichlorobenzene	NCC	3.5E-03	NC	8.0E-01	NC
Benzene	NCC	3.5E-03	NC	9.0E-03	NC
Carbon Tetrachloride	NCC	3.5E-03	NC	4.3E-01	NC
Chlorobenzene	NCC	3.5E-03	NC	2.0E-02	NC
Chloroform	NCC	3.5E-03	NC	6.6E-01	NC
Tetrachloroethene	NCC	3.5E-03	NC	6.0E-01	NC
Trichloroethene	NCC	3.5E-03	NC	1.8E-01	NC
Vinyl Chloride	NCC	3.5E-03	NC	1.0E-01	NC
Semivolatile Organic Compounds					
Benzo(a)anthracene	NCC	3.5E-03	NC	NA	NC
Benzo(a)pyrene	1.1E-09	3.5E-03	3.7E-12	NA	NC
Benzo(b)fluoranthene	NCC	3.5E-03	NC	NA	NC
Benzo(g,h,i)perylene	7.2E-10	3.5E-03	2.5E-12	NA	NC
bis(2-Ethylhexyl)phthalate	5.2E-08	3.5E-03	1.8E-10	NA	NC
Phenanthrene	1.1E-09	3.5E-03	4.0E-12	NA	NC
Pesticides/PCBs					
Aldrin	NCC	3.5E-03	NC	NA	NC
Dieldrin	NCC	3.5E-03	NC	NA	NC
Metals					
Aluminum, total	**3.6E-05**	**3.5E-03**	**1.3E-07**	**NA**	**NC**
Arsenic, total	2.6E-08	3.5E-03	9.3E-11	NA	NC
Barium, total	1.9E-07	3.5E-03	6.7E-10	5.0E-04	1.3E-06
Beryllium, total	**7.3E-09**	**3.5E-03**	**2.6E-11**	**2.0E-05**	**1.3E-06**
Cadmium, total	NCC	3.5E-03	NC	NA	NC
Copper, total	NCC	3.5E-03	NC	NA	NC
Iron, total	NCC	3.5E-03	NC	NA	NC
Lead, total	4.0E-07	3.5E-03	1.4E-09	NA	NC
Manganese, total	1.2E-06	3.5E-03	4.4E-09	5.0E-05	8.7E-05
Mercury, total	NCC	3.5E-03	NC	3.0E-04	NC
Nickel, total	NCC	3.5E-03	NC	NA	NC
Thallium, total	NCC	3.5E-03	NC	NA	NC
Vanadium, total	NCC	3.5E-03	NC	NA	NC
Zinc, total	2.0E-06	3.5E-03	7.1E-09	NA	NC
				SUBTOTAL:	**9.0E-05**
				SITE RELATED RISK:	**8.8E-05**
				BACKGROUND RISK:	**1.3E-06**

TABLE 8.44-5 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INHALATION OF FUGITIVE DUST

RECEPTOR: Local Resident (Trespassers)
CARCINOGENIC EFFECTS

Contaminant	Exposure Point Concentration (ug/m^3)	x	Receptor-Specific Exposure Factor (unitless)	=	Lifetime Average Daily Dose (ug/m^3)	x	Inhalation Unit Risk $(ug/m^3)^{-1}$	=	Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds									
1,4-Dichlorobenzene	NCC		4.5E-04		NC		NA		NC
Benzene	NCC		4.5E-04		NC		7.8E-06		NC
Carbon Tetrachloride	NCC		4.5E-04		NC		1.5E-05		NC
Chlorobenzene	NCC		4.5E-04		NC		NA		NC
Chloroform	NCC		4.5E-04		NC		2.3E-05		NC
Tetrachloroethene	NCC		4.5E-04		NC		5.8E-07		NC
Trichloroethene	NCC		4.5E-04		NC		1.7E-06		NC
Vinyl Chloride	NCC		4.5E-04		NC		8.8E-06		NC
Semivolatile Organic Compounds									
Benzo(a)anthracene	NCC		4.5E-04		NC		NA		NC
Benzo(a)pyrene	1.1E-06		4.5E-04		4.8E-10		8.8E-04		4.2E-13
Benzo(b)fluoranthene	NCC		4.5E-04		NC		NA		NC
Benzo(g,h,i)perylene	7.2E-07		4.5E-04		3.3E-10		NA		NC
bis(2-Ethylhexyl)phthalate	5.2E-05		4.5E-04		2.4E-08		NA		NC
Phenanthrene	1.1E-06		4.5E-04		5.2E-10		NA		NC
Pesticides/PCBs									
Aldrin	NCC		4.5E-04		NC		4.9E-03		NC
Dieldrin	NCC		4.5E-04		NC		4.6E-03		NC
Metals									
Aluminum, total	**3.6E-02**		**4.5E-04**		**1.6E-05**		**NA**		**NC**
Arsenic, total	2.6E-05		4.5E-04		1.2E-08		4.3E-03		5.1E-11
Barium, total	1.9E-04		4.5E-04		8.6E-08		NA		NC
Beryllium, total	**7.3E-06**		**4.5E-04**		**3.3E-09**		**2.4E-03**		**7.9E-12**
Cadmium, total	NCC		4.5E-04		NC		1.8E-03		NC
Copper, total	NCC		4.5E-04		NC		NA		NC
Iron, total	NCC		4.5E-04		NC		NA		NC
Lead, total	4.0E-04		4.5E-04		1.8E-07		NA		NC
Manganese, total	1.2E-03		4.5E-04		5.6E-07		NA		NC
Mercury, total	NCC		4.5E-04		NC		NA		NC
Nickel, total	NCC		4.5E-04		NC		2.4E-04		NC
Thallium, total	NCC		4.5E-04		NC		NA		NC
Vanadium, total	NCC		4.5E-04		NC		NA		NC
Zinc, total	2.0E-03		4.5E-04		9.2E-07		NA		NC
							SUBTOTAL:		**6.0E-11**
							SITE RELATED RISK:		**5.2E-11**
							BACKGROUND RISK:		**7.9E-12**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.

TABLE 8.44-6

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - SEDIMENTATION PONDS

RECEPTOR: Local Resident (Trespassers)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	9.4E-06	NC	NA	NC
Benzene	NCC	NA	9.4E-06	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	NA	9.4E-06	NC	7.0E-04	NC
Chlorobenzene	NCC	NA	9.4E-06	NC	2.0E-02	NC
Chloroform	NCC	NA	9.4E-06	NC	1.0E-02	NC
Tetrachloroethene	NCC	NA	9.4E-06	NC	1.0E-02	NC
Trichloroethene	NCC	NA	9.4E-06	NC	2.0E-03	NC
Vinyl Chloride	NCC	NA	9.4E-06	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	9.2E-01	0.13	9.4E-06	1.1E-06	3.0E-02	3.7E-05
Benzo(a)pyrene	6.2E-01	0.13	9.4E-06	7.5E-07	3.0E-02	2.5E-05
Benzo(b)fluoranthene	1.2E+00	0.13	9.4E-06	1.4E-06	3.0E-02	4.7E-05
Benzo(g,h,i)perylene	2.5E-01	0.10	9.4E-06	2.3E-07	3.0E-02	7.8E-06
bis(2-Ethylhexyl)phthalate	NCC	0.10	9.4E-06	NC	2.0E-02	NC
Phenanthrene	9.2E-01	0.10	9.4E-06	8.6E-07	3.0E-02	2.9E-05
Pesticides/PCBs						
Aldrin	NCC	NA	9.4E-06	NC	3.0E-05	NC
Dieldrin	NCC	0.25	9.4E-06	NC	5.0E-05	NC
Metals						
Aluminum, total	**1.6E+04**	**0.01**	9.4E-06	**1.5E-03**	**1.0E+00**	**1.5E-03**
Arsenic, total	**5.8E+00**	**0.03**	9.4E-06	**1.6E-06**	**3.0E-04**	**5.4E-03**
Barium, total	NCC	0.01	9.4E-06	NC	7.0E-02	NC
Beryllium, total	**2.8E+00**	**0.01**	9.4E-06	**2.6E-07**	**2.0E-03**	**1.3E-04**
Cadmium, total	**8.9E-01**	**0.001**	9.4E-06	**8.3E-09**	**1.0E-03**	**8.3E-06**
Copper, total	NCC	0.017	9.4E-06	NC	3.7E-02	NC
Iron, total	NCC	0.01	9.4E-06	NC	NA	NC
Lead, total	**1.1E+02**	**1.00**	9.4E-06	**1.0E-03**	**NA**	**NC**
Manganese, total	7.5E+02	0.01	9.4E-06	7.0E-05	7.0E-02	1.0E-03
Mercury, total	NCC	0.01	9.4E-06	NC	3.0E-04	NC
Nickel, total	NCC	0.01	9.4E-06	NC	2.0E-02	NC
Thallium, total	NCC	0.01	9.4E-06	NC	2.0E-01	NC
Vanadium, total	2.8E+01	0.01	9.4E-06	2.7E-06	7.0E-03	3.8E-04
Zinc, total	NCC	0.01	9.4E-06	NC	3.0E-01	NC
					SUBTOTAL:	**8.6E-03**
					SITE RELATED RISK:	**1.2E-03**
					BACKGROUND RISK:	**7.4E-03**

TABLE 8.44-6 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - SEDIMENTATION PONDS

RECEPTOR: Local Resident (Trespassers)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption x Adjustment Factor	Receptor-Specific Exposure Factor (kg/kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)-1	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	1.2E-06	NC	2.4E-02	NC
Benzene	NCC	NA	1.2E-06	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	NA	1.2E-06	NC	1.3E-01	NC
Chlorobenzene	NCC	NA	1.2E-06	NC	NA	NC
Chloroform	NCC	NA	1.2E-06	NC	6.1E-03	NC
Tetrachloroethene	NCC	NA	1.2E-06	NC	5.2E-02	NC
Trichloroethene	NCC	NA	1.2E-06	NC	1.1E-02	NC
Vinyl Chloride	NCC	NA	1.2E-06	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	9.2E-01	0.13	1.2E-06	1.4E-07	7.3E-01	1.1E-07
Benzo(a)pyrene	6.2E-01	0.13	1.2E-06	9.7E-08	7.3E+00	7.1E-07
Benzo(b)fluoranthene	1.2E+00	0.13	1.2E-06	1.8E-07	7.3E-01	1.3E-07
Benzo(g,h,i)perylene	2.5E-01	NA	1.2E-06	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	0.10	1.2E-06	NC	1.4E-02	NC
Phenanthrene	9.2E-01	NA	1.2E-06	NC	NA	NC
Pesticides/PCBs						
Aldrin	NCC	NA	1.2E-06	NC	1.7E+01	NC
Dieldrin	NCC	0.25	1.2E-06	NC	1.6E+01	NC
Metals						
Aluminum, total	**1.6E+04**	**NA**	**1.2E-06**	**NC**	**NA**	**NC**
Arsenic, total	**5.8E+00**	**0.03**	**1.2E-06**	**2.1E-07**	**1.5E+00**	**3.1E-07**
Barium, total	NCC	NA	1.2E-06	NC	NA	NC
Beryllium, total	**2.8E+00**	**0.01**	**1.2E-06**	**3.4E-08**	**4.3E+00**	**1.5E-07**
Cadmium, total	**8.9E-01**	**1.00**	**1.2E-06**	**1.1E-06**	**NA**	**NC**
Copper, total	NCC	1.00	1.2E-06	NC	NA	NC
Iron, total	NCC	NA	1.2E-06	NC	NA	NC
Lead, total	**1.1E+02**	**NA**	**1.2E-06**	**NC**	**NA**	**NC**
Manganese, total	7.5E+02	NA	1.2E-06	NC	NA	NC
Mercury, total	NCC	NA	1.2E-06	NC	NA	NC
Nickel, total	NCC	NA	1.2E-06	NC	NA	NC
Thallium, total	NCC	NA	1.2E-06	NC	NA	NC
Vanadium, total	**2.8E+01**	**NA**	**1.2E-06**	**NC**	**NA**	**NC**
Zinc, total	NCC	NA	1.2E-06	NC	NA	NC
					SUBTOTAL:	**1.4E-06**
					SITE RELATED RISK:	**9.4E-07**
					BACKGROUND RISK:	**4.6E-07**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.

2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-7

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - SEDIMENTATION PONDS

RECEPTOR: Local Resident (Trespassers)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	1.0E-07	NC	NA	NC
Benzene	NCC	1.00	1.0E-07	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	1.0E-07	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	1.0E-07	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.0E-07	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	1.0E-07	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	1.0E-07	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	1.0E-07	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	9.2E-01	1.00	1.0E-07	9.5E-08	3.0E-02	3.2E-06
Benzo(a)pyrene	6.2E-01	1.00	1.0E-07	6.4E-08	3.0E-02	2.1E-06
Benzo(b)fluoranthene	1.2E+00	1.00	1.0E-07	1.2E-07	3.0E-02	4.0E-06
Benzo(g,h,i)perylene	2.5E-01	1.00	1.0E-07	2.6E-08	3.0E-02	8.6E-07
bis(2-Ethylhexyl)phthalate	NCC	1.00	1.0E-07	NC	2.0E-02	NC
Phenanthrene	9.2E-01	1.00	1.0E-07	9.5E-08	3.0E-02	3.2E-06
Pesticides/PCBs						
Aldrin	NCC	1.00	1.0E-07	NC	3.0E-05	NC
Dieldrin	NCC	1.00	1.0E-07	NC	5.0E-05	NC
Metals						
Aluminum, total	**1.6E+04**	**1.00**	**1.0E-07**	**1.6E-03**	**1.0E+00**	**1.6E-03**
Arsenic, total	**5.8E+00**	**0.48**	**1.0E-07**	**2.9E-07**	**3.0E-04**	**9.5E-04**
Barium, total	NCC	1.00	1.0E-07	NC	7.0E-02	NC
Beryllium, total	**2.8E+00**	**1.00**	**1.0E-07**	**2.9E-07**	**2.0E-03**	**1.5E-04**
Cadmium, total	**8.9E-01**	**1.00**	**1.0E-07**	**9.2E-08**	**1.0E-03**	**9.2E-05**
Copper, total	NCC	1.00	1.0E-07	NC	3.7E-02	NC
Iron, total	NCC	1.00	1.0E-07	NC	NA	NC
Lead, total	**1.1E+02**	**1.00**	**1.0E-07**	**1.1E-05**	**NA**	**NC**
Manganese, total	7.5E+02	1.00	1.0E-07	7.7E-05	7.0E-02	1.1E-03
Mercury, total	NCC	0.50	1.0E-07	NC	3.0E-04	NC
Nickel, total	NCC	1.00	1.0E-07	NC	2.0E-02	NC
Thallium, total	NCC	1.00	1.0E-07	NC	2.0E-01	NC
Vanadium, total	**2.8E+01**	**1.00**	**1.0E-07**	**2.9E-06**	**7.0E-03**	**4.2E-04**
Zinc, total	NCC	1.00	1.0E-07	NC	3.0E-01	NC
					SUBTOTAL:	**4.4E-03**
					SITE RELATED RISK:	**1.1E-03**
					BACKGROUND RISK:	**3.2E-03**

TABLE 8.44-7 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - SEDIMENTATION PONDS

RECEPTOR: Local Resident (Trespassers)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	1.3E-08	NC	2.4E-02	NC
Benzene	NCC	1.00	1.3E-08	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	1.3E-08	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	1.3E-08	NC	NA	NC
Chloroform	NCC	1.00	1.3E-08	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	1.3E-08	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	1.3E-08	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	1.3E-08	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	9.2E-01	1.00	1.3E-08	1.2E-08	7.3E-01	8.9E-09
Benzo(a)pyrene	6.2E-01	1.00	1.3E-08	8.2E-09	7.3E+00	6.0E-08
Benzo(b)fluoranthene	1.2E+00	1.00	1.3E-08	1.5E-08	7.3E-01	1.1E-08
Benzo(g,h,i)perylene	2.5E-01	1.00	1.3E-08	3.3E-09	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	1.3E-08	NC	1.4E-02	NC
Phenanthrene	9.2E-01	1.00	1.3E-08	1.2E-08	NA	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	1.3E-08	NC	1.7E+01	NC
Dieldrin	NCC	1.00	1.3E-08	NC	1.6E+01	NC
Metals						
Aluminum, total	**1.6E+04**	**1.00**	**1.3E-08**	**2.1E-04**	**NA**	**NC**
Arsenic, total	**5.8E+00**	**0.48**	**1.3E-08**	**3.7E-08**	**1.5E+00**	**5.5E-08**
Barium, total	NCC	1.00	1.3E-08	NC	NA	NC
Beryllium, total	**2.8E+00**	**1.00**	**1.3E-08**	**3.7E-08**	**4.3E+00**	**1.6E-07**
Cadmium, total	**8.9E-01**	**1.00**	**1.3E-08**	**1.2E-08**	**NA**	**NC**
Copper, total	NCC	1.00	1.3E-08	NC	NA	NC
Iron, total	NCC	1.00	1.3E-08	NC	NA	NC
Lead, total	**1.1E+02**	**1.00**	**1.3E-08**	**1.4E-06**	**NA**	**NC**
Manganese, total	7.5E+02	1.00	1.3E-08	1.0E-05	NA	NC
Mercury, total	NCC	1.00	1.3E-08	NC	NA	NC
Nickel, total	NCC	1.00	1.3E-08	NC	NA	NC
Thallium, total	NCC	1.00	1.3E-08	NC	NA	NC
Vanadium, total	**2.8E+01**	**1.00**	**1.3E-08**	**3.8E-07**	**NA**	**NC**
Zinc, total	NCC	1.00	1.3E-08	NC	NA	NC
					SUBTOTAL:	**3.0E-07**
					SITE RELATED RISK:	**8.0E-08**
					BACKGROUND RISK:	**2.2E-07**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.

2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-8

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - SEDIMENTATION PONDS

RECEPTOR: Local Resident (Trespassers)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	x Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	1.5E-02	NC	NA	NC
Benzene	NCC	1.00	1.1E-01	1.5E-02	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	1.5E-02	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	4.1E-02	1.5E-02	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.3E-01	1.5E-02	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	3.7E-01	1.5E-02	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	1.5E-02	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	7.3E-03	1.5E-02	NC	3.0E-03	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	1.5E-02	NC	3.0E-02	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	1.5E-02	NC	3.0E-02	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	1.5E-02	NC	3.0E-02	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	1.5E-02	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	3.3E-02	1.5E-02	NC	2.0E-02	NC
Phenanthrene	NCC	1.00	2.3E-01	1.5E-02	NC	3.0E-02	NC
Pesticides/PCBs							
Aldrin	1.8E-05	1.00	1.6E-03	1.5E-02	4.2E-10	3.0E-05	1.4E-05
Dieldrin	NCC	1.00	1.6E-02	1.5E-02	NC	5.0E-05	NC
Metals							
Aluminum, total	NCC	1.00	1.0E-03	1.5E-02	NC	1.0E+00	NC
Arsenic, total	3.5E-03	1.00	1.0E-03	1.5E-02	5.1E-08	3.0E-04	1.7E-04
Barium, total	NCC	1.00	1.0E-03	1.5E-02	NC	7.0E-02	NC
Beryllium, total	1.7E-03	1.00	1.0E-03	1.5E-02	2.5E-08	2.0E-03	1.3E-05
Cadmium, total	NCC	1.00	1.0E-03	1.5E-02	NC	1.0E-03	NC
Copper, total	NCC	1.00	1.0E-03	1.5E-02	NC	3.7E-02	NC
Iron, total	NCC	1.00	1.0E-03	1.5E-02	NC	NA	NC
Lead, total	3.5E-03	1.00	1.0E-03	1.5E-02	5.1E-08	NA	NC
Manganese, total	1.9E+00	1.00	1.0E-03	1.5E-02	2.8E-05	7.0E-02	4.0E-04
Mercury, total	4.3E-04	1.00	1.0E-03	1.5E-02	6.2E-09	3.0E-04	2.1E-05
Nickel, total	NCC	1.00	1.0E-03	1.5E-02	NC	2.0E-02	NC
Thallium, total	NCC	1.00	1.0E-03	1.5E-02	NC	2.0E-01	NC
Vanadium, total	NCC	1.00	1.0E-03	1.5E-02	NC	7.0E-03	NC
Zinc, total	NCC	1.00	1.0E-03	1.5E-02	NC	3.0E-01	NC
						SUBTOTAL:	6.1E-04
						SITE RELATED RISK:	5.9E-04
						BACKGROUND RISK:	1.3E-05

TABLE 8.44-8 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - SEDIMENTATION PONDS

RECEPTOR: Local Resident (Trespassers)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	1.9E-03	NC	2.4E-02	NC
Benzene	NCC	1.00	1.1E-01	1.9E-03	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	1.9E-03	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	4.1E-02	1.9E-03	NC	NA	NC
Chloroform	NCC	1.00	1.3E-01	1.9E-03	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	3.7E-01	1.9E-03	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	1.9E-03	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	7.3E-03	1.9E-03	NC	1.4E+00	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	1.9E-03	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	1.9E-03	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	1.9E-03	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	1.9E-03	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	3.3E-02	1.9E-03	NC	1.4E-02	NC
Phenanthrene	NCC	1.00	2.3E-01	1.9E-03	NC	NA	NC
Pesticides/PCBs							
Aldrin	1.8E-05	1.00	1.6E-03	1.9E-03	5.4E-11	1.7E+01	9.2E-10
Dieldrin	NCC	1.00	1.6E-02	1.9E-03	NC	1.6E+01	NC
Metals							
Aluminum, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Arsenic, total	3.5E-03	1.00	1.0E-03	1.9E-03	6.6E-09	1.5E+00	9.9E-09
Barium, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Beryllium, total	1.7E-03	1.00	1.0E-03	1.9E-03	3.3E-09	4.3E+00	1.4E-08
Cadmium, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Copper, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Iron, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Lead, total	3.5E-03	1.00	1.0E-03	1.9E-03	6.6E-09	NA	NC
Manganese, total	1.9E+00	1.00	1.0E-03	1.9E-03	3.6E-06	NA	NC
Mercury, total	4.3E-04	1.00	1.0E-03	1.9E-03	8.0E-10	NA	NC
Nickel, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Thallium, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Vanadium, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Zinc, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
						SUBTOTAL:	2.5E-08
						SITE RELATED RISK:	9.9E-09
						BACKGROUND RISK:	1.4E-08

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-9

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Local Resident (Trespassers)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	9.4E-06	NC	NA	NC
Benzene	NCC	NA	9.4E-06	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	NA	9.4E-06	NC	7.0E-04	NC
Chlorobenzene	NCC	NA	9.4E-06	NC	2.0E-02	NC
Chloroform	NCC	NA	9.4E-06	NC	1.0E-02	NC
Tetrachloroethene	NCC	NA	9.4E-06	NC	1.0E-02	NC
Trichloroethene	NCC	NA	9.4E-06	NC	2.0E-03	NC
Vinyl Chloride	NCC	NA	9.4E-06	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	2.5E-01	0.13	9.4E-06	3.0E-07	3.0E-02	1.0E-05
Benzo(a)pyrene	2.2E-01	0.13	9.4E-06	2.7E-07	3.0E-02	9.0E-06
Benzo(b)fluoranthene	3.1E-01	0.13	9.4E-06	3.8E-07	3.0E-02	1.3E-05
Benzo(g,h,i)perylene	7.9E-02	0.10	9.4E-06	7.4E-08	3.0E-02	2.5E-06
bis(2-Ethylhexyl)phthalate	NCC	0.10	9.4E-06	NC	2.0E-02	NC
Phenanthrene	2.8E-01	0.10	9.4E-06	2.7E-07	3.0E-02	8.8E-06
Pesticides/PCBs						
Aldrin	NCC	NA	9.4E-06	NC	3.0E-05	NC
Dieldrin	NCC	0.25	9.4E-06	NC	5.0E-05	NC
Metals						
Aluminum, total	**1.2E+04**	**0.01**	9.4E-06	**1.2E-03**	**1.0E+00**	**1.2E-03**
Arsenic, total	**7.7E+00**	**0.03**	9.4E-06	**2.1E-06**	**3.0E-04**	**7.2E-03**
Barium, total	NCC	0.01	9.4E-06	NC	7.0E-02	NC
Beryllium, total	**2.4E+00**	**0.01**	9.4E-06	**2.3E-07**	**2.0E-03**	**1.1E-04**
Cadmium, total	**1.4E-01**	**0.001**	9.4E-06	**1.3E-09**	**1.0E-03**	**1.3E-06**
Copper, total	NCC	0.02	9.4E-06	NC	3.7E-02	NC
Iron, total	NCC	0.01	9.4E-06	NC	NA	NC
Lead, total	**3.7E+01**	**1.00**	9.4E-06	**3.5E-04**	**NA**	**NC**
Manganese, total	7.6E+02	0.01	9.4E-06	7.1E-05	7.0E-02	1.0E-03
Mercury, total	NCC	0.01	9.4E-06	NC	3.0E-04	NC
Nickel, total	NCC	0.01	9.4E-06	NC	2.0E-02	NC
Thallium, total	NCC	0.01	9.4E-06	NC	2.0E-01	NC
Vanadium, total	4.2E+01	0.01	9.4E-06	3.9E-06	7.0E-03	5.6E-04
Zinc, total	NCC	0.01	9.4E-06	NC	3.0E-01	NC
					SUBTOTAL:	**1.0E-02**
					SITE RELATED RISK:	**1.1E-03**
					BACKGROUND RISK:	**9.0E-03**

TABLE 8.44-9 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Local Resident (Trespassers)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	1.2E-06	NC	2.4E-02	NC
Benzene	NCC	NA	1.2E-06	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	NA	1.2E-06	NC	1.3E-01	NC
Chlorobenzene	NCC	NA	1.2E-06	NC	NA	NC
Chloroform	NCC	NA	1.2E-06	NC	6.1E-03	NC
Tetrachloroethene	NCC	NA	1.2E-06	NC	5.2E-02	NC
Trichloroethene	NCC	NA	1.2E-06	NC	1.1E-02	NC
Vinyl Chloride	NCC	NA	1.2E-06	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	2.5E-01	0.13	1.2E-06	3.8E-08	7.3E-01	2.8E-08
Benzo(a)pyrene	2.2E-01	0.13	1.2E-06	3.5E-08	7.3E+00	2.5E-07
Benzo(b)fluoranthene	3.1E-01	0.13	1.2E-06	4.9E-08	7.3E-01	3.6E-08
Benzo(g,h,i)perylene	7.9E-02	NA	1.2E-06	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	0.10	1.2E-06	NC	1.4E-02	NC
Phenanthrene	2.8E-01	NA	1.2E-06	NC	NA	NC
Pesticides/PCBs						
Aldrin	NCC	NA	1.2E-06	NC	1.7E+01	NC
Dieldrin	NCC	0.25	1.2E-06	NC	1.6E+01	NC
Metals						
Aluminum, total	**1.2E+04**	**NA**	**1.2E-06**	**NC**	**NA**	**NC**
Arsenic, total	**7.7E+00**	**0.03**	**1.2E-06**	**2.8E-07**	**1.5E+00**	**4.1E-07**
Barium, total	NCC	NA	1.2E-06	NC	NA	NC
Beryllium, total	**2.4E+00**	**0.01**	**1.2E-06**	**2.9E-08**	**4.3E+00**	**1.2E-07**
Cadmium, total	**1.4E-01**	**1.00**	**1.2E-06**	**1.7E-07**	**NA**	**NC**
Copper, total	NCC	NA	1.2E-06	NC	NA	NC
Iron, total	NCC	NA	1.2E-06	NC	NA	NC
Lead, total	**3.7E+01**	**NA**	**1.2E-06**	**NC**	**NA**	**NC**
Manganese, total	7.6E+02	NA	1.2E-06	NC	NA	NC
Mercury, total	NCC	NA	1.2E-06	NC	NA	NC
Nickel, total	NCC	NA	1.2E-06	NC	NA	NC
Thallium, total	NCC	NA	1.2E-06	NC	NA	NC
Vanadium, total	**4.2E+01**	**NA**	**1.2E-06**	**NC**	**NA**	**NC**
Zinc, total	NCC	NA	1.2E-06	NC	NA	NC
					SUBTOTAL:	**8.6E-07**
					SITE RELATED RISK:	**3.2E-07**
					BACKGROUND RISK:	**5.4E-07**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-10

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Local Resident (Trespassers)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	1.0E-07	NC	NA	NC
Benzene	NCC	1.00	1.0E-07	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	1.0E-07	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	1.0E-07	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.0E-07	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	1.0E-07	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	1.0E-07	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	1.0E-07	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	2.5E-01	1.00	1.0E-07	2.5E-08	3.0E-02	8.4E-07
Benzo(a)pyrene	2.2E-01	1.00	1.0E-07	2.3E-08	3.0E-02	7.6E-07
Benzo(b)fluoranthene	3.1E-01	1.00	1.0E-07	3.2E-08	3.0E-02	1.1E-06
Benzo(g,h,i)perylene	7.9E-02	1.00	1.0E-07	8.1E-09	3.0E-02	2.7E-07
bis(2-Ethylhexyl)phthalate	NCC	1.00	1.0E-07	NC	2.0E-02	NC
Phenanthrene	2.8E-01	1.00	1.0E-07	2.9E-08	3.0E-02	9.7E-07
Pesticides/PCBs						
Aldrin	NCC	1.00	1.0E-07	NC	3.0E-05	NC
Dieldrin	NCC	1.00	1.0E-07	NC	5.0E-05	NC
Metals						
Aluminum, total	**1.2E+04**	**1.00**	**1.0E-07**	**1.3E-03**	**1.0E+00**	**1.3E-03**
Arsenic, total	**7.7E+00**	**0.48**	**1.0E-07**	**3.8E-07**	**3.0E-04**	**1.3E-03**
Barium, total	NCC	1.00	1.0E-07	NC	7.0E-02	NC
Beryllium, total	**2.4E+00**	**1.00**	**1.0E-07**	**2.5E-07**	**2.0E-03**	**1.2E-04**
Cadmium, total	**1.4E-01**	**1.00**	**1.0E-07**	**1.4E-08**	**1.0E-03**	**1.4E-05**
Copper, total	NCC	1.00	1.0E-07	NC	3.7E-02	NC
Iron, total	NCC	1.00	1.0E-07	NC	NA	NC
Lead, total	**3.7E+01**	**1.00**	**1.0E-07**	**3.8E-06**	**NA**	**NC**
Manganese, total	7.6E+02	1.00	1.0E-07	7.8E-05	7.0E-02	1.1E-03
Mercury, total	NCC	0.50	1.0E-07	NC	3.0E-04	NC
Nickel, total	NCC	1.00	1.0E-07	NC	2.0E-02	NC
Thallium, total	NCC	1.00	1.0E-07	NC	2.0E-01	NC
Vanadium, total	4.2E+01	1.00	1.0E-07	4.3E-06	7.0E-03	6.2E-04
Zinc, total	NCC	1.00	1.0E-07	NC	3.0E-01	NC
					SUBTOTAL:	**4.4E-03**
					SITE RELATED RISK:	**1.1E-03**
					BACKGROUND RISK:	**3.3E-03**

