APPENDIX IV-1

Results of Chemical of Potential Concern Selection

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This appendix presents tables summarizing the results of two of the screening procedures used to select chemicals of potential concern (COPC) for quantitative evaluation in the PHERE. By selecting a subset of all the chemical contaminants detected in environmental media, the PHERE is focused on the most significant chemicals with respect to risk

Chemical contaminants that are infrequently detected may be artifacts in the data due to sampling, analytical, or other problems, and therefore might not be related to site operations. Accordingly, any chemical that was detected in less than five percent of the samples taken in each on-site medium is eliminated from further consideration in the risk assessment. The results of the frequency of detection screen are summarized in Table IV-1-1.

Following the frequency of detection screen and the elimination of essential nutrients (i.e., calcium, iron, magnesium, potassium, and sodium), a risk-based concentration (RBC) screening procedure was conducted. The purpose of the RBC screen is to identify the chemicals in a particular environmental medium that, based on concentration and toxicity, are most likely to contribute significantly to risks calculated for exposure scenarios involving that medium. This screening procedure involves the comparison of USEPA Region III's table of risk-based concentrations ("Region III RBCs") with the maximum detected chemical concentrations from the site.

In the RBC screening procedure, the maximum concentration of each chemical in a medium is compared to risk-based concentrations associated with target risks and conservative default exposure assumptions. For the purposes of conducting RBC screens, USEPA Region I has adopted the Region III RBCs, with the following modifications (USEPA 1995d):

- Region I requires the use of a Target Hazard Quotient (THQ) of 0.1 per chemical for screening noncarcinogens. The Region III RBCs for noncarcinogens were calculated based on a THQ of 1.0. Therefore, for the RBC screening procedure in the PHERE, the Region III RBCs for noncarcinogens were reduced by a factor of ten to meet the Region I criteria. For chemicals that potentially have both cancer and noncancer health effects, an RBC based on the carcinogenic potential was also calculated, and the lower of the two RBCs was used. The calculation of RBCs used in this screening procedure is summarized in Table IV-1-2.

- For the soil ingestion pathway, Region III provides RBCs for both industrial and residential scenarios. For RBC screening purposes, Region I requires the use of the residential-based concentrations for this pathway.

The Region III RBCs include screening values for tap water, ambient air, fish, and soil ingestion. The maximum detected concentrations in each of the environmental media were compared to RBC values as follows:

- The soil and sediment data were compared to the residential soil ingestion pathway values.

- The ground water data were conservatively compared to the tap water pathway values.

- The surface water data were compared to Water Quality Criteria (WQC) developed by CTDEP for human health protection based on consumption of water and organisms (CTDEP 1997).

- Because of the relatively low number of constituents detected in the soil gas (five), all of these chemicals were retained for quantitative analysis in the PHERE for this pathway.

- Because the analysis of ground water will be based on a limited number of monitoring wells, as discussed previously, all of the chemicals detected in these wells will be retained for quantitative analysis in the PHERE for this pathway.

- Since the Pre-Envirite Waste Material is located at depth, the exposure pathway of concern for constituents in the waste material is soil-to-air volatilization. Therefore, the Pre-Envirite Waste Material samples were compared to values for the soil-to-air volatilization pathway developed in USEPA's recently updated *Soil Screening Guidance* (SSG) document (USEPA 1996b).[1] SSG values for the soil-to-air pathway are listed in the Region III RBC table. However, these tabulated

[1]If no soil-to-air volatilization value was listed in the SSG for a chemical (USEPA 1996b), the chemical was automatically retained for quantitative evaluation if a toxicity value is available for that chemical. Chemicals for which toxicity values are not available are discussed qualitatively in Chapter IV.D.2.

values were taken from an older version of the SSG (USEPA 1994b). For the PHERE, values from the most recent SSG were used.

The results of the RBC screen are summarized in Table IV-1-3.

TABLE IV-1-1
Results of Frequency of Detection Screen

Medium[1]	Chemical	Detects	Samples	Detection Frequency	Retained
SD	Acenaphthene	4	38	0.11	X
SD	Acetone	25	39	0.64	X
SD	Aldrin	4	18	0.22	X
SD	Anthracene	12	38	0.32	X
SD	Arsenic	3	22	0.14	X
SD	Benzo[a]pyrene	23	38	0.61	X
SD	Benzo[b]fluoranthene	25	38	0.66	X
SD	Benzo[k]fluoranthene	25	38	0.66	X
SD	Bis(2-ethylhexyl)phthalate	7	38	0.18	X
SD	Bromodichloromethane	1	39	0.03	
SD	2-Butanone	9	39	0.23	X
SD	Butylbenzylphthalate	3	38	0.08	X
SD	Cadmium	6	22	0.27	X
SD	Chloroform	25	39	0.64	X
SD	4,4'-DDT	1	18	0.06	X
SD	Dibenzofuran	4	38	0.11	X
SD	Dibutyl phthalate	22	38	0.58	X
SD	1,2-Dichloroethylene (cis)	1	39	0.03	
SD	Dieldrin	2	18	0.11	X
SD	Diethylphthalate	16	38	0.42	X
SD	Fluoranthene	29	38	0.76	X
SD	Fluorene	14	38	0.37	X
SD	Heptachlor	3	18	0.17	X
SD	Lead	20	22	0.91	X
SD	Methoxychlor	3	18	0.17	X
SD	Naphthalene	1	38	0.03	
SD	Nickel	21	22	0.95	X
SD	Phenanthrene	27	38	0.71	X
SD	Pyrene	29	38	0.76	X
SD	Silver	5	22	0.23	X
SD	Tetrachloroethylene (PCE)	2	39	0.05	X
SD	Toluene	1	39	0.03	
SD	Trichloroethene	1	39	0.03	
SD	2,4,5-Trichlorophenol	1	38	0.03	
SD	Vanadium	1	22	0.05	
SL	Acenaphthene	29	165	0.18	X
SL	Acenaphthylene	4	19	0.21	X
SL	Acetone	16	176	0.09	X
SL	Aldrin	1	162	0.01	
SL	Aluminum	60	62	0.97	X
SL	Anthracene	94	165	0.57	X
SL	Antimony	44	217	0.20	X
SL	Aroclor 1254	11	27	0.41	X
SL	Arsenic	149	155	0.96	X
SL	Barium	155	217	0.71	X
SL	Benz[a]anthracene	4	19	0.21	X
SL	Benzene	3	188	0.02	
SL	Benzo(g,h,i)perylene	3	19	0.16	X
SL	Benzo[a]pyrene	115	165	0.70	X
SL	Benzo[b]fluoranthene	119	165	0.72	X

TABLE IV-1-1
Results of Frequency of Detection Screen

Medium[1]	Chemical	Detects	Samples	Detection Frequency	Retained
SL	Benzo[k]fluoranthene	119	165	0.72	X
SL	Beryllium	90	154	0.58	X
SL	BHC, delta	8	161	0.05	
SL	Bis(2-ethylhexyl)phthalate	35	159	0.22	X
SL	Bromodichloromethane	1	188	0.01	
SL	2-Butanone	13	186	0.07	X
SL	Butylbenzylphthalate	16	164	0.10	X
SL	Cadmium	110	218	0.50	X
SL	Carbazole	3	17	0.18	X
SL	*Carbon disulfide*	*5*	*188*	*0.03*	
SL	Carbon tetrachloride	2	188	0.01	
SL	Chlordane	1	22	0.05	
SL	Chlorobenzene	2	188	0.01	
SL	Chloroform	7	188	0.04	
SL	Chloromethane	1	188	0.01	
SL	2-Chlorophenol	3	165	0.02	
SL	Chromium	209	218	0.96	X
SL	Chrysene	6	19	0.32	X
SL	Cobalt	153	216	0.71	X
SL	4,4'-DDD	1	22	0.05	
SL	4,4'-DDE	40	161	0.25	X
SL	4,4'-DDT	100	163	0.61	X
SL	Di-n-Octyl phthalate	59	165	0.36	X
SL	Dibenzo(a,h)anthracene	2	19	0.11	X
SL	Dibenzofuran	36	165	0.22	X
SL	Dibutyl phthalate	41	162	0.25	X
SL	1,2-Dichloroethane	1	188	0.01	
SL	1,1-Dichloroethene	2	188	0.01	
SL	1,2-Dichloroethylene (cis)	32	188	0.17	X
SL	1,2-Dichloroethylene (trans)	8	188	0.04	
SL	2,4-Dichlorophenol	3	165	0.02	
SL	2,6-Dichlorophenol	3	147	0.02	
SL	Dieldrin	7	163	0.04	
SL	Diethylphthalate	30	165	0.18	X
SL	*2,4-Dimethylphenol*	*2*	*18*	*0.11*	X
SL	Endrin aldehyde	10	163	0.06	X
SL	Ethylbenzene	92	188	0.49	X
SL	Fluoranthene	128	165	0.78	X
SL	Fluorene	45	165	0.27	X
SL	HCH (alpha)	1	22	0.05	
SL	HCH (gamma) Lindane	35	162	0.22	X
SL	Heptachlor	1	162	0.01	
SL	Heptachlor epoxide	1	22	0.05	
SL	2-Hexanone	5	187	0.03	
SL	Indeno[1,2,3-cd]pyrene	3	19	0.16	X
SL	Isophorone	2	19	0.11	X
SL	Lead	192	218	0.88	X
SL	Mercury	34	218	0.16	X
SL	Methoxychlor	12	162	0.07	X
SL	4-Methyl-2-pentanone	33	187	0.18	X

TABLE IV-1-1
Results of Frequency of Detection Screen

Medium[1]	Chemical	Detects	Samples	Detection Frequency	Retained
SL	Methylene chloride	26	188	0.14	X
SL	2-Methylnaphthalene	37	165	0.22	X
SL	4-Methylphenol	2	19	0.11	X
SL	2-Methylphenol (o-cresol)	3	19	0.16	X
SL	Naphthalene	41	165	0.25	X
SL	N-Nitrosodimethylamine	5	148	0.03	
SL	N-Nitrosodiphenylamine	4	165	0.02	
SL	PCBs (total)	106	162	0.65	X
SL	Phenanthrene	125	165	0.76	X
SL	Phenol	1	17	0.06	X
SL	Pyrene	135	165	0.82	X
SL	Selenium	20	104	0.19	X
SL	Silver	96	218	0.44	X
SL	Styrene	25	188	0.13	X
SL	Tetrachloroethylene (PCE)	123	188	0.65	X
SL	Thallium	30	154	0.19	X
SL	Tin	31	217	0.14	X
SL	Toluene	130	187	0.70	X
SL	1,1,1-Trichloroethane	8	188	0.04	
SL	Trichloroethene	88	188	0.47	X
SL	2,4,6-Trichlorophenol	3	165	0.02	
SL	2,4,5-Trichlorophenol	3	165	0.02	
SL	Vanadium	134	155	0.86	X
SL	Xylenes (total)	127	185	0.69	X
SW	Acetone	1	40	0.03	
SW	Bis(2-ethylhexyl)phthalate	1	40	0.03	
SW	Copper	2	60	0.03	
SW	Dibutyl phthalate	7	40	0.17	X
SW	HCH (gamma) Lindane	2	20	0.10	X
SW	Manganese	30	60	0.50	X
SW	Mercury	9	60	0.15	X
SW	Methylene chloride	1	40	0.03	
SW	PCBs (total)	2	20	0.10	X
SW	2,4,5,6-Tetrachloro-m-xylene	2	20	0.10	X
SW	Tetrachloroethylene (PCE)	3	40	0.07	X
SW	Trichloroethene	17	40	0.42	X
SW	Zinc	48	60	0.80	X
W-SL	Acenaphthylene	1	3	0.33	X
W-SL	Aldrin	1	2	0.50	X
W-SL	Antimony	4	6	0.67	X
W-SL	Benzene	3	6	0.50	X
W-SL	Benzo[k]fluoranthene	2	3	0.67	X
W-SL	Beryllium	4	6	0.67	X
W-SL	BHC, beta	1	2	0.50	X
W-SL	BHC, delta	1	2	0.50	X
W-SL	Bis(2-chloro-1-methylethyl)ether	1	3	0.33	X
W-SL	Bis(2-ethylhexyl)phthalate	3	6	0.50	X
W-SL	2-Butanone	1	6	0.17	X
W-SL	Butylbenzylphthalate	1	6	0.17	X
W-SL	Cadmium	5	6	0.83	X

TABLE IV-1-1
Results of Frequency of Detection Screen

Medium[1]	Chemical	Detects	Samples	Detection Frequency	Retained
W-SL	Carbon tetrachloride	2	4	0.50	X
W-SL	Chlordane	1	2	0.50	X
W-SL	4-Chloroaniline	3	6	0.50	X
W-SL	Chlorobenzene	1	2	0.50	X
W-SL	Chloroform	1	2	0.50	X
W-SL	4,4'-DDD	1	2	0.50	X
W-SL	4,4'-DDE	1	2	0.50	X
W-SL	4,4'-DDT	1	2	0.50	X
W-SL	Dibutyl phthalate	3	6	0.50	X
W-SL	1,1-Dichloroethene	1	2	0.50	X
W-SL	1,2-Dichloroethylene (cis)	3	6	0.50	X
W-SL	1,2-Dichloroethylene (trans)	3	6	0.50	X
W-SL	Dieldrin	1	2	0.50	X
W-SL	4,6-Dinitro-2-methylphenol	1	3	0.33	X
W-SL	2,4-Dinitrophenol	3	6	0.50	X
W-SL	Endosulfan I	1	2	0.50	X
W-SL	Endosulfan II	1	2	0.50	X
W-SL	Endosulfan sulfate	1	2	0.50	X
W-SL	Endrin	1	2	0.50	X
W-SL	Endrin aldehyde	1	2	0.50	X
W-SL	Endrin ketone	1	2	0.50	X
W-SL	Ethylbenzene	5	6	0.83	X
W-SL	HCH (alpha)	1	2	0.50	X
W-SL	HCH (gamma) Lindane	1	2	0.50	X
W-SL	Heptachlor	1	2	0.50	X
W-SL	Heptachlor epoxide	1	2	0.50	X
W-SL	Hexachlorocyclopentadiene	3	6	0.50	X
W-SL	Isophorone	2	6	0.33	X
W-SL	Mercury	5	6	0.83	X
W-SL	Methoxychlor	1	2	0.50	X
W-SL	4-Methyl-2-pentanone	2	6	0.33	X
W-SL	Naphthalene	5	6	0.83	X
W-SL	3-Nitroaniline	1	3	0.33	X
W-SL	2-Nitrophenol	1	3	0.33	X
W-SL	Pentachlorophenol	2	6	0.33	X
W-SL	Phenol	2	6	0.33	X
W-SL	Selenium	4	6	0.67	X
W-SL	Silver	4	6	0.67	X
W-SL	Styrene	2	6	0.33	X
W-SL	Tetrachloroethylene (PCE)	4	6	0.67	X
W-SL	Thallium	4	6	0.67	X
W-SL	Tin	3	6	0.50	X
W-SL	Toxaphene	1	2	0.50	X
W-SL	Trichloroethene	3	6	0.50	X

[1] SD - Sediment; SL - Soil; SW - Surface Water; W-SL - Pre-Envirite Waste Material

TABLE IV-1-2
Calculation of Risk-Based Concentrations for Use in RBC Screening Procedure

