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

PREPARED FOR:
Rhode Island Resource Recovery Corporation
Johnston, Rhode Island

PREPARED BY:
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Providence, 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 Child (1 through 7 years of age): Child/Adult (1 through 30 years of age):	95% UCL of the Arithmetic Mean Concentration in Sediment [1]	Chemical-Specific [2]	NA	18 kg [4] 50 kg [4]	NA	3,936 mg [6] 6,501 mg [6]	NA	71 events/year [8]	1 day/event [9]	7 years [10] 30 years [10]	7 years NA	NA 70 years [11]
Incidental Ingestion of Sediment Child (1 through 7 years of age): Child/Adult (1 through 30 years of age):	95% UCL of the Arithmetic Mean Concentration in Sediment [1]	Chemical-Specific [2]	NA	18 kg [4] 50 kg [4]	171 mg/day [3] 117 mg/day [3]	NA	NA	71 events/year [8]	1 day/event [9]	7 years [10] 30 years [10]	7 years NA	NA 70 years [11]
Dermal Contact with Surface Water Child (1 through 7 years of age): Child/Adult (1 through 30 years of age):	95% UCL of the Arithmetic Mean Concentration in Surface Water or (Future) Modeled Concentrations [1]	Chemical-Specific [2]	Chemical-Specific [3]	18 kg [4] 50 kg [4]	NA	NA	7,236 cm² [7] 14,415 cm² [7]	71 events/year [8]	1 hour/event [9]	7 years [10] 30 years [10]	7 years NA	NA 70 years [11]
Incidental Ingestion of Surface Water Child (1 through 7 years of age): Child/Adult (1 through 30 years of age):	95% UCL of the Arithmetic Mean Concentration in Surface Water or (Future) Modeled Concentrations [1]	Chemical-Specific [2]	NA	18 kg [4] 50 kg [4]	0.05 l/hour [5]	NA	NA	71 events/year [8]	1 hour/event [9]	7 years [10] 30 years [10]	7 years NA	NA 70 years [11]
Fish Ingestion Child (1 through 7 years of age): Child/Adult (1 through 30 years of age):	Estimated Concentrations	Chemical-Specific	NA	18 kg [4] 50 kg [4]	68 g/meal [5] 117 g/meal [5]	NA	NA	7 meals/year [8]	NA	7 years [10] 30 years [10]	7 years NA	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/ℓ [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/ℓ [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/ℓ [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.

Tables 8.31-8.32 and 8.43-8.45
(pages 66-143)
are available
in a separate file (size: 4.5 MB).

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Tables 9-1 through 9-31
(pages 144-182)
are available
in a separate file (size: 2 MB).

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