TABLE 8.44-10 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Local Resident (Trespassers)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	1.3E-08	NC	2.4E-02	NC
Benzene	NCC	1.00	1.3E-08	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	1.3E-08	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	1.3E-08	NC	NA	NC
Chloroform	NCC	1.00	1.3E-08	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	1.3E-08	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	1.3E-08	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	1.3E-08	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	2.5E-01	1.00	1.3E-08	3.2E-09	7.3E-01	2.4E-09
Benzo(a)pyrene	2.2E-01	1.00	1.3E-08	2.9E-09	7.3E+00	2.1E-08
Benzo(b)fluoranthene	3.1E-01	1.00	1.3E-08	4.1E-09	7.3E-01	3.0E-09
Benzo(g,h,i)perylene	7.9E-02	1.00	1.3E-08	1.0E-09	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	1.3E-08	NC	1.4E-02	NC
Phenanthrene	2.8E-01	1.00	1.3E-08	3.8E-09	NA	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	1.3E-08	NC	1.7E+01	NC
Dieldrin	NCC	1.00	1.3E-08	NC	1.6E+01	NC
Metals						
Aluminum, total	**1.2E+04**	**1.00**	**1.3E-08**	**1.6E-04**	**NA**	**NC**
Arsenic, total	**7.7E+00**	**0.48**	**1.3E-08**	**4.9E-08**	**1.5E+00**	**7.3E-08**
Barium, total	NCC	1.00	1.3E-08	NC	NA	NC
Beryllium, total	**2.4E+00**	**1.00**	**1.3E-08**	**3.2E-08**	**4.3E+00**	**1.4E-07**
Cadmium, total	**1.4E-01**	**1.00**	**1.3E-08**	**1.9E-09**	**NA**	**NC**
Copper, total	NCC	1.00	1.3E-08	NC	NA	NC
Iron, total	NCC	1.00	1.3E-08	NC	NA	NC
Lead, total	**3.7E+01**	**1.00**	**1.3E-08**	**4.9E-07**	**NA**	**NC**
Manganese, total	7.6E+02	1.00	1.3E-08	1.0E-05	NA	NC
Mercury, total	NCC	1.00	1.3E-08	NC	NA	NC
Nickel, total	NCC	1.00	1.3E-08	NC	NA	NC
Thallium, total	NCC	1.00	1.3E-08	NC	NA	NC
Vanadium, total	4.2E+01	1.00	1.3E-08	5.6E-07	NA	NC
Zinc, total	NCC	1.00	1.3E-08	NC	NA	NC
					SUBTOTAL:	**2.4E-07**
					SITE RELATED RISK:	**2.7E-08**
					BACKGROUND RISK:	**2.1E-07**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-11

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Local Resident (Trespassers)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	= Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	1.5E-02	NC	NA	NC
Benzene	NCC	1.00	1.1E-01	1.5E-02	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	1.5E-02	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	4.1E-02	1.5E-02	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.3E-01	1.5E-02	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	3.7E-01	1.5E-02	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	1.5E-02	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	7.3E-03	1.5E-02	NC	3.0E-03	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	1.5E-02	NC	3.0E-02	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	1.5E-02	NC	3.0E-02	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	1.5E-02	NC	3.0E-02	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	1.5E-02	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	3.3E-02	1.5E-02	NC	2.0E-02	NC
Phenanthrene	NCC	1.00	2.3E-01	1.5E-02	NC	3.0E-02	NC
Pesticides/PCBs							
Aldrin	NCC	1.00	1.6E-03	1.5E-02	NC	3.0E-05	NC
Dieldrin	NCC	1.00	1.6E-02	1.5E-02	NC	5.0E-05	NC
Metals							
Aluminum, total	NCC	1.00	1.0E-03	1.5E-02	NC	1.0E+00	NC
Arsenic, total	2.2E-03	1.00	1.0E-03	1.5E-02	3.2E-08	3.0E-04	1.1E-04
Barium, total	NCC	1.00	1.0E-03	1.5E-02	NC	7.0E-02	NC
Beryllium, total	**2.5E-03**	**1.00**	**1.0E-03**	**1.5E-02**	**3.7E-08**	**2.0E-03**	**1.9E-05**
Cadmium, total	NCC	1.00	1.0E-03	1.5E-02	NC	1.0E-03	NC
Copper, total	NCC	1.00	1.0E-03	1.5E-02	NC	3.7E-02	NC
Iron, total	NCC	1.00	1.0E-03	1.5E-02	NC	NA	NC
Lead, total	6.0E-03	1.00	1.0E-03	1.5E-02	8.8E-08	NA	NC
Manganese, total	3.0E+01	1.00	1.0E-03	1.5E-02	4.3E-04	7.0E-02	6.2E-03
Mercury, total	9.8E-04	1.00	1.0E-03	1.5E-02	1.4E-08	3.0E-04	4.8E-05
Nickel, total	NCC	1.00	1.0E-03	1.5E-02	NC	2.0E-02	NC
Thallium, total	1.1E-02	1.00	1.0E-03	1.5E-02	1.6E-07	2.0E-01	7.9E-07
Vanadium, total	NCC	1.00	1.0E-03	1.5E-02	NC	7.0E-03	NC
Zinc, total	NCC	1.00	1.0E-03	1.5E-02	NC	3.0E-01	NC
						SUBTOTAL:	**6.3E-03**
						SITE RELATED RISK:	**6.3E-03**
						BACKGROUND RISK:	**1.9E-05**

TABLE 8.44-11 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Local Resident (Trespassers)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	x Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)-1	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	1.9E-03	NC	2.4E-02	NC
Benzene	NCC	1.00	1.1E-01	1.9E-03	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	1.9E-03	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	4.1E-02	1.9E-03	NC	NA	NC
Chloroform	NCC	1.00	1.3E-01	1.9E-03	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	3.7E-01	1.9E-03	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	1.9E-03	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	7.3E-03	1.9E-03	NC	1.4E+00	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	1.9E-03	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	1.9E-03	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	1.9E-03	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	1.9E-03	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	3.3E-02	1.9E-03	NC	1.4E-02	NC
Phenanthrene	NCC	1.00	2.3E-01	1.9E-03	NC	NA	NC
Pesticides/PCBs							
Aldrin	NCC	1.00	1.6E-03	1.9E-03	NC	1.7E+01	NC
Dieldrin	NCC	1.00	1.6E-02	1.9E-03	NC	1.6E+01	NC
Metals							
Aluminum, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Arsenic, total	2.2E-03	1.00	1.0E-03	1.9E-03	4.1E-09	1.5E+00	6.1E-09
Barium, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Beryllium, total	**2.5E-03**	**1.00**	**1.0E-03**	**1.9E-03**	**4.8E-09**	**4.3E+00**	**2.1E-08**
Cadmium, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Copper, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Iron, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Lead, total	6.0E-03	1.00	1.0E-03	1.9E-03	1.1E-08	NA	NC
Manganese, total	3.0E+01	1.00	1.0E-03	1.9E-03	5.5E-05	NA	NC
Mercury, total	9.8E-04	1.00	1.0E-03	1.9E-03	1.8E-09	NA	NC
Nickel, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Thallium, total	1.1E-02	1.00	1.0E-03	1.9E-03	2.0E-08	NA	NC
Vanadium, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
Zinc, total	NCC	1.00	1.0E-03	1.9E-03	NC	NA	NC
						SUBTOTAL:	**2.7E-08**
						SITE RELATED RISK:	**6.1E-09**
						BACKGROUND RISK:	**2.1E-08**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-12

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - ALMY RESERVOIR

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	4.3E-05	NC	NA	NC
Benzene	NCC	NA	4.3E-05	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	NA	4.3E-05	NC	7.0E-04	NC
Chlorobenzene	NCC	NA	4.3E-05	NC	2.0E-02	NC
Chloroform	NCC	NA	4.3E-05	NC	1.0E-02	NC
Tetrachloroethene	NCC	NA	4.3E-05	NC	1.0E-02	NC
Trichloroethene	NCC	NA	4.3E-05	NC	2.0E-03	NC
Vinyl Chloride	NCC	NA	4.3E-05	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	6.6E-02	0.13	4.3E-05	3.6E-07	3.0E-02	1.2E-05
Benzo(a)pyrene	8.4E-02	0.13	4.3E-05	4.6E-07	3.0E-02	1.5E-05
Benzo(b)fluoranthene	1.2E-01	0.13	4.3E-05	6.6E-07	3.0E-02	2.2E-05
Benzo(g,h,i)perylene	8.7E-02	0.10	4.3E-05	3.7E-07	3.0E-02	1.2E-05
bis(2-Ethylhexyl)phthalate	NCC	0.10	4.3E-05	NC	2.0E-02	NC
Phenanthrene	6.7E-02	0.10	4.3E-05	2.8E-07	3.0E-02	9.5E-06
Pesticides/PCBs						
Aldrin	NCC	NA	4.3E-05	NC	3.0E-05	NC
Dieldrin	NCC	0.25	4.3E-05	NC	5.0E-05	NC
Metals						
Aluminum, total	**1.7E+04**	**0.01**	**4.3E-05**	**7.4E-03**	**1.0E+00**	**7.4E-03**
Arsenic, total	**8.5E+00**	**0.03**	**4.3E-05**	**1.1E-05**	**3.0E-04**	**3.6E-02**
Barium, total	NCC	0.01	4.3E-05	NC	7.0E-02	NC
Beryllium, total	**2.8E+01**	**0.01**	**4.3E-05**	**1.2E-05**	**2.0E-03**	**5.9E-03**
Cadmium, total	**4.9E+00**	**0.001**	**4.3E-05**	**2.1E-07**	**1.0E-03**	**2.1E-04**
Copper, total	NCC	0.02	4.3E-05	NC	3.7E-02	NC
Iron, total	NCC	0.01	4.3E-05	NC	NA	NC
Lead, total	**1.9E+02**	**1.00**	**4.3E-05**	**8.3E-03**	**NA**	**NC**
Manganese, total	8.7E+03	0.01	4.3E-05	3.7E-03	7.0E-02	5.3E-02
Mercury, total	NCC	0.01	4.3E-05	NC	3.0E-04	NC
Nickel, total	NCC	0.01	4.3E-05	NC	2.0E-02	NC
Thallium, total	1.2E+01	0.01	4.3E-05	5.0E-06	2.0E-01	2.5E-05
Vanadium, total	**4.2E+01**	**0.01**	**4.3E-05**	**1.8E-05**	**7.0E-03**	**2.6E-03**
Zinc, total	NCC	0.01	4.3E-05	NC	3.0E-01	NC
					SUBTOTAL:	**1.0E-01**
					SITE RELATED RISK:	**5.3E-02**
					BACKGROUND RISK:	**5.2E-02**

TABLE 8.44-12 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - ALMY RESERVOIR

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	1.1E-05	NC	2.4E-02	NC
Benzene	NCC	NA	1.1E-05	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	NA	1.1E-05	NC	1.3E-01	NC
Chlorobenzene	NCC	NA	1.1E-05	NC	NA	NC
Chloroform	NCC	NA	1.1E-05	NC	6.1E-03	NC
Tetrachloroethene	NCC	NA	1.1E-05	NC	5.2E-02	NC
Trichloroethene	NCC	NA	1.1E-05	NC	1.1E-02	NC
Vinyl Chloride	NCC	NA	1.1E-05	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	6.6E-02	0.13	1.1E-05	9.3E-08	7.3E-01	6.8E-08
Benzo(a)pyrene	8.4E-02	0.13	1.1E-05	1.2E-07	7.3E+00	8.6E-07
Benzo(b)fluoranthene	1.2E-01	0.13	1.1E-05	1.7E-07	7.3E-01	1.2E-07
Benzo(g,h,i)perylene	8.7E-02	NA	1.1E-05	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	0.10	1.1E-05	NC	1.4E-02	NC
Phenanthrene	6.7E-02	NA	1.1E-05	NC	NA	NC
Pesticides/PCBs						
Aldrin	NCC	NA	1.1E-05	NC	1.7E+01	NC
Dieldrin	NCC	0.25	1.1E-05	NC	1.6E+01	NC
Metals						
Aluminum, total	1.7E+04	NA	1.1E-05	NC	NA	NC
Arsenic, total	8.5E+00	0.03	1.1E-05	2.7E-06	1.5E+00	4.1E-06
Barium, total	NCC	NA	1.1E-05	NC	NA	NC
Beryllium, total	2.8E+01	0.01	1.1E-05	3.0E-06	4.3E+00	1.3E-05
Cadmium, total	4.9E+00	1.00	1.1E-05	5.3E-05	NA	NC
Copper, total	NCC	NA	1.1E-05	NC	NA	NC
Iron, total	NCC	NA	1.1E-05	NC	NA	NC
Lead, total	1.9E+02	NA	1.1E-05	NC	NA	NC
Manganese, total	8.7E+03	NA	1.1E-05	NC	NA	NC
Mercury, total	NCC	NA	1.1E-05	NC	NA	NC
Nickel, total	NCC	NA	1.1E-05	NC	NA	NC
Thallium, total	1.2E+01	NA	1.1E-05	NC	NA	NC
Vanadium, total	4.2E+01	NA	1.1E-05	NC	NA	NC
Zinc, total	NCC	NA	1.1E-05	NC	NA	NC
					SUBTOTAL:	1.8E-05
					SITE RELATED RISK:	1.1E-06
					BACKGROUND RISK:	1.7E-05

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-13

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - ALMY RESERVOIR

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	1.9E-06	NC	NA	NC
Benzene	NCC	1.00	1.9E-06	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	1.9E-06	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	1.9E-06	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.9E-06	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	1.9E-06	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	1.9E-06	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	1.9E-06	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	6.6E-02	1.00	1.9E-06	1.2E-07	3.0E-02	4.1E-06
Benzo(a)pyrene	8.4E-02	1.00	1.9E-06	1.6E-07	3.0E-02	5.2E-06
Benzo(b)fluoranthene	1.2E-01	1.00	1.9E-06	2.2E-07	3.0E-02	7.4E-06
Benzo(g,h,i)perylene	8.7E-02	1.00	1.9E-06	1.6E-07	3.0E-02	5.4E-06
bis(2-Ethylhexyl)phthalate	NCC	1.00	1.9E-06	NC	2.0E-02	NC
Phenanthrene	6.7E-02	1.00	1.9E-06	1.2E-07	3.0E-02	4.1E-06
Pesticides/PCBs						
Aldrin	NCC	1.00	1.9E-06	NC	3.0E-05	NC
Dieldrin	NCC	1.00	1.9E-06	NC	5.0E-05	NC
Metals						
Aluminum, total	**1.7E+04**	**1.00**	**1.9E-06**	**3.2E-02**	**1.0E+00**	**3.2E-02**
Arsenic, total	**8.5E+00**	**0.48**	**1.9E-06**	**7.5E-06**	**3.0E-04**	**2.5E-02**
Barium, total	NCC	1.00	1.9E-06	NC	7.0E-02	NC
Beryllium, total	**2.8E+01**	**1.00**	**1.9E-06**	**5.2E-05**	**2.0E-03**	**2.6E-02**
Cadmium, total	**4.9E+00**	**1.00**	**1.9E-06**	**9.0E-06**	**1.0E-03**	**9.0E-03**
Copper, total	NCC	1.00	1.9E-06	NC	3.7E-02	NC
Iron, total	NCC	1.00	1.9E-06	NC	NA	NC
Lead, total	**1.9E+02**	**1.00**	**1.9E-06**	**3.6E-04**	NA	NC
Manganese, total	8.7E+03	1.00	1.9E-06	1.6E-02	7.0E-02	2.3E-01
Mercury, total	NCC	0.50	1.9E-06	NC	3.0E-04	NC
Nickel, total	NCC	1.00	1.9E-06	NC	2.0E-02	NC
Thallium, total	1.2E+01	1.00	1.9E-06	2.2E-05	2.0E-01	1.1E-04
Vanadium, total	**4.2E+01**	**1.00**	**1.9E-06**	**7.8E-05**	**7.0E-03**	**1.1E-02**
Zinc, total	NCC	1.00	1.9E-06	NC	3.0E-01	NC
					SUBTOTAL:	**3.3E-01**
					SITE RELATED RISK:	**2.3E-01**
					BACKGROUND RISK:	**1.0E-01**

TABLE 8.44-13 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - ALMY RESERVOIR

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)-1	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	1.9E-07	NC	2.4E-02	NC
Benzene	NCC	1.00	1.9E-07	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	1.9E-07	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	1.9E-07	NC	NA	NC
Chloroform	NCC	1.00	1.9E-07	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	1.9E-07	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	1.9E-07	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	1.9E-07	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	6.6E-02	1.00	1.9E-07	1.3E-08	7.3E-01	9.4E-09
Benzo(a)pyrene	8.4E-02	1.00	1.9E-07	1.6E-08	7.3E+00	1.2E-07
Benzo(b)fluoranthene	1.2E-01	1.00	1.9E-07	2.3E-08	7.3E-01	1.7E-08
Benzo(g,h,i)perylene	8.7E-02	1.00	1.9E-07	1.7E-08	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	1.9E-07	NC	1.4E-02	NC
Phenanthrene	6.7E-02	1.00	1.9E-07	1.3E-08	NA	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	1.9E-07	NC	1.7E+01	NC
Dieldrin	NCC	1.00	1.9E-07	NC	1.6E+01	NC
Metals						
Aluminum, total	**1.7E+04**	**1.00**	1.9E-07	**3.4E-03**	NA	NC
Arsenic, total	**8.5E+00**	**0.48**	1.9E-07	**7.9E-07**	**1.5E+00**	**1.2E-06**
Barium, total	NCC	1.00	1.9E-07	NC	NA	NC
Beryllium, total	**2.8E+01**	**1.00**	1.9E-07	**5.4E-06**	**4.3E+00**	**2.3E-05**
Cadmium, total	4.9E+00	1.00	1.9E-07	9.5E-07	NA	NC
Copper, total	NCC	1.00	1.9E-07	NC	NA	NC
Iron, total	NCC	1.00	1.9E-07	NC	NA	NC
Lead, total	**1.9E+02**	**1.00**	1.9E-07	**3.8E-05**	NA	NC
Manganese, total	8.7E+03	1.00	1.9E-07	1.7E-03	NA	NC
Mercury, total	NCC	1.00	1.9E-07	NC	NA	NC
Nickel, total	NCC	1.00	1.9E-07	NC	NA	NC
Thallium, total	1.2E+01	1.00	1.9E-07	2.3E-06	NA	NC
Vanadium, total	**4.2E+01**	**1.00**	1.9E-07	**8.2E-06**	NA	NC
Zinc, total	NCC	1.00	1.9E-07	NC	NA	NC
					SUBTOTAL:	**2.5E-05**
					SITE RELATED RISK:	**1.5E-07**
					BACKGROUND RISK:	**2.5E-05**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-14

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - ALMY RESERVOIR
CURRENT CONDITIONS

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	= Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	7.8E-02	NC	NA	NC
Benzene	NCC	1.00	1.1E-01	7.8E-02	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	7.8E-02	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	4.1E-02	7.8E-02	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.3E-01	7.8E-02	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	3.7E-01	7.8E-02	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	7.8E-02	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	7.3E-03	7.8E-02	NC	3.0E-03	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	7.8E-02	NC	3.0E-02	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	7.8E-02	NC	3.0E-02	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	7.8E-02	NC	3.0E-02	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	7.8E-02	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	3.3E-02	7.8E-02	NC	2.0E-02	NC
Phenanthrene	NCC	1.00	2.3E-01	7.8E-02	NC	3.0E-02	NC
Pesticides/PCBs							
Aldrin	NCC	1.00	1.6E-03	7.8E-02	NC	3.0E-05	NC
Dieldrin	NCC	1.00	1.6E-02	7.8E-02	NC	5.0E-05	NC
Metals							
Aluminum, total	NCC	1.00	1.0E-03	7.8E-02	NC	1.0E+00	NC
Arsenic, total	2.1E-03	1.00	1.0E-03	7.8E-02	1.6E-07	3.0E-04	5.5E-04
Barium, total	NCC	1.00	1.0E-03	7.8E-02	NC	7.0E-02	NC
Beryllium, total	**2.5E-04**	**1.00**	**1.0E-03**	**7.8E-02**	**1.9E-08**	**2.0E-03**	**9.7E-06**
Cadmium, total	NCC	1.00	1.0E-03	7.8E-02	NC	1.0E-03	NC
Copper, total	NCC	1.00	1.0E-03	7.8E-02	NC	3.7E-02	NC
Iron, total	NCC	1.00	1.0E-03	7.8E-02	NC	NA	NC
Lead, total	NCC	1.00	1.0E-03	7.8E-02	NC	NA	NC
Manganese, total	3.0E-02	1.00	1.0E-03	7.8E-02	2.3E-06	7.0E-02	3.3E-05
Mercury, total	NCC	1.00	1.0E-03	7.8E-02	NC	3.0E-04	NC
Nickel, total	NCC	1.00	1.0E-03	7.8E-02	NC	2.0E-02	NC
Thallium, total	NCC	1.00	1.0E-03	7.8E-02	NC	2.0E-01	NC
Vanadium, total	NCC	1.00	1.0E-03	7.8E-02	NC	7.0E-03	NC
Zinc, total	NCC	1.00	1.0E-03	7.8E-02	NC	3.0E-01	NC
						SUBTOTAL:	**5.9E-04**
						SITE RELATED RISK:	**5.8E-04**
						BACKGROUND RISK:	**9.7E-06**

TABLE 8.44-14 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - ALMY RESERVOIR
CURRENT CONDITIONS

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	Dermal x Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	x Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)-1	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	2.4E-02	NC	2.4E-02	NC
Benzene	NCC	1.00	1.1E-01	2.4E-02	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	2.4E-02	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	4.1E-02	2.4E-02	NC	NA	NC
Chloroform	NCC	1.00	1.3E-01	2.4E-02	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	3.7E-01	2.4E-02	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	2.4E-02	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	7.3E-03	2.4E-02	NC	1.4E+00	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	2.4E-02	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	2.4E-02	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	2.4E-02	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	2.4E-02	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	3.3E-02	2.4E-02	NC	1.4E-02	NC
Phenanthrene	NCC	1.00	2.3E-01	2.4E-02	NC	NA	NC
Pesticides/PCBs							
Aldrin	NCC	1.00	1.6E-03	2.4E-02	NC	1.7E+01	NC
Dieldrin	NCC	1.00	1.6E-02	2.4E-02	NC	1.6E+01	NC
Metals							
Aluminum, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Arsenic, total	2.1E-03	1.00	1.0E-03	2.4E-02	5.0E-08	1.5E+00	7.6E-08
Barium, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Beryllium, total	2.5E-04	1.00	1.0E-03	2.4E-02	6.0E-09	4.3E+00	2.6E-08
Cadmium, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Copper, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Iron, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Lead, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Manganese, total	3.0E-02	1.00	1.0E-03	2.4E-02	7.1E-07	NA	NC
Mercury, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Nickel, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Thallium, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Vanadium, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Zinc, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
						SUBTOTAL:	1.0E-07
						SITE RELATED RISK:	7.6E-08
						BACKGROUND RISK:	2.6E-08

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-15

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SURFACE WATER - ALMY RESERVOIR
CURRENT CONDITIONS

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	Oral x Absorption x Adjustment Factor	Receptor-Specific Exposure Factor (l/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	5.4E-04	NC	NA	NC
Benzene	NCC	1.00	5.4E-04	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	5.4E-04	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	5.4E-04	NC	2.0E-02	NC
Chloroform	NCC	1.00	5.4E-04	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	5.4E-04	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	5.4E-04	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	5.4E-04	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(a)pyrene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(b)fluoranthene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(g,h,i)perylene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	5.4E-04	NC	2.0E-02	NC
Phenanthrene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	5.4E-04	NC	3.0E-05	NC
Dieldrin	NCC	1.00	5.4E-04	NC	5.0E-05	NC
Metals						
Aluminum, total	NCC	1.00	5.4E-04	NC	1.0E+00	NC
Arsenic, total	2.1E-03	1.00	5.4E-04	1.1E-06	3.0E-04	3.8E-03
Barium, total	NCC	1.00	5.4E-04	NC	7.0E-02	NC
Beryllium, total	**2.5E-04**	**1.00**	**5.4E-04**	1.3E-07	**2.0E-03**	**6.7E-05**
Cadmium, total	NCC	1.00	5.4E-04	NC	5.0E-04	NC
Copper, total	NCC	1.00	5.4E-04	NC	3.7E-02	NC
Iron, total	NCC	1.00	5.4E-04	NC	NA	NC
Lead, total	NCC	1.00	5.4E-04	NC	NA	NC
Manganese, total	3.0E-02	1.00	5.4E-04	1.6E-05	2.4E-02	6.6E-04
Mercury, total	NCC	1.00	5.4E-04	NC	3.0E-04	NC
Nickel, total	NCC	1.00	5.4E-04	NC	2.0E-02	NC
Thallium, total	NCC	1.00	5.4E-04	NC	2.0E-01	NC
Vanadium, total	NCC	1.00	5.4E-04	NC	7.0E-03	NC
Zinc, total	NCC	1.00	5.4E-04	NC	3.0E-01	NC
					SUBTOTAL:	**4.5E-03**
					SITE RELATED RISK:	**4.4E-03**
					BACKGROUND RISK:	**6.7E-05**

TABLE 8.44-15 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SURFACE WATER - ALMY RESERVOIR
CURRENT CONDITIONS

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Cancer Slope Factor (mg/kg-day)-[1]	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	8.3E-05	NC	2.4E-02	NC
Benzene	NCC	1.00	8.3E-05	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	8.3E-05	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	8.3E-05	NC	NA	NC
Chloroform	NCC	1.00	8.3E-05	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	8.3E-05	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	8.3E-05	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	8.3E-05	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	1.00	8.3E-05	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	8.3E-05	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	8.3E-05	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	8.3E-05	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	8.3E-05	NC	1.4E-02	NC
Phenanthrene	NCC	1.00	8.3E-05	NC	NA	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	8.3E-05	NC	1.7E+01	NC
Dieldrin	NCC	1.00	8.3E-05	NC	1.6E+01	NC
Metals						
Aluminum, total	NCC	1.00	8.3E-05	NC	NA	NC
Arsenic, total	2.1E-03	1.00	8.3E-05	1.8E-07	1.5E+00	2.6E-07
Barium, total	NCC	1.00	8.3E-05	NC	NA	NC
Beryllium, total	**2.5E-04**	**1.00**	**8.3E-05**	**2.1E-08**	**4.3E+00**	**8.9E-08**
Cadmium, total	NCC	1.00	8.3E-05	NC	NA	NC
Copper, total	NCC	1.00	8.3E-05	NC	NA	NC
Iron, total	NCC	1.00	8.3E-05	NC	NA	NC
Lead, total	NCC	1.00	8.3E-05	NC	NA	NC
Manganese, total	3.0E-02	1.00	8.3E-05	2.5E-06	NA	NC
Mercury, total	NCC	1.00	8.3E-05	NC	NA	NC
Nickel, total	NCC	1.00	8.3E-05	NC	NA	NC
Thallium, total	NCC	1.00	8.3E-05	NC	NA	NC
Vanadium, total	NCC	1.00	8.3E-05	NC	NA	NC
Zinc, total	NCC	1.00	8.3E-05	NC	NA	NC
					SUBTOTAL:	**3.5E-07**
					SITE RELATED RISK:	**2.6E-07**
					BACKGROUND RISK:	**8.9E-08**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-16

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - ALMY RESERVOIR
FUTURE CONDITIONS

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	= Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	7.8E-02	NC	NA	NC
Benzene	NCC	1.00	1.1E-01	7.8E-02	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	7.8E-02	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	4.1E-02	7.8E-02	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.3E-01	7.8E-02	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	3.7E-01	7.8E-02	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	7.8E-02	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	7.3E-03	7.8E-02	NC	3.0E-03	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	7.8E-02	NC	3.0E-02	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	7.8E-02	NC	3.0E-02	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	7.8E-02	NC	3.0E-02	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	7.8E-02	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	1.7E-04	1.00	3.3E-02	7.8E-02	4.4E-07	2.0E-02	2.2E-05
Phenanthrene	NCC	1.00	2.3E-01	7.8E-02	NC	3.0E-02	NC
Pesticides/PCBs							
Aldrin	NCC	1.00	1.6E-03	7.8E-02	NC	3.0E-05	NC
Dieldrin	5.1E-07	1.00	1.6E-02	7.8E-02	6.4E-10	5.0E-05	1.3E-05
Metals							
Aluminum, total	2.2E-02	1.00	1.0E-03	7.8E-02	1.7E-06	1.0E+00	1.7E-06
Arsenic, total	NCC	1.00	1.0E-03	7.8E-02	NC	3.0E-04	NC
Barium, total	1.4E-03	1.00	1.0E-03	7.8E-02	1.1E-07	7.0E-02	1.6E-06
Beryllium, total	9.0E-05	1.00	1.0E-03	7.8E-02	7.0E-09	2.0E-03	3.5E-06
Cadmium, total	4.0E-05	1.00	1.0E-03	7.8E-02	3.1E-09	1.0E-03	3.1E-06
Copper, total	1.3E-04	1.00	1.0E-03	7.8E-02	1.0E-08	3.7E-02	2.7E-07
Iron, total	1.4E-01	1.00	1.0E-03	7.8E-02	1.1E-05	NA	NC
Lead, total	2.6E-04	1.00	1.0E-03	7.8E-02	2.0E-08	NA	NC
Manganese, total	5.8E-03	1.00	1.0E-03	7.8E-02	4.5E-07	7.0E-02	6.5E-06
Mercury, total	5.0E-05	1.00	1.0E-03	7.8E-02	3.9E-09	3.0E-04	1.3E-05
Nickel, total	2.0E-04	1.00	1.0E-03	7.8E-02	1.6E-08	2.0E-02	7.8E-07
Thallium, total	NCC	1.00	1.0E-03	7.8E-02	NC	2.0E-01	NC
Vanadium, total	NCC	1.00	1.0E-03	7.8E-02	NC	7.0E-03	NC
Zinc, total	NCC	1.00	1.0E-03	7.8E-02	NC	3.0E-01	NC
						SUBTOTAL:	6.5E-05
						SITE RELATED RISK:	6.2E-05
						BACKGROUND RISK:	3.5E-06

TABLE 8.44-16 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - ALMY RESERVOIR
FUTURE CONDITIONS