		Res soil			
Contaminant	CAS_RN	noncarc (mg/kg)	carc (mg/kg)	RBC pub (mg/kg)	Value_used (mg/kg)
Acenaphthene	83329	4.7E+02	NT	4.70E+03	4.7E+02
Acenaphthylene	208968	NT	NT	NT	NT
Acetone	67641	7.8E+02	NT	7.80E+03	7.8E+02
Aldrin	309002	2.3E-01	3.8E-02	3.80E-02	3.8E-02
Aluminum	7429905	7.8E+03	NT	7.80E+04	7.8E+03
Anthracene	120127	2.3E+03	NT	2.30E+04	2.3E+03
Antimony	7440360	3.1E+00	NT	3.10E+01	3.1E+00
Aroclor 1254	11097691	1.6E-01	8.3E-02	1.60E+00	8.3E-02
Arsenic	7440382	2.3E+00	4.3E-01	2.30E+01	4.3E-01
Barium	7440393	5.5E+02	NT	5.50E+03	5.5E+02
Benz[a]anthracene	56553	NT	8.7E-01	8.80E-01	8.7E-01
Benzene	71432	NT	2.2E+01	2.20E+01	2.2E+01
Benzo(g,h,i)perylene	191242	NT	NT	NT	NT
Benzo[a]pyrene	50328	NT	8.7E-02	8.80E-02	8.7E-02
Benzo[b]fluoranthene	205992	NT	8.7E-01	8.80E-01	8.7E-01
Benzo[k]fluoranthene	207089	NT	8.7E+00	8.80E+00	8.7E+00
Beryllium	7440417	3.9E+01	1.5E-01	1.50E-01	1.5E-01
BHC, beta	319857	NT	3.5E-01	3.50E-01	3.5E-01
BHC, delta	319868	NT	NT	NT	NT
Bis(2-chloro-1-methylethyl)ether	108601	NT	NT	NT	NT
Bis(2-ethylhexyl)phthalate	117817	1.6E+02	4.6E+01	4.60E+01	4.6E+01
2-Butanone	78933	4.7E+03	NT	4.70E+04	4.7E+03
Butylbenzylphthalate	85687	1.6E+03	NT	1.60E+04	1.6E+03
Cadmium	7440439	3.9E+00	NT	3.90E+01	3.9E+00
Carbazole	86748	NT	3.2E+01	3.20E+01	3.2E+01
Carbon tetrachloride	56235	5.5E+00	4.9E+00	4.90E+00	4.9E+00
Chlordane	57749	4.7E-01	4.9E-01	4.90E-01	4.7E-01
4-Chloroaniline	106478	3.1E+01	NT	3.10E+02	3.1E+01
Chlorobenzene	108907	1.6E+02	NT	1.60E+03	1.6E+02
Chloroform	67663	7.8E+01	1.0E+02	1.00E+02	7.8E+01
Chromium	7440473	3.90E+01	NT	3.90E+02	3.90E+01
Chrysene	218019	NT	8.7E+01	8.80E+01	8.7E+01
Cobalt	7440484	4.7E+02	NT	4.70E+03	4.7E+02
Copper	7440508	3.1E+02	NT	3.10E+03	3.1E+02
4,4'-DDD	72548	NT	2.7E+00	2.70E+00	2.7E+00
4,4'-DDE	72559	NT	1.9E+00	1.90E+00	1.9E+00
4,4'-DDT	50293	3.9E+00	1.9E+00	1.90E+00	1.9E+00
Di-n-Octyl phthalate	117840	1.6E+02	NT	1.60E+03	1.6E+02
Dibenzo(a,h)anthracene	53703	NT	8.7E-02	8.80E-02	8.7E-02
Dibenzofuran	132649	3.1E+01	NT	3.10E+02	3.1E+01
Dibutyl phthalate	84742	7.8E+02	NT	7.80E+03	7.8E+02
1,2-Dichloroethane	107062	NT	7.0E+00	7.00E+00	7.0E+00
1,1-Dichloroethene	75354	7.0E+01	1.1E+00	1.10E+00	1.1E+00
1,2-Dichloroethylene (cis)	156592	7.8E+01	NT	7.80E+02	7.8E+01
1,2-Dichloroethylene (trans)	156605	1.6E+02	NT	1.60E+03	1.6E+02
Dieldrin	60571	3.9E-01	4.0E-02	4.00E-02	4.0E-02
Diethylphthalate	84662	6.3E+03	NT	6.30E+04	6.3E+03
2,4-Dimethylphenol	105679	1.6E+02	NT	1.60E+03	1.6E+02
4,6-Dinitro-2-methylphenol	534521	NT	NT	NT	NT
2,4-Dinitrophenol	51285	1.6E+01	NT	1.60E+02	1.6E+01
Endosulfan I	959988	4.70E+01	NT	4.70E+02	4.70E+01

TABLE IV-1-2
Calculation of Risk-Based Concentrations for Use in RBC Screening Procedure

		Res soil			
Contaminant	CAS_RN	noncarc (mg/kg)	carc (mg/kg)	RBC pub (mg/kg)	Value_used (mg/kg)
Endosulfan II	33213659	4.70E+01	NT	4.70E+02	4.70E+01
Endosulfan sulfate	1031078	NT	NT	NT	NT
Endrin	72208	2.3E+00	NT	2.30E+01	2.3E+00
Endrin aldehyde	7421934	NT	NT	NT	NT
Endrin ketone	53494705	NT	NT	NT	NT
Ethylbenzene	100414	7.8E+02	NT	7.80E+03	7.8E+02
Fluoranthene	206440	3.1E+02	NT	3.10E+03	3.1E+02
Fluorene	86737	3.1E+02	NT	3.10E+03	3.1E+02
HCH (alpha)	319846	NT	1.0E-01	1.00E-01	1.0E-01
HCH (gamma) Lindane	58899	2.3E+00	4.9E-01	4.90E-01	4.9E-01
Heptachlor	76448	3.9E+00	1.4E-01	1.40E-01	1.4E-01
Heptachlor epoxide	1024573	1.0E-01	7.0E-02	7.00E-02	7.0E-02
Hexachlorocyclopentadiene	77474	5.5E+01	NT	5.50E+02	5.5E+01
Indeno[1,2,3-cd]pyrene	193395	NT	8.7E-01	8.80E-01	8.7E-01
Isophorone	78591	1.6E+03	6.7E+02	6.70E+02	6.7E+02
Lead	7439921	NT	NT	NT	NT
Manganese	7439965	1.8E+02	NT	1.80E+03	1.8E+02
Mercury	7439976	2.3E+00	NT	2.30E+01	2.3E+00
Methoxychlor	72435	3.9E+01	NT	3.90E+02	3.9E+01
4-Methyl-2-pentanone	108101	6.3E+02	NT	6.30E+03	6.3E+02
Methylene chloride	75092	4.7E+02	8.5E+01	8.50E+01	8.5E+01
2-Methylnaphthalene	91576	NT	NT	NT	NT
4-Methylphenol	106445	3.9E+01	NT	3.90E+02	3.9E+01
2-Methylphenol (o-cresol)	95487	3.9E+02	NT	3.90E+03	3.9E+02
Naphthalene	91203	3.1E+02	NT	3.10E+03	3.1E+02
Nickel	7440020	1.6E+02	NT	1.60E+03	1.6E+02
3-Nitroaniline	99092	2.3E+01	NT	2.30E+02	2.3E+01
2-Nitrophenol	88755	NT	NT	NT	NT
PCBs (total)	1336363	NT	8.3E-02	8.30E-02	8.3E-02
Pentachlorophenol	87865	2.3E+02	5.3E+00	5.30E+00	5.3E+00
Phenanthrene	85018	3.10E+02	NT	3.10E+03	3.10E+02
Phenol	108952	4.7E+03	NT	4.70E+04	4.7E+03
Pyrene	129000	2.3E+02	NT	2.30E+03	2.3E+02
Selenium	7782492	3.9E+01	NT	3.90E+02	3.9E+01
Silver	7440224	3.9E+01	NT	3.90E+02	3.9E+01
Styrene	100425	1.6E+03	NT	1.60E+04	1.6E+03
2,4,5,6-Tetrachloro-m-xylene	877098	NT	NT	NT	NT
Tetrachloroethylene (PCE)	127184	7.8E+01	1.2E+01	1.20E+01	1.2E+01
Thallium	7440280	6.30E-01	NT	6.30E+00	6.30E-01
Tin	7440315	4.70E+03	NT	4.70E+04	4.70E+03
Titanium	7440326	NT	NT	NT	NT
Toluene	108883	1.6E+03	NT	1.60E+04	1.6E+03
Toxaphene	8001352	NT	5.8E-01	5.80E-01	5.8E-01
1,1,1-Trichloroethane	71556	2.7E+02	NT	2.70E+03	2.7E+02
Trichloroethene	79016	4.7E+01	5.8E+01	5.80E+01	4.7E+01
Vanadium	7440622	5.5E+01	NT	5.50E+02	5.5E+01
Xylenes (total)	1330207	1.60E+04	NT	1.60E+05	1.60E+04
Zinc	7440666	2.30E+03	NT	2.30E+04	2.30E+03

TABLE IV-1-3
Results of Risk Based Concentration Screen

Medium[1]	Chemical	Max. Value[2]	RBC Value[3]	Retained
SD	Acenaphthene	3.30E-01	4.69E+02	
SD	Acetone	3.70E-02	7.82E+02	
SD	Aldrin	2.10E-02	3.76E-02	
SD	Anthracene	4.20E-01	2.35E+03	
SD	Arsenic	1.20E+00	4.26E-01	X
SD	Barium	4.00E+02	5.48E+02	
SD	Benzo[a]pyrene	1.60E+00	8.75E-02	X
SD	Benzo[b]fluoranthene	2.40E+00	8.75E-01	X
SD	Benzo[k]fluoranthene	2.20E+00	8.75E+00	
SD	Bis(2-ethylhexyl)phthalate	4.80E-01	4.56E+01	
SD	2-Butanone	1.00E-02	4.69E+03	
SD	Butylbenzylphthalate	3.30E-01	1.56E+03	
SD	Cadmium	1.10E+00	3.91E+00	
SD	Chloroform	3.60E-02	7.82E+01	
SD	Chromium	7.83E+01	3.91E+01	X
SD	Cobalt	1.00E+01	4.69E+02	
SD	Copper	1.01E+02	3.13E+02	
SD	4,4'-DDT	3.50E-02	1.88E+00	
SD	Dibenzofuran	3.30E-01	3.13E+01	
SD	Dibutyl phthalate	2.60E+00	7.82E+02	
SD	Dieldrin	2.67E-02	3.99E-02	
SD	Diethylphthalate	2.00E+00	6.26E+03	
SD	Fluoranthene	8.00E+00	3.13E+02	
SD	Fluorene	3.30E-01	3.13E+02	
SD	Heptachlor	2.40E-03	1.42E-01	
SD	Lead	4.10E+02	NT	
SD	Methoxychlor	3.20E-02	3.91E+01	
SD	Methylene chloride	4.00E-02	8.52E+01	
SD	Nickel	2.20E+01	1.56E+02	
SD	PCBs (total)	5.00E-02	3.19E-01	
SD	Phenanthrene	3.00E+00	3.13E+02	
SD	Pyrene	2.90E+00	2.35E+02	
SD	Silver	2.20E+00	3.91E+01	
SD	2,4,5,6-Tetrachloro-m-xylene	2.10E-02	NT	
SD	Tetrachloroethylene (PCE)	1.00E-02	1.23E+01	
SD	Zinc	1.70E+02	2.35E+03	
SG	1,2-Dichloroethane	6.39E-01	NS	X
SG	1,1-Dichloroethene	4.00E+00	NS	X
SG	Tetrachloroethylene (PCE)	5.00E+01	NS	X
SG	1,1,1-Trichloroethane	4.65E-01	NS	X
SG	Trichloroethene	7.40E+00	NS	X
SL	Acenaphthene	8.90E+01	4.69E+02	
SL	Acenaphthylene	8.90E+01	NT	
SL	Acetone	1.90E+00	7.82E+02	
SL	Aluminum	8.50E+04	7.82E+03	X
SL	Anthracene	8.90E+01	2.35E+03	
SL	Antimony	5.00E+01	3.13E+00	X
SL	Aroclor 1254	8.20E+00	1.56E-01	X
SL	Arsenic	7.50E+00	4.26E-01	X
SL	Barium	1.49E+02	5.48E+02	

TABLE IV-1-3
Results of Risk Based Concentration Screen

Medium[1]	Chemical	Max. Value[2]	RBC Value[3]	Retained
SL	Benz[a]anthracene	8.90E+01	8.75E-01	X
SL	Benzo(g,h,i)perylene	8.90E+01	NT	
SL	Benzo[a]pyrene	8.90E+01	8.75E-02	X
SL	Benzo[b]fluoranthene	8.90E+01	8.75E-01	X
SL	Benzo[k]fluoranthene	8.90E+01	8.75E+00	X
SL	Beryllium	3.40E+00	1.49E-01	X
SL	Bis(2-ethylhexyl)phthalate	5.60E+02	4.56E+01	X
SL	2-Butanone	2.60E+00	4.69E+03	
SL	Butylbenzylphthalate	8.90E+01	1.56E+03	
SL	Cadmium	3.90E+01	3.91E+00	X
SL	Carbazole	8.90E+01	3.19E+01	X
SL	Chromium	3.82E+03	3.91E+01	X
SL	Chrysene	8.90E+01	8.75E+01	X
SL	Cobalt	2.91E+01	4.69E+02	
SL	Copper	2.84E+04	3.13E+02	X
SL	4,4'-DDE	3.30E-01	1.88E+00	
SL	4,4'-DDT	3.30E-01	1.88E+00	
SL	*Di-n-Octyl phthalate*	*8.90E+01*	*1.56E+02*	
SL	Dibenzo(a,h)anthracene	8.90E+01	8.75E-02	X
SL	Dibenzofuran	8.90E+01	3.13E+01	X
SL	Dibutyl phthalate	8.90E+01	7.82E+02	
SL	1,2-Dichloroethylene (cis)	3.20E+00	7.82E+01	
SL	Diethylphthalate	8.90E+01	6.26E+03	
SL	2,4-Dimethylphenol	8.90E+01	1.56E+02	
SL	Endrin aldehyde	3.30E-01	NT	
SL	Ethylbenzene	6.90E+01	7.82E+02	
SL	Fluoranthene	8.90E+01	3.13E+02	
SL	Fluorene	8.90E+01	3.13E+02	
SL	HCH (gamma) Lindane	3.30E-01	4.91E-01	
SL	Indeno[1,2,3-cd]pyrene	8.90E+01	8.75E-01	X
SL	Isophorone	8.90E+01	6.72E+02	
SL	Lead	8.62E+02	NT	
SL	Manganese	3.80E+02	1.80E+02	X
SL	Mercury	1.20E+00	2.35E+00	
SL	Methoxychlor	9.40E-02	3.91E+01	
SL	4-Methyl-2-pentanone	3.00E+00	6.26E+02	
SL	Methylene chloride	1.60E+00	8.52E+01	
SL	2-Methylnaphthalene	8.90E+01	NT	
SL	4-Methylphenol	8.90E+01	3.91E+01	X
SL	2-Methylphenol (o-cresol)	8.90E+01	3.91E+02	
SL	Naphthalene	2.00E+01	3.13E+02	
SL	Nickel	3.47E+03	1.56E+02	X
SL	PCBs (total)	8.20E+00	3.19E-01	X
SL	Phenanthrene	8.90E+01	3.13E+02	
SL	Phenol	8.90E+01	4.69E+03	
SL	Pyrene	8.90E+01	2.35E+02	
SL	Selenium	2.00E+00	3.91E+01	
SL	Silver	7.85E+01	3.91E+01	X
SL	Styrene	5.00E+00	1.56E+03	
SL	2,4,5,6-Tetrachloro-m-xylene	1.30E-02	NT	