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	= Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	2.4E-02	NC	2.4E-02	NC
Benzene	NCC	1.00	1.1E-01	2.4E-02	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	2.4E-02	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	4.1E-02	2.4E-02	NC	NA	NC
Chloroform	NCC	1.00	1.3E-01	2.4E-02	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	3.7E-01	2.4E-02	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	2.4E-02	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	7.3E-03	2.4E-02	NC	1.4E+00	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	2.4E-02	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	2.4E-02	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	2.4E-02	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	2.4E-02	NC	NA	NC
bis(2-Ethylhexyl)phthalate	1.7E-04	1.00	3.3E-02	2.4E-02	1.3E-07	1.4E-02	1.9E-09
Phenanthrene	NCC	1.00	2.3E-01	2.4E-02	NC	NA	NC
Pesticides/PCBs							
Aldrin	NCC	1.00	1.6E-03	2.4E-02	NC	1.7E+01	NC
Dieldrin	5.1E-07	1.00	1.6E-02	2.4E-02	2.0E-10	1.6E+01	3.1E-09
Metals							
Aluminum, total	2.2E-02	1.00	1.0E-03	2.4E-02	5.2E-07	NA	NC
Arsenic, total	NCC	1.00	1.0E-03	2.4E-02	NC	1.5E+00	NC
Barium, total	1.4E-03	1.00	1.0E-03	2.4E-02	3.4E-08	NA	NC
Beryllium, total	**9.0E-05**	**1.00**	**1.0E-03**	**2.4E-02**	**2.2E-09**	**4.3E+00**	**9.3E-09**
Cadmium, total	4.0E-05	1.00	1.0E-03	2.4E-02	9.6E-10	NA	NC
Copper, total	1.3E-04	1.00	1.0E-03	2.4E-02	3.1E-09	NA	NC
Iron, total	1.4E-01	1.00	1.0E-03	2.4E-02	3.3E-06	NA	NC
Lead, total	2.6E-04	1.00	1.0E-03	2.4E-02	6.2E-09	NA	NC
Manganese, total	5.8E-03	1.00	1.0E-03	2.4E-02	1.4E-07	NA	NC
Mercury, total	5.0E-05	1.00	1.0E-03	2.4E-02	1.2E-09	NA	NC
Nickel, total	2.0E-04	1.00	1.0E-03	2.4E-02	4.8E-09	NA	NC
Thallium, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Vanadium, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Zinc, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
						SUBTOTAL:	**1.4E-08**
						SITE RELATED RISK:	**5.0E-09**
						BACKGROUND RISK:	**9.3E-09**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-17

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES FOR INCIDENTAL INGESTION OF SURFACE WATER - ALMY RESERVOIR FUTURE CONDITIONS

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	Oral x Absorption x Adjustment Factor	Receptor-Specific Exposure Factor (l/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	5.4E-04	NC	NA	NC
Benzene	NCC	1.00	5.4E-04	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	5.4E-04	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	5.4E-04	NC	2.0E-02	NC
Chloroform	NCC	1.00	5.4E-04	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	5.4E-04	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	5.4E-04	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	5.4E-04	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(a)pyrene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(b)fluoranthene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(g,h,i)perylene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	1.7E-04	1.00	5.4E-04	9.2E-08	2.0E-02	4.6E-06
Phenanthrene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	5.4E-04	NC	3.0E-05	NC
Dieldrin	5.1E-07	1.00	5.4E-04	2.8E-10	5.0E-05	5.5E-06
Metals						
Aluminum, total	2.2E-02	1.00	5.4E-04	1.2E-05	1.0E+00	1.2E-05
Arsenic, total	NCC	1.00	5.4E-04	NC	3.0E-04	NC
Barium, total	1.4E-03	1.00	5.4E-04	7.6E-07	7.0E-02	1.1E-05
Beryllium, total	**9.0E-05**	**1.00**	**5.4E-04**	**4.9E-08**	**2.0E-03**	**2.4E-05**
Cadmium, total	4.0E-05	1.00	5.4E-04	2.2E-08	5.0E-04	4.3E-05
Copper, total	1.3E-04	1.00	5.4E-04	7.0E-08	3.7E-02	1.9E-06
Iron, total	1.4E-01	1.00	5.4E-04	7.4E-05	NA	NC
Lead, total	2.6E-04	1.00	5.4E-04	1.4E-07	NA	NC
Manganese, total	5.8E-03	1.00	5.4E-04	3.1E-06	2.4E-02	1.3E-04
Mercury, total	5.0E-05	1.00	5.4E-04	2.7E-08	3.0E-04	9.0E-05
Nickel, total	2.0E-04	1.00	5.4E-04	1.1E-07	2.0E-02	5.4E-06
Thallium, total	NCC	1.00	5.4E-04	NC	2.0E-01	NC
Vanadium, total	NCC	1.00	5.4E-04	NC	7.0E-03	NC
Zinc, total	NCC	1.00	5.4E-04	NC	3.0E-01	NC
					SUBTOTAL:	**3.3E-04**
					SITE RELATED RISK:	**3.0E-04**
					BACKGROUND RISK:	**2.4E-05**

TABLE 8.44-17 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SURFACE WATER - ALMY RESERVOIR
FUTURE CONDITIONS

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	Oral x Absorption x Adjustment Factor	Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Cancer Slope Factor (mg/kg-day)-[1]	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	8.3E-05	NC	2.4E-02	NC
Benzene	NCC	1.00	8.3E-05	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	8.3E-05	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	8.3E-05	NC	NA	NC
Chloroform	NCC	1.00	8.3E-05	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	8.3E-05	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	8.3E-05	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	8.3E-05	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	1.00	8.3E-05	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	8.3E-05	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	8.3E-05	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	8.3E-05	NC	NA	NC
bis(2-Ethylhexyl)phthalate	1.7E-04	1.00	8.3E-05	1.4E-08	1.4E-02	2.0E-10
Phenanthrene	NCC	1.00	8.3E-05	NC	NA	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	8.3E-05	NC	1.7E+01	NC
Dieldrin	5.1E-07	1.00	8.3E-05	4.3E-11	1.6E+01	6.8E-10
Metals						
Aluminum, total	2.2E-02	1.00	8.3E-05	1.8E-06	NA	NC
Arsenic, total	NCC	1.00	8.3E-05	NC	1.5E+00	NC
Barium, total	1.4E-03	1.00	8.3E-05	1.2E-07	NA	NC
Beryllium, total	**9.0E-05**	**1.00**	**8.3E-05**	**7.5E-09**	**4.3E+00**	**3.2E-08**
Cadmium, total	4.0E-05	1.00	8.3E-05	3.3E-09	NA	NC
Copper, total	1.3E-04	1.00	8.3E-05	1.1E-08	NA	NC
Iron, total	1.4E-01	1.00	8.3E-05	1.1E-05	NA	NC
Lead, total	2.6E-04	1.00	8.3E-05	2.2E-08	NA	NC
Manganese, total	5.8E-03	1.00	8.3E-05	4.8E-07	NA	NC
Mercury, total	5.0E-05	1.00	8.3E-05	4.2E-09	NA	NC
Nickel, total	2.0E-04	1.00	8.3E-05	1.7E-08	NA	NC
Thallium, total	NCC	1.00	8.3E-05	NC	NA	NC
Vanadium, total	NCC	1.00	8.3E-05	NC	NA	NC
Zinc, total	NCC	1.00	8.3E-05	NC	NA	NC
					SUBTOTAL:	**3.3E-08**
					SITE RELATED RISK:	**8.8E-10**
					BACKGROUND RISK:	**3.2E-08**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-18

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - UPPER SIMMONS

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption x Adjustment Factor	Receptor-Specific Exposure = Factor (kg/kg-day)	Chronic Average Daily / Dose (mg/kg-day)	Oral Chronic Reference = Dose (mg/kg-day)	Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	4.3E-05	NC	NA	NC
Benzene	NCC	NA	4.3E-05	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	NA	4.3E-05	NC	7.0E-04	NC
Chlorobenzene	NCC	NA	4.3E-05	NC	2.0E-02	NC
Chloroform	NCC	NA	4.3E-05	NC	1.0E-02	NC
Tetrachloroethene	NCC	NA	4.3E-05	NC	1.0E-02	NC
Trichloroethene	NCC	NA	4.3E-05	NC	2.0E-03	NC
Vinyl Chloride	NCC	NA	4.3E-05	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	7.8E-01	0.13	4.3E-05	4.3E-06	3.0E-02	1.4E-04
Benzo(a)pyrene	5.7E-01	0.13	4.3E-05	3.2E-06	3.0E-02	1.1E-04
Benzo(b)fluoranthene	1.1E+00	0.13	4.3E-05	6.1E-06	3.0E-02	2.0E-04
Benzo(g,h,i)perylene	2.1E-01	0.10	4.3E-05	8.9E-07	3.0E-02	3.0E-05
bis(2-Ethylhexyl)phthalate	NCC	0.10	4.3E-05	NC	2.0E-02	NC
Phenanthrene	1.0E+00	0.10	4.3E-05	4.3E-06	3.0E-02	1.4E-04
Pesticides/PCBs						
Aldrin	NCC	NA	4.3E-05	NC	3.0E-05	NC
Dieldrin	NCC	0.25	4.3E-05	NC	5.0E-05	NC
Metals						
Aluminum, total	**1.4E+04**	**0.01**	**4.3E-05**	**6.0E-03**	**1.0E+00**	**6.0E-03**
Arsenic, total	**1.4E+01**	**0.03**	**4.3E-05**	**1.8E-05**	**3.0E-04**	**5.9E-02**
Barium, total	NCC	0.01	4.3E-05	NC	7.0E-02	NC
Beryllium, total	**1.9E+01**	**0.01**	**4.3E-05**	**8.2E-06**	**2.0E-03**	**4.1E-03**
Cadmium, total	**2.6E+00**	**0.001**	**4.3E-05**	**1.1E-07**	**1.0E-03**	**1.1E-04**
Copper, total	NCC	0.02	4.3E-05	NC	3.7E-02	NC
Iron, total	NCC	0.01	4.3E-05	NC	NA	NC
Lead, total	**5.3E+01**	**1.00**	**4.3E-05**	**2.2E-03**	**NA**	**NC**
Manganese, total	6.4E+02	0.01	4.3E-05	2.7E-04	7.0E-02	3.9E-03
Mercury, total	NCC	0.01	4.3E-05	NC	3.0E-04	NC
Nickel, total	NCC	0.01	4.3E-05	NC	2.0E-02	NC
Thallium, total	NCC	0.01	4.3E-05	NC	2.0E-01	NC
Vanadium, total	**2.9E+01**	**0.01**	**4.3E-05**	**1.2E-05**	**7.0E-03**	**1.8E-03**
Zinc, total	NCC	0.01	4.3E-05	NC	3.0E-01	NC
					SUBTOTAL:	**7.5E-02**
					SITE RELATED RISK:	**4.5E-03**
					BACKGROUND RISK:	**7.1E-02**

TABLE 8.44-18 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - UPPER SIMMONS

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	Dermal x Absorption x Adjustment Factor	Receptor-Specific Exposure = Factor (kg/kg-day)	Lifetime Average Daily x Dose (mg/kg-day)	Oral Cancer Slope = Factor $(mg/kg\text{-}day)^{-1}$	Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	1.1E-05	NC	2.4E-02	NC
Benzene	NCC	NA	1.1E-05	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	NA	1.1E-05	NC	1.3E-01	NC
Chlorobenzene	NCC	NA	1.1E-05	NC	NA	NC
Chloroform	NCC	NA	1.1E-05	NC	6.1E-03	NC
Tetrachloroethene	NCC	NA	1.1E-05	NC	5.2E-02	NC
Trichloroethene	NCC	NA	1.1E-05	NC	1.1E-02	NC
Vinyl Chloride	NCC	NA	1.1E-05	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	7.8E-01	0.13	1.1E-05	1.1E-06	7.3E-01	8.0E-07
Benzo(a)pyrene	5.7E-01	0.13	1.1E-05	8.0E-07	7.3E+00	5.9E-06
Benzo(b)fluoranthene	1.1E+00	0.13	1.1E-05	1.6E-06	7.3E-01	1.1E-06
Benzo(g,h,i)perylene	2.1E-01	NA	1.1E-05	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	0.10	1.1E-05	NC	1.4E-02	NC
Phenanthrene	1.0E+00	NA	1.1E-05	NC	NA	NC
Pesticides/PCBs						
Aldrin	NCC	NA	1.1E-05	NC	1.7E+01	NC
Dieldrin	NCC	0.25	1.1E-05	NC	1.6E+01	NC
Metals						
Aluminum, total	**1.4E+04**	**NA**	**1.1E-05**	**NC**	**NA**	**NC**
Arsenic, total	**1.4E+01**	**0.03**	**1.1E-05**	**4.5E-06**	**1.5E+00**	**6.7E-06**
Barium, total	NCC	NA	1.1E-05	NC	NA	NC
Beryllium, total	**1.9E+01**	**0.01**	**1.1E-05**	**2.1E-06**	**4.3E+00**	**9.0E-06**
Cadmium, total	**2.6E+00**	**1.00**	**1.1E-05**	**2.8E-05**	**NA**	**NC**
Copper, total	NCC	NA	1.1E-05	NC	NA	NC
Iron, total	NCC	NA	1.1E-05	NC	NA	NC
Lead, total	**5.3E+01**	**NA**	**1.1E-05**	**NC**	**NA**	**NC**
Manganese, total	6.4E+02	NA	1.1E-05	NC	NA	NC
Mercury, total	NCC	NA	1.1E-05	NC	NA	NC
Nickel, total	NCC	NA	1.1E-05	NC	NA	NC
Thallium, total	NCC	NA	1.1E-05	NC	NA	NC
Vanadium, total	**2.9E+01**	**NA**	**1.1E-05**	**NC**	**NA**	**NC**
Zinc, total	NCC	NA	1.1E-05	NC	NA	NC
					SUBTOTAL:	**2.4E-05**
					SITE RELATED RISK:	**7.8E-06**
					BACKGROUND RISK:	**1.6E-05**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-19

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - UPPER SIMMONS

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	1.9E-06	NC	NA	NC
Benzene	NCC	1.00	1.9E-06	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	1.9E-06	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	1.9E-06	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.9E-06	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	1.9E-06	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	1.9E-06	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	1.9E-06	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	7.8E-01	1.00	1.9E-06	1.4E-06	3.0E-02	4.8E-05
Benzo(a)pyrene	5.7E-01	1.00	1.9E-06	1.1E-06	3.0E-02	3.5E-05
Benzo(b)fluoranthene	1.1E+00	1.00	1.9E-06	2.0E-06	3.0E-02	6.8E-05
Benzo(g,h,i)perylene	2.1E-01	1.00	1.9E-06	3.9E-07	3.0E-02	1.3E-05
bis(2-Ethylhexyl)phthalate	NCC	1.00	1.9E-06	NC	2.0E-02	NC
Phenanthrene	1.0E+00	1.00	1.9E-06	1.9E-06	3.0E-02	6.2E-05
Pesticides/PCBs						
Aldrin	NCC	1.00	1.9E-06	NC	3.0E-05	NC
Dieldrin	NCC	1.00	1.9E-06	NC	5.0E-05	NC
Metals						
Aluminum, total	**1.4E+04**	**1.00**	**1.9E-06**	**2.6E-02**	**1.0E+00**	**2.6E-02**
Arsenic, total	**1.4E+01**	**0.48**	**1.9E-06**	**1.2E-05**	**3.0E-04**	**4.1E-02**
Barium, total	NCC	1.00	1.9E-06	NC	7.0E-02	NC
Beryllium, total	**1.9E+01**	**1.00**	**1.9E-06**	**3.6E-05**	**2.0E-03**	**1.8E-02**
Cadmium, total	**2.6E+00**	**1.00**	**1.9E-06**	**4.8E-06**	**1.0E-03**	**4.8E-03**
Copper, total	NCC	1.00	1.9E-06	NC	3.7E-02	NC
Iron, total	NCC	1.00	1.9E-06	NC	NA	NC
Lead, total	**5.3E+01**	**1.00**	**1.9E-06**	**9.7E-05**	NA	NC
Manganese, total	6.4E+02	1.00	1.9E-06	1.2E-03	7.0E-02	1.7E-02
Mercury, total	NCC	0.50	1.9E-06	NC	3.0E-04	NC
Nickel, total	NCC	1.00	1.9E-06	NC	2.0E-02	NC
Thallium, total	NCC	1.00	1.9E-06	NC	2.0E-01	NC
Vanadium, total	**2.9E+01**	**1.00**	**1.9E-06**	**5.4E-05**	**7.0E-03**	**7.8E-03**
Zinc, total	NCC	1.00	1.9E-06	NC	3.0E-01	NC
					SUBTOTAL:	**1.1E-01**
					SITE RELATED RISK:	**1.7E-02**
					BACKGROUND RISK:	**9.8E-02**

TABLE 8.44-19 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - UPPER SIMMONS

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)-1	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	1.9E-07	NC	2.4E-02	NC
Benzene	NCC	1.00	1.9E-07	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	1.9E-07	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	1.9E-07	NC	NA	NC
Chloroform	NCC	1.00	1.9E-07	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	1.9E-07	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	1.9E-07	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	1.9E-07	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	7.8E-01	1.00	1.9E-07	1.5E-07	7.3E-01	1.1E-07
Benzo(a)pyrene	5.7E-01	1.00	1.9E-07	1.1E-07	7.3E+00	8.1E-07
Benzo(b)fluoranthene	1.1E+00	1.00	1.9E-07	2.1E-07	7.3E-01	1.6E-07
Benzo(g,h,i)perylene	2.1E-01	1.00	1.9E-07	4.1E-08	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	1.9E-07	NC	1.4E-02	NC
Phenanthrene	1.0E+00	1.00	1.9E-07	1.9E-07	NA	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	1.9E-07	NC	1.7E+01	NC
Dieldrin	NCC	1.00	1.9E-07	NC	1.6E+01	NC
Metals						
Aluminum, total	1.4E+04	1.00	1.9E-07	2.8E-03	NA	NC
Arsenic, total	1.4E+01	0.48	1.9E-07	1.3E-06	1.5E+00	1.9E-06
Barium, total	NCC	1.00	1.9E-07	NC	NA	NC
Beryllium, total	1.9E+01	1.00	1.9E-07	3.8E-06	4.3E+00	1.6E-05
Cadmium, total	2.6E+00	1.00	1.9E-07	5.0E-07	NA	NC
Copper, total	NCC	1.00	1.9E-07	NC	NA	NC
Iron, total	NCC	1.00	1.9E-07	NC	NA	NC
Lead, total	5.3E+01	1.00	1.9E-07	1.0E-05	NA	NC
Manganese, total	6.4E+02	1.00	1.9E-07	1.3E-04	NA	NC
Mercury, total	NCC	1.00	1.9E-07	NC	NA	NC
Nickel, total	NCC	1.00	1.9E-07	NC	NA	NC
Thallium, total	NCC	1.00	1.9E-07	NC	NA	NC
Vanadium, total	2.9E+01	1.00	1.9E-07	5.7E-06	NA	NC
Zinc, total	NCC	1.00	1.9E-07	NC	NA	NC
					SUBTOTAL:	1.9E-05
					SITE RELATED RISK:	1.1E-06
					BACKGROUND RISK:	1.8E-05

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-20

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - UPPER SIMMONS
CURRENT CONDITIONS

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	x Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	7.8E-02	NC	NA	NC
Benzene	NCC	1.00	1.1E-01	7.8E-02	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	7.8E-02	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	4.1E-02	7.8E-02	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.3E-01	7.8E-02	NC	1.0E-02	NC
Tetrachloroethene	5.5E-04	1.00	3.7E-01	7.8E-02	1.6E-05	1.0E-02	1.6E-03
Trichloroethene	NCC	1.00	2.3E-01	7.8E-02	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	7.3E-03	7.8E-02	NC	3.0E-03	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	7.8E-02	NC	3.0E-02	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	7.8E-02	NC	3.0E-02	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	7.8E-02	NC	3.0E-02	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	7.8E-02	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	3.3E-02	7.8E-02	NC	2.0E-02	NC
Phenanthrene	NCC	1.00	2.3E-01	7.8E-02	NC	3.0E-02	NC
Pesticides/PCBs							
Aldrin	NCC	1.00	1.6E-03	7.8E-02	NC	3.0E-05	NC
Dieldrin	NCC	1.00	1.6E-02	7.8E-02	NC	5.0E-05	NC
Metals							
Aluminum, total	NCC	1.00	1.0E-03	7.8E-02	NC	1.0E+00	NC
Arsenic, total	1.3E-03	1.00	1.0E-03	7.8E-02	1.0E-07	3.0E-04	3.5E-04
Barium, total	NCC	1.00	1.0E-03	7.8E-02	NC	7.0E-02	NC
Beryllium, total	9.1E-04	1.00	1.0E-03	7.8E-02	7.1E-08	2.0E-03	3.6E-05
Cadmium, total	NCC	1.00	1.0E-03	7.8E-02	NC	1.0E-03	NC
Copper, total	NCC	1.00	1.0E-03	7.8E-02	NC	3.7E-02	NC
Iron, total	NCC	1.00	1.0E-03	7.8E-02	NC	NA	NC
Lead, total	NCC	1.00	1.0E-03	7.8E-02	NC	NA	NC
Manganese, total	6.3E+00	1.00	1.0E-03	7.8E-02	4.9E-04	7.0E-02	7.0E-03
Mercury, total	NCC	1.00	1.0E-03	7.8E-02	NC	3.0E-04	NC
Nickel, total	NCC	1.00	1.0E-03	7.8E-02	NC	2.0E-02	NC
Thallium, total	1.1E-02	1.00	1.0E-03	7.8E-02	8.4E-07	2.0E-01	4.2E-06
Vanadium, total	NCC	1.00	1.0E-03	7.8E-02	NC	7.0E-03	NC
Zinc, total	NCC	1.00	1.0E-03	7.8E-02	NC	3.0E-01	NC
						SUBTOTAL:	**9.0E-03**
						SITE RELATED RISK:	**9.0E-03**
						BACKGROUND RISK:	**3.6E-05**

TABLE 8.44-20 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - UPPER SIMMONS
CURRENT CONDITIONS

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	= Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)-1	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	2.4E-02	NC	2.4E-02	NC
Benzene	NCC	1.00	1.1E-01	2.4E-02	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	2.4E-02	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	4.1E-02	2.4E-02	NC	NA	NC
Chloroform	NCC	1.00	1.3E-01	2.4E-02	NC	6.1E-03	NC
Tetrachloroethene	5.5E-04	1.00	3.7E-01	2.4E-02	4.9E-06	5.2E-02	2.5E-07
Trichloroethene	NCC	1.00	2.3E-01	2.4E-02	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	7.3E-03	2.4E-02	NC	1.4E+00	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	2.4E-02	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	2.4E-02	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	2.4E-02	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	2.4E-02	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	3.3E-02	2.4E-02	NC	1.4E-02	NC
Phenanthrene	NCC	1.00	2.3E-01	2.4E-02	NC	NA	NC
Pesticides/PCBs							
Aldrin	NCC	1.00	1.6E-03	2.4E-02	NC	1.7E+01	NC
Dieldrin	NCC	1.00	1.6E-02	2.4E-02	NC	1.6E+01	NC
Metals							
Aluminum, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Arsenic, total	1.3E-03	1.00	1.0E-03	2.4E-02	3.2E-08	1.5E+00	4.8E-08
Barium, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Beryllium, total	**9.1E-04**	**1.00**	**1.0E-03**	**2.4E-02**	**2.2E-08**	**4.3E+00**	**9.4E-08**
Cadmium, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Copper, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Iron, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Lead, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Manganese, total	6.3E+00	1.00	1.0E-03	2.4E-02	1.5E-04	NA	NC
Mercury, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Nickel, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Thallium, total	1.1E-02	1.00	1.0E-03	2.4E-02	2.6E-07	NA	NC
Vanadium, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Zinc, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
						SUBTOTAL:	**4.0E-07**
						SITE RELATED RISK:	**3.0E-07**
						BACKGROUND RISK:	**9.4E-08**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-21

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SURFACE WATER - UPPER SIMMONS
CURRENT CONDITIONS

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	Oral x Absorption x Adjustment Factor	Receptor-Specific Exposure Factor (l/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	5.4E-04	NC	NA	NC
Benzene	NCC	1.00	5.4E-04	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	5.4E-04	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	5.4E-04	NC	2.0E-02	NC
Chloroform	NCC	1.00	5.4E-04	NC	1.0E-02	NC
Tetrachloroethene	5.5E-04	1.00	5.4E-04	3.0E-07	1.0E-02	3.0E-05
Trichloroethene	NCC	1.00	5.4E-04	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	5.4E-04	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(a)pyrene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(b)fluoranthene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(g,h,i)perylene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	5.4E-04	NC	2.0E-02	NC
Phenanthrene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	5.4E-04	NC	3.0E-05	NC
Dieldrin	NCC	1.00	5.4E-04	NC	5.0E-05	NC
Metals						
Aluminum, total	NCC	1.00	5.4E-04	NC	1.0E+00	NC
Arsenic, total	1.3E-03	1.00	5.4E-04	7.2E-07	3.0E-04	2.4E-03
Barium, total	NCC	1.00	5.4E-04	NC	7.0E-02	NC
Beryllium, total	9.1E-04	1.00	5.4E-04	4.9E-07	2.0E-03	2.5E-04
Cadmium, total	NCC	1.00	5.4E-04	NC	5.0E-04	NC
Copper, total	NCC	1.00	5.4E-04	NC	3.7E-02	NC
Iron, total	NCC	1.00	5.4E-04	NC	NA	NC
Lead, total	NCC	1.00	5.4E-04	NC	NA	NC
Manganese, total	6.3E+00	1.00	5.4E-04	3.4E-03	2.4E-02	1.4E-01
Mercury, total	NCC	1.00	5.4E-04	NC	3.0E-04	NC
Nickel, total	NCC	1.00	5.4E-04	NC	2.0E-02	NC
Thallium, total	1.1E-02	1.00	5.4E-04	5.8E-06	2.0E-01	2.9E-05
Vanadium, total	NCC	1.00	5.4E-04	NC	7.0E-03	NC
Zinc, total	NCC	1.00	5.4E-04	NC	3.0E-01	NC
					SUBTOTAL:	**1.4E-01**
					SITE RELATED RISK:	**1.4E-01**
					BACKGROUND RISK:	**2.5E-04**

TABLE 8.44-21 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SURFACE WATER - UPPER SIMMONS
CURRENT CONDITIONS

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	Oral x Absorption x Adjustment Factor	Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Cancer Slope Factor (mg/kg-day)$^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	8.3E-05	NC	2.4E-02	NC
Benzene	NCC	1.00	8.3E-05	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	8.3E-05	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	8.3E-05	NC	NA	NC
Chloroform	NCC	1.00	8.3E-05	NC	6.1E-03	NC
Tetrachloroethene	5.5E-04	1.00	8.3E-05	4.6E-08	5.2E-02	2.4E-09
Trichloroethene	NCC	1.00	8.3E-05	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	8.3E-05	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	1.00	8.3E-05	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	8.3E-05	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	8.3E-05	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	8.3E-05	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	8.3E-05	NC	1.4E-02	NC
Phenanthrene	NCC	1.00	8.3E-05	NC	NA	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	8.3E-05	NC	1.7E+01	NC
Dieldrin	NCC	1.00	8.3E-05	NC	1.6E+01	NC
Metals						
Aluminum, total	NCC	1.00	8.3E-05	NC	NA	NC
Arsenic, total	1.3E-03	1.00	8.3E-05	1.1E-07	1.5E+00	1.7E-07
Barium, total	NCC	1.00	8.3E-05	NC	NA	NC
Beryllium, total	**9.1E-04**	**1.00**	**8.3E-05**	**7.6E-08**	**4.3E+00**	**3.3E-07**
Cadmium, total	NCC	1.00	8.3E-05	NC	NA	NC
Copper, total	NCC	1.00	8.3E-05	NC	NA	NC
Iron, total	NCC	1.00	8.3E-05	NC	NA	NC
Lead, total	NCC	1.00	8.3E-05	NC	NA	NC
Manganese, total	6.3E+00	1.00	8.3E-05	5.2E-04	NA	NC
Mercury, total	NCC	1.00	8.3E-05	NC	NA	NC
Nickel, total	NCC	1.00	8.3E-05	NC	NA	NC
Thallium, total	1.1E-02	1.00	8.3E-05	9.0E-07	NA	NC
Vanadium, total	NCC	1.00	8.3E-05	NC	NA	NC
Zinc, total	NCC	1.00	8.3E-05	NC	NA	NC
					SUBTOTAL:	**5.0E-07**
					SITE RELATED RISK:	**1.7E-07**
					BACKGROUND RISK:	**3.3E-07**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-22

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - UPPER SIMMONS
FUTURE CONDITIONS

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	x Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	7.8E-02	NC	NA	NC
Benzene	NCC	1.00	1.1E-01	7.8E-02	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	7.8E-02	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	4.1E-02	7.8E-02	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.3E-01	7.8E-02	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	3.7E-01	7.8E-02	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	7.8E-02	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	7.3E-03	7.8E-02	NC	3.0E-03	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	7.8E-02	NC	3.0E-02	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	7.8E-02	NC	3.0E-02	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	7.8E-02	NC	3.0E-02	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	7.8E-02	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	1.4E-03	1.00	3.3E-02	7.8E-02	3.5E-06	2.0E-02	1.8E-04
Phenanthrene	NCC	1.00	2.3E-01	7.8E-02	NC	3.0E-02	NC
Pesticides/PCBs							
Aldrin	9.4E-07	1.00	1.6E-03	7.8E-02	1.2E-10	3.0E-05	3.9E-06
Dieldrin	1.9E-06	1.00	1.6E-02	7.8E-02	2.4E-09	5.0E-05	4.7E-05
Metals							
Aluminum, total	4.9E-02	1.00	1.0E-03	7.8E-02	3.8E-06	1.0E+00	3.8E-06
Arsenic, total	2.9E-04	1.00	1.0E-03	7.8E-02	2.3E-08	3.0E-04	7.7E-05
Barium, total	1.8E-02	1.00	1.0E-03	7.8E-02	1.4E-06	7.0E-02	2.0E-05
Beryllium, total	**1.2E-04**	**1.00**	**1.0E-03**	**7.8E-02**	**9.2E-09**	**2.0E-03**	**4.6E-06**
Cadmium, total	1.2E-04	1.00	1.0E-03	7.8E-02	9.2E-09	1.0E-03	9.2E-06
Copper, total	NCC	1.00	1.0E-03	7.8E-02	NC	3.7E-02	NC
Iron, total	5.5E-01	1.00	1.0E-03	7.8E-02	4.3E-05	NA	NC
Lead, total	8.2E-04	1.00	1.0E-03	7.8E-02	6.4E-08	NA	NC
Manganese, total	1.2E-01	1.00	1.0E-03	7.8E-02	9.1E-06	7.0E-02	1.3E-04
Mercury, total	1.2E-05	1.00	1.0E-03	7.8E-02	9.2E-10	3.0E-04	3.1E-06
Nickel, total	3.3E-03	1.00	1.0E-03	7.8E-02	2.6E-07	2.0E-02	1.3E-05
Thallium, total	5.7E-03	1.00	1.0E-03	7.8E-02	4.5E-07	2.0E-01	2.2E-06
Vanadium, total	1.5E-03	1.00	1.0E-03	7.8E-02	1.1E-07	7.0E-03	1.6E-05
Zinc, total	NCC	1.00	1.0E-03	7.8E-02	NC	3.0E-01	NC
						SUBTOTAL:	**5.1E-04**
						SITE RELATED RISK:	**5.0E-04**
						BACKGROUND RISK:	**4.6E-06**

TABLE 8.44-22 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - UPPER SIMMONS
FUTURE CONDITIONS

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	x Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	2.4E-02	NC	2.4E-02	NC
Benzene	NCC	1.00	1.1E-01	2.4E-02	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	2.4E-02	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	4.1E-02	2.4E-02	NC	NA	NC
Chloroform	NCC	1.00	1.3E-01	2.4E-02	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	3.7E-01	2.4E-02	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	2.4E-02	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	7.3E-03	2.4E-02	NC	1.4E+00	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	2.4E-02	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	2.4E-02	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	2.4E-02	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	2.4E-02	NC	NA	NC
bis(2-Ethylhexyl)phthalate	1.4E-03	1.00	3.3E-02	2.4E-02	1.1E-06	1.4E-02	1.5E-08
Phenanthrene	NCC	1.00	2.3E-01	2.4E-02	NC	NA	NC
Pesticides/PCBs							
Aldrin	9.4E-07	1.00	1.6E-03	2.4E-02	3.6E-11	1.7E+01	6.2E-10
Dieldrin	1.9E-06	1.00	1.6E-02	2.4E-02	7.2E-10	1.6E+01	1.2E-08
Metals							
Aluminum, total	4.9E-02	1.00	1.0E-03	2.4E-02	1.2E-06	NA	NC
Arsenic, total	2.9E-04	1.00	1.0E-03	2.4E-02	7.1E-09	1.5E+00	1.1E-08
Barium, total	1.8E-02	1.00	1.0E-03	2.4E-02	4.3E-07	NA	NC
Beryllium, total	**1.2E-04**	**1.00**	**1.0E-03**	**2.4E-02**	**2.8E-09**	**4.3E+00**	**1.2E-08**
Cadmium, total	1.2E-04	1.00	1.0E-03	2.4E-02	2.8E-09	NA	NC
Copper, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
Iron, total	5.5E-01	1.00	1.0E-03	2.4E-02	1.3E-05	NA	NC
Lead, total	8.2E-04	1.00	1.0E-03	2.4E-02	2.0E-08	NA	NC
Manganese, total	1.2E-01	1.00	1.0E-03	2.4E-02	2.8E-06	NA	NC
Mercury, total	1.2E-05	1.00	1.0E-03	2.4E-02	2.8E-10	NA	NC
Nickel, total	3.3E-03	1.00	1.0E-03	2.4E-02	7.9E-08	NA	NC
Thallium, total	5.7E-03	1.00	1.0E-03	2.4E-02	1.4E-07	NA	NC
Vanadium, total	1.5E-03	1.00	1.0E-03	2.4E-02	3.5E-08	NA	NC
Zinc, total	NCC	1.00	1.0E-03	2.4E-02	NC	NA	NC
						SUBTOTAL:	**5.0E-08**
						SITE RELATED RISK:	**3.7E-08**
						BACKGROUND RISK:	**1.2E-08**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-23

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SURFACE WATER - UPPER SIMMONS
FUTURE CONDITIONS

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	Oral x Absorption x Adjustment Factor	Receptor-Specific Exposure Factor (l/kg-day)	= Chronic Average Daily / Dose (mg/kg-day)	Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	5.4E-04	NC	NA	NC
Benzene	NCC	1.00	5.4E-04	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	5.4E-04	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	5.4E-04	NC	2.0E-02	NC
Chloroform	NCC	1.00	5.4E-04	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	5.4E-04	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	5.4E-04	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	5.4E-04	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(a)pyrene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(b)fluoranthene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Benzo(g,h,i)perylene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	1.4E-03	1.00	5.4E-04	7.3E-07	2.0E-02	3.7E-05
Phenanthrene	NCC	1.00	5.4E-04	NC	3.0E-02	NC
Pesticides/PCBs						
Aldrin	9.4E-07	1.00	5.4E-04	5.1E-10	3.0E-05	1.7E-05
Dieldrin	1.9E-06	1.00	5.4E-04	1.0E-09	5.0E-05	2.0E-05
Metals						
Aluminum, total	4.9E-02	1.00	5.4E-04	2.6E-05	1.0E+00	2.6E-05
Arsenic, total	2.9E-04	1.00	5.4E-04	1.6E-07	3.0E-04	5.3E-04
Barium, total	1.8E-02	1.00	5.4E-04	9.6E-06	7.0E-02	1.4E-04
Beryllium, total	**1.2E-04**	**1.00**	**5.4E-04**	**6.4E-08**	**2.0E-03**	**3.2E-05**
Cadmium, total	1.2E-04	1.00	5.4E-04	6.4E-08	5.0E-04	1.3E-04
Copper, total	NCC	1.00	5.4E-04	NC	3.7E-02	NC
Iron, total	5.5E-01	1.00	5.4E-04	3.0E-04	NA	NC
Lead, total	8.2E-04	1.00	5.4E-04	4.4E-07	NA	NC
Manganese, total	1.2E-01	1.00	5.4E-04	6.3E-05	2.4E-02	2.6E-03
Mercury, total	1.2E-05	1.00	5.4E-04	6.4E-09	3.0E-04	2.1E-05
Nickel, total	3.3E-03	1.00	5.4E-04	1.8E-06	2.0E-02	8.9E-05
Thallium, total	5.7E-03	1.00	5.4E-04	3.1E-06	2.0E-01	1.5E-05
Vanadium, total	1.5E-03	1.00	5.4E-04	7.9E-07	7.0E-03	1.1E-04
Zinc, total	NCC	1.00	5.4E-04	NC	3.0E-01	NC
					SUBTOTAL:	**3.8E-03**
					SITE RELATED RISK:	**3.7E-03**
					BACKGROUND RISK:	**3.2E-05**

TABLE 8.44-23 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SURFACE WATER - UPPER SIMMONS
FUTURE CONDITIONS

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Oral Absorption x Adjustment Factor	= Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	Lifetime Average Daily Dose (mg/kg-day)	x Cancer Slope Factor (mg/kg-day)-[1]	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	8.3E-05	NC	2.4E-02	NC
Benzene	NCC	1.00	8.3E-05	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	8.3E-05	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	8.3E-05	NC	NA	NC
Chloroform	NCC	1.00	8.3E-05	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	8.3E-05	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	8.3E-05	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	8.3E-05	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	NCC	1.00	8.3E-05	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	8.3E-05	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	8.3E-05	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	8.3E-05	NC	NA	NC
bis(2-Ethylhexyl)phthalate	1.4E-03	1.00	8.3E-05	1.1E-07	1.4E-02	1.6E-09
Phenanthrene	NCC	1.00	8.3E-05	NC	NA	NC
Pesticides/PCBs						
Aldrin	9.4E-07	1.00	8.3E-05	7.8E-11	1.7E+01	1.3E-09
Dieldrin	1.9E-06	1.00	8.3E-05	1.6E-10	1.6E+01	2.5E-09
Metals						
Aluminum, total	4.9E-02	1.00	8.3E-05	4.0E-06	NA	NC
Arsenic, total	2.9E-04	1.00	8.3E-05	2.5E-08	1.5E+00	3.7E-08
Barium, total	1.8E-02	1.00	8.3E-05	1.5E-06	NA	NC
Beryllium, total	**1.2E-04**	**1.00**	**8.3E-05**	**9.8E-09**	**4.3E+00**	**4.2E-08**
Cadmium, total	1.2E-04	1.00	8.3E-05	9.8E-09	NA	NC
Copper, total	NCC	1.00	8.3E-05	NC	NA	NC
Iron, total	5.5E-01	1.00	8.3E-05	4.6E-05	NA	NC
Lead, total	8.2E-04	1.00	8.3E-05	6.9E-08	NA	NC
Manganese, total	1.2E-01	1.00	8.3E-05	9.7E-06	NA	NC
Mercury, total	1.2E-05	1.00	8.3E-05	9.8E-10	NA	NC
Nickel, total	3.3E-03	1.00	8.3E-05	2.7E-07	NA	NC
Thallium, total	5.7E-03	1.00	8.3E-05	4.8E-07	NA	NC
Vanadium, total	1.5E-03	1.00	8.3E-05	1.2E-07	NA	NC
Zinc, total	NCC	1.00	8.3E-05	NC	NA	NC
					SUBTOTAL:	**8.4E-08**
					SITE RELATED RISK:	**4.1E-08**
					BACKGROUND RISK:	**4.2E-08**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-24

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Adult Facilty Worker
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	1.6E-08	NC	NA	NC
Benzene	NCC	NA	1.6E-08	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	NA	1.6E-08	NC	7.0E-04	NC
Chlorobenzene	NCC	NA	1.6E-08	NC	2.0E-02	NC
Chloroform	NCC	NA	1.6E-08	NC	1.0E-02	NC
Tetrachloroethene	NCC	NA	1.6E-08	NC	1.0E-02	NC
Trichloroethene	NCC	NA	1.6E-08	NC	2.0E-03	NC
Vinyl Chloride	NCC	NA	1.6E-08	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	2.5E-01	0.13	1.6E-08	5.2E-10	3.0E-02	1.7E-08
Benzo(a)pyrene	2.2E-01	0.13	1.6E-08	4.7E-10	3.0E-02	1.6E-08
Benzo(b)fluoranthene	3.1E-01	0.13	1.6E-08	6.6E-10	3.0E-02	2.2E-08
Benzo(g,h,i)perylene	7.9E-02	0.10	1.6E-08	1.3E-10	3.0E-02	4.3E-09
bis(2-Ethylhexyl)phthalate	NCC	0.10	1.6E-08	NC	2.0E-02	NC
Phenanthrene	2.8E-01	0.10	1.6E-08	4.6E-10	3.0E-02	1.5E-08
Pesticides/PCBs						
Aldrin	NCC	NA	1.6E-08	NC	3.0E-05	NC
Dieldrin	NCC	0.25	1.6E-08	NC	5.0E-05	NC
Metals						
Aluminum, total	1.2E+04	0.01	1.6E-08	2.0E-06	1.0E+00	2.0E-06
Arsenic, total	7.7E+00	0.03	1.6E-08	3.7E-09	3.0E-04	1.2E-05
Barium, total	NCC	0.01	1.6E-08	NC	7.0E-02	NC
Beryllium, total	2.4E+00	0.01	1.6E-08	3.9E-10	2.0E-03	2.0E-07
Cadmium, total	1.4E-01	0.001	1.6E-08	2.3E-12	1.0E-03	2.3E-09
Copper, total	NCC	0.02	1.6E-08	NC	3.7E-02	NC
Iron, total	NCC	0.01	1.6E-08	NC	NA	NC
Lead, total	3.7E+01	1.000	1.6E-08	6.0E-07	NA	NC
Manganese, total	7.6E+02	0.01	1.6E-08	1.2E-07	7.0E-02	1.8E-06
Mercury, total	NCC	0.01	1.6E-08	NC	3.0E-04	NC
Nickel, total	NCC	0.01	1.6E-08	NC	2.0E-02	NC
Thallium, total	NCC	0.01	1.6E-08	NC	2.0E-01	NC
Vanadium, total	4.2E+01	0.01	1.6E-08	6.8E-09	7.0E-03	9.8E-07
Zinc, total	NCC	0.01	1.6E-08	NC	3.0E-01	NC
					SUBTOTAL:	1.7E-05
					SITE RELATED RISK:	1.8E-06
					BACKGROUND RISK:	1.6E-05

TABLE 8.44-24 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Adult Facilty Worker
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x	Dermal Absorption Adjustment Factor	x	Receptor-Specific Exposure Factor (kg/kg-day)	=	Lifetime Average Daily Dose (mg/kg-day)	x	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	=	Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds											
1,4-Dichlorobenzene	NCC		NA		5.8E-09		NC		2.4E-02		NC
Benzene	NCC		NA		5.8E-09		NC		2.9E-02		NC
Carbon Tetrachloride	NCC		NA		5.8E-09		NC		1.3E-01		NC
Chlorobenzene	NCC		NA		5.8E-09		NC		NA		NC
Chloroform	NCC		NA		5.8E-09		NC		6.1E-03		NC
Tetrachloroethene	NCC		NA		5.8E-09		NC		5.2E-02		NC
Trichloroethene	NCC		NA		5.8E-09		NC		1.1E-02		NC
Vinyl Chloride	NCC		NA		5.8E-09		NC		1.4E+00		NC
Semivolatile Organic Compounds											
Benzo(a)anthracene	2.5E-01		0.13		5.8E-09		1.8E-10		7.3E-01		1.3E-10
Benzo(a)pyrene	2.2E-01		0.13		5.8E-09		1.7E-10		7.3E+00		1.2E-09
Benzo(b)fluoranthene	3.1E-01		0.13		5.8E-09		2.4E-10		7.3E-01		1.7E-10
Benzo(g,h,i)perylene	7.9E-02		NA		5.8E-09		NC		NA		NC
bis(2-Ethylhexyl)phthalate	NCC		0.10		5.8E-09		NC		1.4E-02		NC
Phenanthrene	2.8E-01		NA		5.8E-09		NC		NA		NC
Pesticides/PCBs											
Aldrin	NCC		NA		5.8E-09		NC		1.7E+01		NC
Dieldrin	NCC		0.25		5.8E-09		NC		1.6E+01		NC
Metals											
Aluminum, total	1.2E+04		NA		5.8E-09		NC		NA		NC
Arsenic, total	7.7E+00		0.03		5.8E-09		1.3E-09		1.5E+00		2.0E-09
Barium, total	NCC		NA		5.8E-09		NC		NA		NC
Beryllium, total	2.4E+00		0.01		5.8E-09		1.4E-10		4.3E+00		6.0E-10
Cadmium, total	1.4E-01		1.00		5.8E-09		8.1E-10		NA		NC
Copper, total	NCC		NA		5.8E-09		NC		NA		NC
Iron, total	NCC		NA		5.8E-09		NC		NA		NC
Lead, total	3.7E+01		NA		5.8E-09		NC		NA		NC
Manganese, total	7.6E+02		NA		5.8E-09		NC		NA		NC
Mercury, total	NCC		NA		5.8E-09		NC		NA		NC
Nickel, total	NCC		NA		5.8E-09		NC		NA		NC
Thallium, total	NCC		NA		5.8E-09		NC		NA		NC
Vanadium, total	4.2E+01		NA		5.8E-09		NC		NA		NC
Zinc, total	NCC		NA		5.8E-09		NC		NA		NC
									SUBTOTAL:		4.1E-09
									SITE RELATED RISK:		1.5E-09
									BACKGROUND RISK:		2.6E-09

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-25

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Adult Facilty Worker
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	1.1E-08	NC	NA	NC
Benzene	NCC	1.00	1.1E-08	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	1.1E-08	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	1.1E-08	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.1E-08	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	1.1E-08	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	1.1E-08	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	1.1E-08	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	2.5E-01	1.00	1.1E-08	2.8E-09	3.0E-02	9.3E-08
Benzo(a)pyrene	2.2E-01	1.00	1.1E-08	2.5E-09	3.0E-02	8.4E-08
Benzo(b)fluoranthene	3.1E-01	1.00	1.1E-08	3.6E-09	3.0E-02	1.2E-07
Benzo(g,h,i)perylene	7.9E-02	1.00	1.1E-08	9.0E-10	3.0E-02	3.0E-08
bis(2-Ethylhexyl)phthalate	NCC	1.00	1.1E-08	NC	2.0E-02	NC
Phenanthrene	2.8E-01	1.00	1.1E-08	3.2E-09	3.0E-02	1.1E-07
Pesticides/PCBs						
Aldrin	NCC	1.00	1.1E-08	NC	3.0E-05	NC
Dieldrin	NCC	1.00	1.1E-08	NC	5.0E-05	NC
Metals						
Aluminum, total	1.2E+04	1.00	1.1E-08	1.4E-04	1.0E+00	1.4E-04
Arsenic, total	7.7E+00	0.48	1.1E-08	4.2E-08	3.0E-04	1.4E-04
Barium, total	NCC	1.00	1.1E-08	NC	7.0E-02	NC
Beryllium, total	2.4E+00	1.00	1.1E-08	2.7E-08	2.0E-03	1.4E-05
Cadmium, total	1.4E-01	1.00	1.1E-08	1.6E-09	1.0E-03	1.6E-06
Copper, total	NCC	1.00	1.1E-08	NC	3.7E-02	NC
Iron, total	NCC	1.00	1.1E-08	NC	NA	NC
Lead, total	3.7E+01	1.00	1.1E-08	4.2E-07	NA	NC
Manganese, total	7.6E+02	1.00	1.1E-08	8.7E-06	7.0E-02	1.2E-04
Mercury, total	NCC	0.50	1.1E-08	NC	3.0E-04	NC
Nickel, total	NCC	1.00	1.1E-08	NC	2.0E-02	NC
Thallium, total	NCC	1.00	1.1E-08	NC	2.0E-01	NC
Vanadium, total	4.2E+01	1.00	1.1E-08	4.8E-07	7.0E-03	6.8E-05
Zinc, total	NCC	1.00	1.1E-08	NC	3.0E-01	NC

SUBTOTAL:	4.9E-04
SITE RELATED RISK:	1.2E-04
BACKGROUND RISK:	3.6E-04

TABLE 8.44-25 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Adult Facilty Worker
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	1.00	4.1E-09	NC	2.4E-02	NC
Benzene	NCC	1.00	4.1E-09	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	4.1E-09	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	4.1E-09	NC	NA	NC
Chloroform	NCC	1.00	4.1E-09	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	4.1E-09	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	4.1E-09	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	4.1E-09	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	2.5E-01	1.00	4.1E-09	1.0E-09	7.3E-01	7.3E-10
Benzo(a)pyrene	2.2E-01	1.00	4.1E-09	9.0E-10	7.3E+00	6.6E-09
Benzo(b)fluoranthene	3.1E-01	1.00	4.1E-09	1.3E-09	7.3E-01	9.3E-10
Benzo(g,h,i)perylene	7.9E-02	1.00	4.1E-09	3.2E-10	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	4.1E-09	NC	1.4E-02	NC
Phenanthrene	2.8E-01	1.00	4.1E-09	1.1E-09	NA	NC
Pesticides/PCBs						
Aldrin	NCC	1.00	4.1E-09	NC	1.7E+01	NC
Dieldrin	NCC	1.00	4.1E-09	NC	1.6E+01	NC
Metals						
Aluminum, total	1.2E+04	1.00	4.1E-09	5.0E-05	NA	NC
Arsenic, total	7.7E+00	0.48	4.1E-09	1.5E-08	1.5E+00	2.2E-08
Barium, total	NCC	1.00	4.1E-09	NC	NA	NC
Beryllium, total	2.4E+00	1.00	4.1E-09	9.8E-09	4.3E+00	4.2E-08
Cadmium, total	1.4E-01	1.00	4.1E-09	5.7E-10	NA	NC
Copper, total	NCC	1.00	4.1E-09	NC	NA	NC
Iron, total	NCC	1.00	4.1E-09	NC	NA	NC
Lead, total	3.7E+01	1.00	4.1E-09	1.5E-07	NA	NC
Manganese, total	7.6E+02	1.00	4.1E-09	3.1E-06	NA	NC
Mercury, total	NCC	1.00	4.1E-09	NC	NA	NC
Nickel, total	NCC	1.00	4.1E-09	NC	NA	NC
Thallium, total	NCC	1.00	4.1E-09	NC	NA	NC
Vanadium, total	4.2E+01	1.00	4.1E-09	1.7E-07	NA	NC
Zinc, total	NCC	1.00	4.1E-09	NC	NA	NC
					SUBTOTAL:	7.3E-08
					SITE RELATED RISK:	8.2E-09
					BACKGROUND RISK:	6.4E-08

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-26

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Adult Facilty Worker
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x	Dermal Absorption Adjustment Factor	x	Permeability Coefficient (cm/hr)	x	Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	=	Chronic Average Daily Dose (mg/kg-day)	/	Oral Chronic Reference Dose (mg/kg-day)	=	Hazard Index
Volatile Organic Compounds													
1,4-Dichlorobenzene	NCC		1.00		6.2E-02		2.3E-03		NC		NA		NC
Benzene	NCC		1.00		1.1E-01		2.3E-03		NC		1.0E-03		NC
Carbon Tetrachloride	NCC		1.00		2.2E-02		2.3E-03		NC		7.0E-04		NC
Chlorobenzene	NCC		1.00		4.1E-02		2.3E-03		NC		2.0E-02		NC
Chloroform	NCC		1.00		1.3E-01		2.3E-03		NC		1.0E-02		NC
Tetrachloroethene	NCC		1.00		3.7E-01		2.3E-03		NC		1.0E-02		NC
Trichloroethene	NCC		1.00		2.3E-01		2.3E-03		NC		2.0E-03		NC
Vinyl Chloride	NCC		1.00		7.3E-03		2.3E-03		NC		3.0E-03		NC
Semivolatile Organic Compounds													
Benzo(a)anthracene	NCC		1.00		8.1E-01		2.3E-03		NC		3.0E-02		NC
Benzo(a)pyrene	NCC		1.00		1.2E+00		2.3E-03		NC		3.0E-02		NC
Benzo(b)fluoranthene	NCC		1.00		1.2E+00		2.3E-03		NC		3.0E-02		NC
Benzo(g,h,i)perylene	NCC		1.00		1.7E+00		2.3E-03		NC		3.0E-02		NC
bis(2-Ethylhexyl)phthalate	NCC		1.00		3.3E-02		2.3E-03		NC		2.0E-02		NC
Phenanthrene	NCC		1.00		2.3E-01		2.3E-03		NC		3.0E-02		NC
Pesticides/PCBs													
Aldrin	NCC		1.00		1.6E-03		2.3E-03		NC		3.0E-05		NC
Dieldrin	NCC		1.00		1.6E-02		2.3E-03		NC		5.0E-05		NC
Metals													
Aluminum, total	NCC		1.00		1.0E-03		2.3E-03		NC		1.0E+00		NC
Arsenic, total	2.2E-03		1.00		1.0E-03		2.3E-03		4.9E-09		3.0E-04		1.6E-05
Barium, total	NCC		1.00		1.0E-03		2.3E-03		NC		7.0E-02		NC
Beryllium, total	**2.5E-03**		**1.00**		**1.0E-03**		**2.3E-03**		**5.8E-09**		**2.0E-03**		**2.9E-06**
Cadmium, total	NCC		1.00		1.0E-03		2.3E-03		NC		1.0E-03		NC
Copper, total	NCC		1.00		1.0E-03		2.3E-03		NC		3.7E-02		NC
Iron, total	NCC		1.00		1.0E-03		2.3E-03		NC		NA		NC
Lead, total	6.0E-03		1.00		1.0E-03		2.3E-03		1.4E-08		NA		NC
Manganese, total	3.0E+01		1.00		1.0E-03		2.3E-03		6.7E-05		7.0E-02		9.5E-04
Mercury, total	9.8E-04		1.00		1.0E-03		2.3E-03		2.2E-09		3.0E-04		7.4E-06
Nickel, total	NCC		1.00		1.0E-03		2.3E-03		NC		2.0E-02		NC
Thallium, total	1.1E-02		1.00		1.0E-03		2.3E-03		2.5E-08		2.0E-01		1.2E-07
Vanadium, total	NCC		1.00		1.0E-03		2.3E-03		NC		7.0E-03		NC
Zinc, total	NCC		1.00		1.0E-03		2.3E-03		NC		3.0E-01		NC
											SUBTOTAL:		**9.8E-04**
											SITE RELATED RISK:		**9.8E-04**
											BACKGROUND RISK:		**2.9E-06**

TABLE 8.44-26 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - CEDAR SWAMP BROOK AND QUARRY STREAM

RECEPTOR: Adult Facilty Worker
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	x Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	8.1E-04	NC	2.4E-02	NC
Benzene	NCC	1.00	1.1E-01	8.1E-04	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	8.1E-04	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	4.1E-02	8.1E-04	NC	NA	NC
Chloroform	NCC	1.00	1.3E-01	8.1E-04	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	3.7E-01	8.1E-04	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	8.1E-04	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	7.3E-03	8.1E-04	NC	1.4E+00	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	8.1E-04	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	8.1E-04	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	8.1E-04	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	8.1E-04	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	3.3E-02	8.1E-04	NC	1.4E-02	NC
Phenanthrene	NCC	1.00	2.3E-01	8.1E-04	NC	NA	NC
Pesticides/PCBs							
Aldrin	NCC	1.00	1.6E-03	8.1E-04	NC	1.7E+01	NC
Dieldrin	NCC	1.00	1.6E-02	8.1E-04	NC	1.6E+01	NC
Metals							
Aluminum, total	NCC	1.00	1.0E-03	8.1E-04	NC	NA	NC
Arsenic, total	2.2E-03	1.00	1.0E-03	8.1E-04	1.7E-09	1.5E+00	2.6E-09
Barium, total	NCC	1.00	1.0E-03	8.1E-04	NC	NA	NC
Beryllium, total	2.5E-03	1.00	1.0E-03	8.1E-04	2.1E-09	4.3E+00	8.9E-09
Cadmium, total	NCC	1.00	1.0E-03	8.1E-04	NC	NA	NC
Copper, total	NCC	1.00	1.0E-03	8.1E-04	NC	NA	NC
Iron, total	NCC	1.00	1.0E-03	8.1E-04	NC	NA	NC
Lead, total	6.0E-03	1.00	1.0E-03	8.1E-04	4.9E-09	NA	NC
Manganese, total	3.0E+01	1.00	1.0E-03	8.1E-04	2.4E-05	NA	NC
Mercury, total	9.8E-04	1.00	1.0E-03	8.1E-04	7.9E-10	NA	NC
Nickel, total	NCC	1.00	1.0E-03	8.1E-04	NC	NA	NC
Thallium, total	1.1E-02	1.00	1.0E-03	8.1E-04	8.8E-09	NA	NC
Vanadium, total	NCC	1.00	1.0E-03	8.1E-04	NC	NA	NC
Zinc, total	NCC	1.00	1.0E-03	8.1E-04	NC	NA	NC
						SUBTOTAL:	1.1E-08
						SITE RELATED RISK:	2.6E-09
						BACKGROUND RISK:	8.9E-09

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-27

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - SEDIMENTATION POND

RECEPTOR: Adult Facilty Worker
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	1.9E-08	NC	NA	NC
Benzene	NCC	NA	1.9E-08	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	NA	1.9E-08	NC	7.0E-04	NC
Chlorobenzene	NCC	NA	1.9E-08	NC	2.0E-02	NC
Chloroform	NCC	NA	1.9E-08	NC	1.0E-02	NC
Tetrachloroethene	NCC	NA	1.9E-08	NC	1.0E-02	NC
Trichloroethene	NCC	NA	1.9E-08	NC	2.0E-03	NC
Vinyl Chloride	NCC	NA	1.9E-08	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	9.2E-01	0.13	1.9E-08	2.3E-09	3.0E-02	7.6E-08
Benzo(a)pyrene	6.2E-01	0.13	1.9E-08	1.5E-09	3.0E-02	5.1E-08
Benzo(b)fluoranthene	1.2E+00	0.13	1.9E-08	2.9E-09	3.0E-02	9.6E-08
Benzo(g,h,i)perylene	2.5E-01	0.10	1.9E-08	4.8E-10	3.0E-02	1.6E-08
bis(2-Ethylhexyl)phthalate	NCC	0.10	1.9E-08	NC	2.0E-02	NC
Phenanthrene	9.2E-01	0.10	1.9E-08	1.8E-09	3.0E-02	5.9E-08
Pesticides/PCBs						
Aldrin	NCC	NA	1.9E-08	NC	3.0E-05	NC
Dieldrin	NCC	0.25	1.9E-08	NC	5.0E-05	NC
Metals						
Aluminum, total	1.6E+04	0.01	1.9E-08	3.0E-06	1.0E+00	3.0E-06
Arsenic, total	5.8E+00	0.03	1.9E-08	3.3E-09	3.0E-04	1.1E-05
Barium, total	NCC	0.01	1.9E-08	NC	7.0E-02	NC
Beryllium, total	2.8E+00	0.01	1.9E-08	5.4E-10	2.0E-03	2.7E-07
Cadmium, total	8.9E-01	0.001	1.9E-08	1.7E-11	1.0E-03	1.7E-08
Copper, total	NCC	0.02	1.9E-08	NC	3.7E-02	NC
Iron, total	NCC	0.01	1.9E-08	NC	NA	NC
Lead, total	1.1E+02	1.000	1.9E-08	2.1E-06	NA	NC
Manganese, total	7.5E+02	0.01	1.9E-08	1.4E-07	7.0E-02	2.1E-06
Mercury, total	NCC	0.01	1.9E-08	NC	3.0E-04	NC
Nickel, total	NCC	0.01	1.9E-08	NC	2.0E-02	NC
Thallium, total	NCC	0.01	1.9E-08	NC	2.0E-01	NC
Vanadium, total	2.8E+01	0.01	1.9E-08	5.4E-09	7.0E-03	7.8E-07
Zinc, total	NCC	0.01	1.9E-08	NC	3.0E-01	NC
					SUBTOTAL:	1.8E-05
					SITE RELATED RISK:	2.4E-06
					BACKGROUND RISK:	1.5E-05

TABLE 8.44-27 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SEDIMENT - SEDIMENTATION POND

RECEPTOR: Adult Facilty Worker
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Dermal Absorption Adjustment Factor	= Receptor-Specific Exposure Factor (kg/kg-day)	x Lifetime Average Daily Dose (mg/kg-day)	= Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	NCC	NA	6.8E-09	NC	2.4E-02	NC
Benzene	NCC	NA	6.8E-09	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	NA	6.8E-09	NC	1.3E-01	NC
Chlorobenzene	NCC	NA	6.8E-09	NC	NA	NC
Chloroform	NCC	NA	6.8E-09	NC	6.1E-03	NC
Tetrachloroethene	NCC	NA	6.8E-09	NC	5.2E-02	NC
Trichloroethene	NCC	NA	6.8E-09	NC	1.1E-02	NC
Vinyl Chloride	NCC	NA	6.8E-09	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	9.2E-01	0.13	6.8E-09	8.2E-10	7.3E-01	6.0E-10
Benzo(a)pyrene	6.2E-01	0.13	6.8E-09	5.5E-10	7.3E+00	4.0E-09
Benzo(b)fluoranthene	1.2E+00	0.13	6.8E-09	1.0E-09	7.3E-01	7.5E-10
Benzo(g,h,i)perylene	2.5E-01	NA	6.8E-09	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	0.10	6.8E-09	NC	1.4E-02	NC
Phenanthrene	9.2E-01	NA	6.8E-09	NC	NA	NC
Pesticides/PCBs						
Aldrin	NCC	NA	6.8E-09	NC	1.7E+01	NC
Dieldrin	NCC	0.25	6.8E-09	NC	1.6E+01	NC
Metals						
Aluminum, total	1.6E+04	NA	6.8E-09	NC	NA	NC
Arsenic, total	5.8E+00	0.03	6.8E-09	1.2E-09	1.5E+00	1.8E-09
Barium, total	NCC	NA	6.8E-09	NC	NA	NC
Beryllium, total	2.8E+00	0.01	6.8E-09	1.9E-10	4.3E+00	8.3E-10
Cadmium, total	8.9E-01	1.00	6.8E-09	6.1E-09	NA	NC
Copper, total	NCC	NA	6.8E-09	NC	NA	NC
Iron, total	NCC	NA	6.8E-09	NC	NA	NC
Lead, total	1.1E+02	NA	6.8E-09	NC	NA	NC
Manganese, total	7.5E+02	NA	6.8E-09	NC	NA	NC
Mercury, total	NCC	NA	6.8E-09	NC	NA	NC
Nickel, total	NCC	NA	6.8E-09	NC	NA	NC
Thallium, total	NCC	NA	6.8E-09	NC	NA	NC
Vanadium, total	2.8E+01	NA	6.8E-09	NC	NA	NC
Zinc, total	NCC	NA	6.8E-09	NC	NA	NC
					SUBTOTAL:	8.0E-09
					SITE RELATED RISK:	5.4E-09
					BACKGROUND RISK:	2.6E-09