TABLE IV-1-3
Results of Risk Based Concentration Screen

Medium[1]	Chemical	Max. Value[2]	RBC Value[3]	Retained
SL	Tetrachloroethylene (PCE)	4.10E+01	1.23E+01	X
SL	Thallium	1.20E+01	6.26E-01	X
SL	Tin	1.00E+02	4.69E+03	
SL	Titanium	8.80E+03	NT	
SL	Toluene	2.90E+01	1.56E+03	
SL	Trichloroethene	4.30E+01	4.69E+01	
SL	Vanadium	1.23E+02	5.48E+01	X
SL	Xylenes (total)	1.80E+02	1.56E+04	
SL	Zinc	5.80E+03	2.35E+03	X
SW	Dibutyl phthalate	1.00E-02	2.70E+00	
SW	HCH (gamma) Lindane	5.30E-05	1.90E-05	X
SW	Manganese	7.20E-02	NT	
SW	Mercury	5.00E-03	1.40E-04	X
SW	PCBs (total)	1.00E-03	1.70E-07	X
SW	2,4,5,6-Tetrachloro-m-xylene	3.00E-04	NT	
SW	Tetrachloroethylene (PCE)	1.00E-02	8.00E-04	X
SW	Trichloroethene	1.00E-02	2.70E-03	X
SW	Zinc	2.20E-02	NT	
W-SL	Acenaphthylene	3.80E+01	NT	
W-SL	Aldrin	3.60E-03	3.00E+00	
W-SL	Antimony	9.63E+01	NA	X
W-SL	Aroclor 1254	9.50E+00	2.70E+01	
W-SL	Arsenic	2.80E+00	7.50E+02	
W-SL	Barium	1.71E+03	6.90E+05	
W-SL	Benzene	9.40E+01	8.00E-01	X
W-SL	Benzo[b]fluoranthene	5.90E-01	7.20E+00	
W-SL	Benzo[k]fluoranthene	3.80E+01	6.80E+01	
W-SL	Beryllium	8.70E-01	1.30E+03	
W-SL	BHC, beta	3.60E-03	1.00E+00	
W-SL	BHC, delta	3.60E-03	NT	
W-SL	Bis(2-chloro-1-methylethyl)ethe	3.80E+01	NA	X
W-SL	Bis(2-ethylhexyl)phthalate	6.50E+03	3.10E+04	
W-SL	2-Butanone	2.10E+03	NA	X
W-SL	Butylbenzylphthalate	2.40E+02	9.30E+02	
W-SL	Cadmium	3.94E+02	1.80E+03	
W-SL	Carbon tetrachloride	1.30E+00	3.00E-01	X
W-SL	Chlordane	3.60E-03	2.00E+01	
W-SL	4-Chloroaniline	2.40E+02	1.20E+03	
W-SL	Chlorobenzene	1.50E-01	1.30E+02	
W-SL	Chloroform	2.40E-01	3.00E-01	
W-SL	Chromium	1.24E+03	2.70E+02	X
W-SL	Cobalt	2.48E+01	NA	X
W-SL	Copper	3.34E+03	NA	X
W-SL	4,4'-DDD	7.10E-03	3.70E+01	
W-SL	4,4'-DDE	7.10E-03	1.00E+01	
W-SL	4,4'-DDT	7.10E-03	8.00E+01	
W-SL	Di-n-Octyl phthalate	7.00E+00	1.00E+04	
W-SL	Dibutyl phthalate	3.10E+03	2.30E+03	X
W-SL	1,1-Dichloroethene	7.00E-02	7.00E-02	
W-SL	1,2-Dichloroethylene (cis)	7.00E+01	1.20E+03	

TABLE IV-1-3
Results of Risk Based Concentration Screen

Medium[1]	Chemical	Max. Value[2]	RBC Value[3]	Retained
W-SL	1,2-Dichloroethylene (trans)	7.00E+01	3.10E+03	
W-SL	Dieldrin	7.10E-03	1.00E+00	
W-SL	4,6-Dinitro-2-methylphenol	9.10E+01	NT	
W-SL	2,4-Dinitrophenol	5.70E+02	1.20E+02	X
W-SL	Endosulfan I	3.60E-03	1.60E+01	
W-SL	Endosulfan II	7.10E-03	1.60E+01	
W-SL	Endosulfan sulfate	7.10E-03	NT	
W-SL	Endrin	7.10E-03	NA	X
W-SL	Endrin aldehyde	7.10E-03	NT	
W-SL	Endrin ketone	7.10E-03	NT	
W-SL	Ethylbenzene	3.10E+03	4.00E+02	X
W-SL	Fluoranthene	1.20E+00	NA	X
W-SL	HCH (alpha)	3.60E-03	8.00E-01	
W-SL	HCH (gamma) Lindane	3.60E-03	NA	X
W-SL	Heptachlor	3.60E-03	1.00E-01	
W-SL	Heptachlor epoxide	3.60E-03	5.00E+00	
W-SL	Hexachlorocyclopentadiene	2.40E+02	1.00E+01	X
W-SL	Isophorone	8.90E+01	4.60E+03	
W-SL	Lead	5.90E+03	NT	
W-SL	Mercury	2.40E+00	1.00E+01	
W-SL	Methoxychlor	3.60E-02	NA	X
W-SL	4-Methyl-2-pentanone	7.90E+03	1.20E+04	
W-SL	2-Methylnaphthalene	4.50E+00	NT	
W-SL	Naphthalene	1.60E+02	NA	X
W-SL	Nickel	5.88E+01	1.30E+04	
W-SL	3-Nitroaniline	9.10E+01	NA	X
W-SL	2-Nitrophenol	3.80E+01	NA	X
W-SL	PCBs (total)	2.60E+01	1.20E+02	
W-SL	Pentachlorophenol	5.70E+02	NA	X
W-SL	Phenanthrene	9.30E-01	NA	X
W-SL	Phenol	1.70E+02	NA	X
W-SL	Pyrene	1.20E+00	NA	X
W-SL	Selenium	4.75E+01	NA	X
W-SL	Silver	3.65E+01	NA	X
W-SL	Styrene	2.30E+03	1.50E+03	X
W-SL	Tetrachloroethylene (PCE)	3.10E+03	1.10E+01	X
W-SL	Thallium	5.90E-01	NA	X
W-SL	Tin	3.54E+01	5.00E+00	X
W-SL	Toluene	1.50E+04	6.50E+02	X
W-SL	Toxaphene	3.60E-01	8.90E+01	
W-SL	Trichloroethene	3.30E+03	5.00E+00	X
W-SL	Vanadium	3.88E+01	2.00E+00	X
W-SL	Xylenes (total)	1.60E+04	3.20E+02	X
W-SL	Zinc	5.57E+03	NA	X

[1] SD - Sediment; SG - Soil Gas; SL - Soil; SW - Surface Water; W-SL - Pre-Envirite Waste Material
[2] For each chemical, the greater of the maximum detected concentration and the highest detection limit (see page IV-12 for details) was used.
[3] NA - Chemicals for which Risk-Based Concentration Values for Soil-to-Air Volatilization Pathway were not available. Chemical was retained if toxicity values are available.
NT - No toxicity value available; discussed qualitatively in Chapter IV.D.2.
NS - No RBC screening performed for soil gas; all soil gas constituents retained.

APPENDIX IV-2

Models and Parameters Used for Estimation of Environmental Concentrations

APPENDIX IV-2
Models And Parameters Used for Estimation of Environmental Concentrations

A. Introduction

While estimates of chemical concentrations for on-site soil ground water and off-site surface water and sediment are based on sampling data collected during the RFI, concentrations for other environmental media (e.g., air) must be estimated using fate and transport models designed to simulate the transport of substances in the environment over time. Mathematical models were used to estimate the emissions and ambient air concentrations on-site based on the soil gas data. Similarly, measurements of the Pre-Envirite Waste Material and mathematical models were used to evaluate the missions and ambient air concentrations resulting from on-site excavation activities by a utility worker. This appendix presents the models used for these scenarios, parameter values required by the models, and assumptions incorporated into the models.

B. Subsurface Soil Excavation

Subsurface utility repair, maintenance, and installation are common activities that may result in periodic contact with contaminated soils by utility workers. Construction activities result in similar contact with contaminated soils by construction workers. In areas where high concentrations of VOCs are known to exist (i.e., the Pre-Envirite Waste Material), elevated VOC emissions could potentially occur when these soils are disturbed and handled. Thus, the inhalation pathway of VOCs emitted from subsurface soils during excavation activities was assessed for hypothetical future utility and construction workers.

The magnitude of VOC emissions depends on a number of factors, including the type of compounds present in the soil, the concentration and distribution of the compounds, the porosity and moisture content of the soil, the duration and vigorousness of the material handling, and the size of equipment used. Relatively limited data are available for VOC emissions from excavation activities. Eklund et al. (1992) developed a model for estimating emission rates from excavation activities resulting primarily from two mechanisms:

- Soil is initially excavated using a backhoe or similar piece of equipment. As the soil is disturbed and the surface area of soil in contact with the atmosphere is increased, some of the soil gas in the soil pore spaces is released.

- Once the excavated soil has been dumped in place into a storage pile, further emissions occur via diffusion through the soil. These diffusion emissions occur continuously until the storage pile is covered after the excavation activities are completed.

Thus, the total emission rate is the sum of the releases resulting from the exchange of contaminant-laden soil-pore gas with the atmosphere when soil is disturbed and from diffusion of contaminants through the soil. The model, which is summarized in Tables IV-2-1 to IV-2-4, incorporates the following assumptions:

- An infinite, homogeneous body of waste or contaminated soil exists under a cap of clean soil.

- The contaminated soil is excavated for 50 minutes per hour.

- Each scoop of soil contains 2 m^3 of soil and 75 scoops are moved per hour (i.e., 150 m^3 of soil excavated per hour); each scoop adds 2 m^2 of surface area to the storage pile of excavated material.

To estimate air concentrations to utility/construction workers resulting from these emissions, a dispersion factor recommended by USEPA (1996a) was used. Using the Industrial Source Complex (ISC2) model, USEPA developed a series of dispersion factors (Q/C) for estimating exposure concentrations to on-site and near-field receptors. Different dispersion factors were calculated for various combinations of source size and meteorological conditions, as represented by 29 locations throughout the United States. Based on a 0.5-acre source area and meteorological conditions for Hartford, Connecticut, a dispersion factor of 71.35 (g/m^2-sec)/(kg/m^3) was used to estimate air concentrations

TABLE IV-2-1
Estimation of Total VOC Emission Rate from Soil Excavation (*ER*)

$$ER = ER_{PS} + ER_{diff}$$

Parameter	Definition	Value
ER	average emission rate from excavation, g/sec	Calculated value (a)
ER_{PS}	soil porosity emission rate of the *i*th component, g/sec	See Table IV-2-2
ER_{diff}	diffusion emission rate of the *i*th component, g/sec	See Table IV-2-3

Notes:
a Eklund et al. (1992)

TABLE IV-2-2
Estimation of Soil Porosity Emission Rate (ER_{PS})

$$ER_{PS} = \frac{VP \times MW \times \left(10^6 \frac{cm^3}{m^3}\right) \times \epsilon_a \times Q \times (E \times C)}{R \times T}$$

Parameter	Definition	Value
ER_{PS}	soil porosity emission rate of the *i*th component, g/sec	Calculated value (a)
VP	vapor pressure of the *i*th component, mm Hg	Chemical-specific (see Appendix C)
MW	molecular weight of the *i*the compound, g/mol	Chemical-specific (see Appendix C)
10^6	conversion factor, cm^3/m^3	10^6
ϵ_a	air-filled porosity, dimensionless	0.284 (b)
Q	excavation rate, m^3/sec	0.042 (a)
$E \times C$	soil gas-to-atmosphere exchange constant, dimensionless	0.33 (a)
R	gas constant, mm Hg-cm^3/gmol-K	62,361
T	temperature, K	298

Notes:
a Eklund et al. (1992)
b USEPA (1996a)

TABLE IV-2-3
Estimation of Diffusion Emission Rate (ER_{diff})

$$ER_{diff} = \frac{C_s \times SA \times 10{,}000}{\left(\frac{\epsilon_a}{K_{eq} \times k_g}\right) + \sqrt{\frac{\pi \times t}{D_e \times K_{eq}}}}$$

$$K_{eq} = \frac{VP \times MW \times \epsilon_a}{R \times T \times C} \qquad D_e = \frac{D_a \times \epsilon_a^{3.33}}{\epsilon_T^{2}}$$

Parameter	Definition	Value
ER_{diff}	diffusion emission rate of *i*th component, g/sec	Calculated value (a)
C_s	mass loading of *i*th component in soil, g/cm^3	See Table IV-2-4
SA	area of emitting surface, m^2	465 (b)
10,000	conversion factor, cm^2/m^2	10,000
ϵ_a	air-filled porosity, dimensionless	0.284 (c)
K_{eq}	weight fraction of VOC in air space, dimensionless	Calculated value
k_g	gas-phase mass transfer coefficient, cm/sec	0.15 (a)
t	time since start of excavation of soil of interest, sec	28,880 (d)
D_e	effective diffusivity, cm^2/sec	Calculated value
VP	vapor pressure, mm Hg	Chemical-specific (see Appendix C)
MW	molecular weight	Chemical-specific (see Appendix C)
R	gas constant, mm Hg-cm^3/gmol-K	62,361
T	temperature, K	298
D_a	diffusivity in air of *i*th component, cm^2/sec	Chemical-specific (see Appendix C)
ϵ_T	total porosity, dimensionless	0.434 (c)

Notes:
a Eklund et al. (1992)
b based on estimated area of Pre-Envirite Waste Material of 40′×125′ (GZA 1995)
c USEPA (1996a)
d equivalent to eight hours

TABLE IV-2-4
Estimation of Mass Loading of the *i*th Component (C_s)

$$C_s = C \times BD \times 10^{-6}$$

Parameter	Definition	Value
C_s	mass loading of *i*th component in soil, g/cm^3	Calculated value
C	concentration of *i*th component in soil, µg/g	Chemical-specific (see Appendix C)
BD	soil bulk density, g/cm^3	1.5 (a)
10^{-6}	conversion factor, g/µg	10^{-6}

Notes:
a USEPA (1996a)

TABLE IV-2-5
Estimation of Air Concentration During Excavation (C_{air})

$$C_{air} = \frac{(ER/SA)}{(Q/C)} \times 1{,}000$$

Parameter	Definition	Value
C_{air}	air concentration of *i*th component above emission source, g/cm^3	Calculated value (a)
ER	average emission rate during excavation, g/sec	See Table IV-2-1
SA	area of emitting surface, m^2	223 (b)
Q/C	dispersion factor, (g/m^2-sec)/(kg/m^3)	71.35 (c)
1,000	conversion factor, g/kg	1,000

Notes:
a USEPA (1996a)
b based on estimated area of PEWM-R of 40′×60′ (GZA 1995)
c based on a 0.5-acre source area and meteorological conditions for Hartford, Connecticut (USEPA 1996a)

C. Volatilization of Chemicals from Soil Into Ambient Air

The Pre-Envirite Waste Material was identified by GZA (1995) as the predominant source of organic constituents at the site. Several volatile organic compounds (VOCs) were detected during soil gas surveys conducted in the region of the Pre-Envirite Waste Material (GZA 1995; ENVIRON 1996). VOCs in the soil gas may diffuse upward through the pore spaces in the soil, and eventually be released into the atmosphere. Based on a review of the soil gas data, most of the detected samples were collected at a depth of 42 inches below ground surface (bgs); no VOCs were detected in most samples collected at depths less than 42 inches bgs. Thus, the emissions of VOCs from the soil were characterized as a covered landfill with no internal gas generation.

USEPA presented a simple screening model for covered landfills with no internal gas generation in its *Superfund Exposure Assessment Manual* (SEAMS) (USEPA 1988; Eklund and Albert 1992). The model is based on Farmer's equation (Farmer et al. 1972) as modified by Shen (1981) and Farino et al. (1983). The effective diffusivity has been substituted into this equation to account for moisture in the soil, as recommended by Millington and Quirk (1961). The model assumes that the landfill is isothermal, contains no fissures or macropores, and that waste is homogeneously distributed.

To estimate air concentrations to receptor populations resulting from these emissions, the same dispersion factor used for the utility/construction worker scenario was utilized. The same dispersion factor was used when estimating concentrations to on-site receptors (i.e., on-site workers and trespassers) and off-site receptors (i.e., off-site workers, residents). This conservatively assumes that the off-site receptors are located immediately adjacent to the site boundary.

TABLE IV-2-6
Estimation of Emission Rate of Chemicals Volatilizing from Soil (*ER*)

$$ER = \frac{C_{PS} \times D_e \times SA}{d_{cover}}$$

$$D_e = \frac{D_a \times \epsilon_a^{3.33}}{\epsilon_T^2}$$

Parameter	Definition	Value
ER	average emission rate from soil, g/sec	Calculated value (a)
C_{PS}	chemical concentration in air-filled pore spaces, g/cm^3	Chemical specific (see Appendix C)
D_e	effective diffusivity, cm^2/sec	Calculated value
SA	area of emitting surface, cm^2	4,650,000 (b)
d_{cover}	depth of soil cover, cm	138 (c)
D_a	diffusivity in air of *i*th component, cm^2/sec	Chemical-specific (see Appendix C)
ϵ_a	air-filled porosity, dimensionless	0.284 (d)
ϵ_T	total porosity, dimensionless	0.434 (d)

Notes:
a Eklund and Albert (1992); USEPA (1988)
b based on estimated area of Pre-Envirite Waste Material of 40′×125′ (GZA 1995)
c based on 42 inch depth at which soil gas concentrations were detected
d USEPA (1992b)

D. Indoor Air Concentration While Showering

Inhalation of volatile and semivolatile organic compounds during showering could result in exposure because of elevated temperatures associated with shower water, the confining nature of the shower stall, and the increased surficial area of atomized water droplets. Showering could result in a short duration, high intensity exposure to chemical vapors. Following showering, chemical vapors may be transported throughout a residence via air exchange mechanisms (e.g., through HVAC systems), resulting in a long duration, low intensity exposure to vapors.