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-28

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - SEDIMENTATION POND

RECEPTOR: Adult Facilty Worker
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x	Oral Absorption Adjustment Factor	x	Receptor-Specific Exposure Factor (kg/kg-day)	=	Chronic Average Daily Dose (mg/kg-day)	/	Oral Chronic Reference Dose (mg/kg-day)	=	Hazard Index
Volatile Organic Compounds											
1,4-Dichlorobenzene	NCC		1.00		1.9E-08		NC		NA		NC
Benzene	NCC		1.00		1.9E-08		NC		1.0E-03		NC
Carbon Tetrachloride	NCC		1.00		1.9E-08		NC		7.0E-04		NC
Chlorobenzene	NCC		1.00		1.9E-08		NC		2.0E-02		NC
Chloroform	NCC		1.00		1.9E-08		NC		1.0E-02		NC
Tetrachloroethene	NCC		1.00		1.9E-08		NC		1.0E-02		NC
Trichloroethene	NCC		1.00		1.9E-08		NC		2.0E-03		NC
Vinyl Chloride	NCC		1.00		1.9E-08		NC		3.0E-03		NC
Semivolatile Organic Compounds											
Benzo(a)anthracene	9.2E-01		1.00		1.9E-08		1.7E-08		3.0E-02		5.8E-07
Benzo(a)pyrene	6.2E-01		1.00		1.9E-08		1.2E-08		3.0E-02		3.9E-07
Benzo(b)fluoranthene	1.2E+00		1.00		1.9E-08		2.2E-08		3.0E-02		7.3E-07
Benzo(g,h,i)perylene	2.5E-01		1.00		1.9E-08		4.7E-09		3.0E-02		1.6E-07
bis(2-Ethylhexyl)phthalate	NCC		1.00		1.9E-08		NC		2.0E-02		NC
Phenanthrene	9.2E-01		1.00		1.9E-08		1.7E-08		3.0E-02		5.8E-07
Pesticides/PCBs											
Aldrin	NCC		1.00		1.9E-08		NC		3.0E-05		NC
Dieldrin	NCC		1.00		1.9E-08		NC		5.0E-05		NC
Metals											
Aluminum, total	1.6E+04		1.00		1.9E-08		3.0E-04		1.0E+00		3.0E-04
Arsenic, total	5.8E+00		0.48		1.9E-08		5.3E-08		3.0E-04		1.8E-04
Barium, total	NCC		1.00		1.9E-08		NC		7.0E-02		NC
Beryllium, total	2.8E+00		1.00		1.9E-08		5.3E-08		2.0E-03		2.7E-05
Cadmium, total	8.9E-01		1.00		1.9E-08		1.7E-08		1.0E-03		1.7E-05
Copper, total	NCC		1.00		1.9E-08		NC		3.7E-02		NC
Iron, total	NCC		1.00		1.9E-08		NC		NA		NC
Lead, total	1.1E+02		1.00		1.9E-08		2.1E-06		NA		NC
Manganese, total	7.5E+02		1.00		1.9E-08		1.4E-05		7.0E-02		2.0E-04
Mercury, total	NCC		0.50		1.9E-08		NC		3.0E-04		NC
Nickel, total	NCC		1.00		1.9E-08		NC		2.0E-02		NC
Thallium, total	NCC		1.00		1.9E-08		NC		2.0E-01		NC
Vanadium, total	2.8E+01		1.00		1.9E-08		5.4E-07		7.0E-03		7.7E-05
Zinc, total	NCC		1.00		1.9E-08		NC		3.0E-01		NC
									SUBTOTAL:		**8.0E-04**
									SITE RELATED RISK:		**2.1E-04**
									BACKGROUND RISK:		**6.0E-04**

TABLE 8.44-28 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR INCIDENTAL INGESTION OF SEDIMENT - SEDIMENTATION POND

RECEPTOR: Adult Facilty Worker
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x	Oral Absorption Adjustment Factor	x	Receptor-Specific Exposure Factor (kg/kg-day)	=	Lifetime Average Daily Dose (mg/kg-day)	x	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	=	Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds											
1,4-Dichlorobenzene	NCC		1.00		6.8E-09		NC		2.4E-02		NC
Benzene	NCC		1.00		6.8E-09		NC		2.9E-02		NC
Carbon Tetrachloride	NCC		1.00		6.8E-09		NC		1.3E-01		NC
Chlorobenzene	NCC		1.00		6.8E-09		NC		NA		NC
Chloroform	NCC		1.00		6.8E-09		NC		6.1E-03		NC
Tetrachloroethene	NCC		1.00		6.8E-09		NC		5.2E-02		NC
Trichloroethene	NCC		1.00		6.8E-09		NC		1.1E-02		NC
Vinyl Chloride	NCC		1.00		6.8E-09		NC		1.4E+00		NC
Semivolatile Organic Compounds											
Benzo(a)anthracene	9.2E-01		1.00		6.8E-09		6.2E-09		7.3E-01		4.5E-09
Benzo(a)pyrene	6.2E-01		1.00		6.8E-09		4.2E-09		7.3E+00		3.1E-08
Benzo(b)fluoranthene	1.2E+00		1.00		6.8E-09		7.8E-09		7.3E-01		5.7E-09
Benzo(g,h,i)perylene	2.5E-01		1.00		6.8E-09		1.7E-09		NA		NC
bis(2-Ethylhexyl)phthalate	NCC		1.00		6.8E-09		NC		1.4E-02		NC
Phenanthrene	9.2E-01		1.00		6.8E-09		6.2E-09		NA		NC
Pesticides/PCBs											
Aldrin	NCC		1.00		6.8E-09		NC		1.7E+01		NC
Dieldrin	NCC		1.00		6.8E-09		NC		1.6E+01		NC
Metals											
Aluminum, total	1.6E+04		1.00		6.8E-09		1.1E-04		NA		NC
Arsenic, total	5.8E+00		0.48		6.8E-09		1.9E-08		1.5E+00		2.8E-08
Barium, total	NCC		1.00		6.8E-09		NC		NA		NC
Beryllium, total	2.8E+00		1.00		6.8E-09		1.9E-08		4.3E+00		8.2E-08
Cadmium, total	8.9E-01		1.00		6.8E-09		6.0E-09		NA		NC
Copper, total	NCC		1.00		6.8E-09		NC		NA		NC
Iron, total	NCC		1.00		6.8E-09		NC		NA		NC
Lead, total	1.1E+02		1.00		6.8E-09		7.4E-07		NA		NC
Manganese, total	7.5E+02		1.00		6.8E-09		5.1E-06		NA		NC
Mercury, total	NCC		1.00		6.8E-09		NC		NA		NC
Nickel, total	NCC		1.00		6.8E-09		NC		NA		NC
Thallium, total	NCC		1.00		6.8E-09		NC		NA		NC
Vanadium, total	2.8E+01		1.00		6.8E-09		1.9E-07		NA		NC
Zinc, total	NCC		1.00		6.8E-09		NC		NA		NC
									SUBTOTAL:		1.5E-07
									SITE RELATED RISK:		4.1E-08
									BACKGROUND RISK:		1.1E-07

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-29

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - SEDIMENTATION POND

RECEPTOR: Adult Facilty Worker
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	x Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	1.5E-03	NC	NA	NC
Benzene	NCC	1.00	1.1E-01	1.5E-03	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	1.5E-03	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	4.1E-02	1.5E-03	NC	2.0E-02	NC
Chloroform	NCC	1.00	1.3E-01	1.5E-03	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	3.7E-01	1.5E-03	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	1.5E-03	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	7.3E-03	1.5E-03	NC	3.0E-03	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	1.5E-03	NC	3.0E-02	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	1.5E-03	NC	3.0E-02	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	1.5E-03	NC	3.0E-02	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	1.5E-03	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	3.3E-02	1.5E-03	NC	2.0E-02	NC
Phenanthrene	NCC	1.00	2.3E-01	1.5E-03	NC	3.0E-02	NC
Pesticides/PCBs							
Aldrin	1.8E-05	1.00	1.6E-03	1.5E-03	4.2E-11	3.0E-05	1.4E-06
Dieldrin	NCC	1.00	1.6E-02	1.5E-03	NC	5.0E-05	NC
Metals							
Aluminum, total	NCC	1.00	1.0E-03	1.5E-03	NC	1.0E+00	NC
Arsenic, total	3.5E-03	1.00	1.0E-03	1.5E-03	5.1E-09	3.0E-04	1.7E-05
Barium, total	NCC	1.00	1.0E-03	1.5E-03	NC	7.0E-02	NC
Beryllium, total	1.7E-03	1.00	1.0E-03	1.5E-03	2.5E-09	2.0E-03	1.3E-06
Cadmium, total	NCC	1.00	1.0E-03	1.5E-03	NC	1.0E-03	NC
Copper, total	NCC	1.00	1.0E-03	1.5E-03	NC	3.7E-02	NC
Iron, total	NCC	1.00	1.0E-03	1.5E-03	NC	NA	NC
Lead, total	3.5E-03	1.00	1.0E-03	1.5E-03	5.1E-09	NA	NC
Manganese, total	1.9E+00	1.00	1.0E-03	1.5E-03	2.8E-06	7.0E-02	4.0E-05
Mercury, total	4.3E-04	1.00	1.0E-03	1.5E-03	6.2E-10	3.0E-04	2.1E-06
Nickel, total	NCC	1.00	1.0E-03	1.5E-03	NC	2.0E-02	NC
Thallium, total	NCC	1.00	1.0E-03	1.5E-03	NC	2.0E-01	NC
Vanadium, total	NCC	1.00	1.0E-03	1.5E-03	NC	7.0E-03	NC
Zinc, total	NCC	1.00	1.0E-03	1.5E-03	NC	3.0E-01	NC
						SUBTOTAL:	6.2E-05
						SITE RELATED RISK:	5.9E-05
						BACKGROUND RISK:	1.3E-06

TABLE 8.44-29 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR DERMAL CONTACT WITH SURFACE WATER - SEDIMENTATION POND

RECEPTOR: Adult Facilty Worker
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/l)	x Dermal Absorption Adjustment Factor	x Permeability Coefficient (cm/hr)	= Receptor-Specific Exposure Factor (l-hr/cm-kg-day)	Lifetime Average Daily Dose (mg/kg-day)	x Oral Cancer Slope Factor (mg/kg-day)-1	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds							
1,4-Dichlorobenzene	NCC	1.00	6.2E-02	5.2E-04	NC	2.4E-02	NC
Benzene	NCC	1.00	1.1E-01	5.2E-04	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	2.2E-02	5.2E-04	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	4.1E-02	5.2E-04	NC	NA	NC
Chloroform	NCC	1.00	1.3E-01	5.2E-04	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	3.7E-01	5.2E-04	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	2.3E-01	5.2E-04	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	7.3E-03	5.2E-04	NC	1.4E+00	NC
Semivolatile Organic Compounds							
Benzo(a)anthracene	NCC	1.00	8.1E-01	5.2E-04	NC	7.3E-01	NC
Benzo(a)pyrene	NCC	1.00	1.2E+00	5.2E-04	NC	7.3E+00	NC
Benzo(b)fluoranthene	NCC	1.00	1.2E+00	5.2E-04	NC	7.3E-01	NC
Benzo(g,h,i)perylene	NCC	1.00	1.7E+00	5.2E-04	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	3.3E-02	5.2E-04	NC	1.4E-02	NC
Phenanthrene	NCC	1.00	2.3E-01	5.2E-04	NC	NA	NC
Pesticides/PCBs							
Aldrin	1.8E-05	1.00	1.6E-03	5.2E-04	1.5E-11	1.7E+01	2.6E-10
Dieldrin	NCC	1.00	1.6E-02	5.2E-04	NC	1.6E+01	NC
Metals							
Aluminum, total	NCC	1.00	1.0E-03	5.2E-04	NC	NA	NC
Arsenic, total	3.5E-03	1.00	1.0E-03	5.2E-04	1.8E-09	1.5E+00	2.7E-09
Barium, total	NCC	1.00	1.0E-03	5.2E-04	NC	NA	NC
Beryllium, total	1.7E-03	1.00	1.0E-03	5.2E-04	9.1E-10	4.3E+00	3.9E-09
Cadmium, total	NCC	1.00	1.0E-03	5.2E-04	NC	NA	NC
Copper, total	NCC	1.00	1.0E-03	5.2E-04	NC	NA	NC
Iron, total	NCC	1.00	1.0E-03	5.2E-04	NC	NA	NC
Lead, total	3.5E-03	1.00	1.0E-03	5.2E-04	1.8E-09	NA	NC
Manganese, total	1.9E+00	1.00	1.0E-03	5.2E-04	9.9E-07	NA	NC
Mercury, total	4.3E-04	1.00	1.0E-03	5.2E-04	2.2E-10	NA	NC
Nickel, total	NCC	1.00	1.0E-03	5.2E-04	NC	NA	NC
Thallium, total	NCC	1.00	1.0E-03	5.2E-04	NC	NA	NC
Vanadium, total	NCC	1.00	1.0E-03	5.2E-04	NC	NA	NC
Zinc, total	NCC	1.00	1.0E-03	5.2E-04	NC	NA	NC
						SUBTOTAL:	6.9E-09
						SITE RELATED RISK:	2.7E-09
						BACKGROUND RISK:	3.9E-09

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.44-30

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR FISH CONSUMPTION
CURRENT CONDITIONS

RECEPTOR: Local Resident (Recreators)
CHRONIC NONCARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Chronic Average Daily Dose (mg/kg-day)	/ Oral Chronic Reference Dose (mg/kg-day)	= Hazard Index
Volatile Organic Compounds						
1,4-Dichlorobenzene	1.4E-01	1.00	7.2E-05	1.0E-05	NA	NC
Benzene	NCC	1.00	7.2E-05	NC	1.0E-03	NC
Carbon Tetrachloride	NCC	1.00	7.2E-05	NC	7.0E-04	NC
Chlorobenzene	NCC	1.00	7.2E-05	NC	2.0E-02	NC
Chloroform	NCC	1.00	7.2E-05	NC	1.0E-02	NC
Tetrachloroethene	NCC	1.00	7.2E-05	NC	1.0E-02	NC
Trichloroethene	NCC	1.00	7.2E-05	NC	2.0E-03	NC
Vinyl Chloride	NCC	1.00	7.2E-05	NC	3.0E-03	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	3.6E-02	1.00	7.2E-05	2.6E-06	3.0E-02	8.7E-05
Benzo(a)pyrene	6.1E-02	1.00	7.2E-05	4.4E-06	3.0E-02	1.5E-04
Benzo(b)fluoranthene	7.7E-02	1.00	7.2E-05	5.5E-06	3.0E-02	1.8E-04
Benzo(g,h,i)perylene	NCC	1.00	7.2E-05	NC	3.0E-02	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	7.2E-05	NC	2.0E-02	NC
Phenanthrene	NCC	1.00	7.2E-05	NC	3.0E-02	NC
Pesticides/PCBs						
Aldrin	6.9E-04	1.00	7.2E-05	5.0E-08	3.0E-05	1.7E-03
Dieldrin	NCC	1.00	7.2E-05	NC	5.0E-05	NC
Metals						
Aluminum, total	NCC	1.00	7.2E-05	NC	1.0E+00	NC
Arsenic, total	5.1E-02	1.00	7.2E-05	3.7E-06	3.0E-04	1.2E-02
Barium, total	NCC	1.00	7.2E-05	NC	7.0E-02	NC
Beryllium, total	NCC	1.00	7.2E-05	NC	2.0E-03	NC
Cadmium, total	NCC	1.00	7.2E-05	NC	5.0E-04	NC
Copper, total	NCC	1.00	7.2E-05	NC	3.7E-02	NC
Iron, total	NCC	1.00	7.2E-05	NC	NA	NC
Lead, total	NCC	1.00	7.2E-05	NC	NA	NC
Manganese, total	3.3E+00	1.00	7.2E-05	2.4E-04	1.4E-01	1.7E-03
Mercury, total	4.1E-02	1.00	7.2E-05	3.0E-06	3.0E-04	9.9E-03
Nickel, total	NCC	1.00	7.2E-05	NC	2.0E-02	NC
Thallium, total	NCC	1.00	7.2E-05	NC	2.0E-01	NC
Vanadium, total	NCC	1.00	7.2E-05	NC	7.0E-03	NC
Zinc, total	NCC	1.00	7.2E-05	NC	3.0E-01	NC
					SUBTOTAL:	**2.6E-02**
					SITE RELATED RISK:	**2.6E-02**
					BACKGROUND RISK:	**NC**

TABLE 8.44-30 (CONT'D)

CALCULATION OF AVERAGE DAILY DOSES AND RISK ESTIMATES
FOR FISH CONSUMPTION
CURRENT CONDITIONS

RECEPTOR: Local Resident (Recreators)
CARCINOGENIC EFFECTS

Contaminants	Exposure Point Concentration (mg/kg)	x Oral Absorption Adjustment Factor	x Receptor-Specific Exposure Factor (kg/kg-day)	= Lifetime Average Daily Dose (mg/kg-day)	x Cancer Slope Factor (mg/kg-day)$^{-1}$	= Incremental Lifetime Cancer Risk Estimate
Volatile Organic Compounds						
1,4-Dichlorobenzene	1.4E-01	1.00	1.9E-05	2.7E-06	2.4E-02	6.4E-08
Benzene	NCC	1.00	1.9E-05	NC	2.9E-02	NC
Carbon Tetrachloride	NCC	1.00	1.9E-05	NC	1.3E-01	NC
Chlorobenzene	NCC	1.00	1.9E-05	NC	NA	NC
Chloroform	NCC	1.00	1.9E-05	NC	6.1E-03	NC
Tetrachloroethene	NCC	1.00	1.9E-05	NC	5.2E-02	NC
Trichloroethene	NCC	1.00	1.9E-05	NC	1.1E-02	NC
Vinyl Chloride	NCC	1.00	1.9E-05	NC	1.4E+00	NC
Semivolatile Organic Compounds						
Benzo(a)anthracene	3.6E-02	1.00	1.9E-05	6.9E-07	7.3E-01	5.1E-07
Benzo(a)pyrene	6.1E-02	1.00	1.9E-05	1.2E-06	7.3E+00	8.5E-06
Benzo(b)fluoranthene	7.7E-02	1.00	1.9E-05	1.5E-06	7.3E-01	1.1E-06
Benzo(g,h,i)perylene	NCC	1.00	1.9E-05	NC	NA	NC
bis(2-Ethylhexyl)phthalate	NCC	1.00	1.9E-05	NC	1.4E-02	NC
Phenanthrene	NCC	1.00	1.9E-05	NC	NA	NC
Pesticides/PCBs						
Aldrin	6.9E-04	1.00	1.9E-05	1.3E-08	1.7E+01	2.3E-07
Dieldrin	NCC	1.00	1.9E-05	NC	1.6E+01	NC
Metals						
Aluminum, total	NCC	1.00	1.9E-05	NC	NA	NC
Arsenic, total	5.1E-02	1.00	1.9E-05	9.9E-07	1.5E+00	1.5E-06
Barium, total	NCC	1.00	1.9E-05	NC	NA	NC
Beryllium, total	NCC	1.00	1.9E-05	NC	4.3E+00	NC
Cadmium, total	NCC	1.00	1.9E-05	NC	NA	NC
Copper, total	NCC	1.00	1.9E-05	NC	NA	NC
Iron, total	NCC	1.00	1.9E-05	NC	NA	NC
Lead, total	NCC	1.00	1.9E-05	NC	NA	NC
Manganese, total	3.3E+00	1.00	1.9E-05	6.3E-05	NA	NC
Mercury, total	4.1E-02	1.00	1.9E-05	7.9E-07	NA	NC
Nickel, total	NCC	1.00	1.9E-05	NC	NA	NC
Thallium, total	NCC	1.00	1.9E-05	NC	NA	NC
Vanadium, total	NCC	1.00	1.9E-05	NC	NA	NC
Zinc, total	NCC	1.00	1.9E-05	NC	NA	NC
					SUBTOTAL:	**1.2E-05**
					SITE RELATED RISK:	**1.2E-05**
					BACKGROUND RISK:	**NC**

Notes:

1. NA = Not Analyzed/Not Applicable; NC = Not Calculated; NSCC = Not a Study Chemical of Concern.
2. For constituents without an AAF value, a default value of 1.00 was used.

TABLE 8.45-1

COMPARISON OF SURFACE WATER EXPOSURE POINT CONCENTRATIONS TO AMBIENT WATER QUALITY CRITERIA FOR ORGANISM CONSUMPTION

Central Landfill - OU2

Johnston, Rhode Island

Contaminant	*CAS Number*	Surface Water				Ambient Water Quality Criteria for Organism consumption (mg/L) *Human Health (10-6 risk for carcinogens)*	
		Almy Reservoir 95% UCL or Maximum Value [1] (mg/l)	Upper Simmons 95% UCL or Maximum Value [1] (mg/l)	Sedimentation Ponds 95% UCL or Maximum Value [1] (mg/l)	Quarry and Cedar 95% UCL or Maximum Value [1] (mg/l)		
Volatile Organic Compounds							
Tetrachloroethene	127184	NCC	5.50E-04	NCC	NCC	8.85E-03	c
Pesticides/PCBs							
Aldrin	309002	NCC	NCC	NCC	NCC	1.40E-07	a,c
Metals							
Arsenic, total	7440382	2.10E-03 *	1.34E-03 *	3.50E-03 *	2.16E-03 *	1.40E-04	a,b,c
Beryllium, total	7440417	2.49E-04 *	9.14E-04 *	1.74E-03 *	2.55E-03 *	6.41E-05	f
Lead, total	7439921	NCC	NCC	3.50E-03	6.01E-03		
Manganese, total	7439965	2.95E-02	6.28E+00 *	1.90E+00 *	2.95E+01 *	1.00E-01	f
Mercury, total	7439976	NCC	NCC	4.26E-04 *	9.80E-04 *	1.50E-04	a
Thallium, total	7440280	NCC	1.08E-02 *	NCC	1.09E-02 *	6.30E-03	a

Notes:

1. Depending normal, lognormal or non-normal distribution. See Figure 8.24-1 for logic diagram on selection of EPC.
2. Shade indicates consistent with background.
3. NCC = Not a Contaminant of Concern in this medium.

a. Criteria for priority pollutants as published in 40 CFR 131.36. These represent EPA's most recent nationwide recommendations which reflect agency RfD values as contained in the Integrated Risk Information System (IRIS) as of July 1, 1995.

b. The criteria refers to the inorganic form only.

c. Criteria in the matrix based on carcinogenicity ($10^{-6\ risk}$)

d. Calculation of criterion was based on sufficient data presented in the 1980 EPA Quality Criteria for Water.

e. US EPA 40 CFR 131.36, July 1,1995.

f. Published Criteria as referenced in US EPA Water Quality Criteria Summary Concentrations. Office of Science and Technology, Health and Ecological Criteria Division (4304).

TABLE 8.45-2

COMPARISON OF LEAD CONCENTRATIONS TO SURFICIAL SOIL STANDARDS
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	95% UCL Concentration on the Mean in Surface Soil (mg/kg)	Maximum Concentration in Surface Soil (mg/kg)	EPA Risk-based Standard (mg/kg)	Rhode Island Permissible Exterior Soil/Dust Standard (mg/kg)
Metals				
Lead, total	85	145	400	150

TABLE 9-1

LIST OF SURFACE WATER AND SEDIMENT DATA GROUPS
USED FOR ECOLOGICAL RISK ASSESSSMENT
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Sedimentation Pond 4	Sedimentation[2] Ponds 2 & 3 and Stream Channels	Upper Simmons Reservoir		Lower Simmons Reservoir	Almy Reservoir	Almy Watershed	Background
SW/SED95-24	SW/SED95-14	SED93-21-I	SED93-31-O	SW/SED95-01	SW/SED95-10	SW/SED95-27	SW/SED95-30
	SW/SED95-15	SED93-23-I	SED93-32-ORE[3]	SW/SED95-02	SW/SED95-11	SW/SED95-28	SW/SED95-31
	SW/SED95-21	SED93-21-O	SW-95-04	SW/SED95-03	SW/SED95-12	SW/SED95-29	SW/SED95-38
	SW/SED95-22	SED93-22-O	SW-95-05	SW/SED98-53	SW/SED95-13	SW/SED95-32	SW/SED95-39
	SW/SED95-23	SED93-23-O	SW-95-06	SW/SED98-54		SW/SED96-48	SW/SED95-44
	SW/SED95-34	SED93-24-O	SW-95-07				SW/SED95-45
	SW/SED95-35	SED93-25-O	SW/SED-95-08				SW96-46
	SW/SED95-37	SED93-26-O	SW-95-09				SW/SED96-49
	SW/SED95-40	SED93-27-O	SW/SED95-42				
	SW/SED95-41	SED93-28-O	SW/SED95-43				Samples Eliminated from ERC[1a]
	Samples Eliminated from ERC[1]	SED93-29-ORE	SW/SED-98-50				
		SED93-30-O	SW/SED-98-51				SED96-46
			SW/SED-98-52				
	SW/SED95-16	Samples Eliminated from ERC[4]					
	SW/SED95-17						
	SW/SED95-19	SED93-24-I	SED-95-04				
	SW/SED95-20	SED93-26-I	SED-95-05				
	SW/SED95-25	SED93-27-I	SED-95-07				
	SW/SED95-26	SED93-30-I					
	SW96-47						

Notes:

1. These samples were eliminated from the ERC because of landscape changes that occurred at the landfill, or because the medium sampled was not representative of ecological exposure points, or due to the dredging of the Upper Simmons Reservoir. See Section 9.13.1 of the report text for details.

1a. This sample was eliminated from the sediment background data set because contaminant concentrations in the sample may have been significantly influenced by a know off-site source.

2. This exposure point includes data from the existing portions of Quarry Stream and Cedar Swamp Brook. Samples SW96-47 and SW95-19 were not used to develop EPCs for the Ecological Risk Assessment. These surface water samples were collected from groundwater seeps or Landfill leachate and were intended to characterize contaminant distribution and transport; not to characterize exposure. Data from locations SW/SED-16, -17, -20, -25, and -26 were not used because these stream sections and Sedimentation Pond 1 location are no longer present.

3. Sample SED93-32-0RE was a blind duplicate for SED93-26-O.

4. Data from landfill-derived sediment samples SED93-24-I, -26-I, -27-I, -30-I, SED95-04, -05, and -06 were not used because these sediments were dredged in 1996.

TABLE 9-2

SEDIMENTATION POND 4 SEDIMENT
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Benchmark [3]	Maximum Detected	Arithmetic Mean Concentration	Background Maximum	Retained?	Comments [4]
Metals (mg/kg)						
Aluminum, total	58030	5590	5590	16700	No	Max < Benchmark & Background Max
Barium, total	-	98	98	88	Yes	No Benchmark Available
Beryllium, total	-	0.1	0.1	15	No	Max < Background Max
Chromium, total	26	8	8	14	No	Max < Benchmark & Background Max
Cobalt, total	50	7	7.1	7.4	No	Max < Benchmark & Background Max
Copper, total	16	11	11	15	No	Max < Benchmark & Background Max
Iron, total	20000	9470	9470	21500	No	Max < Benchmark & Background Max
Manganese, total	460	144	144	654	No	Max < Benchmark & Background Max
Nickel, total	16	3	3	16	No	Max < Benchmark & Background Max
Vanadium, total	-	11	11	41	No	Max < Background Max
Zinc, total	120	24	24	276	No	Max < Benchmark & Background Max

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-15 for benchmark sources.
4. Max = Maximum Detected ; Background Max = Background Maximum.
5. ND = Not Detected.

TABLE 9-3

SEDIMENTATION PONDS 2 AND 3 AND STREAM CHANNELS SEDIMENT
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Benchmark[1]	Maximum Detected	Arithmetic Mean Concentration	Background Maximum	Retained?	Comments[1]
Volatile Organic Compounds (mg/kg TOC)						
1,1,1-Trichloroethane	17	0.14	0.14		No	Max < Benchmark
Acetone	0.87	11.76	4.57		Yes	Max > Benchmark
Chlorobenzene	82	2.99	0.94		No	Max < Benchmark
Methyl ethyl Ketone	27	3.88	1.62		No	Max < Benchmark
Toluene	67	0.35	0.32		No	Max < Benchmark
Semivolatile Organic Compounds (mg/kg TOC)						
1,4-Dichlorobenzene	35	1.46	1.46		No	Max < Benchmark
4-Methylphenol	1.2	15.88	9.07		Yes	Max > Benchmark
Acenaphthene	62	3.74	3.46		No	Max < Benchmark
Anthracene	22	10	7.15		No	Max < Benchmark
Benzo(a)anthracene	11	31.75	19.02		Yes	Max > Benchmark
Benzo(a)pyrene	14	31.11	18.11		Yes	Max > Benchmark
Benzo(b)fluoranthene	24	48.24	26.75		Yes	Max > Benchmark
Benzo(g,h,i)perylene	17	10.79	7.58		No	Max < Benchmark
Benzo(k)fluoranthene	24	13.53	8.69		No	Max < Benchmark
bis(2-Ethylhexyl)phthalate	89000	182.35	102.74		No	Max < Benchmark
Butylbenzylphthalate	1100	212.60	40.53		No	Max < Benchmark
Carbazole	-	3.96	3.72		Yes	No Benchmark Available
Chrysene	34	31.75	18.67		No	Max < Benchmark
Di-n-butylphthalate	1100	28.95	14.86		No	Max < Benchmark
Di-n-octylphthalate	6.39E+08	21.76	10.49		No	Max < Benchmark
Dibenzofuran	200	2.83	2.83		No	Max < Benchmark
Fluoranthene	290	50.79	33.33		No	Max < Benchmark
Fluorene	54	4.59	4.23		No	Max < Benchmark
Indeno(1,2,3-c,d)pyrene	20	9.84	6.53		No	Max < Benchmark
Phenanthrene	85	33.53	21.61		No	Max < Benchmark
Phenol	3.1	5.18	4.18		Yes	Max > Benchmark
Pyrene	49	60.32	37.46		Yes	Max > Benchmark
Pesticides/PCBs (mg/kg TOC)						
Aldrin	0.2	0.71	0.30		Yes	Bioaccumulative, Max > Benchmark
alpha-Chlordane	280	0.26	0.15		Yes	Bioaccumulative
gamma-Chlordane	280	0.31	0.18		Yes	Bioaccumulative
Metals (mg/kg)						
Aluminum, total	58030	19800	13829	16700	No	Max < Benchmark
Arsenic, total	6	11	4	9	Yes	Max > Benchmark & Background Max
Barium, total	-	245	145	88	Yes	No Benchmark Available
Beryllium, total	-	4	2	15	No	Max < Background Max
Cadmium, total	0.60	0.89	0.26	4	No	Max < Background Max
Chromium, total	26	76	32	14	Yes	Max > Benchmark & Background Max
Cobalt, total	50	23	14	7	No	Max < Benchmark
Copper, total	16	82	37	15	Yes	Max > Benchmark & Background Max
Iron, total	20000	37100	24228	21500	Yes	Max > Benchmark & Background Max
Lead, total	31	179	68	209	No	Max < Background Max
Manganese, total	460	1210	673	654	Yes	Max > Benchmark & Background Max
Mercury, total	0.2	1	0.17	0.49	Yes	Max > Benchmark & Background Max
Nickel, total	16	25	11	16	Yes	Max > Benchmark & Background Max
Vanadium, total	-	43	25	41	Yes	No Benchmark Available
Zinc, total	120	467	224	276	Yes	Max > Benchmark & Background Max

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-15 for benchmark sources.
4. Max = Maximum Detected ; Background Max = Background Maximum.
5. ND = Not Detected.

TABLE 9-4

UPPER SIMMONS RESERVOIR SEDIMENT
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Benchmark [3]	Maximum Detected	Arithmetic Mean Concentration [1]	Background Maximum	Retained? [4]	Comments [4]
Volatile Organic Compounds (mg/kg TOC)						
1,1-Dichloroethane	2.7	0.03	0.03		No	Max < Benchmark
2-Hexanone	2.2	0.36	0.18		No	Max < Benchmark
Acetone	0.87	2.71	0.90		Yes	Max > Benchmark
Benzene	5.7	0.13	0.08		No	Max < Benchmark
Carbon Disulfide	0.085	0.71	0.24		Yes	Max > Benchmark
Chlorobenzene	82	2.66	0.38		No	Max < Benchmark
Methyl ethyl Ketone	27	0.74	0.28		No	Max < Benchmark
Methylene Chloride	37	0.32	0.17		No	Max < Benchmark
Styrene	-	0.03	0.03		Yes	No Benchmark Available
Tetrachloroethene	53	0.08	0.07		No	Max < Benchmark
Toluene	67	1.03	0.22		No	Max < Benchmark
Trichloroethene	160	0.08	0.07		No	Max < Benchmark
Xylenes	2.5	0.13	0.09		No	Max < Benchmark
Semivolatile Organic Compounds (mg/kg TOC)						
2-Methylnaphthalene	13	0.42	0.39		No	Max < Benchmark
Acenaphthene	62	0.68	0.62		No	Max < Benchmark
Acenaphthylene	-	0.53	0.36		Yes	No Benchmark Available
Anthracene	22	5.24	2.74		No	Max < Benchmark
Benzo(a)anthracene	11	20.6	5.33		Yes	Max > Benchmark
Benzo(a)pyrene	14	17.5	4.84		Yes	Max > Benchmark
Benzo(b)fluoranthene	24	24.8	6.30		Yes	Max > Benchmark
Benzo(g,h,i)perylene	17	7.34	3.28		No	Max < Benchmark
Benzo(k)fluoranthene	24	7.69	3.15		No	Max < Benchmark
bis(2-Ethylhexyl)phthalate	89000	1417	125.21		No	Max < Benchmark
Butylbenzylphthalate	1100	3.11	1.97		No	Max < Benchmark
Carbazole	-	2.27	1.87		Yes	No Benchmark Available
Chrysene	34	21.7	5.2		No	Max < Benchmark
Di-n-butylphthalate	1100	3.47	1.33		No	Max < Benchmark
Di-n-octylphthalate	6.39E+08	1850	374.2		No	Max < Benchmark
Dibenz(a,h)anthracene	6	3.22	1.98		No	Max < Benchmark
Dibenzofuran	200	2.90	2.07		No	Max < Benchmark
Diethylphthalate	63	0.54	0.34		No	Max < Benchmark
Fluoranthene	290	38.5	7.87		No	Max < Benchmark
Fluorene	54	2.06	1.2		No	Max < Benchmark
Indeno(1,2,3-c,d)pyrene	20	6.99	3.22		No	Max < Benchmark
Naphthalene	48	0.46	0.39		No	Max < Benchmark
Phenanthrene	85	14.3	5.2		No	Max < Benchmark
Pyrene	49	42	7.95		No	Max < Benchmark
Pesticides/PCBs (mg/kg TOC)						
4,4'-DDD	11	0.42	0.11		Yes	Bioaccumulative
4,4'-DDE	11	0.11	0.05		Yes	Bioaccumulative
4,4'-DDT	34	0.42	0.10		Yes	Bioaccumulative
Aldrin	0.2	0.02	0.01		Yes	Bioaccumulative
alpha-Chlordane	280	0.06	0.03		Yes	Bioaccumulative
delta-BHC	0.3	0.08	0.05		Yes	Bioaccumulative
Endosulfan-sulfate	0.54	0.02	0.02		Yes	Bioaccumulative
Endosulfan I	0.54	0.05	0.02		Yes	Bioaccumulative
gamma-Chlordane	280	0.04	0.02		Yes	Bioaccumulative
Methoxychlor	1.9	0.09	0.08		Yes	Bioaccumulative
PCB 1232	60	0.58	0.40		Yes	Bioaccumulative
PCB 1242	17	2.10	0.68		Yes	Bioaccumulative
PCB 1254	81	0.79	0.43		Yes	Bioaccumulative
Metals (mg/kg)						
Aluminum, total	58030	21300	12623	16700	No	Max < Benchmark
Arsenic, total	6	13.8	3.93	9	Yes	Max > Benchmark & Background Max
Barium, total	-	145	73.4	88	Yes	No Benchmark Available
Beryllium, total	-	29.8	12.7	15	Yes	No Benchmark Available
Cadmium, total	0.6	4.7	1.81	4	Yes	Max > Benchmark & Background Max
Chromium, total	26	19.8	12.0	14	No	Max < Benchmark
Cobalt, total	50	12.2	4.32	7	No	Max < Benchmark
Copper, total	16	36.1	20.5	15	Yes	Max > Benchmark & Background Max
Cyanide, total	-	14.90	5.09	ND	Yes	No Benchmark Available
Iron, total	20,000	37,500	14,532	21,500	Yes	Max > Benchmark & Background Max
Lead, total	31	88	43	209	No	Max < Background Max
Manganese, total	460	1130	481	654	Yes	Max > Benchmark & Background Max
Mercury, total	0.2	0.16	0.13	0.49	No	Max < Benchmark & Background Max
Nickel, total	16	55.4	13.62	16	Yes	Max > Benchmark & Background Max
Selenium, total	2.5	2.05	1.04	ND	No	Max < Benchmark
Vanadium, total	-	223	39.04	41	Yes	No Benchmark Available
Zinc, total	120	351	143.9	276	Yes	Max > Benchmark & Background Max

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-15 for benchmark sources.
4. Max = Maximum Detected ; Background Max = Background Maximum.
5. ND = Not Detected.

TABLE 9-5

LOWER SIMMONS RESERVOIR SEDIMENT
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Benchmark[3]	Maximum Detected	Arithmetic Mean Concentration	Background Maximum	Retained?	Comments[4]
Volatile Organic Compounds (mg/kg TOC)						
Acetone	0.87	4.97	2.68		Yes	Max > Benchmark
Chloromethane	-	0.09	0.08		Yes	No Benchmark Available
Methyl ethyl Ketone	27	0.99	0.72		No	Max < Benchmark
Semivolatile Organic Compounds (mg/kg TOC)						
4-Chloro-3-methylphenol	-	3.08	3.08		Yes	No Benchmark Available
Benzo(a)anthracene	11	2.14	2.14		No	Max < Benchmark
Benzo(a)pyrene	14	2.71	2.71		No	Max < Benchmark
Benzo(b)fluoranthene	24	4.97	3.95		No	Max < Benchmark
Benzo(k)fluoranthene	24	2.17	2.17		No	Max < Benchmark
bis(2-Ethylhexyl)phthalate	89000	20.54	14.78		No	Max < Benchmark
Butylbenzylphthalate	1100	34.36	24.21		No	Max < Benchmark
Chrysene	34	3.16	3.16		No	Max < Benchmark
Fluoranthene	290	4.29	2.89		No	Max < Benchmark
Phenanthrene	85	1.83	1.83		No	Max < Benchmark
Pyrene	49	4.51	2.74		No	Max < Benchmark
Pesticides/PCBs (mg/kg TOC)						
4,4'-DDD	11	0.19	0.16		Yes	Bioaccumulative
4,4'-DDE	11	0.29	0.19		Yes	Bioaccumulative
alpha-Chlordane	280	0.10	0.08		Yes	Bioaccumulative
delta-BHC	0.3	0.18	0.13		Yes	Bioaccumulative
Endosulfan I	0.54	0.10	0.10		Yes	Bioaccumulative
Metals (mg/kg)						
Aluminum, total	58030	22400	11844	16700	No	Max < Benchmark
Antimony, total	2	1.3	0.71	ND	No	Max < Benchmark
Arsenic, total	6	16.3	9.72	8.8	Yes	Max > Benchmark & Background Max
Barium, total	-	287	172.8	88	Yes	No Benchmark Available
Beryllium, total	-	18	9.54	14.5	Yes	No Benchmark Available
Cadmium, total	0.6	5.9	3.54	3.8	Yes	Max > Benchmark & Background Max
Chromium, total	26	32.9	18.95	14.1	Yes	Max > Benchmark & Background Max
Cobalt, total	50	22.6	13.68	7.4	No	Max < Benchmark
Copper, total	16	37.2	22.08	14.7	Yes	Max > Benchmark & Background Max
Cyanide, total	-	12.1	6.31	ND	Yes	No Benchmark Available
Iron, total	20000	34800	24666	21500	Yes	Max > Benchmark & Background Max
Lead, total	31	93	61.66	209	No	Max <Background Max
Manganese, total	460	13900	8422	654	Yes	Max > Benchmark & Background Max
Mercury, total	0.2	0.37	0.24	0.49	No	Max <Background Max
Nickel, total	16	35.40	16.41	16.30	Yes	Max > Benchmark & Background Max
Selenium, total	2.5	5.00	2.86	ND	Yes	Max > Benchmark
Thallium, total	-	26.40	10.11	ND	Yes	No Benchmark Available
Vanadium, total	-	80.30	40.78	40.50	Yes	No Benchmark Available
Zinc, total	120	438.00	268.40	276.00	Yes	Max > Benchmark & Background Max

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-15 for benchmark sources.
4. Max = Maximum detected ; Background Max = Background Maximum.
5. ND = Not Detected.

TABLE 9-6

ALMY RESERVOIR SEDIMENT
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Benchmark [3]	Maximum Detected	Arithmetic Mean Concentration	Background Maximum	Retained?	Comments [4]
Semivolatile Organic Compounds (mg/kg TOC)						
4-Methylphenol	1.2	0.53	0.53		No	Max < Benchmark
Benzo(a)pyrene	14	0.97	0.97		No	Max < Benchmark
Benzo(b)fluoranthene	24	1.53	0.97		No	Max < Benchmark
Benzo(g,h,i)perylene	17	1.11	1.11		No	Max < Benchmark
bis(2-Ethylhexyl)phthalate	89000	6.14	3.74		No	Max < Benchmark
Butylbenzylphthalate	1100	1.50	1.25		No	Max < Benchmark
Chrysene	34	0.90	0.90		No	Max < Benchmark
Di-n-butylphthalate	1100	0.82	0.73		No	Max < Benchmark
Fluoranthene	290	1.53	1.05		No	Max < Benchmark
Phenanthrene	85	0.86	0.86		No	Max < Benchmark
Pyrene	49	1.41	0.96		No	Max < Benchmark
Metals (mg/kg)						
Aluminum, total	58030	21,000	17,325	16,700	No	Max < Benchmark
Arsenic, total	6	12.2	10.3	8.8	Yes	Max > Benchmark & Background Max
Barium, total	-	95.0	76.5	88	Yes	No Benchmark Avaialble
Beryllium, total	-	30.4	24.4	15	Yes	No Benchmark Avaialble
Cadmium, total	0.6	4.30	3.27	3.8	Yes	Max > Benchmark & Background Max
Chromium, total	26	11.9	10.5	14	No	Max < Benchmark & Backgrpound Max
Cobalt, total	50	13.6	11.6	7.4	No	Max < Benchmark
Copper, total	16	31.0	26.2	15	Yes	Max > Benchmark & Background Max
Iron, total	20000	29,600	25,550	21,500	Yes	Max > Benchmark & Background Max
Lead, total	31	262	194	209	Yes	Max > Benchmark & Background Max
Manganese, total	460	1,050	691	654	Yes	Max > Benchmark & Background Max
Mercury, total	0.2	0.50	0.42	0.49	Yes	Max > Benchmark & Background Max
Thallium, total	-	1.40	1.16	ND	Yes	No Benchmark Avaialble
Vanadium, total	-	51.9	48	41	Yes	No Benchmark Avaialble
Zinc, total	120	629	497	276	Yes	Max > Benchmark & Background Max

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-15 for benchmark sources.
4. Max = Maximum detected ; Background Max = Background maximum.
5. ND = Not Detected

TABLE 9-7

ALMY WATERSHED SEDIMENT
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Benchmark [3]	Maximum Detected	Arithmetic Mean Concentration	Background Maximum	Retained?	Comments [4]
Volatile Organic Compounds (mg/kg TOC)						
Tetrachloroethene	53	3.38	0.74		No	Max < Benchmark
Semivolatile Organic Compounds (mg/kg TOC)						
Benzo(a)anthracene	11	0.67	0.67		No	Max < Benchmark
Benzo(a)pyrene	14	0.86	0.86		No	Max < Benchmark
Benzo(b)fluoranthene	24	1.22	1.22		No	Max < Benchmark
Benzo(g,h,i)perylene	17	0.67	0.67		No	Max < Benchmark
Butylbenzylphthalate	1100	26.3	7.74		No	Max < Benchmark
Chrysene	34	0.98	0.98		No	Max < Benchmark
Di-n-butylphthalate	1100	12.4	3.52		No	Max < Benchmark
Fluoranthene	290	2.04	1.54		No	Max < Benchmark
Phenanthrene	85	0.68	0.68		No	Max < Benchmark
Pyrene	49	2.14	1.76		No	Max < Benchmark
Pesticides/PCBs (mg/kg TOC)						
4,4'-DDD	11	0.37	0.10		Yes	Bioaccumulative
4,4'-DDE	11	0.66	0.16		Yes	Bioaccumulative
4,4'-DDT	34	0.10	0.042		Yes	Bioaccumulative
Endosulfan II	0.54	0.12	0.044		Yes	Bioaccumulative
Metals (mg/kg)						
Aluminum, total	58030	18,500	10,624	16,700	No	Max < Benchmark
Arsenic, total	6	3.00	1.72	8.8	No	Max < Benchmark & Background Max
Barium, total	-	152	80	88	Yes	No Benchmark Available
Beryllium, total	-	34.3	20.4	15	Yes	No Benchmark Available
Cadmium, total	0.6	6.90	3.88	3.8	Yes	Max > Benchmark & Background Max
Chromium, total	26	22.8	8.83	14	No	Max < Benchmark
Cobalt, total	50	24.5	9.52	7.4	No	Max < Benchmark
Copper, total	16	18.4	8.98	15	Yes	Max > Benchmark & Background Max
Iron, total	20,000	22,500	12,292	21,500	Yes	Max > Benchmark & Background Max
Lead, total	31	187	139	209	No	Max < Background Max
Manganese, total	460	8,670	2,477	654	Yes	Max > Benchmark & Background Max
Mercury, total	0.2	0.41	0.35	0.49	No	Max < Background Max
Nickel, total	16	13.2	5.59	16	No	Max < Benchmark & Background Max
Selenium, total	2.5	5.40	1.72	ND	Yes	Max > Benchmark
Silver, total	1	0.92	0.30	ND	No	Max < Benchmark
Thallium, total	-	16.2	5.0	ND	Yes	No Benchmark Available
Vanadium, total	-	25.7	17.9	41	No	Max < Background Max
Zinc, total	120	754	344	276	Yes	Max > Benchmark & Background Max

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-15 for benchmarks sources.
4. Max = Maximum Detected ; Background Max = Background Maximum.
5. ND = Not Detected.

TABLE 9-8

SEDIMENTATION POND 4 SURFACE WATER
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island
(mg/l)

Contaminant	Benchmark [3]	Maximum Detected	Arithmetic Mean Concentration	Background Maximum	Retained?	Comments
Semivolatile Organic Compounds						
Butylbenzylphthalate	0.0019	0.01	0.01		Yes	Max > Benchmark
Total Metals						
Aluminum, total	0.087	0.0419	0.0419	0.3285	No	Max < Benchmark & Background Max
Arsenic, total	0.15	0.0035	0.0035	0.0034	No	Max < Benchmark
Barium, total	0.004	0.0383	0.0383	0.0274	Yes	Max > Benchmark & Background Max
Chromium, total	0.17 [5]	0.0017	0.0017	0.0015	No	Max < Benchmark
Cobalt, total	0.023	0.0006	0.0006	0.0008	No	Max < Benchmark & Background Max
Copper, total	0.019 [5]	0.0086	0.0086	0.0039	No	Max < Benchmark
Iron, total	1	0.1363	0.1363	0.5246	No	Max < Benchmark & Background Max
Manganese, total	6.85	0.0443	0.0443	0.0829	No	Max < Benchmark & Background Max
Mercury, total	0.00077	0.0006	0.0006	0.0008	No	Max < Benchmark & Background Max
Nickel, total	0.106 [5]	0.0027	0.0027	0.0010	No	Max < Benchmark
Vanadium, total	0.02	0.0016	0.0016	0.0019	No	Max < Benchmark & Background Max
Zinc,total	0.24 [5]	0.0340	0.0340	0.0538	No	Max < Benchmark & Background Max
Dissolved Metals						
Arsenic (As)	0.15	0.0028	0.0028	0.0043	No	Max < Benchmark & Background Max
Barium (Ba)	0.0040	0.0313	0.0313	0.0315	No	Max < Background Max
Beryllium (Be)	0.0053	0.0004	0.0004	0.0028	No	Max < Benchmark & Background Max
Chromium (Cr)	0.15 [5]	0.0009	0.0009	0.0018	No	Max < Benchmark & Background Max
Cobalt (Co)	0.023	0.0014	0.0014	0.0222	No	Max < Benchmark & Background Max
Copper (Cu)	0.018 [5]	0.0115	0.0115	0.0051	No	Max < Benchmark
Iron (Fe)	1	0.0073	0.0073	0.3640	No	Max < Benchmark & Background Max
Manganese (Mn)	6.50	0.0045	0.0045	0.0968	No	Max < Benchmark & Background Max
Nickel (Ni)	0.11 [5]	0.0019	0.0019	0.0036	No	Max < Benchmark & Background Max
Wet Chemistry						
Ammonia (N)	2.28	0.200	0.20	0.20	No	Max = Background Max

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-14 for benchmarks sources.
4. Max = Maximum Detected ; Background Max = Background Maximum.
5. Chronic AWQC based on the average hardness value of 230 mg/L from Sedimentation Pond 4 surface water.
6. ND = Not Detected.

TABLE 9-9

SEDIMENTATION PONDS 2 & 3 SURFACE WATER
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island
(mg/l)

Contaminant	Benchmark [3]	Maximum Detected	Arithmetic Mean Concentration	Background Maximum	Retained?	Comments [4]
Volatile Organic Compounds						
1,1,1-Trichloroethane	0.011	0.0007	0.0005		No	Max < Benchmark
Benzene	0.0059	0.0005	0.0005		No	Max < Benchmark
Chlorobenzene	0.018	0.0055	0.0026		No	Max < Benchmark
Chloromethane	2.2	0.0013	0.0007		No	Max < Benchmark
Ethylbenzene	0.036	0.0013	0.0006		No	Max < Benchmark
Toluene	0.014	0.0050	0.0010		No	Max < Benchmark
Semivolatile Organic Compounds						
4-Methylphenol	0.013	0.0053	0.0028		No	Max < Benchmark
Phenol	0.0056	0.0148	0.0039		Yes	Max > Benchmark
Pesticides/PCBs						
Aldrin	0.0003	0.00002	0.00001		Yes	Bioaccumulative
Total Metals						
Aluminum, total	0.087	1.62	0.63	0.33	Yes	Max > Benchmark & Background Max
Barium, total	0.004	0.0679	0.0550	0.027	Yes	Max > Benchmark & Background Max
Beryllium, total	0.00017	0.0036	0.0012	0.0024	Yes	Max > Benchmark & Background Max
Cadmium, total	0.0035 [5]	0.0010	0.0002	0.0004	No	Max < Benchmark
Chromium, total	0.13 [5]	0.0021	0.0012	0.0015	No	Max < Benchmark
Cobalt, total	0.023	0.0019	0.0011	0.0008	No	Max < Benchmark
Cyanide, total	0.0052	0.0115	0.0057	ND	Yes	Max > Benchmark
Iron, total	1	4.20	2.65	0.52	Yes	Max > Benchmark & Background Max
Lead, total	0.0057 [5]	0.0047	0.0025	ND	No	Max < Benchmark
Manganese, total	6.34	2.90	1.5329	0.083	No	Max < Benchmark
Mercury, total	0.00077	0.00083	0.0003	0.00080	Yes	Max > Benchmark & Background Max
Nickel, total	0.077 [5]	0.0059	0.0031	0.001	No	Max < Benchmark
Selenium, total	0.00461	0.0039	0.0020	ND	No	Max < Benchmark
Vanadium, total	0.02	0.0057	0.0027	0.0019	No	Max < Benchmark
Zinc, total	0.177 [5]	0.3873	0.0722	0.054	Yes	Max > Benchmark & Background Max
Dissolved Metals						
Barium (Ba)	0.0040	0.105	0.0614	0.032	Yes	Max > Benchmark & Background Max
Cadmium (Cd)	0.0031 [5]	0.0004	0.0002	ND	No	Max < Benchmark
Chromium (Cr)	0.11 [5]	0.0013	0.0007	0.0018	No	Max < Benchmark &Background Max
Lead (Pb)	0.0041 [5]	0.0017	0.0006	0.0019	No	Max < Benchmark &Background Max
Manganese (Mn)	6.02	4.20	1.7894	0.097	No	Max < Benchmark
Selenium (Se)	0.00461	0.0090	0.0039	0.0077	Yes	Max > Benchmark & Background Max
Vanadium (V)	0.02	0.0048	0.0027	ND	No	Max < Benchmark
Wet Chemistry						
Ammonia (N)	2.28	8.75	4.1278	0.2	Yes	Max > Benchmark & Background Max

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-14 for benchmark sources.
4. Max = Maximum Detected ; Background Max = Background Maximum.
5. Chronic AWQC based on the average hardness value of 159 mg/L from Sedimentation Ponds 2 & 3surface water.
6. ND = Not Detected.

TABLE 9-10

UPPER SIMMONS RESERVOIR SURFACE WATER
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island
(mg/l)

Contaminant	Benchmark [3]	Maximum Detected	Arithmetic Mean Concentration	Background Maximum	Retained?	Comments [4]
Volatile Organic Compounds						
1,1,2-Trichloroethane	0.02	0.0006	0.00051		No	Max < Benchmark
1,2-Dichlorobenzene	0.0018	0.002	0.00062		Yes	Max > Benchmark
1,2-Dichloropropane	0.058	0.0008	0.00053		No	Max < Benchmark
1,4-Dichlorobenzene	0.0012	0.004	0.00088		Yes	Max > Benchmark
Acetone	1.5	0.004	0.00292		No	Max < Benchmark
Benzene	0.0059	0.002	0.00065		No	Max < Benchmark
Carbon Tetrachloride	0.0098	0.0007	0.00052		No	Max < Benchmark
Chlorobenzene	0.018	0.088	0.010		Yes	Max > Benchmark
cis-1,2-Dichloroethene	0.59	0.0008	0.00052		No	Max < Benchmark
Tetrachloroethene	0.0053	0.0006	0.00051		No	Max < Benchmark
Semivolatile Organic Compounds						
bis(2-Ethylhexyl)phthalate	0.0120	0.006	0.0028		No	Max < Benchmark
Butylbenzylphthalate	0.0019	0.004	0.0027		Yes	Max > Benchmark
Di-n-butylphthalate	0.035	0.002	0.0020		No	Max < Benchmark
Diethylphthalate	0.058	0.002	0.002		No	Max < Benchmark
Pesticides/PCBs						
delta-BHC	0.0022	0.000012	5.58E-06		Yes	Bioaccumulative
Total Metals						
Aluminum, total	0.087	1.35	0.26	0.33	Yes	Max > Benchmark & Background Max
Arsenic, total	0.15	0.0023	0.0012	0.0027	No	Max < Benchmark & Background Max
Barium, total	0.004	0.189	0.08	0.027	Yes	Max > Benchmark & Background Max
Beryllium, total	0.00017	0.0016	0.0004	0.0024	No	Max < Background Max
Cadmium, total	0.0037 [5]	0.00055	0.0002	0.0004	No	Max < Benchmark
Chromium, total	0.131 [5]	0.0072	0.002	0.0015	No	Max < Benchmark
Cobalt, total	0.023	0.0047	0.001	0.0008	No	Max < Benchmark
Copper, total	0.014 [5]	0.0075	0.004	0.0039	No	Max < Benchmark
Cyanide, total	0.0052	0.01	0.005	ND	Yes	Max > Benchmark
Manganese, total	6.35	14.9	3.25	0.083	Yes	Max > Benchmark & Backgrd Max
Nickel, total	0.08 [5]	0.0227	0.01	0.001	No	Max < Benchmark
Selenium, total	0.00461	0.006	0.0022	ND	Yes	Max > Benchmark
Thallium, total	0.001	0.02	0.003	ND	Yes	Max > Benchmark
Vanadium, total	0.02	0.0115	0.003	0.0019	No	Max < Benchmark
Zinc,total	0.18 [5]	0.0605	0.02	0.054	No	Max < Benchmark
Dissolved Metals						
Barium (Ba)	0.004	0.167	0.06	0.032	Yes	Max > Benchmark & Background Max
Cobalt (Co)	0.023	0.0027	0.001	0.022	No	Max < Benchmark & Background Max
Copper (Cu)	0.0138 [5]	0.0148	0.003	0.0051	Yes	Max > Benchmark & Background Max
Iron (Fe)	1	0.605	0.11	0.36	No	Max < Benchmark
Manganese (Mn)	6.09	11.6	2.52	0.097	Yes	Max > Benchmark & Background Max
Nickel (Ni)	0.08 [5]	0.0154	0.004	0.0036	No	Max < Benchmark
Selenium (Se)	0.00461	0.0179	0.01	0.0077	Yes	Max > Benchmark & Background Max
Vanadium (V)	0.02	0.011	0.003	ND	No	Max < Benchmark
Zinc (Zn)	0.182 [5]	0.0088	0.0049	ND	No	Max < Benchmark
Wet Chemistry						
Ammonia (N)	2.28	33	10.32	0.2	Yes	Max > Benchmark & Background Max

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U)
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-14 for benchmarks sources.
4. Max = Maximum Detected ; Background Max = Background Maximum.
5. Chronic AWQC based on the average hardness value of 166 mg/L from Upper Simmons Reservoir surface water
6. ND = Not Detected.

TABLE 9-11

LOWER SIMMONS RESERVOR SURFACE WATER
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island
(mg/l)

Contaminant	Benchmark [3]	Maximum Detected	Arithmetic Mean Concentration	Background Maximum	Retained?	Comments [4]
Volatile Organic Compounds						
Acetone	1.5	0.004	0.0034		No	Max < Benchmark
Xylenes	0.0018	0.0010	0.0006		No	Max < Benchmark
Pesticides/PCBs						
4,4'-DDT	0.000013	1.00E-04	3.17E-05		Yes	Max > Benchmark & Bioaccumulative
Aldrin	0	2.50E-05	1.17E-05		Yes	Bioaccumulative
Endosulfan I	0.000051	1.10E-05	9.20E-06		Yes	Bioaccumulative
Total Metals						
Aluminum, total	0.087	1.44	0.36	0.330	Yes	Max > Benchmark & Background Max
Arsenic, total	0.15	0.0045	0.0021	0.00270	No	Max < Benchmark
Barium, total	0.004	0.112	0.07	0.0270	Yes	Max > Benchmark & Background Max
Beryllium, total	0.00017	0.00091	0.0004	0.0024	No	Max < Background Max
Chromium, total	0.11 [5]	0.0028	0.0018	0.002	No	Max < Benchmark
Cobalt, total	0.023	0.0022	0.0011	0.001	No	Max < Benchmark
Copper, total	0.013 [5]	0.007	0.01	0.004	No	Max < Benchmark
Iron, total	1	3	1.41	0.520	Yes	Max > Benchmark & Background Max
Manganese, total	6.20	2.55	1.84	0.083	No	Max < Benchmark
Nickel, total	0.07 [5]	0.0075	0.0040	0.001	No	Max < Benchmark
Silver, total	0.00012	0.0063	0.0016	0.001	Yes	Max > Benchmark & Background Max
Vanadium, total	0.02	0.0067	0.0035	0.002	No	Max < Benchmark
Zinc,total	0.16 [5]	0.0184	0.01	0.05	No	Max < Benchmark & Background Max
Dissolved Metals						
Arsenic (As)	0.15	0.0036	0.002	0.0043	No	Max < Benchmark & Background Max
Barium (Ba)	0.004	0.058	0.04	0.032	Yes	Max > Benchmark & Background Max
Beryllium (Be)	0.0053	0.0006	0.0003	0.0028	No	Max < Benchmark & Background Max
Chromium (Cr)	0.0986 [5]	0.0022	0.0008	0.0018	No	Max < Benchmark
Cobalt (Co)	0.023	0.002	0.0007	0.022	No	Max < Benchmark & Background Max
Copper (Cu)	0.012 [5]	0.0053	0.0028	0.0051	No	Max < Benchmark
Iron (Fe)	1	0.0374	0.04	0.36	No	Max < Benchmark & Background Max
Manganese (Mn)	5.89	1.71	1.32	0.097	No	Max < Benchmark
Nickel (Ni)	0.07 [5]	0.007	0.0039	0.0036	No	Max < Benchmark
Selenium (Se)	0.005	0.0077	0.0044	0.0077	No	Max = Background Max
Vanadium (V)	0.02	0.0063	0.0029	ND	No	Max < Benchmark
Zinc (Zn)	0.159 [5]	0.0055	0.0038	ND	No	Max < Benchmark
Wet Chemistry						
Ammonia (N)	2.28	5.7	3.36	0.20	Yes	Max > Benchmark & Background Max

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-14 for benchmarks sources.
4. Max = Maximum Detected ; Background Max = Background Maximum.
5. Chronic AWQC based on the average hardness value of 142 mg/L from Lower Simmons Reservoir surface water.
6. ND = Not Detected.