Under the hypothetical future use scenario, residents in households adjacent to the site are assumed to be exposed to volatilized chemicals present in ground water that are released during showering. This exposure pathway requires the prediction of the chemical volatilization rate from the descending shower water. An integrated household exposure model (IHEM), developed by Foster and Chrostowski (1986) was used as the initial basis for determining volatile vapor emissions resulting from showering. This model is based on an estimation of the rate that organic compounds can volatilize from a water droplet in free fall from a shower spray head (inorganic and metal compounds are assumed to be non-volatile and are not considered in the model). An organic compound at an initial concentration, C_w, in a water droplet is released through a process of molecular diffusion in both the water and air phases that comprise the droplet. Molecular diffusion in these phases is modeled using two-film gas-liquid mass transfer theory.

Volatilization from a water droplet is assumed to follow first order kinetics with respect to the organic concentration. The volatilization driving force is the concentration gradient between the relatively higher chemical concentration in the liquid phase and the lower concentration in the air phase at the surface of the water droplet. The rate of volatilization is estimated as the depletion of the organic compound in the water droplet from the time the droplet is released from the shower head to the time it strikes the shower stall floor. For a single water droplet, this depletion is described by the following relationship:

$$-\frac{dC_s}{dt} = K_{LS}a\ (C_s - C) \qquad (7)$$

where:

C_s	=	shower water droplet chemical concentration for a single droplet, mg/m^3
K_{LS}	=	overall mass transfer coefficient at shower water temperature, cm/hr
a	=	specific interfacial area, cm^{-1} (assumed to be equal to $6/d$, where d is the mean droplet diameter)
C	=	concentration of chemical at the air-liquid interface, mg/m^3

This rate equation can be integrated and solved for C_s by conservatively assuming that the concentration of chemical at the interface, C, is negligible in comparison to the shower droplet chemical concentration:

$$C_s = C_w \exp\left(\frac{-K_{LS}t}{600d}\right) \tag{8}$$

where:

C_w	=	initial tap water chemical concentration, mg/m^3 ($C_s = C_w$ at t=0)
t	=	shower droplet free fall time, s (assumed to be 2 sec)
d	=	mean shower droplet diameter, cm (assumed to be 0.1 cm)

The total loss of a chemical into the shower stall air via volatilization from a water droplet at an initial concentration, C_w, to a final concentration, C_s, can be calculated by a mass balance:

$$C_d = C_w - C_s = C_w\left(1 - e^{-K_{LS}t/600d}\right) \tag{9}$$

where:

C_d	=	chemical concentration volatilizing from a water droplet, mg/m^3

Based on this model, the airborne organic concentration in the shower stall, C_a, increases linearly as the duration of the shower increases. Thus, the airborne concentration in the shower stall will continuously increase with the volume of water used while showering (i.e., the volume of water used increases as the duration of the shower increases). For a known shower duration, therefore, the airborne chemical concentration at the end of a shower can be described by:

$$C_{a,final} = \frac{C_w(1 - e^{-K_{LS}t/600d})SW}{V_s} \tag{10}$$

where:

$C_{a,final}$	=	final air concentration in shower stall, mg/m^3
SW	=	volume of water used while showering, m^3
V_s	=	shower stall air volume, m^3

Because of the linear relationship between instantaneous air concentration in the shower stall and shower duration, the average concentration over the shower duration is:

$$C_a = \frac{C_w(1 - e^{-K_{LS}t/600d})SW}{2V_s} \tag{11}$$

where:

C_a = average air concentration in shower stall over shower duration, mg/m^3

In the above equations, the resistance to transport in liquid and gaseous phases is expressed by an overall mass transfer coefficient, K_L, which is related to the mass transfer coefficients for each phase by:

$$K_L = \left(\frac{1}{k_l} + \frac{RT}{Hk_g} \right)^{-1} \tag{12}$$

where:

H = Henry's Law constant, atm-m^3/mol

RT = 2.4×10^{-2} atm-m^3/mol-K at 293 K

k_l = liquid phase mass transfer coefficient, cm/hr

k_g = gas phase mass transfer coefficient, cm/hr

Typical values for k_l (20 cm/hr) and k_g (3,000 cm/hr), measured for CO_2 and H_2O, respectively, may be used to estimate individual mass transfer coefficients for any compound, c, according to the following relationships:

$$k_{g,c} = 3{,}000 \left(\frac{18}{MW_c} \right)^{0.5} \tag{13}$$

$$k_{l,c} = 20 \left(\frac{44}{MW_c} \right)^{0.5} \tag{14}$$

where:

MW_c = molecular weight of compound c, g/mol

The above equations for K_L is based on a temperature of 20°C (293 K). The following adjustment must be made to this mass transfer coefficient to account for the difference in viscosity at showering temperatures, T_S (assumed to be 45°C):

$$K_{LS} = K_L \left(\frac{T_{cal}\ \mu_S}{T_S\ \mu_{cal}} \right)^{-0.5} \tag{15}$$

where:

K_{LS}	=	mass transfer coefficient at shower water temperature, cm/hr
K_L	=	mass transfer coefficient at calibration water temperature, cm/hr
T_{cal}	=	calibration water temperature of K_L, K
T_S	=	shower water temperature, K
μ_{cal}	=	water viscosity at T_l, cp
μ_S	=	water viscosity at T_s, cp

The values used as input parameters were selected from a range of values that appear in the literature (Foster and Chrostowski 1986). These values, which are summarized in Tables G-2 and G-3, are generally conservative and would likely overestimate exposure from showering.

In addition, several specific modeling assumptions are implicit in the derivation of the model and the parameters chosen, including the following:

- For highly volatile chemicals (i.e., $H>10^{-3}$ atm-m^3/mol), mass transfer of the chemical is limited by resistance in the liquid phase. For semi-volatile chemicals (i.e., $10^{-5}<H<10^{-3}$ atm-m^3/mol), mass transfer may be limited by resistance in both the liquid and gas phases. For essentially non-volatile chemicals (i.e., $H<10^{-5}$ atm-m^3/mol), mass transfer is generally limited by resistance in the gas phase.

- Droplets are assumed to fall to the shower floor without impinging on the individual showering. This assumption would tend to overestimate exposures since chemical emissions from atomized water are greater than emissions from water flowing down an individual's body.

- The calculated concentration in air cannot exceed the equilibrium concentration predicted using Henry's Law.

- Air exchange within the shower stall was not considered in the derivation of this model. For short duration showers (i.e., 15 minutes), the concentration dilution through air exchange outside the shower stall should not be significant.

TABLE IV-2-7
Estimation of Indoor Air Chemical Concentration In Shower Stall

$$C_a = \frac{C_w(1 - e^{-K_{LS}\, t/600d})SW}{2V_S}$$

Parameter	Definition	Value
C_a	average air concentration in shower stall during shower period, mg/m^3	Calculated value
C_w	chemical concentration in water, µg/L (=mg/m^3)	Chemical specific
K_{LS}	overall mass transfer coefficient at shower temperature, cm/hr	See Table IV-2-8
t	shower droplet free fall time, sec	2 (a)
d	mean shower droplet diameter, cm	0.1 (a)
SW	volume of water used while showering, m^3	0.1 (a)
V_S	shower stall air volume, m^3	2.94 (a)

Notes:
a Foster and Chrostowski (1986)

TABLE IV-2-8
Estimation of Overall Mass Transfer Coefficient

$$K_L = \left(\frac{1}{k_l} + \frac{RT_{cal}}{Hk_g} \right)^{-1}$$

$$k_{g,c} = 3{,}000 \left(\frac{18}{MW_c} \right)^{0.5}$$

$$k_{l,c} = 20 \left(\frac{44}{MW_c} \right)^{0.5}$$

$$K_{LS} = K_L \left(\frac{T_{cal}\mu_S}{T_S\mu_{cal}} \right)^{-0.5}$$

Parameter	Definition	Value
K_L	overall mass transfer coefficient at calibration temperature, cm/hr	Calculated value
R	gas constant, atm-m^3/mol-K	8.2×10^{-5}
T_{cal}	calibration water temperature, K	293
H	Henry's Law constant, atm-m^3/mol	Chemical-specific
$k_{l,c}$	liquid-phase mass transfer coefficient, cm/hr	Calculated value
$k_{g,c}$	gas-phase mass transfer coefficient, cm/hr	Calculated value
MW_c	molecular weight of chemical c, g/mol	Chemical-specific
K_{Ls}	overall mass transfer coefficient at shower temperature, cm/hr	Calculated value
T_S	shower water temperature, K	318 (a)
μ_{cal}	water viscosity at calibration water temperature, cp	1.002 (a)
μ_S	water viscosity at shower water temperature, cp	0.596 (a)

Notes:
a Foster and Chrostowski (1986)

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APPENDIX IV-3

Models and Parameters Used for Estimation of Exposure Dose

APPENDIX IV-3
Models And Parameters Used For Estimation of Exposure Doses

A. Introduction

This appendix summarizes the equations and parameters used to estimate the chronic daily intake (CDI) received through exposure to chemicals in various environmental media. These equations are dependent on the route of exposure (e.g., ingestion, inhalation, dermal contact). Exposure through inhalation or ingestion pathways is generally calculated using the following equation:

$$CDI = \frac{C \times IR \times FI \times EF \times ED}{BW \times AT}$$

where:

CDI	=	chronic daily intake, mg/kg/day
C	=	chemical concentration in medium of interest, mg/kg (soil), mg/L (water), or mg/m^3 (air)
IR	=	intake rate, mg/day (soil), L/day (water), or m^3/day (air)
FI	=	fraction ingested from contaminated source, unitless
EF	=	exposure frequency, days/year
ED	=	exposure duration, years
BW	=	body weight, kilograms
AT	=	time over which the dose is averaged, days

Dermal exposure to chemicals in surface water is estimated using the following equation:

$$CDI = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT}$$

where:

CDI	=	chronic daily intake, mg/kg/day
DA_{event}	=	adsorbed dose per event, mg/cm^2-event
SA	=	skin surface area available for contact, cm^2
EF	=	exposure frequency, events/year
ED	=	exposure duration, years
BW	=	body weight, kilograms

AT = time over which the dose is averaged, days

DA_{event} is estimated based on a steady state relationship with the water concentration, in accordance to USEPA guidance (USEPA 1992).

The specific assumptions and parameter values used to estimate potential exposures of each of the potentially exposed populations are presented in Tables IV-3-1 through IV-3-17. The chemical concentration values are based on either the highest detected concentration from the RFI data or the 95 percent upper confidence level (95% UCL) on the mean concentration, whichever is lower. These chemical concentrations are summarized in Appendix IV-4. Exposure parameters were generally based on USEPA's most recent *Exposure Factors Handbook* (USEPA 1997), other USEPA guidance (USEPA 1991a, 1991b, 1992, 1994), and professional judgment.

As discussed in Chapter IV.E, estimates of both potential carcinogenic and noncarcinogenic health risks are based on the CDI for all chemicals except for lead. For evaluating risks associated with exposure to lead, an approach based on the methodology outlined by USEPA's Technical Review Workgroup (TRW) for Lead (USEPA 1996c, 1999) was used. In the TRW approach, the blood lead concentration is calculated for women of child-bearing age, and the corresponding 95th percentile fetal blood lead concentration is estimated. The predicted fetal blood lead concentrations will be compared to the level of 10 micrograms of lead per deciliter of blood (µg Pb/dL), the level determined by USEPA and the Centers for Disease Control and Prevention (CDC) to present a risk to a child's health. The specific assumptions and parameter values used to estimate potential risks associated with exposure to lead are presented in Table IV-3-18.

TABLE IV-3-1
Estimation of Intake Rate from Ingestion of Soil by On-Site Worker

$$CDI = \frac{CS \times \left(\frac{10^{-6} kg}{mg}\right) \times IR \times FI \times EF \times ED}{BW \times AT}$$

Parameter	Definition		Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day		Calculated value	
CS	chemical concentration in soil, mg/kg		Chemical-specific (see Appendix IV-4)	
IR	ingestion rate, mg/day		50 (a,b)	100 (b)
FI	fraction ingested from contaminated source, unitless		0.5 (d)	0.5 (d)
EF	exposure frequency, days/yr		150 (c)	250 (a)
ED	exposure duration, yrs		6.6 (b)	25 (a)
BW	body weight, kg		70 (a)	70 (a)
AT	averaging time, days	carcinogens	25,550	25,550
		noncarcinogens	2,409	9,125

Notes:
a USEPA (1991a, 1991b)
b USEPA (1997)
c USEPA (1994)
d Professional judgment. ENVIRON assumed that half of the worker's daily soil ingestion occurred off-site (e.g., at home or other recreational areas).

TABLE IV-3-2
Estimation of Intake Rate from Ingestion of Soil by On-Site Utility/Construction Worker

$$CDI = \frac{CS \times \left(\frac{10^{-6} kg}{mg}\right) \times IR \times FI \times EF \times ED}{BW \times AT}$$

Parameter	Definition		Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day		Calculated value	
CS	chemical concentration in soil, mg/kg		Chemical-specific (see Appendix IV-4)	
IR	ingestion rate, mg/day		50 (a)	440 (b)
FI	fraction ingested from contaminated source, unitless		1	1
EF	exposure frequency, days/yr		5 (c)	30 (c)
ED	exposure duration, yrs		1 (c)	1 (c)
BW	body weight, kg		70 (a)	70 (a)
AT	averaging time, days	carcinogens noncarcinogens	25,550 5	25,550 30

Notes:

a USEPA (1997). Assumes that a CTE ingestion rate of 100 mg/day is divided equally between soil and waste material.

b Hawley (1985). Assumes that an RME ingestion rate of 480 mg/day is divided equally between soil and waste material for one week out of the six week period (i.e., five weeks at a soil ingestion rate of 480 mg/day and one week at a soil ingestion rate of 240 mg/day).

c Professional judgment. Based on assumed one-week utility-related excavation activities in the CTE scenario and a six-week construction period in the RME scenario. Excavation of PEWM is assumed to only occur for one week (five days). Utility and construction activities are assumed to occur only once.

TABLE IV-3-3
Estimation of Intake Rate from Ingestion of Pre-Envirite Waste Material by On-Site Utility/Construction Worker

$$CDI = \frac{CS \times \left(\frac{10^{-6} kg}{mg}\right) \times IR \times FI \times EF \times ED}{BW \times AT}$$

Parameter	Definition		Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day		Calculated value	
CS	chemical concentration in waste material, mg/kg		Chemical-specific (see Appendix IV-4)	
IR	ingestion rate, mg/day		50 (a)	240 (b)
FI	fraction ingested from contaminated source, unitless		1	1
EF	exposure frequency, days/yr		5 (c)	5 (c)
ED	exposure duration, yrs		1 (c)	1 (c)
BW	body weight, kg		70 (a)	70 (a)
AT	averaging time, days	carcinogens noncarcinogens	25,550 5	25,550 30

Notes:

a USEPA (1997). Assumes that a CTE ingestion rate of 100 mg/day is divided equally between soil and waste material.

b Hawley (1985). Assumes that an RME ingestion rate of 480 mg/day is divided equally between soil and waste material.

c Professional judgment. Based on assumed one-week utility-related excavation activities in the CTE scenario and a six-week construction period in the RME scenario. Excavation of PEWM is assumed to only occur for one week (five days). Utility and construction activities are assumed to occur only once.

TABLE IV-3-4
Estimation of Intake Rate from Ingestion of Soil by On-Site Trespasser

$$CDI = \frac{CS \times \left(\frac{10^{-6} kg}{mg}\right) \times IR \times FI \times EF \times ED}{BW \times AT}$$

Parameter	Definition		Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day		Calculated value	
CS	chemical concentration in soil, mg/kg		Chemical-specific (see Appendix IV-4)	
IR	ingestion rate, mg/day		100 (a)	200 (a)
FI	fraction ingested from contaminated source, unitless		0.5 (b)	0.5 (b)
EF	exposure frequency, days/yr		24 (c)	48 (c)
ED	exposure duration, yrs		6 (c)	6 (c)
BW	body weight, kg		45 (d)	45 (d)
AT	averaging time, days	carcinogens	25,550	25,550
		noncarcinogens	2,190	2,190

Notes:

a USEPA (1997)

b Professional judgment. ENVIRON assumed that half of the trespasser's daily soil ingestion occurred off-site (e.g., at home, other recreational areas, or trespassing on other properties).

c For the CTE scenario, the trespasser population is represented by a 12-year old child who trespasses on-site two times per week during the summer months (i.e., 24 days per year) for six years. For the RME scenario, the trespasser population is represented by a 12-year old child who trespasses on-site two times per week for a 24-week period during the warmer months between April and September (i.e., 48 days per year) for six years.

d Trespasser body weight calculated from the average of 12-year old males and females (USEPA 1997).