TABLE 9-12

ALMY RESERVOIR SURFACE WATER
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island
(mg/l)

Contaminant	Benchmark [3]	Maximum Detected	Arithmetic Mean Concentration	Maximum Background	Retained?	Comments [4]
Total Metals						
Aluminum, total	0.087	0.044	0.026	0.33	No	Max < Benchmark & Background Max
Arsenic, total	0.15	0.0021	0.0019	0.0027	No	Max < Benchmark & Background Max
Barium, total	0.004	0.0081	0.0075	0.027	No	Max < Background Max
Beryllium, total	0.00017	0.0003	0.0002	0.0024	No	Max < Background Max
Chromium, total	0.0277	0.0010	0.0008	0.0015	No	Max < Benchmark & Background Max
Cobalt, total	0.023	0.0006	0.0004	0.0008	No	Max < Benchmark & Background Max
Copper, total	0.0029	0.0048	0.0036	0.0039	Yes	Max > Benchmark & Background Max
Iron, total	1	0.11	0.10	0.52	No	Max < Benchmark & Background Max
Manganese, total	4.33	0.031	0.025	0.083	No	Max < Benchmark & Background Max
Nickel, total	0.016	0.0012	0.0009	0.001	No	Max < Benchmark
Vanadium, total	0.02	0.0009	0.0006	0.0019	No	Max < Benchmark & Background Max
Zinc, total	0.037	0.011	0.0085	0.054	No	Max < Benchmark & Background Max
Dissolved Metals						
Aluminum (Al)	-	0.12	0.081	0.39	No	Max < Background Max
Arsenic (As)	0.150	0.0053	0.0046	0.0043	No	Max < Benchmark
Barium (Ba)	0.004	0.018	0.015	0.032	No	Max < Background Max
Beryllium (Be)	0.005	0.0008	0.0007	0.0028	No	Max < Benchmark & Background Max
Chromium (Cr)	0.024	0.0020	0.0014	0.0018	No	Max < Benchmark
Cobalt (Co)	0.023	0.0035	0.0029	0.022	No	Max < Benchmark & Background Max
Copper (Cu)	0.003	0.0093	0.0071	0.0051	Yes	Max > Benchmark & Background Max
Iron (Fe)	1	0.14	0.070	0.36	No	Max < Benchmark & Background Max
Lead (Pb)	0.001	0.0018	0.0008	0.0019	No	Max < Background Max
Manganese (Mn)	4.11	0.012	0.0091	0.097	No	Max < Benchmark & Background Max
Nickel (Ni)	0.016	0.0037	0.0029	0.0036	No	Max < Benchmark

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-14 for benchmark sources.
4. Max = Maximum Detected ; Background Max = Background Maximum.
5. ND = Not Detected.

TABLE 9-13

ALMY RESERVOIR WATERSHED SURFACE WATER
SELECTION OF CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island
(mg/l)

Contaminant	Benchmark[3]	Maximum Detected	Arithmetic Mean Concentration	Background Maximum	Retained?	Comments[4]
Volatile Organic Compounds						
Carbon Disulfide	0.0009	0.0023	0.0010	0.06	Yes	Max > Benchmark
Tetrachloroethene	0.0053	0.0098	0.0024	ND	Yes	Max > Benchmark
Semivolatile Organic Compounds						
Butylbenzylphthalate	0.0019	0.0048	0.0031	0.0020	Yes	Max > Benchmark
Total Metals						
Aluminum, total	0.087	0.21	0.15	0.33	No	Max < Background Max
Arsenic, total	0.15	0.0034	0.0016	0.00270	No	Max < Benchmark
Barium, total	0.0040	0.020	0.011	0.0270	No	Max < Background Max
Beryllium, total	0.0002	0.0018	0.0013	0.0024	No	Max < Background Max
Chromium, total	0.0277	0.0005	0.0002	0.0015	No	Max < Benchmark & Background Max
Cobalt, total	0.0230	0.0011	0.0004	0.0008	No	Max < Benchmark
Copper, total	0.0029	0.0025	0.0014	0.0039	No	Max < Benchmark & Background Max
Iron, total	1	0.87	0.29	0.52	No	Max < Benchmark
Manganese, total	4.33	0.11	0.040	0.0830	No	Max < Benchmark
Mercury, total	0.0008	0.0003	0.0002	0.00080	No	Max < Benchmark & Background Max
Silver, total	0.0001	0.0055	0.0015	0.0014	Yes	Max > Benchmark & Background Max
Vanadium, total	0.020	0.0019	0.0007	0.0019	No	Max < Benchmark & Background Max
Zinc, total	0.037	0.043	0.026	0.05	No	Max < Background Max
Dissolved Metals						
Aluminum (Al)	-	0.36	0.21	0.39	No	Max < Background Max
Antimony (Sb)	0.030	0.0054	0.0028	ND	No	Max < Benchmark
Arsenic (As)	0.150	0.0038	0.0019	0.0043	No	Max < Benchmark & Background Max
Barium (Ba)	0.004	0.022	0.01355	0.032	No	Max < Background Max
Beryllium (Be)	0.005	0.0019	0.0013	0.0028	No	Max < Benchmark & Background Max
Cadmium (Cd)	0.001	0.0005	0.0003	ND	No	Max < Benchmark
Chromium (Cr)	0.024	0.0011	0.0005	0.002	No	Max < Benchmark & Background Max
Cobalt (Co)	0.023	0.0027	0.0010	0.022	No	Max < Benchmark & Background Max
Copper (Cu)	0.003	0.0075	0.0031	0.0051	Yes	Max > Benchmark & Background Max
Iron (Fe)	1	0.26	0.13	0.360	No	Max < Benchmark & Background Max
Lead (Pb)	0.00054	0.0028	0.0013	0.0019	Yes	Max > Benchmark & Background Max
Manganese (Mn)	4.11	0.10	0.079	0.0970	No	Max < Benchmark
Nickel (Ni)	0.016	0.0039	0.0018	0.0036	No	Max < Benchmark
Selenium (Se)	0.0046	0.005	0.0033	0.0077	No	Max < Background Max
Wet Chemistry						
Ammonia (N)	2.28	1	0.30	0.20	No	Max < Benchmark

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. See Table 9-14 for benchmark sources.
4. Max = Maximum Detected ; Background Max = Background Maximum.
5. ND = Not Detected.

TABLE 9-14

WATER QUALITY BENCHMARK CONCENTRATIONS
FOR PROTECTION OF AQUATIC LIFE
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Water Quality Benchmarks (mg/l)
Volatile Organic Compounds	
1,1,1-Trichloroethane	0.011 [4a]
1,1,2-Trichloroethane	0.02 [3]
1,2-Dichlorobenzene	0.0018 [3]
1,2-Dichloropropane	0.058 [3]
1,4-Dichlorobenzene	0.0012 [3]
Acetone	1.5 [4a]
Benzene	0.0059 [3]
Carbon Disulfide	0.00092 [4a]
Carbon Tetrachloride	0.0098 [4a]
Chlorobenzene	0.018 [3]
Chloroethane	-
Chloromethane	2.2 [4a]
cis-1,2-Dichloroethene	0.59 [4b]
Ethylbenzene	0.036 [3]
Methyl ethyl ketone	14 [4a]
Tetrachloroethene	0.0053 [3]
Toluene	0.014 [3]
Trichloroethene	0.043 [3]
Xylenes	0.0018 [4]
Semivolatile Organic Compounds	
2-Methylphenol	0.013 [4c]
4-Methylphenol	0.013 [4c]
bis(2-Ethylhexyl)phthalate	0.012 [3]
Butylbenzylphthalate	0.0019 [3]
Di-n-butylphthalate	0.035 [4a]
Diethylphthalate	0.058 [3]
Naphthalene	0.012 [4a]
N-Nitrosodiphenylamines	0.0065 [3]
Phenol	0.0056 [3]

TABLE 9-14

WATER QUALITY BENCHMARK CONCENTRATIONS
FOR PROTECTION OF AQUATIC LIFE
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Water Quality Benchmarks (mg/l)
Pesticides/PCBs	
alpha-BHC	0.0022 [4a]
delta-BHC	0.0022 [4a]
4,4'-DDD	0.000011 [4a]
4,4'-DDT	0.000013 [4]
Dieldrin	0.000056 [1]
Endosulfan I	0.000051 [4]
gamma-BHC(Lindane)	0.00095 [1]
Total Metals	
Aluminum, total	0.087 [2]
Antimony, total	0.03 [2]
Arsenic, total	0.15 [1]
Barium, total	0.004 [4a]
Beryllium, total	0.00017 [3]
Cadmium, total	0.0008 [1a]
Calcium, total	-
Chromium, total	0.028 [1a]
Cobalt, total	0.023 [4a]
Copper, total	0.0029 [1a]
Cyanide, total	0.0052 [1]
Iron, total	1 [1]
Lead, total	0.0005 [1a]
Magnesium, total	-
Manganese, total	4.33 [5]
Mercury, total	0.00077 [1]
Nickel, total	0.016 [1a]
Potassium, total	-
Selenium, total	0.005 [1]
Silver, total	0.00012 [2]
Sodium, total	-
Thallium, total	0.001 [3]
Vanadium, total	0.02 [4a]
Zinc, total	0.037 [1a]

TABLE 9-14

WATER QUALITY BENCHMARK CONCENTRATIONS
FOR PROTECTION OF AQUATIC LIFE
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Water Quality Benchmarks (mg/l)
Dissolved Metals	
Aluminum (Al)	-
Antimony (Sb)	0.03 [2]
Arsenic (As)	0.15 [1]
Barium (Ba)	0.004 [4a]
Beryllium (Be)	0.0053 [2]
Cadmium (Cd)	0.0008 [1a]
Calcium (Ca)	-
Chromium (Cr)	0.02 [1]
Cobalt (Co)	0.023 [4a]
Copper (Cu)	0.003 [1a]
Iron (Fe)	1 [1]
Lead (Pb)	0.0005 [1a]
Magnesium (Mg)	-
Manganese (Mn)	4.11 [5a]
Mercury (Hg)	7.70E-04 [1]
Nickel (Ni)	0.016 [1a]
Potassium (K)	-
Selenium (Se)	0.00461 [1]
Sodium (Na)	-
Vanadium (V)	0.02 [4a]
Zinc (Zn)	0.036 [1a]
Wet Chemistry	
Ammonia (N)	2.28 [1b]

Notes:

1. U.S. EPA Chronic Ambient Water Quality Criterion (AWQC) and Rhode Island Water Quality Standard (WQS).
1a. U.S. EPA Chronic AWQC based on a default hardness value of 25. Equations used for calculating total and dissolved metals criteria are presented in USEPA National Recommended Water Quality Criteria, Federal Register, December 10, 1998.
1b. Ammonia benchmark is the chronic AWQC based on a pH of 7.5 which is conservatively representative of conditions at the site at the time the surface water samples were collected.
2. Chronic Lowest Observed Effects Level (LOEL) cited by U.S. EPA in the Ambient Water Quality Criteria Document.
3. Chronic Minimum Data Base Guideline (MDBG) developed by Rhode Island DEM, derived by dividing an Acute LOEL by a factor of 900.
4. Chronic Tier II values presented as Ecotox Thresholds by the EPA Office of Solid Waste and Emergency Response (EPA, 1996).
4a. Many of the Tier II chronic Ecotox values used by EPA (1996) were developed by Oak Ridge National Laboratories in 1994. These values are updated ORNL Screening values presented in Suter and Tsao, 1996.
4b. The Tier II value for 1,2-dichloroethene was used as the benchmark for cis-1,2-dichloroethene (Suter, and Tsao,1996).
4c. The Tier II value for 2-methylphenol was used as the benchmark for 4-methylphenol (Suter, and Tsao,1996).
5. This benchmark for total manganese is the 25% Inhibition Concentration (IC25) for survival and growth of brown trout presented in Stubblefield et al., 1997, based on a hardness value of 25.
5a. This benchmark for dissolved manganese is 95% of the total manganese benchmark value (Stubblefield et al., 1997).

TABLE 9-15

SEDIMENT QUALITY BENCHMARK CONCENTRATIONS
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Sediment Quality Benchmarks
Volatile Organic Compounds (mg/kg TOC)	
1,1,1-Trichloroethane	17 [2a]
1,1-Dichloroethane	2.7 [4]
2-Hexanone	2.20 [4]
Acetone	0.87 [4]
Benzene	5.7 [2a]
Carbon Disulfide	0.09 [4]
Chlorobenzene	82 [2a]
Methyl ethyl Ketone	27 [4]
Methylene Chloride	37 [4]
Styrene	-
Tetrachloroethene	53 [2a]
Toluene	67 [2a]
Trichloroethene	160 [2a]
Xylenes	2.5 [2b]
Semivolatile Organic Compounds (mg/kg TOC)	
1,4-Dichlorobenzene	35 [2a]
2-Methylnaphthalene	13 [4c]
4-Methylphenol	1.2 [4d]
Acenaphthene	62 [2]
Acenaphthylene	-
Anthracene	22 [4]
Benzo(a)anthracene	11 [4]
Benzo(a)pyrene	14 [4]
Benzo(b)fluoranthene	24 [3]
Benzo(g,h,i)perylene	17 [1a]
Benzo(k)fluoranthene	24 [1a]
bis(2-Ethylhexyl)phthalate	8.90E+04 [4]
Butylbenzylphthalate	1100 [2a]
Carbazole	-
Chrysene	34 [1a]
Di-n-butylphthalate	1100 [2a]
Di-n-octylphthalate	6.39E+08 [4b]
Dibenz(a,h)anthracene	6 [1a]
Dibenzofuran	200 [2a]
Diethylphthalate	63 [2a]
Fluoranthene	290 [2]
Fluorene	54 [2a]
Indeno(1,2,3-c,d)pyrene	20 [1a]
Naphthalene	48 [2a]
Phenanthrene	85 [2]
Phenol	3.10 [4]
Pyrene	49 [1a]

TABLE 9-15

SEDIMENT QUALITY BENCHMARK CONCENTRATIONS
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Sediment Quality Benchmarks
Pesticides/PCBs (mg/kg TOC)	
4,4'-DDD	11 [4]
4,4'-DDE	11 [4e]
4,4'-DDT	34 [4]
Aldrin	0.20 [1a]
alpha-Chlordane	280 [4a]
delta-BHC	0.3 [1d]
Endosulfan-sulfate	0.54 [2c]
Endosulfan I	0.54 [2c]
Endosulfan II	0.54 [2c]
gamma-Chlordane	280 [4a]
Methoxychlor	1.9 [2a]
PCB 1232	60 [4]
PCB 1242	17 [4]
PCB 1254	81 [4]
Metals (mg/kg dry wgt.)	
Aluminum, total	58,030 [5]
Antimony, total	2 [1c]
Arsenic, total	6 [1a]
Barium, total	-
Beryllium, total	-
Cadmium, total	0.6 [1a]
Calcium, total	-
Chromium, total	26 [1a]
Cobalt, total	50 [1b]
Copper, total	16 [1a]
Iron, total	20,000 [1a]
Lead, total	31 [1a]
Magnesium, total	-
Manganese, total	460 [1a]
Mercury, total	0.2 [1a]
Nickel, total	16 [1a]
Potassium, total	-
Selenium, total	2.5 [6]
Silver, total	1 [1c]
Sodium, total	-
Thallium, total	-
Vanadium, total	-
Zinc, total	120 [1a]

TABLE 9-15

SEDIMENT QUALITY BENCHMARK CONCENTRATIONS
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Notes:

1a. Lowest Effect Levels (LELs) from Ontario Ministry of the Environment (Persaud et al., 1993), as presented in Jones and Suter, 1997. LELs are levels at or below which sediment contaminants are not expected to adversely, effect most benthic species.
1b. Ontario Ministry of the Environment Open Water Disposal Guidelines (Persaud et al., 1993).
1c. Effects Range - Low (ER-L) from Long and Morgan (1990). ER-Ls are the tenth percentile of sediment contaminant levels which resulted in observed or predicted adverse effects to benthic organisms.
1d. This value is the LEL for lindane (gamma BHC) presented in the same source as 1a.
2. EPA Sediment Quality Criterion (SQC) for freshwater. SQCs are presented in the Ecotox Thresholds document from the EPA Office of Solid Waste and Emergency Response (EPA, 1996).
2a. Sediment Quality Benchmark based on Equilibrium Partitioning method. SQBs are Ecotox Thresholds from EPA Office of Solid Waste and Emergency Response (EPA, 1996).
2b The benchmark for xylenes is the SQB for m-xylene from same source as 2a above.
2c. This value is the SQB for endosulfan, mixed isomers from the same source as 2a above.
3. Lowest Effect Level for benzo(k)fluoranthene from Persaud et al. (1993), normalized to mg/kg TOC.
4. Sediment Quality Benchmark based on Equilibrium Partitioning (EpP) method from Jones and Suter, 1997
4a. Values for alpha and gamma chlordanes are the SQB for chlordane based on EpP method from the same source as 4 above.
4b. Equilibrium partitioning-based sediment quality benchmark for di-n-octylphthalate calculated using log Koc from EPA (1986),and water quality benchmark (Lowest Chronic Value) from Suter and Tsao, (1996). Because higher molecular weight esters (6 or more C atoms) are not considered to be toxic to aquatic organisms (Staples et al., 1997), this value is considered to be a suitable benchmark for di-n-octylphtalate.
4c. This value is the SQB for 1-methylnaphthalene based on the EqP method from the same source as 4.
4d. This value is the SQB for 2-methylphenol based on the EqP method from the same source as 4 above.
4e. This value is the SQB for p,p'-DDD based on the EqP method from the same source as 4 above.
5. This value is the Probable Effect Concentration calculated as part of the Assessment and Remediation of Contaminated Sediment (ARCS) Project (EPA, 1996) presented in Jones and Suter 1997.
6. Selenium sediment benchmark was developed using the same methods as Long and Morgan (1990) ER-Ls by Van Derveer and Canton (1997). "Predicted Effects" data for freshwater sediment were used to develop ER-L, which was a lower benchmark than that based on "Observed Effects" data (4.0 ppm).

TABLE 9-16

COMPARIONS OF METAL CONCENTRATION RANGES IN OU2 EXOPOSURE AREA SEDIMENT TO
NORMAL METAL CONCENTRATIONS IN MASSACHUSETTS LAKE SEDIMENTS
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island
(mg/kg)

Contaminant	Normal [1] Concentrations In Massasciusetts Lake Sediments	Sedimentation Ponds 2 &3 and Channels		Sedimentation Pond 4	Upper Simmons Reservoir		Lower Simmons Reservoir		Almy Reservoir		Almy Reservoir Watershed	
		Average	Max	Average	Average	Max	Average	Max	Average	Max	Average	Max
Metals												
Arsenic, total	< 25	4.44	10.8	ND	3.93	13.8	9.7	16.3	10.3	12.2	1.72	3
Cadmium, total	< 5	0.26	0.89	ND	1.81	4.7	4.4	5.9	3.27	4.3	3.88	6.9
Chromium, total	< 30	32	76.2	8.4	12.0	19.8	19	32.9	10.5	11.9	8.83	22.8
Copper, total	< 70	37	81.8	10.9	20.5	36.1	22.1	37.2	26.2	31	8.98	18.4
Iron, total	< 30,000	24,228	37,100	9,470	14,532	37,500	24,666	34,800	25,550	29,600	12,292	22,500
Lead, total	< 200	68	179	ND	43.1	87.9	61.7	93	194	262	139	187
Manganese, total	< 350	673	1210	144	481	1130	8,422	13,900	691	1,050	2,477	8,670
Mercury, total	< 0.35	0.17	0.6	ND	0.13	0.16	0.24	0.37	0.42	0.5	0.35	0.41
Nickel, total	< 35	11	24.7	3.2	13.6	55.4	16.4	35.4	ND		5.59	13.2
Vanadium, total	< 60	25	42.7	11.4	39	223	40.8	80.3	48.3	51.9	18	25.7
Zinc, total	< 250	224	467	24	144	351	268	438	497	629	344	754

Notes:
1. From Rojoko, 1996.

TABLE 9-17

SURFICIAL SOIL
SELECTION OF CONTAMINANTS OF CONCERN
Central Landfill - OU2
Johnston, Rhode Island
(mg/kg)

Contaminant	Benchmark [2]		Maximum Detected	Arithmetic Mean Concentration	Background Maximum	Retained?	Comments [1]
Volatile Organic Compounds							
1,1,1-Trichloroethane	-		0.092	0.019	0.017	Yes	No bnchmk available
1,1-Dichloroethane	20	[4]	0.022	0.0067	0.006	No	max < bnchmk
Methyl ethyl ketone	-		0.0020	0.002	ND	Yes	No bnchmk available
Toluene	200	P	0.0020	0.0013	ND	No	max < bnchmk
Xylenes	20	[4]	0.0030	0.0025	ND	No	max < bnchmk
Semivolatile Organic Compounds							
2-Methylphenol	-		0.13	0.13	ND	Yes	No bnchmk available
Anthracene	-		0.073	0.073	ND	Yes	No bnchmk available
Benzo(a)anthracene	-		0.29	0.16	ND	Yes	No bnchmk available
Benzo(a)pyrene	-		0.28	0.17	ND	Yes	No bnchmk available
Benzo(b)fluoranthene	-		0.59	0.19	ND	Yes	No bnchmk available
Benzo(g,h,i)perylene	-		0.15	0.13	ND	Yes	No bnchmk available
Benzo(k)fluoranthene	-		0.18	0.12	ND	Yes	No bnchmk available
bis(2-Ethylhexyl)phthalate	-		24	2.4	0.098	Yes	No bnchmk available
Carbazole	-		0.075	0.075	ND	Yes	No bnchmk available
Chrysene	-		0.35	0.14	ND	Yes	No bnchmk available
Di-n-butylphthalate	200	P	0.17	0.11	ND	No	max < bnchmk
Fluoranthene	-		0.63	0.21	0.055	Yes	No bnchmk available
Indeno(1,2,3-c,d)pyrene	-		0.11	0.076	ND	Yes	No bnchmk available
Phenanthrene	-		0.42	0.17	ND	Yes	No bnchmk available
Pyrene	-		0.77	0.25	0.067	Yes	No bnchmk available
Pesticides/PCBs							
4,4'-DDD	-		0.010	0.0037	ND	Yes	Bioaccumulative
4,4'-DDE	-		0.037	0.0099	0.0140	Yes	Bioaccumulative
4,4'-DDT	-		0.11	0.022	0.0087	Yes	Bioaccumulative
Aldrin	-		0.0037	0.0015	ND	Yes	Bioaccumulative
alpha-Chlordane	-		0.0040	0.0017	ND	Yes	Bioaccumulative
Endosulfan-sulfate	-		0.0059	0.0029	ND	Yes	Bioaccumulative
Metals							
Aluminum, total	50	P	12,900	6335	15300	No	max < backgrd max
Arsenic, total	10	P	9.78	4.2	9.6	No	max < bnchmk
Barium, total	500	P	69	33	37.8	No	max < bnchmk
Beryllium, total	10	P	2.88	1.2	4.8	No	max < bnchmk & bckgrd max
Cadmium, total	4	P	0.52	0.18	0.26	No	max < bnchmk
Calcium, total	-		3,150	1050	513	No	
Chromium, total	0.4	E	12.3	6.4	8.3	Yes	
Cobalt, total	20	P	5.80	3.1	5	No	max < bnchmk
Copper, total	50	E	21.7	11	7.1	No	max < bnchmk
Cyanide, total	-		2.50	1.3	ND	Yes	No bnchmk available
Iron, total	-		20,600	10567	18600	Yes	No bnchmk available
Lead, total	50	P	145	66	63.9	Yes	
Magnesium, total	-		1,468	569	956	No	
Manganese, total	500	P	556	194	215	Yes	
Nickel, total	30	P	8.60	4.3	ND	No	max < bnchmk
Potassium, total	-		2620	741	907	No	
Selenium, total	1	P	1.43	0.65	ND	Yes	
Sodium, total	-		405	97	ND	No	
Vanadium, total	2	P	38.9	23	30	Yes	
Zinc, total	50	P	3393	298	85.9	Yes	

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (U).
2. If a location was sampled more than once, the summary statistics are based on the average concentrations at that location.
3. Benchmarks are P = Soil plant toxicity benchmarks or E = Soil invertebrate toxicity benchmarks presented in Efroymson et al. (1997a and b, respectively), unless otherwise noted.
4. Plant benchmark concentrations for trichloroethane and xylenes were presented by Efroymson et al., (1997a) in terms of soil solution as 100 mg/L. These benchmarks were converted to a soil dry weight basis by multiplying by the lowest soil moisture content (0.20, as a fraction) measured for surficial soil samples from OU2.
5. max = Maximum Detected ; bnchmk = Benchmark ; bckgrd max = Background Maximum.

TABLE 9-18

UPPER SIMMONS RESERVOIR
FUTURE SURFACE WATER CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN (mg/l)
Central Landfill - OU2
Johnston, Rhode Island
(mg/l)

	Contaminant	Benchmark	Arithmetic Mean Concentration	Retained?	Commnets
	Semivolatile Organic Compounds				
	bis(2-Ethylhexyl)phthalate	0.012	0.0014	No	Mean < Benchmark
	Di-n-butylphthalate	0.035	0.0007	No	Mean < Benchmark
	Naphthalene	0.012	0.0004	No	Mean < Benchmark
	Pesticides/PCBs				
	4,4'-DDD	0.000011	0.000002	Yes	Bioaccumulative
	4,4'-DDT	0.000013	0.000002	Yes	Bioaccumulative
	Aldrin	0	0.0000009	Yes	Bioaccumulative
	alpha-BHC	0.0022	0.0000009	Yes	Bioaccumulative
	Dieldrin	0.000056	0.000002	Yes	Bioaccumulative
	Endosulfan I	0.000051	0.0000009	Yes	Bioaccumulative
	gamma-BHC(Lindane)	0.00095	0.000001	Yes	Bioaccumulative
	Total Metals				
	Aluminum, total	0.087	0.049	No	Mean < Benchmark
	Antimony, total	0.03	0.015	No	Mean < Benchmark
	Arsenic, total	0.15	0.0003	No	Mean < Benchmark
**	Barium, total	0.004	0.018	Yes	Mean > Benchmark
	Beryllium, total	0.00017	0.0001	No	Mean < Benchmark
	Cadmium, total	0.0037	0.0001	No	Mean < Benchmark
	Calcium, total	-	2.47		
	Chromium, total	0.314	0.0013	No	Mean < Benchmark
	Cobalt, total	0.023	0.0008	No	Mean < Benchmark
	Copper, total	0.0183	0.0005	No	Mean < Benchmark
	Cyanide, total	0.0052	0.0005	No	Mean < Benchmark
	Iron, total	1	0.55	No	Mean < Benchmark
	Lead, total	0.006	0.0008	No	Mean < Benchmark
	Magnesium, total	-	1.45		
	Manganese, total	4.33	0.12	No	Mean < Benchmark
	Mercury, total	0.00077	0.00001	No	Mean < Benchmark
	Nickel, total	0.243	0.0033	No	Mean < Benchmark
	Potassium, total	-	3.59		
	Selenium, total	0.0046	0.0005	No	Mean < Benchmark
	Sodium, total	-	11.6		
**	Thallium, total	0.001	0.0057	Yes	Mean > Benchmark
	Vanadium, total	0.020	0.0015	No	Mean < Benchmark
	Zinc, total	0.163	0.011	No	Mean < Benchmark

Notes:

1. ** Indicates that the maximum detected concentration was greater than the maximum background concentration, and both the average and maximum concentrations were greater than the benchmark. Site values were considered to be "greater than" if they were more than 5 percent higher than the background or the benchmark (i.e., ratio or TQ greater than 1.05).

TABLE 9-19

ALMY RESERVOIR
FUTURE SURFACE WATER CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN
Central Landfill - OU2
Johnston, Rhode Island
(mg/l)

Contaminant	Benchmark	Arithmetic Mean Concentration	Retained?	Comments
Semivolatile Organic Compounds				
2-Methylphenol	0.013	0.00005714	No	Mean < Benchmark
bis(2-Ethylhexyl)phthalate	0.012	0.00017	No	Mean < Benchmark
Di-n-butylphthalate	0.035	0.000048	No	Mean < Benchmark
Pesticides/PCBs				
Dieldrin	0.000056	0.00000051	Yes	Bioaccumulative
Total Metals				
Aluminum, total	0.087	0.02168	No	Mean < Benchmark
Barium, total	0.004	0.0014	No	Mean < Benchmark
Beryllium, total	0.00017	0.00009	No	Mean < Benchmark
Cadmium, total	0.0008	0.00004	No	Mean < Benchmark
Calcium, total	-	0.03496		
Chromium, total	0.067	0.00022	No	Mean < Benchmark
Copper, total	0.004	0.00013	No	Mean < Benchmark
Cyanide, total	0.005	0.0008	No	Mean < Benchmark
Iron, total	1	0.13724	No	Mean < Benchmark
Lead, total	0.0005	0.00026	No	Mean < Benchmark
Magnesium, total	-	0.01457		
Manganese, total	4.33	0.00581	No	Mean < Benchmark
Mercury, total	0.00077	0.00005	No	Mean < Benchmark
Nickel, total	0.0488	0.0002	No	Mean < Benchmark
Potassium, total	-	0.01457		
Selenium, total	0.00461	0.00008	No	Mean < Benchmark
Sodium, total	-	0.06391		
Zinc, total	0.0327	0.00479	No	Mean < Benchmark

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND), and one time the method detection limit was used to represent the concentrations of constituents reported as "BMQL".
2. If a location was sampled more than once, the summary statistics are based on the average concentration over time at that location.

TABLE 9-20

SUMMARY OF SURFACE WATER CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN BY EXPOSURE AREA
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Sedimentation Pond 4	Sedimentation Ponds 2 & 3 and Stream Channels	Upper Simmons Reservoir	Lower Simmons Reservoir	Almy Reservoir	Almy Watershed
		1,2-Dichlorobenzene			
		1,4-Dichlorobenzene			
		Chlorobenzene			Carbon Disulfide
					Tetrachloroethene
Butylbenzylphthalate		Butylbenzylphthalate			Butylbenzylphthalate
	Phenol				
	Aldrin		4,4'-DDT		
		delta-BHC	Aldrin		
			Endosulfan I		
Barium, total	Aluminum, total	Aluminum, total	Aluminum, total		
	Barium, total	Barium, total	Barium, total		
	Beryllium, total			Copper, total	
	Cyanide, total	Cyanide, total			
	Iron, total		Iron, total		
	Mercury, total	Manganese, total			
		Selenium, total			
			Silver, total		Silver, total
	Zinc, total	Thallium, total			
	Barium, dissolved	Barium, dissolved	Barium, dissolved		
		Copper, dissolved		Copper, dissolved	Copper, dissolved
					Lead, dissolved
		Manganese, dissolved			
	Selenium, dissolved	Selenium, dissolved			
	Ammonia	Ammonia	Ammonia		

TABLE 9-21

SUMMARY OF SEDIMENT CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN BY EXPOSURE AREA
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Sedimentation Pond 4	Sedimentation Ponds 2 & 3 and Stream Channels	Upper Simmons Reservoir	Lower Simmons Reservoir	Almy Reservoir	Almy Waterbed
	Acetone	Acetone Carbon Disulfide	Acetone		
		Styrene	Chloromethane		
		Acenaphthylene			
	4-Methylphenol		4-Chloro-3-methylphenol		
	Benzo(a)anthracene	Benzo(a)anthracene			
	Benzo(a)pyrene	Benzo(a)pyrene			
	Benzo(b)fluoranthene	Benzo(b)fluoranthene			
	Carbazole	Carbazole			
	Phenol				
	Pyrene				
		4,4'-DDD	4,4'-DDD		4,4'-DDD
		4,4'DDE	4,4'-DDE		4,4'-DDE
		4,4'-DDT			4,4'-DDT
	Aldrin	Aldrin			
	alpha-Chlordane	alpha-Chlordane	alpha-Chlordane		
		delta-BHC	delta-BHC		
		Endosulfan-sulfate			
		Endosulfan I	Endosulfan I		
					Endosulfan II
	gamma-Chlordane	gamma-Chlordane			
		Methoxychlor			
		PCB 1232			
		PCB 1242			
		PCB 1254			
	Arsenic	Arsenic	Arsenic	Aresenic	
Barium	Barium	Barium	Barium	Barium	Barium
		Beryllium	Beryllium	Beryllium	Beryllium
		Cadmium	Cadmium	Cadmium	Cadmium
	Chromium	Chromium	Chromium		
	Copper	Copper	Copper	Copper	Copper
		Cyanide	Cyanide		
	Iron	Iron	Iron	Iron	Iron
				Lead	
	Manganese	Manganese	Manganese	Manganese	Manganese
	Mercury			Mercury	
	Nickel	Nickel	Nickel		
			Selenium		Selenium
			Thallium	Thallium	Thallium
	Vanadium	Vanadium	Vanadium	Vanadium	
	Zinc	Zinc	Zinc	Zinc	Zinc

TABLE 9-22

SURFICIAL SOIL DATA COMPARED TO TYPICAL CONCENTRATIONS
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Maximum Detected (mg/kg)	Arithmetic Mean Concentration (mg/kg)	Conterminous United States[3]		90th Percentile MA DEP[4] Non-Urban Background
			Average	Range	
Metals					
Chromium, total	12.3	6.4	54	1 - 2,000	29
Cyanide, total	2.5	1.3	NA	NA	NA
Iron, total	20600	10567	26,000	100 - >100,000	17,000
Lead, total	145	66	19	<10 - 700	99
Manganese, total	556	194	550	<2 - 7,000	300
Selenium, total	1.43	0.65	8.9	<5 - 50	0.5
Vanadium, total	38.9	23	80	<7 - 500	29
Zinc, total[2]	3393	298	60	<5 - 2,900	116

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND), and one time the method detection limit was used to represent the concentrations of constituents reported as "BMQL".
2. If anomolous high detectection in sample SS95-02 (6702 ppm for first round, average of 3393 ppm between the two rounds) is eliminated, the average concentration of zinc is about 76 ppm.
3. These values are from Shacklette, H.T., and J.G. Boerngen, 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S.G.S. Professional Paper 1270.
4. From Massachusetts Department of Environmental Protection, 1996. Guidance for Disposal Site Risk Characterization in Support of Massachusetts Contingency Plan. Interim Final Policy WSC/ORS-95-141. Section 9.0, Method 3 Environmental Risk Characterization. Massachusetts Protection, Office of Research and Standards. April.