TABLE IV-3-5
Estimation of Intake Rate from Inhalation of Outdoor Air by On-Site or Off-Site Worker

$$CDI = \frac{CA \times IR \times FI \times EF \times ED}{BW \times AT}$$

Parameter	Definition	Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day	Calculated value	
CA	chemical concentration in air, mg/m^3	Chemical-specific (see Appendix IV-4)	
IR	inhalation rate, m^3/day	12 (a)	20 (a)
FI	fraction ingested from contaminated source, unitless	1.0	1.0
EF	exposure frequency, days/yr	150 (c)	250 (b)
ED	exposure duration, yrs	6.6 (d)	25 (b)
BW	body weight, kg	70 (b)	70 (b)
AT	averaging time, days carcinogens noncarcinogens	25,550 2,409	25,550 9,125

Notes:
a USEPA (1997). Based on short-term inhalation rate of 1.5 m^3/hr for moderate/industrial (CTE) and 2.5 m^3/hr for heavy/construction (RME) outdoor worker activities and an eight hour day spent on-site.
b USEPA (1991a, 1991b)
c USEPA (1994)
d USEPA (1997)

TABLE IV-3-6
Estimation of Intake Rate from Inhalation of Outdoor Air by On-Site Utility/Construction Worker

$$CDI = \frac{CA \times IR \times FI \times EF \times ED}{BW \times AT}$$

Parameter	Definition		Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day		Calculated value	
CA	chemical concentration in air, mg/m^3		Chemical-specific (see Appendix IV-4)	
IR	inhalation rate, m^3/day		20 (a)	24 (a)
FI	fraction ingested from contaminated source, unitless		1.0	1.0
EF	exposure frequency, days/yr		5 (b)	30 (b)
ED	exposure duration, yrs		1 (b)	1 (b)
BW	body weight, kg		70 (c)	70 (c)
AT	averaging time, days	carcinogens	25,550	25,550
		noncarcinogens	5	30

Notes:

a USEPA (1997). Based on short-term inhalation rate of 2.5 m^3/hr for heavy outdoor (CTE) and 3.0 m^3/hr for heavy industrial worker (RME) activities and an eight hour day spent on-site.

b Professional judgment. Based on assumed one-week utility-related excavation activities in the CTE scenario and a six-week construction period in the RME scenario. Utility and construction activities are assumed to occur only once.

c USEPA (1991a, 1991b)

TABLE IV-3-7
Estimation of Intake Rate from Inhalation of Outdoor Air by On-Site Trespasser

$$CDI = \frac{CA \times IR \times FI \times EF \times ED}{BW \times AT}$$

Parameter	Definition	Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day	Calculated value	
CA	chemical concentration in air, mg/m^3	Chemical-specific (see Appendix IV-4)	
IR	inhalation rate, m^3/day	2.4 (a)	4.8 (a)
FI	fraction ingested from contaminated source, unitless	1.0	1.0
EF	exposure frequency, days/yr	24 (b)	48 (b)
ED	exposure duration, yrs	6 (b)	6 (b)
BW	body weight, kg	45 (c)	45 (c)
AT	averaging time, days carcinogens noncarcinogens	25,550 2,190	25,550 2,190

Notes:

a USEPA (1997). Based on short-term inhalation rate of 1.2 m^3/hr for moderate activities and two (CTE) to four (RME) hours per day spent on-site by trespasser.

b For the CTE scenario, the trespasser population is represented by a 12-year old child who trespasses on-site two times per week during the summer months (i.e., 24 days per year) for six years. For the RME scenario, the trespasser population is represented by a 12-year old child who trespasses on-site two times per week for a 24-week period during the warmer months between April and September (i.e., 48 days per year) for six years.

c Trespasser body weight calculated from the average of 12-year old males and females (USEPA 1997).

TABLE IV-3-8
Estimation of Intake Rate from Inhalation of Outdoor Air by Off-Site Resident

$$CDI = \frac{CA \times IR \times FI \times EF \times ED}{BW \times AT}$$

Parameter	Definition		Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day		Calculated value	
CA	chemical concentration in air, mg/m^3		Chemical-specific (see Appendix IV-4)	
IR	inhalation rate, m^3/day		15 (a)	20 (b)
FI	fraction ingested from contaminated source, unitless		1.0	1.0
EF	exposure frequency, days/yr		234 (b)	350 (b,c)
ED	exposure duration, yrs		9 (b)	30 (c)
BW	body weight, kg		70 (c)	70 (c)
AT	averaging time, days	carcinogens	25,550	25,550
		noncarcinogens	3,285	10,950

Notes:
a USEPA (1997)
b USEPA (1994)
c USEPA (1991a, 1991b)

TABLE IV-3-9
Estimation of Intake Rate from Ingestion of Ground Water by Off-Site Resident

$$CDI = \frac{CW \times IR \times FI \times EF \times ED}{BW \times AT}$$

Parameter	Definition	Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day	Calculated value	
CW	chemical concentration in ground water, mg/L	Chemical-specific (see Appendix IV-4)	
IR	ingestion rate, L/day	1.4 (a,c)	2 (c)
FI	fraction ingested from contaminated source, unitless	1.0	1.0
EF	exposure frequency, days/yr	350 (b)	350 (b)
ED	exposure duration, yrs	9 (c)	30 (b)
BW	body weight, kg	70 (b)	70 (b)
AT	averaging time, days — carcinogens noncarcinogens	25,550 3,285	25,550 10,950

Notes:
a USEPA (1997)
b USEPA (1991a, 1991b)
c USEPA (1994)

TABLE IV-3-10
Estimation of Intake Rate from Dermal Contact with Ground Water While Showering by Off-Site Resident

$$CDI = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT}$$

Parameter	Definition		Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day		Calculated value	
DA_{event}	dose absorbed per unit area per event, mg/cm^2-event		See Table IV-3-10	
SA	surface area, cm^2		20,000 (a)	23,000 (a)
EF	exposure frequency, events/yr		350 (b)	350 (b)
ED	exposure duration, yrs		9 (a)	30 (a)
BW	body weight, kg		70 (b)	70 (b)
AT	averaging time, days	carcinogens	25,550	25,550
		noncarcinogens	3,285	10,950

Notes:
a USEPA (1997)
b USEPA (1991a, 1991b)

TABLE IV-3-11
Estimation of Dose Absorbed per Event
During Dermal Contact with Ground Water While Showering

$$DA_{event} = 2 \times K_p \times C_w \left[\frac{6 \times \tau \times t_{event}}{\pi}\right]^{1/2} \times \left(10^{-3}\frac{mg}{\mu g}\right) \times \left(10^{-3}\frac{L}{cm^3}\right)$$ Organic Compounds if $t_{event} < t^*$

$$DA_{event} = K_p \times C_w \times \left[\frac{t_{event}}{1+B} + 2\tau\left[\frac{1+3B}{1+B}\right]\right] \times \left(10^{-3}\frac{mg}{\mu g}\right) \times \left(10^{-3}\frac{L}{cm^3}\right)$$ if $t_{event} > t^*$

$$DA_{event} = K_p \times C_w \times t_{event} \times \left(10^{-3}\frac{mg}{\mu g}\right) \times \left(10^{-3}\frac{L}{cm^3}\right)$$ Inorganic Compounds

Parameter	Definition	Central Tendency Exposure	Reasonable Maximum Exposure
DA_{event}	dose absorbed per unit area per event, mg/cm^2-event	Calculated value	
K_p	permeability coefficient, cm/hr	Chemical-specific (a)	
C_w	concentration of chemical in water, µg/L	Chemical-specific (see Appendix IV-4)	
t_{event}	duration of event, hr/event	0.17 (b)	0.25 (b)
τ	lag time, hours	Chemical-specific (a)	
t*	time to steady-state, hours	Chemical-specific (a)	
B	effect of viable epidermis on mass, unitless	Chemical-specific (a)	

Notes:
a USEPA (1992)
b USEPA (1997). Based on shower durations of 10 minutes (CTE) and 15 minutes (RME).

TABLE IV-3-12
Estimation of Intake Rate from Inhalation of Indoor Air in Shower Stall by Off-Site Residents

$$CDI = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT}$$

Parameter	Definition		Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day		Calculated value	
CA	chemical concentration in air, mg/m^3		Chemical-specific	
IR	inhalation rate, m^3/hr		1.0 (a)	1.0 (a)
ET	exposure time, hours/day		0.17 (b)	0.25 (b)
EF	exposure frequency, days/yr		350 (c)	350 (c)
ED	exposure duration, yrs		9 (d)	30 (d)
BW	body weight, kg		70 (c)	70 (c)
AT	averaging time, days	carcinogens	25,550	25,550
		noncarcinogens	3,285	10,950

Notes:
a USEPA (1997). Based on short-term inhalation rate for light activities.
b USEPA (1997). Based on shower duration of 10 minutes (CTE) and 15 minutes (RME).
c USEPA (1991a, 1991b)
d USEPA (1997)

TABLE IV-3-13
Estimation of Intake Rate from Ingestion of Ground Water by Off-Site Worker

$$CDI = \frac{CW \times IR \times FI \times EF \times ED}{BW \times AT}$$

Parameter	Definition	Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day	Calculated value	
CW	chemical concentration in ground water, mg/L	Chemical-specific (see Appendix IV-4)	
IR	ingestion rate, L/day	0.01 (a)	0.01 (a)
FI	fraction ingested from contaminated source, unitless	1.0	1.0
EF	exposure frequency, days/yr	150 (d)	250 (b)
ED	exposure duration, yrs	6.6 (c)	25 (b)
BW	body weight, kg	70 (b)	70 (b)
AT	averaging time, days — carcinogens noncarcinogens	25,550 2,409	25,550 9,125

Notes:

a Professional judgment. Incidental ingestion of ground water by a worker may occur during its use for cooling water or rinsing equipment. ENVIRON estimated incidental ingestion from these activities would be less than incidental ingestion while swimming (i.e., 50 mL/event). Therefore, an ingestion rate of 10 mL/day was assumed.

b USEPA (1991a, 1991b)

c USEPA (1997)

d USEPA (1994)

TABLE IV-3-14
Estimation of Intake Rate from Ingestion of Surface Water by Recreational Visitor

$$CDI = CW \times \left(\frac{IR_{child} \times ED_{child}}{BW_{child}} + \frac{IR_{adult} \times ED_{adult}}{BW_{adult}} \right) \times \frac{FI \times EF}{AT}$$

Parameter	Definition	Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day	Calculated value	
CW	chemical concentration in surface water, mg/L	Chemical-specific (see Appendix IV-4)	
IR_{child}	ingestion rate from ages 1-6, L/day	0.05 (a)	0.05 (a)
ED_{child}	exposure duration during ages 1-6, yrs	2 (b)	6 (c)
BW_{child}	average body weight from ages 1-6, kg	15 (d)	15 (d)
IR_{adult}	ingestion rate from ages 7-30, L/day	0.05 (a)	0.05 (a)
ED_{adult}	exposure duration during ages 7-30, yrs	7 (b)	24 (c)
BW_{adult}	average body weight from ages 7-30, kg	70 (d)	70 (d)
FI	fraction ingested from contaminated source, unitless	1.0	1.0
EF	exposure frequency, days/yr	12 (e)	24 (e)
AT	averaging time, days carcinogens noncarcinogens	25,550 2,190 (f)	25,550 2,190 (f)

Notes:
a USEPA (1997)
b Based on age-adjusted, 9-year exposure duration (USEPA 1991a) divided as 2 years for a child and 7 years for an adult
c Based on age-adjusted, 30-year exposure duration (USEPA 1991a) divided as 6 years for a child and 24 years for an adult
d USEPA (1991a, 1991b)
e Professional judgment. Corresponds recreational visitors swimming one to two days per week for three months.
f Noncarcinogenic risks are conservatively represented by the child

TABLE IV-3-15
Estimation of Intake Rate from Dermal Contact with Surface Water by Recreational Visitor

$$CDI = DA_{event} \times \left(\frac{SA_{child} \times ED_{child}}{BW_{child}} + \frac{SA_{adult} \times ED_{adult}}{BW_{adult}} \right) \times \frac{EF}{AT}$$

Parameter	Definition	Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day	Calculated value	
DA_{event}	dose absorbed per unit area per event, mg/cm^2-event	See Table IV-3-12	
SA_{child}	average body surface area from ages 1-6, cm^2	7,860 (a)	9,350 (a)
ED_{child}	exposure duration during ages 1-6, yrs	2 (b)	6 (c)
BW_{child}	average body weight from ages 1-6, kg	15 (d)	15 (d)
SA_{adult}	average body surface area from ages 7-30, cm^2	20,000 (a)	23,000 (a)
ED_{adult}	exposure duration during ages 7-30, yrs	7 (b)	24 (c)
BW_{adult}	average body weight from ages 7-30, kg	70 (d)	70 (d)
EF	exposure frequency, days/yr	12 (e)	24 (e)
AT	averaging time, days carcinogens noncarcinogens	25,550 2,190 (f)	25,550 2,190 (f)

Notes:
a USEPA (1992)
b Based on age-adjusted, 9-year exposure duration (USEPA 1994) divided as 2 years for a child and 7 years for an adult
c Based on age-adusted, 30-year exposure duration (USEPA 1991a) divided as 6 years for a child and 24 years for an adult
d USEPA (1991a, 1991b)
e Professional judgment. Corresponds recreational visitors swimming one to two days per week for three months.
f Noncarcinogenic risks are conservatively represented by the child

TABLE IV-3-16
Estimation of Dose Absorbed per Event During Dermal Contact with Surface Water

$$DA_{event} = 2 \times K_p \times C_w \left[\frac{6 \times \tau \times t_{event}}{\pi}\right]^{1/2} \times \left(10^{-3}\frac{mg}{\mu g}\right) \times \left(10^{-3}\frac{L}{cm^3}\right)$$ Organic Compounds if $t_{event} < t^*$

$$DA_{event} = K_p \times C_w \times \left[\frac{t_{event}}{1+B} + 2\tau\left[\frac{1+3B}{1+B}\right]\right] \times \left(10^{-3}\frac{mg}{\mu g}\right) \times \left(10^{-3}\frac{L}{cm^3}\right)$$ if $t_{event} > t^*$

$$DA_{event} = K_p \times C_w \times t_{event} \times \left(10^{-3}\frac{mg}{\mu g}\right) \times \left(10^{-3}\frac{L}{cm^3}\right)$$ Inorganic Compounds

Parameter	Definition	Value
DA_{event}	dose absorbed per unit area per event, mg/cm^2-event	Calculated value
K_p	permeability coefficient, cm/hr	Chemical-specific (a)
C_w	concentration of chemical in water, µg/L	Chemical-specific (see Appendix IV-4)
t_{event}	duration of event, hr/event	1 (b)
τ	lag time, hours	Chemical-specific (a)
t*	time to steady-state, hours	Chemical-specific (a)
B	effect of viable epidermis on mass, unitless	Chemical-specific (a)

Notes:
a USEPA (1992)
b USEPA (1997).

TABLE IV-3-17
Estimation of Intake Rate from Ingestion of Sediment by Recreational Visitor

$$CDI = CS \times \left(\frac{10^{-6} kg}{mg} \right) \times \left(\frac{IR_{child} \times ED_{child}}{BW_{child}} + \frac{IR_{adult} \times ED_{adult}}{BW_{adult}} \right) \times \frac{FI \times EF}{AT}$$

Parameter	Definition	Central Tendency Exposure	Reasonable Maximum Exposure
CDI	chronic daily intake, mg/kg-day	Calculated value	
CS	chemical concentration in sediment, mg/kg	Chemical-specific (see Appendix IV-4)	
IR_{child}	ingestion rate from ages 1-6, mg/day	100 (a)	200 (b)
ED_{child}	exposure duration during ages 1-6, yrs	2 (c)	6 (d)
BW_{child}	average body weight from ages 1-6, kg	15 (e)	15 (e)
IR_{adult}	ingestion rate from ages 7-31, mg/day	50 (a)	100 (b)
ED_{adult}	exposure duration during ages 7-31, yrs	7 (c)	24 (d)
BW_{adult}	average body weight from ages 7-31, kg	70 (e)	70 (e)
FI	fraction ingested from contaminated source, unitless	1.0	1.0
EF	exposure frequency, days/yr	12 (f)	24 (f)
AT	averaging time, days carcinogens noncarcinogens	25,550 2,190 (g)	25,550 2,190 (g)

Notes:
a USEPA (1991a). Conservatively estimated same as soil ingestion.
b USEPA (1997). Conservatively estimated same as soil ingestion.
c Based on age-adjusted, 9-year exposure duration (USEPA 1994) divided as 2 years for a child and 7 years for an adult
d Based on age-adjusted, 30-year exposure duration (USEPA 1991a) divided as 6 years for a child and 24 years for an adult
e USEPA (1991a, 1991b)
f Professional judgment. Corresponds recreational visitors swimming one to two days per week for three months.
g Noncarcinogenic risks are conservatively represented by the child

TABLE IV-3-18
Estimation of Fetal Blood Lead Concentration for an On-Site Female Worker

$$PbB_{fetal,GM} = R_{fetal/maternal} \times \left(PbB_{adult,0} + \frac{PbS \times BKSF \times IR_S \times AF_S \times EF_S}{AT} \right)$$

Parameter	Definition	CTE	RME
$PbB_{fetal,GM}$	central estimate of blood lead concentrations for fetuses carried by women who have site exposures to soil lead at concentration *PbS*, µg/dL	Calculated value	
$R_{fetal/maternal}$	constant of proportionality between fetal and maternal blood lead concentrations, unitless	0.9 (a)	
$PbB_{adult,0}$	typical blood lead concentration in adults in the absence of exposures to the site that is being assessed, µg/dL	2.0 (a)	
PbS	soil lead concentration, µg/g	53 (b)	53 (b)
BKSF	biokinetic slope factor relating the (quasi-steady state) increase in typical adult blood lead concentartion to average daily lead uptake, µg/dL blood lead increase per µg/day lead uptake	0.4 (a)	
IR_S	intake rate of soil, g/day	0.05 (a)	0.1 (c)
AF_S	absolute gastrointestinal absorption fraction for ingested lead in soil, unitless	0.12 (a)	
EF_S	exposure frequency for contact with assessed soil, days	150	250
AT	averaging time, days	365	365

Notes:
a USEPA (1996, 1999)
b From Table III-6
c USEPA (1997)

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APPENDIX IV-4

Summary of Chemical-Specific Calculations for Human Health Exposure Pathways

APPENDIX IV-4
Summary of Chemical-Specific Calculations for Human Health Exposure Pathways

This appendix presents tables summarizing the calculations performed in determining the human health risks shown in Tables IV-14 through IV-21. Calculations are provided for potential cancer and noncancer risks associated with soil ingestion (Table IV-4-1), inhalation of outdoor air (Table IV-4-2), residential and industrial uses of off-site ground water (Tables IV-4-3 through IV-4-5), ingestion of and dermal contact with surface water and sediments (Table IV-4-6), and excavation of the Pre-Envirite Waste Material by a hypothetical utility/construction worker (Tables IV-4-7 and IV-4-8). Calculations of risks associated with worker exposure to lead are provided in Table IV-4-9. Parameter values not listed in this appendix can be found in Appendices IV-2 and IV-3.

TABLE IV-4-1
Summary of Risk Calculations Associated with Soil Ingestion Exposure Pathway

RME Scenario	95% UCL	LADD		ADD		SFo	RfDo	Cancer Risk			Hazard Quotient		
	soil (0-1 ft)	Worker	Trespasser	Worker	Trespasser			Worker	Trespasser	frac of	Worker	Trespasser	frac of
Contaminant	mg/kg	mg/kg/d	mg/kg/d	mg/kg/d	mg/kg/d	kg-d/mg	mg/kg-d			total risk			total HQ
Aluminum	9.52E+03	1.66E-03	2.38E-04	4.66E-03	2.78E-03	NT	1.00E+00	NT	NT	NT	4.66E-03	2.78E-03	6.12E-02
Antimony	1.16E+01	2.03E-06	2.91E-07	5.68E-06	3.39E-06	NT	4.00E-04	NT	NT	NT	1.42E-02	8.47E-03	1.87E-01
Aroclor 1254	1.60E-02	2.80E-09	4.01E-10	7.83E-09	4.68E-09	NT	2.00E-05	NT	NT	NT	3.91E-04	2.34E-04	5.15E-03
Arsenic	1.50E+00	2.62E-07	3.76E-08	7.35E-07	4.39E-07	1.50E+00	NT	3.94E-07	5.64E-08	2.62E-01	NT	NT	NT
Benzene	5.00E-03	8.74E-10	1.25E-10	2.45E-09	1.46E-09	2.90E-02	NT	2.53E-11	3.63E-12	1.69E-05	NT	NT	NT
Benzo[a]pyrene	3.47E-01	6.06E-08	8.68E-09	1.70E-07	1.01E-07	7.30E+00	NT	4.42E-07	6.34E-08	2.95E-01	NT	NT	NT
Benzo[b]fluoranthene	3.69E-01	6.44E-08	9.24E-09	1.80E-07	1.08E-07	7.30E-01	NT	4.70E-08	6.74E-09	3.14E-02	NT	NT	NT
Benzo[k]fluoranthene	3.83E-01	6.69E-08	9.59E-09	1.87E-07	1.12E-07	7.30E-02	NT	4.88E-09	7.00E-10	3.25E-03	NT	NT	NT
Beryllium	7.40E-01	1.29E-07	1.85E-08	3.62E-07	2.16E-07	4.30E+00	5.00E-03	5.56E-07	7.97E-08	3.71E-01	7.24E-05	4.33E-05	9.52E-04
Bis(2-ethylhexyl)phthalate	4.12E-01	7.20E-08	1.03E-08	2.02E-07	1.20E-07	1.40E-02	2.00E-02	1.01E-09	1.44E-10	6.72E-04	1.01E-05	6.02E-06	1.33E-04
Cadmium	4.04E+00	7.06E-07	1.01E-07	1.98E-06	1.18E-06	NT	5.00E-04	NT	NT	NT	3.96E-03	2.36E-03	5.20E-02
Chromium	1.24E+02	2.16E-05	3.10E-06	6.05E-05	3.61E-05	NT	5.00E-03	NT	NT	NT	1.21E-02	7.22E-03	1.59E-01
Copper	3.43E+02	5.99E-05	8.59E-06	1.68E-04	1.00E-04	NT	4.00E-02	NT	NT	NT	4.19E-03	2.50E-03	5.51E-02
Dibenzofuran	1.60E-01	2.80E-08	4.01E-09	7.83E-08	4.68E-08	NT	4.00E-03	NT	NT	NT	1.96E-05	1.17E-05	2.57E-04
Ethylbenzene	5.92E-03	1.03E-09	1.48E-10	2.90E-09	1.73E-09	NT	1.00E-01	NT	NT	NT	2.90E-08	1.73E-08	3.81E-07
Lead	5.29E+01	9.25E-06	1.33E-06	2.59E-05	1.55E-05	NT	NT	NT	NT	NT	NT	NT	NT
Manganese	3.12E+02	5.44E-05	7.80E-06	1.52E-04	9.10E-05	NT	1.40E-01	NT	NT	NT	1.09E-03	6.50E-04	1.43E-02
Nickel	7.75E+01	1.35E-05	1.94E-06	3.79E-05	2.27E-05	NT	2.00E-02	NT	NT	NT	1.90E-03	1.13E-03	2.49E-02
PCBs (total)	1.57E-01	2.75E-08	3.94E-09	7.70E-08	4.60E-08	2.00E+00	NT	5.50E-08	7.88E-09	3.67E-02	NT	NT	NT
Silver	1.17E+01	2.04E-06	2.92E-07	5.71E-06	3.41E-06	NT	5.00E-03	NT	NT	NT	1.14E-03	6.82E-04	1.50E-02
Tetrachloroethylene	3.96E-03	6.91E-10	9.91E-11	1.94E-09	1.16E-09	5.20E-02	1.00E-02	3.60E-11	5.15E-12	2.40E-05	1.94E-07	1.16E-07	2.55E-06
Thallium	4.84E+00	8.46E-07	1.21E-07	2.37E-06	1.42E-06	NT	8.00E-05	NT	NT	NT	2.96E-02	1.77E-02	3.90E-01
Trichloroethene	5.20E-03	9.08E-10	1.30E-10	2.54E-09	1.52E-09	1.10E-02	6.00E-03	9.99E-12	1.43E-12	6.66E-06	4.24E-07	2.53E-07	5.57E-06
Vanadium	3.28E+01	5.73E-06	8.21E-07	1.60E-05	9.58E-06	NT	7.00E-03	NT	NT	NT	2.29E-03	1.37E-03	3.01E-02
Xylenes (total)	1.46E-02	2.55E-09	3.65E-10	7.13E-09	4.26E-09	NT	2.00E+00	NT	NT	NT	3.57E-09	2.13E-09	4.69E-08
Zinc	2.60E+02	4.54E-05	6.51E-06	1.27E-04	7.60E-05	NT	3.00E-01	NT	NT	NT	4.24E-04	2.53E-04	5.58E-03
						TOTAL RISK		1.50E-06	2.15E-07		7.60E-02	4.54E-02	

TABLE IV-4-1
Summary of Risk Calculations Associated with Soil Ingestion Exposure Pathway

CTE Scenario	95% UCL	LADD		ADD		SFo	RfDo	Cancer Risk			Hazard Quotient		
	soil (0-1 ft)	Worker	Trespasser	Worker	Trespasser			Worker	Trespasser	frac of	Worker	Trespasser	frac of
Contaminant	mg/kg	mg/kg/d	mg/kg/d	mg/kg/d	mg/kg/d	kg-d/mg	mg/kg-d			total risk			total HQ
Aluminum	9.52E+03	1.32E-04	5.96E-05	1.40E-03	6.95E-04	NT	1.00E+00	NT	NT	NT	1.40E-03	6.95E-04	6.12E-02
Antimony	1.16E+01	1.61E-07	7.26E-08	1.70E-06	8.47E-07	NT	4.00E-04	NT	NT	NT	4.26E-03	2.12E-03	1.87E-01
Aroclor 1254	1.60E-02	2.21E-10	1.00E-10	2.35E-09	1.17E-09	NT	2.00E-05	NT	NT	NT	1.17E-04	5.84E-05	5.15E-03
Arsenic	1.50E+00	2.08E-08	9.41E-09	2.20E-07	1.10E-07	1.50E+00	NT	3.12E-08	1.41E-08	2.62E-01	NT	NT	NT
Benzene	5.00E-03	6.92E-11	3.13E-11	7.34E-10	3.65E-10	2.90E-02	NT	2.01E-12	9.08E-13	1.69E-05	NT	NT	NT
Benzo[a]pyrene	3.47E-01	4.80E-09	2.17E-09	5.09E-08	2.53E-08	7.30E+00	NT	3.50E-08	1.58E-08	2.95E-01	NT	NT	NT
Benzo[b]fluoranthene	3.69E-01	5.10E-09	2.31E-09	5.41E-08	2.69E-08	7.30E-01	NT	3.72E-09	1.69E-09	3.14E-02	NT	NT	NT
Benzo[k]fluoranthene	3.83E-01	5.30E-09	2.40E-09	5.62E-08	2.80E-08	7.30E-02	NT	3.87E-10	1.75E-10	3.25E-03	NT	NT	NT
Beryllium	7.40E-01	1.02E-08	4.64E-09	1.09E-07	5.41E-08	4.30E+00	5.00E-03	4.40E-08	1.99E-08	3.71E-01	2.17E-05	1.08E-05	9.52E-04
Bis(2-ethylhexyl)phthalate	4.12E-01	5.70E-09	2.58E-09	6.05E-08	3.01E-08	1.40E-02	2.00E-02	7.98E-11	3.61E-11	6.72E-04	3.02E-06	1.50E-06	1.33E-04
Cadmium	4.04E+00	5.59E-08	2.53E-08	5.93E-07	2.95E-07	NT	5.00E-04	NT	NT	NT	1.19E-03	5.91E-04	5.20E-02
Chromium	1.24E+02	1.71E-06	7.74E-07	1.81E-05	9.03E-06	NT	5.00E-03	NT	NT	NT	3.63E-03	1.81E-03	1.59E-01
Copper	3.43E+02	4.74E-06	2.15E-06	5.03E-05	2.50E-05	NT	4.00E-02	NT	NT	NT	1.26E-03	6.26E-04	5.51E-02
Dibenzofuran	1.60E-01	2.21E-09	1.00E-09	2.35E-08	1.17E-08	NT	4.00E-03	NT	NT	NT	5.87E-06	2.92E-06	2.57E-04
Ethylbenzene	5.92E-03	8.19E-11	3.71E-11	8.69E-10	4.33E-10	NT	1.00E-01	NT	NT	NT	8.69E-09	4.33E-09	3.81E-07
Lead	5.29E+01	7.32E-07	3.31E-07	7.77E-06	3.87E-06	NT	NT	NT	NT	NT	NT	NT	NT
Manganese	3.12E+02	4.31E-06	1.95E-06	4.57E-05	2.28E-05	NT	1.40E-01	NT	NT	NT	3.27E-04	1.63E-04	1.43E-02
Nickel	7.75E+01	1.07E-06	4.85E-07	1.14E-05	5.66E-06	NT	2.00E-02	NT	NT	NT	5.69E-04	2.83E-04	2.49E-02
PCBs (total)	1.57E-01	2.18E-09	9.85E-10	2.31E-08	1.15E-08	2.00E+00	NT	4.35E-09	1.97E-09	3.67E-02	NT	NT	NT
Silver	1.17E+01	1.61E-07	7.31E-08	1.71E-06	8.53E-07	NT	5.00E-03	NT	NT	NT	3.43E-04	1.71E-04	1.50E-02
Tetrachloroethylene	3.96E-03	5.48E-11	2.48E-11	5.81E-10	2.89E-10	5.20E-02	1.00E-02	2.85E-12	1.29E-12	2.40E-05	5.81E-08	2.89E-08	2.55E-06
Thallium	4.84E+00	6.70E-08	3.03E-08	7.11E-07	3.54E-07	NT	8.00E-05	NT	NT	NT	8.89E-03	4.42E-03	3.90E-01
Trichloroethene	5.20E-03	7.19E-11	3.25E-11	7.63E-10	3.80E-10	1.10E-02	6.00E-03	7.91E-13	3.58E-13	6.66E-06	1.27E-07	6.33E-08	5.57E-06
Vanadium	3.28E+01	4.54E-07	2.05E-07	4.81E-06	2.39E-06	NT	7.00E-03	NT	NT	NT	6.87E-04	3.42E-04	3.01E-02
Xylenes (total)	1.46E-02	2.02E-10	9.13E-11	2.14E-09	1.07E-09	NT	2.00E+00	NT	NT	NT	1.07E-09	5.33E-10	4.69E-08
Zinc	2.60E+02	3.60E-06	1.63E-06	3.82E-05	1.90E-05	NT	3.00E-01	NT	NT	NT	1.27E-04	6.33E-05	5.58E-03
						TOTAL RISK		1.19E-07	5.38E-08		2.28E-02	1.14E-02	

TABLE IV-4-2
Summary of Risk Calculations Associated with Inhalation of Outdoor Air Pathway

RME Scenario	max detected						LADD			ADD	
	soil gas conc	Ci	Da	E	Cair	Worker	Trespasser	Resident	Worker	Trespasser	Resident
Contaminant	ug/L	g/cm3	cm2/sec	g/sec	mg/m3	mg/kg/d	mg/kg/d	mg/kg/d	mg/kg/d	mg/kg/d	mg/kg/d
1,2-Dichloroethane	0.5	5.00E-10	8.31E-03	6.97E-09	4.38E-07	3.06E-08	5.27E-10	5.15E-08	8.58E-08	6.15E-09	1.20E-07
1,1-Dichloroethylene	4	4.00E-09	7.19E-03	4.83E-08	3.03E-06	2.12E-07	3.65E-09	3.56E-07	5.94E-07	4.26E-08	8.31E-07
Tetrachloroethylene	50	5.00E-08	5.76E-03	4.83E-07	3.03E-05	2.12E-06	3.65E-08	3.56E-06	5.94E-06	4.26E-07	8.31E-06
1,1,1-Trichloroethane	0.4	4.00E-10	6.24E-03	4.18E-09	2.63E-07	1.84E-08	3.16E-10	3.09E-08	5.15E-08	3.69E-09	7.21E-08
Trichloroethylene	7.4	7.40E-09	6.32E-03	7.84E-08	4.93E-06	3.44E-07	5.93E-09	5.79E-07	9.64E-07	6.91E-08	1.35E-06