TABLE 9-23

UPPER SIMMONS RESERVOIR SURFACE WATER
TOXICITY TEST SAMPLE SET COMPARED TO DRAFT RISK ASSESSMENT SAMPLE SET (ppm)

Constituent	Frequency of Detection		Maximum Detected		Location of Maximum Detected Concentration		Average Concentrations	
	Toxicity Samples	Draft RA Data	Toxicity Samples	Draft RA Data	Toxicity Samples	Draft RA Samples	Toxicity Samples	Draft RA Data
Volatile Organic Compounds								
1,1,2-Trichloroethane	0 / 3	1 / 10	ND	0.0006	ND	SW95-42	ND	0.0005
1,2-Dichlorobenzene	0 / 3	1 / 10	ND	0.002	ND	SW95-42	ND	0.0007
1,2-Dichloropropane	0 / 0	1 / 10	ND	0.0008	ND	SW95-42	NA	0.0005
1,4-Dichlorobenzene	0 / 3	2 / 10	ND	0.004	ND	SW95-42	ND	0.0010
Acetone	3 / 3	0 / 10	0.004	ND	SW98-51	ND	0.0030	ND
Benzene	0 / 3	2 / 10	ND	0.002	ND	SW95-42	ND	0.0007
Carbon Tetrachloride	0 / 3	1 / 10	ND	0.0007	ND	SW95-42	ND	0.0005
Chlorobenzene	1 / 3	6 / 10	0.003	0.088	SW98-51	SW95-42	0.0013	0.0126
cis-1,2-Dichloroethene	0 / 3	1 / 10	ND	0.0008	ND	SW95-42	ND	0.0005
Tetrachloroethene	0 / 3	1 / 10	ND	0.0006	ND	SW95-42	ND	0.0005
Semivolatile Organic Compounds								
bis(2-Ethylhexyl)phthalate	0 / 3	1 / 10	ND	0.006	ND	SW95-42	ND	0.0029
Butylbenzylphthalate	0 / 3	3 / 10	ND	0.004	ND	SW95-04	ND	0.0028
Di-n-butylphthalate	0 / 3	1 / 10	ND	0.002	ND	SW95-04	ND	0.0020
Diethylphthalate	1 / 3	0 / 10	0.002	ND	SW98-52	ND	0.0020	ND
Pesticides/PCBs								
delta-BHC	0 / 3	1 / 10	ND	0.000012	ND	SW95-42	ND	0.0000058

TABLE 9-23

UPPER SIMMONS RESERVOIR SURFACE WATER
TOXICITY TEST SAMPLE SET COMPARED TO DRAFT RISK ASSESSMENT SAMPLE SET (ppm)

Constituent	Frequency of Detection		Maximum Detected		Location of Maximum Detected Concentration		Average Concentrations	
	Toxicity Samples	Draft RA Data	Toxicity Samples	Draft RA Data	Toxicity Samples	Draft RA Samples	Toxicity Samples	Draft RA Data
Dissolved Metals								
Barium (Ba)	3 / 3	8 / 8	0.044	0.167	SW98-51	SW95-42	0.0380	0.0721
Cobalt (Co)	0 / 3	1 / 8	ND	0.0027	ND	SW95-42	ND	0.0007
Copper (Cu)	1 / 3	1 / 8	0.01	0.0148	SW98-50	SW95-09	0.0041	0.0029
Iron (Fe)	0 / 3	2 / 8	ND	0.605	ND	SW95-43	ND	0.145
Magnesium (Mg)	3 / 3	8 / 8	9.83	37.8	SW98-52	SW95-42	9.13	15.9
Manganese (Mn)	3 / 3	8 / 8	2.21	11.6	SW98-51	SW95-42	1.84	2.77
Nickel (Ni)	1 / 3	1 / 8	0.0063	0.0154	SW98-51	SW95-42	0.004	0.005
Selenium (Se)	0 / 3	6 / 8	ND	0.0179	ND	SW95-42	ND	0.008
Vanadium (V)	0 / 3	2 / 8	ND	0.011	ND	SW95-42	ND	0.004
Zinc (Zn)	3 / 3	0 / 7	0.0088	ND	SW98-52	ND	0.007	ND
Wet Chemistry								
Ammonia (N)	3 / 3	10 / 10	12	33	SW98-51	SW95-42	5.63	1.17E+01

Note:

1. NA = Not Analyzed; ND = Not Detected.

TABLE 9-24

LOWER SIMMONS RESERVOIR SURFACE WATER
COMPARISONS OF CHEMICAL DATA BETWEEN SAMPLES COLLECTED FOR TOXICITY TESTS
AND PREVIOUSLY COLLECTED SAMPLES (ppm)

Constituent	Frequency of Detection		Maximum Detected		Location of Maximum Detected Concentration		Average Concentrations	
	Toxicity Samples	Previous Samples	Toxicity Samples	Previous Samples	Toxicity Samples	Previous Samples	Toxicity Samples	Previous Samples
Pesticides/PCBs								
4,4'-DDT	1 / 2	0 / 6	0.0001	ND	SW98-54	ND	0.00006	ND
Aldrin	1 / 2	0 / 6	0.000025	ND	SW98-54	ND	0.00002	ND
Endosulfan I	1 / 2	0 / 6	0.000011	ND	SW98-54	ND	0.00001	ND
Dissolved Metals								
Arsenic (As)	0 / 2	1 / 5	ND	0.0036	ND	SW95-02	ND	0.0026
Barium (Ba)	0 / 2	3 / 5	ND	0.058	ND	SW95-03	ND	0.0555
Beryllium (Be)	0 / 2	1 / 5	ND	0.0006	ND	SW95-02	ND	0.00035
Chromium (Cr)	0 / 2	1 / 5	ND	0.0022	ND	SW95-02	ND	0.0012
Cobalt (Co)	0 / 2	1 / 5	ND	0.002	ND	SW95-02	ND	0.0010
Copper (Cu)	0 / 2	1 / 5	ND	0.0053	ND	SW95-02	ND	0.0032
Iron (Fe)	1 / 2	1 / 5	0.111	0.0374	SW98-53	SW95-02	0.07	0.0181
Manganese (Mn)	2 / 2	3 / 5	1.07	1.71	SW98-54	SW95-02	1.05	1.51
Nickel (Ni)	0 / 2	2 / 5	ND	0.007	ND	SW95-01	ND	0.005
Selenium (Se)	0 / 2	2 / 5	ND	0.0077	ND	SW95-02	ND	0.006
Vanadium (V)	0 / 2	1 / 5	ND	0.0063	ND	SW95-01	ND	0.004
Zinc (Zn)	1 / 2	0 / 4	0.0055	ND	SW98-54	ND	0.0038	ND
Wet Chemistry								
Ammonia (N)	2 / 2	3 / 6	5.7	5	SW98-53	SW95-03	4.1	2.99

Note:
1. NA = Not Analyzed; ND = Not Detected.

TABLE 9-25
RESULTS OF QUALITATIVE PLANKTON ANALYSIS
Upper and Lower Simmons Reservoirs
Johnston, Rhode Island

Plankton	Upper Simmons			Lower Simmons
	Delta (North End)	North Basin	South Basin	North End
Zooplankton Taxa				
Cladocera				
Bosmina	X	X	X	X
Daphnia		X	X	X
Copopoda				
Calanoidea			X	
Cyclopoidea			X	
nauplii (immatures)		X	X	X
Rotifera				
Asplanchna		X	X	X
Kellicotia		X	X	
Keratella	X	X	X	X
Polyarthra	X	X	X	X
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	X	X	X	X
Fragilaria				X
Navicula				X
Pinnularia				X
Stauroneis				X
Synedra	X	X	X	X
Tabellaria				X
Chlorophyta (green algae)				
Pediastrum			X	X
Scenedesmus	X			
Spirogyra	X	X		X
Chrysophyta (yellow-green algae, excluding diatoms)				
Dinobryon	X	X	X	X
Cyanophyta (blue-green algae)				
Spirulina	X	X		
Phaycus	X	X	X	X
testae rhizopods	X	X	X	X
Taxa Richness	11	14	15	18

Note: All samples collected with a a 35 micron net on May 20, 1998.

TABLE 9-26

UPPER SIMMONS RESERVOIR SEDIMENT
TOXICITY TEST SAMPLE SET COMPARED TO
ALL PREVIOUS SAMPLES (ppm)

Constituent	Frequency of Detection		Maximum Detected		Location of Maximum Detected Concentration		Average Concentrations	
	Toxicity Samples	All Previous Samples	Toxicity Samples	All Previous Samples	Toxicity Samples	All Previous Samples	Toxicity Samples	All Previous Samples
Volatile Organic Compounds								
1,1-Dichloroethane	0 / 3	1 / 16	ND	0.004	ND	SED93-26-O	ND	0.004
2-Hexanone	0 / 3	2 / 16	ND	0.006	ND	SED93-26-O	ND	0.02
Acetone	1 / 3	14 / 16	0.3	0.335	SED98-51	SED93-26-O	0.11	0.10
Benzene	0 / 3	4 / 16	ND	0.021	ND	SED93-29-ORE	ND	0.012
Carbon Disulfide	0 / 3	5 / 16	ND	0.1135	ND	SED93-26-O	ND	0.029
Chlorobenzene	2 / 3	4 / 16	0.006	0.076	SED98-52	SED95-42	0.0045	0.022
Methyl ethyl Ketone	3 / 3	6 / 16	0.072	0.1185	SED98-51	SED93-26-O	0.038	0.03
Methylene Chloride	0 / 3	11 / 16	ND	0.045	ND	SED93-27-O	ND	0.019
Styrene	0 / 3	1 / 16	ND	0.005	ND	SED93-26-O	ND	0.005
Tetrachloroethene	0 / 3	1 / 16	ND	0.012	ND	SED93-26-O	ND	0.009
Toluene	0 / 3	4 / 16	ND	0.041	ND	SED93-22-O	ND	0.018
Trichloroethene	0 / 3	1 / 16	ND	0.003	ND	SED93-22-O	ND	0.003
Xylenes	0 / 3	1 / 16	ND	0.02	ND	SED93-26-O	ND	0.013
Semivolatile Organic Compounds								
2-Methylnaphthalene	1 / 3	1 / 13	0.04	0.047	SED98-51	SED93-21-I	0.039	0.047
Acenaphthene	1 / 3	1 / 13	0.0755	0.062	SED98-51	SED93-21-I	0.076	0.062
Acenaphthylene	1 / 3	2 / 13	0.05	0.059	SED98-51	SED93-21-I	0.050	0.036
Anthracene	2 / 3	4 / 13	0.22	0.15	SED98-51	SED93-21-I	0.14	0.098
Benzo(a)anthracene	3 / 3	7 / 13	0.7	0.59	SED98-51	SED95-42	0.36	0.31
Benzo(a)pyrene	3 / 3	8 / 13	0.545	0.5	SED98-51	SED95-42	0.31	0.25
Benzo(b)fluoranthene	3 / 3	8 / 13	0.985	0.71	SED98-51	SED95-42	0.51	0.28
Benzo(g,h,i)perylene	2 / 3	4 / 13	0.185	0.21	SED98-51	SED95-42	0.15	0.13
Benzo(k)fluoranthene	3 / 3	7 / 13	0.2525	0.056	SED98-51	SED93-21-I	0.19	0.17
bis(2-Ethylhexyl)phthalate	3 / 3	13 / 13	2.7	18	SED98-51	SED95-43	1.33	1.75

TABLE 9-26

UPPER SIMMONS RESERVOIR SEDIMENT
TOXICITY TEST SAMPLE SET COMPARED TO
ALL PREVIOUS SAMPLES (ppm)

Constituent	Frequency of Detection		Maximum Detected		Location of Maximum Detected Concentration		Average Concentrations	
	Toxicity Samples	All Previous Samples	Toxicity Samples	All Previous Samples	Toxicity Samples	All Previous Samples	Toxicity Samples	All Previous Samples
Butylbenzylphthalate	1 / 3	3 / 13	0.345	0.05	SED98-51	SED93-21-O	0.28	0.036
Carbazole	1 / 3	1 / 2	0.16	0.065	SED98-51	SED95-42	0.16	0.065
Chrysene	3 / 3	9 / 13	0.775	0.62	SED98-51	SED95-42	0.41	0.28
Di-n-butylphthalate	1 / 3	11 / 13	0.03	0.2	SED98-51	SED93-21-O	0.028	0.143
Di-n-octylphthalate	1 / 3	1 / 2	0.495	23.5	SED98-51	SED95-43	0.35	11.9
Dibenz(a,h)anthracene	2 / 3	1 / 2	0.357	0.065	SED98-51	SED95-42	0.2	0.065
Dibenzofuran	1 / 3	1 / 13	0.3215	0.039	SED98-51	SED93-21-I	0.27	0.039
Diethylphthalate	0 / 3	4 / 13	ND	0.92	ND	SED93-24-I	ND	0.3
Dimethylphthalate	0 / 3	1 / 13	ND	0.03	ND	SED93-27-I	ND	0.03
Fluoranthene	3 / 3	12 / 13	1.45	1.1	SED98-51	SED95-42	0.70	0.31
Fluorene	1 / 3	3 / 13	0.105	0.023	SED98-51	SED93-21-I	0.11	0.06
Indeno(1,2,3-c,d)pyrene	2 / 3	3 / 13	0.2	0.1	SED98-51	SED93-21-I	0.16	0.17
Naphthalene	1 / 3	1 / 13	0.051	0.036	SED98-51	SED93-21-I	0.051	0.036
Phenanthrene	3 / 3	8 / 13	0.975	0.51	SED98-51	SED93-21-I	0.43	0.24
Phenol	0 / 3	1 / 13	ND	0.026	ND	SED93-27-I	ND	0.026
Pyrene	3 / 3	12 / 13	1.65	1.2	SED98-51	SED95-42	0.73	0.26
Pesticides/PCBs								
4,4'-DDD	3 / 3	5 / 10	0.013	0.012	SED98-50	SED93-26-I	0.008	0.006
4,4'-DDE	2 / 3	3 / 10	0.012	0.0028	SED98-52	SED93-26-I	0.008	0.004
4,4'-DDT	3 / 3	3 / 10	0.047	0.0018	SED98-50	SED93-21-I	0.020	0.003
Aldrin	0 / 3	3 / 10	ND	0.0017	ND	SED95-06	ND	0.002
alpha-Chlordane	2 / 3	2 / 10	0.0057	0.0035	SED98-52	SED93-21-I	0.004	0.002
delta-BHC	3 / 3	0 / 6	0.0093	ND	SED98-52	ND	0.007	NCC
Endosulfan-sulfate	1 / 3	0 / 6	0.0026	ND	SED98-51	ND	0.002	NCC
Endosulfan I	1 / 3	0 / 6	0.01	ND	SED98-52	ND	0.003	NCC
gamma-Chlordane	2 / 3	2 / 10	0.0027	0.0022	SED98-52	SED93-21-I	0.002	0.002
Methoxychlor	1 / 3	0 / 6	0.01	ND	SED98-51	ND	0.009	NCC
PCB 1232	2 / 3	0 / 6	0.064	ND	SED98-52	ND	0.050	NCC

TABLE 9-26

UPPER SIMMONS RESERVOIR SEDIMENT
TOXICITY TEST SAMPLE SET COMPARED TO
ALL PREVIOUS SAMPLES (ppm)

Constituent	Frequency of Detection		Maximum Detected		Location of Maximum Detected Concentration		Average Concentrations	
	Toxicity Samples	All Previous Samples	Toxicity Samples	All Previous Samples	Toxicity Samples	All Previous Samples	Toxicity Samples	All Previous Samples
PCB 1242	0 / 3	2 / 10	ND	0.06	ND	SED93-21-I	ND	0.039
PCB 1254	2 / 3	2 / 10	0.087	0.074	SED98-52	SED93-21-I	0.058	0.039
PCB 1260	0 / 3	1 / 10	ND	0.062	ND	SED93-26-I	ND	0.033
Metals								
Aluminum, total	3 / 3	19 / 19	21300	34400	SED98-50	SED93-30-I	12,490	16,371
Arsenic, total	3 / 3	8 / 10	13.8	6.7	SED98-50	SED95-43	8.13	2.71
Barium, total	3 / 3	19 / 19	145	222	SED98-50	SED93-27-I	96.8	95.5
Beryllium, total	3 / 3	10 / 10	29.8	22.5	SED98-50	SED93-26-O	12.6	11.7
Cadmium, total	3 / 3	10 / 10	4.7	2.6	SED98-50	SED93-23-O	2.44	1.59
Chromium, total	3 / 3	11 / 11	19.8	18.7	SED98-50	SED93-26-I	14.6	11.1
Cobalt, total	3 / 3	14 / 19	12.2	13.5	SED98-50	SED93-27-I	8.07	5.08
Copper, total	3 / 3	8 / 10	34	37	SED98-50	SED93-24-I	29	21
Cyanide, total	3 / 3	1 / 3	14.9	ND	SED98-50	ND	8.00	0.483
Iron, total	3 / 3	19 / 19	26900	56500	SED98-50	SED93-27-I	19,937	19,132
Lead, total	3 / 3	19 / 19	87.9	104	SED98-50	SED93-26-I	71.0	43.2
Manganese, total	3 / 3	19 / 19	1130	1340	SED98-50	SED93-27-I	753	579
Mercury, total	0 / 3	9 / 19	ND	0.3	ND	SED93-27-I	ND	0.17
Nickel, total	3 / 3	15 / 19	22.7	55.4	SED98-52	SED93-23-I	16.97	17
Selenium, total	0 / 3	7 / 10	ND	2.05	ND	SED93-26-O	ND	0.97
Vanadium, total	3 / 3	19 / 19	58.5	223	SED98-52	SED93-23-I	40	59
Zinc, total	3 / 3	19 / 19	351	483	SED98-50	SED93-27-I	231	184

Note:

1. NA = Not Analyzed; ND = Not Detected.

TABLE 9-27

LOWER SIMMONS RESERVOIR SEDIMENT
COMPARISONS OF CHEMICAL DATA BETWEEN SAMPLES COLLECTED FOR TOXICITY TESTS
AND PREVIOUSLY COLLECTED SAMPLES (ppm)

Constituent	Frequency of Detection		Maximum Detected		Location of Maximum Detected Concentration		Average Concentrations	
	Toxicity Samples	Draft RA Samples	Toxicity Samples	Draft RA Samples	Toxicity Samples	Draft RA Samples	Toxicity Samples	Draft RA Samples
Volatile Organic Compounds								
Acetone	2 / 2	2 / 3	0.22	0.18	SED98-53	SED95-01	0.18	0.091
Chloromethane	2 / 2	0 / 3	0.004	ND	SED98-53	ND	0.0035	ND
Methyl ethyl Ketone	2 / 2	2 / 3	0.044	0.057	SED98-53	SED95-01	0.039	0.029
Semivolatile Organic Compounds								
4-Chloro-3-methylphenol	0 / 2	1 / 3	ND	0.057	ND	SED95-03	ND	0.057
Anthracene	1 / 2	0 / 3	0.068	ND	SED98-54	ND	0.264	ND
Benzo(a)anthracene	1 / 2	0 / 3	0.094	ND	SED98-54	ND	0.277	ND
Benzo(a)pyrene	1 / 2	0 / 3	0.115	ND	SED98-54	ND	0.288	ND
Benzo(b)fluoranthene	2 / 2	0 / 3	0.21	ND	SED98-54	ND	0.17	ND
Benzo(k)fluoranthene	1 / 2	0 / 3	0.098	ND	SED98-54	ND	0.279	ND
bis(2-Ethylhexyl)phthalate	1 / 2	1 / 3	0.35	0.38	SED98-54	SED95-03	0.405	0.352
Butylbenzylphthalate	0 / 2	1 / 3	ND	1.9	ND	SED95-02	ND	0.838
Chrysene	1 / 2	0 / 3	0.12	ND	SED98-54	ND	0.29	ND
Fluoranthene	2 / 2	1 / 3	0.165	0.08	SED98-54	SED95-02	0.1475	0.08
Phenanthrene	1 / 2	0 / 3	0.081	ND	SED98-54	ND	0.271	ND
Pyrene	2 / 2	3 / 3	0.20	0.094	SED98-54	SED95-02	0.2	0.078
Pesticides/PCBs								
4,4'-DDD	1 / 2	0 / 3	0.0083	ND	SED98-53	ND	0.005	ND
4,4'-DDE	2 / 2	0 / 3	0.013	ND	SED98-53	ND	0.009	ND
alpha-Chlordane	2 / 2	0 / 3	0.0043	ND	SED98-53	ND	0.004	ND
delta-BHC	2 / 2	0 / 3	0.0079	ND	SED98-53	ND	0.006	ND
Endosulfan I	1 / 2	0 / 3	0.0046	ND	SED98-53	ND	0.003	ND

TABLE 9-27

LOWER SIMMONS RESERVOIR SEDIMENT
COMPARISONS OF CHEMICAL DATA BETWEEN SAMPLES COLLECTED FOR TOXICITY TESTS
AND PREVIOUSLY COLLECTED SAMPLES (ppm)

Constituent	Frequency of Detection		Maximum Detected		Location of Maximum Detected Concentration		Average Concentrations	
	Toxicity Samples	Draft RA Samples	Toxicity Samples	Draft RA Samples	Toxicity Samples	Draft RA Samples	Toxicity Samples	Draft RA Samples
Metals								
Aluminum, total	2 / 2	3 / 3	17000	22400	SED98-53	SED95-01	12170	11627
Antimony, total	0 / 0	1 / 3	ND	1.3	ND	SED95-02	NA	0.71
Arsenic, total	2 / 2	3 / 3	10.9	16.3	SED98-53	SED95-01	9.5	9.87
Barium, total	2 / 2	3 / 3	225	287	SED98-53	SED95-01	205	151
Beryllium, total	2 / 2	3 / 3	18	11.4	SED98-53	SED95-01	13	7.23
Cadmium, total	2 / 2	3 / 3	5.9	4	SED98-53	SED95-01	4.85	2.67
Chromium, total	2 / 2	2 / 3	17	32.9	SED98-53	SED95-02	14.7	21.8
Cobalt, total	2 / 2	3 / 3	16.8	22.6	SED98-53	SED95-01	14.1	13.4
Copper, total	2 / 2	2 / 3	31.6	37.2	SED98-53	SED95-01	25.6	19.7
Cyanide, total	2 / 2	1 / 3	12.1	ND	SED98-53	ND	10.1	1.68
Iron, total	2 / 2	3 / 3	33500	34800	SED98-54	SED95-01	31000	20443
Lead, total	2 / 2	3 / 3	88.3	93	SED98-53	SED95-01	60.2	62.7
Manganese, total	2 / 2	3 / 3	12100	13900	SED98-54	SED95-02	8430	8416
Mercury, total	0 / 2	3 / 3	ND	0.37	ND	SED95-01	ND	0.23
Nickel, total	2 / 2	2 / 3	35.4	20.3	SED98-53	SED95-01	24.2	11
Selenium, total	1 / 2	0 / 3	5	ND	SED98-54	ND	4	ND
Thallium, total	1 / 2	2 / 3	5.9	26.4	SED98-54	SED95-02	4	14
Vanadium, total	2 / 2	2 / 3	80.3	70	SED98-53	SED95-01	52	33
Zinc, total	2 / 2	3 / 3	438	411	SED98-53	SED95-01	325	231

Note:

1. NA = Not Analyzed; ND = Not Detected.

TABLE 9-28

GREAT BLUE HERON FOOD WEB ASSESSMENT
SUMMARY OF TOXICITY QUOTIENTS AND TOTAL HAZARD QUOTIENTS
Central Landfill - OU2 Remedial Investigation
Johnston, Rhode Island

Contaminant	Entire CLF Drainage Area		Upper Simmons Reservoir		Upper Simmons Reservoir North Basin		Lower Simmons Reservoir		Sedimentation Ponds 2 & 3 and Stream Channels		Sedimentation Pond 4	
	LOEL TQ	NOEL TQ	LOEL TQ	NOEL TQ	LOEL TQ	NOEL TQ	LOEL TQ	NOEL TQ	LOEL TQ	NOEL TQ	LOEL TQ	NOEL TQ
Benzo(a)anthracene									1.3	12.7		
Benzo(a)pyrene		1.9							3.1	30.8		
Butylbenzylphthalate		1.9		3.6		2.8					1.4	14.4
DDE						1.2						
DDT	3.7	34.2					6.5	60.2				
Total DDTR	3.8	35.2				2.7	6.6	61.3				
Beryllium		1.3		1.6				1.2				
Mercury (assumed methyl)		4.7							4.0	42.7		
Thallium	7.4	73.6				6.7	12.8	128.5				
Hazard Quotient (organic)	4.3	40.6		4.7		7.8	6.6	61.5	4.5	44.9	1.4	14.4
Hazard Quotient (inorganic)	8.1	81.7		3.9		8.5	13.3	131.9	4.2	44.8		
Total Hazard Quotient (organic + inorganic)	12.4	122.3		8.6	1.6	16.4	19.8	193.4	8.7	89.7	1.5	14.5

Notes:

1. The LOEL and NOEL Toxicity Quotients (TQ) are the Estimated Daily Dose for the contaminant divided by the LOEL and NOEL benchmark, resepectively.
2. The Total Hazard Quotient (HQ) for organics is the sum of the individual toxicity quotients for organic COCs; Total Hazard Quotient for inorganics is the sum of the individual toxicity quotients for inorganic COCs; and the Total Hazard Quotient is the sum of the Total Hazard Quotient for organics and the Total Hazard Quotient for inorganics.
3. Only exceedances (Toxicity Quotients or Hazard Quotients that are greater than one) are presented in this table; The Hazard Quotients may be greater than the TQs less than 1 are included in the HQs.
4. The Total Hazard Quotient (HQ) for organics do not include the individual toxicity quotient for Total DDTR.
5. Total DDTR is the sum of DDE, DDD, and DDT.

TABLE 9-29

AMERICAN ROBIN FOOD WEB ASSESSMENT
SUMMARY OF TOXICITY QUOTIENTS AND TOTAL HAZARD QUOTIENTS
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Based on Average Concentrations		Based on Maximum Concentrations	
	NOAEL TQ	LOAEL TQ	NOAEL TQ	LOAEL TQ
Semivolatile Organic Compounds				
bis(2-Ethylhexyl)phthalate			1.9	
Pesticides/PCBs				
4,4'-DDE			1.9	
4,4'-DDT	2.3		12	1.2
Total DDTR	3.0		14	1.5
Metals				
Chromium, total	1.8		3.5	
Lead, total	10.1	1.0	22	2.2
Zinc, total	19.3	2.1	220	24
Hazard Quotient	39.3	4.43	279	30.8

Notes:

1. The LOEL and NOEL Toxicity Quotients (TQ) are the Estimated Daily Dose for the contaminant divided by the LOEL and NOEL benchmark, resepectively.
2. The LOEL or NOEL Hazard Quotient (HQ) is the sum of the individual LOEL or NOEL Toxicity Quotients for all of the COCs analyzed in the food web.
3. Only exceedances (Toxicity Quotients or Hazard Quotients that are greater than one) are presented in this table; The Hazard Quotients may be greater than the TQs less than 1 are included in the HQs.

TABLE 9-30

MEADOW VOLE FOOD WEB ASSESSMENT
SUMMARY OF TOXICITY QUOTIENTS AND TOTAL HAZARD QUOTIENTS
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Based on Average Concentrations		Based on Maximum Concentrations	
	NOAEL TQ	LOAEL TQ	NOAEL TQ	LOAEL TQ
Vanadium, total			1.01	
Hazard Quotient	0.88	0.14	2.19	0.53

Notes:

1. The LOEL and NOEL Toxicity Quotients (TQ) are the Estimated Daily Dose for the contaminant divided by the LOEL and NOEL benchmark, resepectively.
2. The LOEL or NOEL Hazard Quotient (HQ) is the sum of the individual LOEL or NOEL Toxicity Quotients for all of the COCs analyzed in the food web.
3. Only exceedances (Toxicity Quotients or Hazard Quotients that are greater than one) are presented in this table; The Hazard Quotients may be greater than the TQs less than 1 are included in the HQs.

TABLE 9-31

SHORT-TAILED SHREW FOOD WEB ASSESSMENT
SUMMARY OF TOXICITY QUOTIENTS AND TOTAL HAZARD QUOTIENTS
Central Landfill - OU2
Johnston, Rhode Island

Contaminant	Based on Average Concentrations		Based on Maximum Concentrations	
	NOAEL TQ	LOAEL TQ	NOAEL TQ	LOAEL TQ
Metals				
Chromium, total			1.2	
Lead, total	1.5		3.2	
Selenium, total			1.1	
Vanadium, total	5.4		9	
Zinc, total	2.2	1.1	25	12.6
Hazard Quotient	10.5	2.32	41	15

Notes:

1. The LOEL and NOEL Toxicity Quotients (TQ) are the Estimated Daily Dose for the contaminant divided by the LOEL and NOEL benchmark, resepectively.
2. The LOEL or NOEL Hazard Quotient (HQ) is the sum of the individual LOEL or NOEL Toxicity Quotients for all of the COCs analyzed in the food web.
3. Only exceedances (Toxicity Quotients or Hazard Quotients that are greater than one) are presented in this table; The Hazard Quotients may be greater than the TQs less than 1 are included in the HQs.