CTE Scenario	max detected						LADD			ADD	
	soil gas conc	Ci	De	E	Cair	Worker	Trespasser	Resident	Worker	Trespasser	Resident
Contaminant	ug/L	g/cm3	cm2/sec	g/sec	mg/m3	mg/kg/d	mg/kg/d	mg/kg/d	mg/kg/d	mg/kg/d	mg/kg/d
1,2-Dichloroethane	0.5	5.00E-10	8.31E-03	6.97E-09	4.38E-07	2.91E-09	1.32E-10	7.74E-09	3.09E-08	1.54E-09	6.02E-08
1,1-Dichloroethylene	4	4.00E-09	7.19E-03	4.83E-08	3.03E-06	2.02E-08	9.12E-10	5.36E-08	2.14E-07	1.06E-08	4.17E-07
Tetrachloroethylene	50	5.00E-08	5.76E-03	4.83E-07	3.03E-05	2.02E-07	9.12E-09	5.36E-07	2.14E-06	1.06E-07	4.17E-06
1,1,1-Trichloroethane	0.4	4.00E-10	6.24E-03	4.18E-09	2.63E-07	1.75E-09	7.91E-11	4.65E-09	1.85E-08	9.22E-10	3.61E-08
Trichloroethylene	7.4	7.40E-09	6.32E-03	7.84E-08	4.93E-06	3.27E-08	1.48E-09	8.70E-08	3.47E-07	1.73E-08	6.77E-07

TABLE IV-4-2
Summary of Risk Calculations Associated with Inhalation of Outdoor Air Pathway

RME Scenario	SFi	RfDi	Cancer risk				Hazard Quotient			
			Worker	Trespasser	Resident	frac of	Worker	Trespasser	Resident	frac of
Contaminant	kg-d/mg	mg/kg-d				total risk				total risk
1,2-Dichloroethane	9.10E-02	2.86E-03	2.79E-09	4.80E-11	4.68E-09	1.06E-02	3.00E-05	2.15E-06	4.20E-05	9.94E-01
1,1-Dichloroethylene	1.20E+00	NT	2.55E-07	4.38E-09	4.28E-07	9.65E-01	NT	NT	NT	NT
Tetrachloroethylene	2.03E-03	NT	4.31E-09	7.41E-11	7.23E-09	1.63E-02	NT	NT	NT	NT
1,1,1-Trichloroethane	NT	2.86E-01	NT	NT	NT	NT	1.80E-07	1.29E-08	2.52E-07	5.96E-03
Trichloroethylene	6.00E-03	NT	2.07E-09	3.56E-11	3.47E-09	7.84E-03	NT	NT	NT	NT
	TOTAL RISK		2.64E-07	4.54E-09	4.43E-07		3.02E-05	2.16E-06	4.22E-05	

CTE Scenario	SFi	RfDi	Cancer risk				Hazard Quotient			
			Worker	Trespasser	Resident	frac of	Worker	Trespasser	Resident	frac of
Contaminant	kg-d/mg	mg/kg-d				total risk				total risk
1,2-Dichloroethane	9.10E-02	2.86E-03	2.65E-10	1.20E-11	7.05E-10	1.06E-02	1.08E-05	5.38E-07	2.11E-05	9.94E-01
1,1-Dichloroethylene	1.20E+00	NT	2.42E-08	1.09E-09	6.43E-08	9.65E-01	NT	NT	NT	NT
Tetrachloroethylene	2.03E-03	NT	4.09E-10	1.85E-11	1.09E-09	1.63E-02	NT	NT	NT	NT
1,1,1-Trichloroethane	NT	2.86E-01	NT	NT	NT	NT	6.48E-08	3.23E-09	1.26E-07	5.96E-03
Trichloroethylene	6.00E-03	NT	1.96E-10	8.89E-12	5.22E-10	7.84E-03	NT	NT	NT	NT
	TOTAL RISK		2.51E-08	1.13E-09	6.66E-08		1.09E-05	5.41E-07	2.12E-05	

TABLE IV-4-3
Summary of Risk Calculations Associated with Ingestion of Off-Site Ground Water

Off-site worker (RME)	MW-43/44/56	LADD	ADD	SFo	RfDo	Cancer Risk		HQ	
	max conc	Worker	Worker			Worker	frac of	Worker	frac of
Contaminant	mg/L	mg/kg/d	mg/kg/d	kg-d/mg	mg/kg-d		total risk		total HQ
Acetone	1.50E-02	5.24E-07	1.47E-06	NT	1.00E-01	NT	NT	1.47E-05	1.38E-04
Aldrin	2.10E-04	7.34E-09	2.05E-08	1.70E+01	3.00E-05	1.25E-07	3.06E-03	6.85E-04	6.44E-03
Arsenic	3.60E-02	1.26E-06	3.52E-06	1.50E+00	NT	1.89E-06	4.63E-02	NT	NT
Barium	1.60E+00	5.59E-05	1.57E-04	NT	7.00E-02	NT	NT	2.24E-03	2.10E-02
Benzene	2.70E-03	9.44E-08	2.64E-07	2.90E-02	NT	2.74E-09	6.71E-05	NT	NT
Beryllium	4.00E-02	1.40E-06	3.91E-06	4.30E+00	5.00E-03	6.01E-06	1.47E-01	7.83E-04	7.36E-03
Bis(2-ethylhexyl)phthalate	1.20E-02	4.19E-07	1.17E-06	1.40E-02	2.00E-02	5.87E-09	1.44E-04	5.87E-05	5.52E-04
Bromodichloromethane	1.00E-02	3.49E-07	9.78E-07	6.20E-02	2.00E-02	2.17E-08	5.31E-04	4.89E-05	4.60E-04
Bromoform	1.00E-02	3.49E-07	9.78E-07	7.90E-03	2.00E-02	2.76E-09	6.77E-05	4.89E-05	4.60E-04
Bromomethane	1.00E-02	3.49E-07	9.78E-07	NT	1.40E-03	NT	NT	6.99E-04	6.57E-03
2-Butanone	1.00E-02	3.49E-07	9.78E-07	NT	6.00E-01	NT	NT	1.63E-06	1.53E-05
Butylbenzylphthalate	5.00E-04	1.75E-08	4.89E-08	NT	2.00E-01	NT	NT	2.45E-07	2.30E-06
Cadmium	1.10E-01	3.84E-06	1.08E-05	NT	5.00E-04	NT	NT	2.15E-02	2.02E-01
Carbon disulfide	1.00E-02	3.49E-07	9.78E-07	NT	1.00E-01	NT	NT	9.78E-06	9.20E-05
Carbon tetrachloride	1.00E-02	3.49E-07	9.78E-07	1.30E-01	7.00E-04	4.54E-08	1.11E-03	1.40E-03	1.31E-02
Chlorobenzene	1.00E-02	3.49E-07	9.78E-07	NT	2.00E-02	NT	NT	4.89E-05	4.60E-04
Chlorodibromomethane	1.00E-02	3.49E-07	9.78E-07	8.40E-02	2.00E-02	2.94E-08	7.20E-04	4.89E-05	4.60E-04
Chloroethane	1.00E-02	3.49E-07	9.78E-07	NT	4.00E-01	NT	NT	2.45E-06	2.30E-05
2-Chloroethyl vinyl ether	1.00E-02	3.49E-07	9.78E-07	NT	2.50E-02	NT	NT	3.91E-05	3.68E-04
Chloroform	3.90E-02	1.36E-06	3.82E-06	6.10E-03	1.00E-02	8.31E-09	2.04E-04	3.82E-04	3.59E-03
Chloromethane	1.00E-02	3.49E-07	9.78E-07	1.30E-02	NT	4.54E-09	1.11E-04	NT	NT
Chromium	3.40E-01	1.19E-05	3.33E-05	NT	5.00E-03	NT	NT	6.65E-03	6.26E-02
Chrysene	4.00E-04	1.40E-08	3.91E-08	7.30E-03	NT	1.02E-10	2.50E-06	NT	NT
Cobalt	1.90E-01	6.64E-06	1.86E-05	NT	6.00E-02	NT	NT	3.10E-04	2.91E-03
Copper	9.70E+00	3.39E-04	9.49E-04	NT	4.00E-02	NT	NT	2.37E-02	2.23E-01
DDT	9.00E-05	3.15E-09	8.81E-09	3.40E-01	5.00E-04	1.07E-09	2.62E-05	1.76E-05	1.66E-04
Dibutyl phthalate	1.10E-02	3.84E-07	1.08E-06	NT	1.00E-01	NT	NT	1.08E-05	1.01E-04
1,2-Dichlorobenzene	3.00E-04	1.05E-08	2.94E-08	NT	9.00E-02	NT	NT	3.26E-07	3.07E-06
1,2-Dichloroethane	1.60E-02	5.59E-07	1.57E-06	9.10E-02	NT	5.09E-08	1.25E-03	NT	NT
1,1-Dichloroethane	1.00E-02	3.49E-07	9.78E-07	NT	1.00E-01	NT	NT	9.78E-06	9.20E-05
1,1-Dichloroethene	1.00E-02	3.49E-07	9.78E-07	6.00E-01	9.00E-03	2.10E-07	5.14E-03	1.09E-04	1.02E-03
1,2-Dichloroethylene (cis)	4.90E-01	1.71E-05	4.79E-05	NT	1.00E-02	NT	NT	4.79E-03	4.51E-02
1,2-Dichloroethylene (trans)	1.00E-02	3.49E-07	9.78E-07	NT	2.00E-02	NT	NT	4.89E-05	4.60E-04
2,4-Dichlorophenol	1.20E-01	4.19E-06	1.17E-05	NT	3.00E-03	NT	NT	3.91E-03	3.68E-02
1,2-Dichloropropane	1.00E-02	3.49E-07	9.78E-07	6.80E-02	NT	2.38E-08	5.83E-04	NT	NT
1,3-Dichloropropene (cis)	1.00E-02	3.49E-07	9.78E-07	1.75E-01	3.00E-04	6.12E-08	1.50E-03	3.26E-03	3.07E-02
1,3-Dichloropropene (trans)	1.00E-02	3.49E-07	9.78E-07	1.75E-01	3.00E-04	6.12E-08	1.50E-03	3.26E-03	3.07E-02

TABLE IV-4-3
Summary of Risk Calculations Associated with Ingestion of Off-Site Ground Water

Off-site worker (RME)	MW-43/44/56	LADD	ADD	SFo	RfDo	Cancer Risk		HQ	
	max conc	Worker	Worker			Worker	frac of	Worker	frac of
Contaminant	mg/L	mg/kg/d	mg/kg/d	kg-d/mg	mg/kg-d		total risk		total HQ
Dieldrin	1.30E-03	4.54E-08	1.27E-07	1.60E+01	5.00E-05	7.27E-07	1.78E-02	2.54E-03	2.39E-02
Diethylphthalate	1.30E-03	4.54E-08	1.27E-07	NT	8.00E-01	NT	NT	1.59E-07	1.49E-06
Di-n-Octyl phthalate	1.90E-03	6.64E-08	1.86E-07	NT	2.00E-02	NT	NT	9.30E-06	8.74E-05
Ethylbenzene	1.00E-02	3.49E-07	9.78E-07	NT	1.00E-01	NT	NT	9.78E-06	9.20E-05
Fluoranthene	7.00E-04	2.45E-08	6.85E-08	NT	4.00E-02	NT	NT	1.71E-06	1.61E-05
HCH (gamma) Lindane	5.50E-05	1.92E-09	5.38E-09	1.30E+00	3.00E-04	2.50E-09	6.13E-05	1.79E-05	1.69E-04
Heptachlor epoxide	2.00E-05	6.99E-10	1.96E-09	9.10E+00	1.30E-05	6.36E-09	1.56E-04	1.51E-04	1.42E-03
2-Hexanone	1.00E-02	3.49E-07	9.78E-07	NT	4.00E-02	NT	NT	2.45E-05	2.30E-04
Lead	1.60E-01	5.59E-06	1.57E-05	NT	NT	NT	NT	NT	NT
Manganese	1.70E+01	5.94E-04	1.66E-03	NT	1.40E-01	NT	NT	1.19E-02	1.12E-01
4-Methyl-2-pentanone	1.00E-02	3.49E-07	9.78E-07	NT	8.00E-02	NT	NT	1.22E-05	1.15E-04
Methylene chloride	1.00E-02	3.49E-07	9.78E-07	7.50E-03	6.00E-02	2.62E-09	6.43E-05	1.63E-05	1.53E-04
Naphthalene	3.00E-04	1.05E-08	2.94E-08	NT	4.00E-02	NT	NT	7.34E-07	6.90E-06
Nickel	2.30E+00	8.04E-05	2.25E-04	NT	2.00E-02	NT	NT	1.13E-02	1.06E-01
4-Nitrophenol	8.00E-04	2.80E-08	7.83E-08	NT	6.20E-02	NT	NT	1.26E-06	1.19E-05
N-Nitrosodimethylamine	1.50E-02	5.24E-07	1.47E-06	5.10E+01	NT	2.67E-05	6.56E-01	NT	NT
PCBs (total)	2.60E-04	9.09E-09	2.54E-08	2.00E+00	NT	1.82E-08	4.46E-04	NT	NT
Pentachlorophenol	1.00E-03	3.49E-08	9.78E-08	1.20E-01	3.00E-02	4.19E-09	1.03E-04	3.26E-06	3.07E-05
Phenanthrene	3.00E-04	1.05E-08	2.94E-08	NT	4.00E-02	NT	NT	7.34E-07	6.90E-06
Pyrene	5.00E-04	1.75E-08	4.89E-08	NT	3.00E-02	NT	NT	1.63E-06	1.53E-05
Styrene	1.00E-02	3.49E-07	9.78E-07	NT	2.00E-01	NT	NT	4.89E-06	4.60E-05
1,1,2,2-Tetrachloroethane	1.00E-02	3.49E-07	9.78E-07	2.00E-01	NT	6.99E-08	1.71E-03	NT	NT
Tetrachloroethylene	7.40E-02	2.59E-06	7.24E-06	5.20E-02	1.00E-02	1.34E-07	3.30E-03	7.24E-04	6.81E-03
Toluene	1.00E-02	3.49E-07	9.78E-07	NT	2.00E-01	NT	NT	4.89E-06	4.60E-05
1,1,2-Trichloroethane	1.00E-02	3.49E-07	9.78E-07	5.70E-02	4.00E-03	1.99E-08	4.89E-04	2.45E-04	2.30E-03
1,1,1-Trichloroethane	2.30E-02	8.04E-07	2.25E-06	NT	3.50E-02	NT	NT	6.43E-05	6.05E-04
Trichloroethene	3.20E-01	1.12E-05	3.13E-05	1.10E-02	6.00E-03	1.23E-07	3.02E-03	5.22E-03	4.91E-02
2,4,5-Trichlorophenol	2.20E-02	7.69E-07	2.15E-06	NT	1.00E-01	NT	NT	2.15E-05	2.02E-04
2,4,6-Trichlorophenol	6.00E-04	2.10E-08	5.87E-08	1.10E-02	NT	2.31E-10	5.66E-06	NT	NT
Vinyl acetate	1.10E-02	3.84E-07	1.08E-06	NT	1.00E+00	NT	NT	1.08E-06	1.01E-05
Vinyl chloride	6.60E-02	2.31E-06	6.46E-06	1.90E+00	NT	4.38E-06	1.07E-01	NT	NT
Xylenes (total)	6.60E-03	2.31E-07	6.46E-07	NT	2.00E+00	NT	NT	3.23E-07	3.04E-06
Zinc	1.00E+01	3.49E-04	9.78E-04	NT	3.00E-01	NT	NT	3.26E-03	3.07E-02
					TOTAL	4.08E-05		1.06E-01	

TABLE IV-4-3
Summary of Risk Calculations Associated with Ingestion of Off-Site Ground Water

Off-site resident (RME) Contaminant	MW-37 max conc mg/L	LADD Resident mg/kg/d	ADD Resident mg/kg/d	SFo kg-d/mg	RfDo mg/kg-d	Cancer Risk Resident	Cancer Risk frac of total risk	HQ Resident	HQ frac of total HQ
Aldrin	5.00E-05	5.87E-07	1.37E-06	1.70E+01	3.00E-05	9.98E-06	9.53E-02	4.57E-02	2.27E-04
BHC, beta	5.00E-05	5.87E-07	1.37E-06	1.80E+00	NT	1.06E-06	1.01E-02	NT	NT
Bis(2-ethylhexyl)phthalate	1.10E-01	1.29E-03	3.01E-03	1.40E-02	2.00E-02	1.81E-05	1.73E-01	1.51E-01	7.48E-04
Bromodichloromethane	9.00E-04	1.06E-05	2.47E-05	6.20E-02	2.00E-02	6.55E-07	6.26E-03	1.23E-03	6.12E-06
Butylbenzylphthalate	5.50E-03	6.46E-05	1.51E-04	NT	2.00E-01	NT	NT	7.53E-04	3.74E-06
Chloroform	8.90E-03	1.05E-04	2.44E-04	6.10E-03	1.00E-02	6.37E-07	6.09E-03	2.44E-02	1.21E-04
Copper	4.00E-02	4.70E-04	1.10E-03	NT	4.00E-02	NT	NT	2.74E-02	1.36E-04
DDE	1.00E-04	1.17E-06	2.74E-06	3.40E-01	NT	3.99E-07	3.81E-03	NT	NT
DDT	1.00E-04	1.17E-06	2.74E-06	3.40E-01	5.00E-04	3.99E-07	3.81E-03	5.48E-03	2.72E-05
Dibutyl phthalate	6.30E-03	7.40E-05	1.73E-04	NT	1.00E-01	NT	NT	1.73E-03	8.57E-06
1,2-Dichloroethane	2.00E-03	2.35E-05	5.48E-05	9.10E-02	NT	2.14E-06	2.04E-02	NT	NT
1,2-Dichloroethylene (cis)	1.10E-02	1.29E-04	3.01E-04	NT	1.00E-02	NT	NT	3.01E-02	1.50E-04
Dieldrin	1.00E-04	1.17E-06	2.74E-06	1.60E+01	5.00E-05	1.88E-05	1.79E-01	5.48E-02	2.72E-04
Endosulfan I	5.00E-05	5.87E-07	1.37E-06	NT	6.00E-03	NT	NT	2.28E-04	1.13E-06
Endosulfan II	1.00E-04	1.17E-06	2.74E-06	NT	6.00E-03	NT	NT	4.57E-04	2.27E-06
HCH (gamma) Lindane	9.50E-06	1.12E-07	2.60E-07	1.30E+00	3.00E-04	1.45E-07	1.38E-03	8.68E-04	4.31E-06
Heptachlor	5.00E-05	5.87E-07	1.37E-06	4.50E+00	5.00E-04	2.64E-06	2.52E-02	2.74E-03	1.36E-05
Manganese	7.20E-01	8.45E-03	1.97E-02	NT	1.40E-01	NT	NT	1.41E-01	6.99E-04
Mercury (inorganic)	2.20E+00	2.58E-02	6.03E-02	NT	3.00E-04	NT	NT	2.01E+02	9.97E-01
Methoxychlor	5.00E-04	5.87E-06	1.37E-05	NT	5.00E-03	NT	NT	2.74E-03	1.36E-05
Methylene chloride	5.70E-03	6.69E-05	1.56E-04	7.50E-03	6.00E-02	5.02E-07	4.79E-03	2.60E-03	1.29E-05
Nickel	4.00E-02	4.70E-04	1.10E-03	NT	2.00E-02	NT	NT	5.48E-02	2.72E-04
PCBs (total)	2.02E-03	2.37E-05	5.53E-05	2.00E+00	NT	4.74E-05	4.53E-01	NT	NT
Tetrachloroethylene	2.20E-03	2.58E-05	6.03E-05	5.20E-02	1.00E-02	1.34E-06	1.28E-02	6.03E-03	2.99E-05
1,1,1-Trichloroethane	6.00E-04	7.05E-06	1.64E-05	NT	3.50E-02	NT	NT	4.70E-04	2.33E-06
Trichloroethene	4.00E-03	4.70E-05	1.10E-04	1.10E-02	6.00E-03	5.17E-07	4.93E-03	1.83E-02	9.06E-05
Zinc	1.60E-01	1.88E-03	4.38E-03	NT	3.00E-01	NT	NT	1.46E-02	7.25E-05
				TOTAL		1.05E-04		2.02E+02	
				excluding mercury				5.87E-01	

TABLE IV-4-3
Summary of Risk Calculations Associated with Ingestion of Off-Site Ground Water

Off-site worker (CTE)	MW-43/44/56	LADD	ADD	SFo	RfDo	Cancer Risk		HQ	
	max conc	Worker	Worker			Worker	frac of	Worker	frac of
Contaminant	mg/L	mg/kg/d	mg/kg/d	kg-d/mg	mg/kg-d		total risk		total HQ
Acetone	1.50E-02	8.30E-08	8.81E-07	NT	1.00E-01	NT	NT	8.81E-06	1.38E-04
Aldrin	2.10E-04	1.16E-09	1.23E-08	1.70E+01	3.00E-05	1.98E-08	3.06E-03	4.11E-04	6.44E-03
Arsenic	3.60E-02	1.99E-07	2.11E-06	1.50E+00	NT	2.99E-07	4.63E-02	NT	NT
Barium	1.60E+00	8.86E-06	9.39E-05	NT	7.00E-02	NT	NT	1.34E-03	2.10E-02
Benzene	2.70E-03	1.49E-08	1.59E-07	2.90E-02	NT	4.33E-10	6.71E-05	NT	NT
Beryllium	4.00E-02	2.21E-07	2.35E-06	4.30E+00	5.00E-03	9.52E-07	1.47E-01	4.70E-04	7.36E-03
Bis(2-ethylhexyl)phthalate	1.20E-02	6.64E-08	7.05E-07	1.40E-02	2.00E-02	9.30E-10	1.44E-04	3.52E-05	5.52E-04
Bromodichloromethane	1.00E-02	5.54E-08	5.87E-07	6.20E-02	2.00E-02	3.43E-09	5.31E-04	2.94E-05	4.60E-04
Bromoform	1.00E-02	5.54E-08	5.87E-07	7.90E-03	2.00E-02	4.37E-10	6.77E-05	2.94E-05	4.60E-04
Bromomethane	1.00E-02	5.54E-08	5.87E-07	NT	1.40E-03	NT	NT	4.19E-04	6.57E-03
2-Butanone	1.00E-02	5.54E-08	5.87E-07	NT	6.00E-01	NT	NT	9.78E-07	1.53E-05
Butylbenzylphthalate	5.00E-04	2.77E-09	2.94E-08	NT	2.00E-01	NT	NT	1.47E-07	2.30E-06
Cadmium	1.10E-01	6.09E-07	6.46E-06	NT	5.00E-04	NT	NT	1.29E-02	2.02E-01
Carbon disulfide	1.00E-02	5.54E-08	5.87E-07	NT	1.00E-01	NT	NT	5.87E-06	9.20E-05
Carbon tetrachloride	1.00E-02	5.54E-08	5.87E-07	1.30E-01	7.00E-04	7.20E-09	1.11E-03	8.39E-04	1.31E-02
Chlorobenzene	1.00E-02	5.54E-08	5.87E-07	NT	2.00E-02	NT	NT	2.94E-05	4.60E-04
Chlorodibromomethane	1.00E-02	5.54E-08	5.87E-07	8.40E-02	2.00E-02	4.65E-09	7.20E-04	2.94E-05	4.60E-04
Chloroethane	1.00E-02	5.54E-08	5.87E-07	NT	4.00E-01	NT	NT	1.47E-06	2.30E-05
2-Chloroethyl vinyl ether	1.00E-02	5.54E-08	5.87E-07	NT	2.50E-02	NT	NT	2.35E-05	3.68E-04
Chloroform	3.90E-02	2.16E-07	2.29E-06	6.10E-03	1.00E-02	1.32E-09	2.04E-04	2.29E-04	3.59E-03
Chloromethane	1.00E-02	5.54E-08	5.87E-07	1.30E-02	NT	7.20E-10	1.11E-04	NT	NT
Chromium	3.40E-01	1.88E-06	2.00E-05	NT	5.00E-03	NT	NT	3.99E-03	6.26E-02
Chrysene	4.00E-04	2.21E-09	2.35E-08	7.30E-03	NT	1.62E-11	2.50E-06	NT	NT
Cobalt	1.90E-01	1.05E-06	1.12E-05	NT	6.00E-02	NT	NT	1.86E-04	2.91E-03
Copper	9.70E+00	5.37E-05	5.69E-04	NT	4.00E-02	NT	NT	1.42E-02	2.23E-01
4,4'-DDT	9.00E-05	4.98E-10	5.28E-09	3.40E-01	5.00E-04	1.69E-10	2.62E-05	1.06E-05	1.66E-04
Dibutyl phthalate	1.10E-02	6.09E-08	6.46E-07	NT	1.00E-01	NT	NT	6.46E-06	1.01E-04
1,2-Dichlorobenzene	3.00E-04	1.66E-09	1.76E-08	NT	9.00E-02	NT	NT	1.96E-07	3.07E-06
1,2-Dichloroethane	1.60E-02	8.86E-08	9.39E-07	9.10E-02	NT	8.06E-09	1.25E-03	NT	NT
1,1-Dichloroethane	1.00E-02	5.54E-08	5.87E-07	NT	1.00E-01	NT	NT	5.87E-06	9.20E-05
1,1-Dichloroethene	1.00E-02	5.54E-08	5.87E-07	6.00E-01	9.00E-03	3.32E-08	5.14E-03	6.52E-05	1.02E-03
1,2-Dichloroethylene (cis)	4.90E-01	2.71E-06	2.88E-05	NT	1.00E-02	NT	NT	2.88E-03	4.51E-02
1,2-Dichloroethylene (trans)	1.00E-02	5.54E-08	5.87E-07	NT	2.00E-02	NT	NT	2.94E-05	4.60E-04
2,4-Dichlorophenol	1.20E-01	6.64E-07	7.05E-06	NT	3.00E-03	NT	NT	2.35E-03	3.68E-02
1,2-Dichloropropane	1.00E-02	5.54E-08	5.87E-07	6.80E-02	NT	3.76E-09	5.83E-04	NT	NT
1,3-Dichloropropene (cis)	1.00E-02	5.54E-08	5.87E-07	1.75E-01	3.00E-04	9.69E-09	1.50E-03	1.96E-03	3.07E-02
1,3-Dichloropropene (trans)	1.00E-02	5.54E-08	5.87E-07	1.75E-01	3.00E-04	9.69E-09	1.50E-03	1.96E-03	3.07E-02

TABLE IV-4-3
Summary of Risk Calculations Associated with Ingestion of Off-Site Ground Water

Off-site worker (CTE)	MW-43/44/56	LADD	ADD	SFo	RfDo	Cancer Risk		HQ	
	max conc	Worker	Worker			Worker	frac of	Worker	frac of
Contaminant	mg/L	mg/kg/d	mg/kg/d	kg-d/mg	mg/kg-d		total risk		total HQ
Dieldrin	1.30E-03	7.20E-09	7.63E-08	1.60E+01	5.00E-05	1.15E-07	1.78E-02	1.53E-03	2.39E-02
Diethylphthalate	1.30E-03	7.20E-09	7.63E-08	NT	8.00E-01	NT	NT	9.54E-08	1.49E-06
Di-n-Octyl phthalate	1.90E-03	1.05E-08	1.12E-07	NT	2.00E-02	NT	NT	5.58E-06	8.74E-05
Ethylbenzene	1.00E-02	5.54E-08	5.87E-07	NT	1.00E-01	NT	NT	5.87E-06	9.20E-05
Fluoranthene	7.00E-04	3.87E-09	4.11E-08	NT	4.00E-02	NT	NT	1.03E-06	1.61E-05
HCH (gamma) Lindane	5.50E-05	3.04E-10	3.23E-09	1.30E+00	3.00E-04	3.96E-10	6.13E-05	1.08E-05	1.69E-04
Heptachlor epoxide	2.00E-05	1.11E-10	1.17E-09	9.10E+00	1.30E-05	1.01E-09	1.56E-04	9.03E-05	1.42E-03
2-Hexanone	1.00E-02	5.54E-08	5.87E-07	NT	4.00E-02	NT	NT	1.47E-05	2.30E-04
Lead	1.60E-01	8.86E-07	9.39E-06	NT	NT	NT	NT	NT	NT
Manganese	1.70E+01	9.41E-05	9.98E-04	NT	1.40E-01	NT	NT	7.13E-03	1.12E-01
4-Methyl-2-pentanone	1.00E-02	5.54E-08	5.87E-07	NT	8.00E-02	NT	NT	7.34E-06	1.15E-04
Methylene chloride	1.00E-02	5.54E-08	5.87E-07	7.50E-03	6.00E-02	4.15E-10	6.43E-05	9.78E-06	1.53E-04
Naphthalene	3.00E-04	1.66E-09	1.76E-08	NT	4.00E-02	NT	NT	4.40E-07	6.90E-06
Nickel	2.30E+00	1.27E-05	1.35E-04	NT	2.00E-02	NT	NT	6.75E-03	1.06E-01
4-Nitrophenol	8.00E-04	4.43E-09	4.70E-08	NT	6.20E-02	NT	NT	7.58E-07	1.19E-05
N-Nitrosodimethylamine	1.50E-02	8.30E-08	8.81E-07	5.10E+01	NT	4.23E-06	6.56E-01	NT	NT
PCBs (total)	2.60E-04	1.44E-09	1.53E-08	2.00E+00	NT	2.88E-09	4.46E-04	NT	NT
Pentachlorophenol	1.00E-03	5.54E-09	5.87E-08	1.20E-01	3.00E-02	6.64E-10	1.03E-04	1.96E-06	3.07E-05
Phenanthrene	3.00E-04	1.66E-09	1.76E-08	NT	4.00E-02	NT	NT	4.40E-07	6.90E-06
Pyrene	5.00E-04	2.77E-09	2.94E-08	NT	3.00E-02	NT	NT	9.78E-07	1.53E-05
Styrene	1.00E-02	5.54E-08	5.87E-07	NT	2.00E-01	NT	NT	2.94E-06	4.60E-05
1,1,2,2-Tetrachloroethane	1.00E-02	5.54E-08	5.87E-07	2.00E-01	NT	1.11E-08	1.71E-03	NT	NT
Tetrachloroethylene (PCE)	7.40E-02	4.10E-07	4.34E-06	5.20E-02	1.00E-02	2.13E-08	3.30E-03	4.34E-04	6.81E-03
Toluene	1.00E-02	5.54E-08	5.87E-07	NT	2.00E-01	NT	NT	2.94E-06	4.60E-05
1,1,2-Trichloroethane	1.00E-02	5.54E-08	5.87E-07	5.70E-02	4.00E-03	3.16E-09	4.89E-04	1.47E-04	2.30E-03
1,1,1-Trichloroethane	2.30E-02	1.27E-07	1.35E-06	NT	3.50E-02	NT	NT	3.86E-05	6.05E-04
Trichloroethene	3.20E-01	1.77E-06	1.88E-05	1.10E-02	6.00E-03	1.95E-08	3.02E-03	3.13E-03	4.91E-02
2,4,5-Trichlorophenol	2.20E-02	1.22E-07	1.29E-06	NT	1.00E-01	NT	NT	1.29E-05	2.02E-04
2,4,6-Trichlorophenol	6.00E-04	3.32E-09	3.52E-08	1.10E-02	NT	3.65E-11	5.66E-06	NT	NT
Vinyl acetate	1.10E-02	6.09E-08	6.46E-07	NT	1.00E+00	NT	NT	6.46E-07	1.01E-05
Vinyl chloride	6.60E-02	3.65E-07	3.87E-06	1.90E+00	NT	6.94E-07	1.07E-01	NT	NT
Xylenes (total)	6.60E-03	3.65E-08	3.87E-07	NT	2.00E+00	NT	NT	1.94E-07	3.04E-06
Zinc	1.00E+01	5.54E-05	5.87E-04	NT	3.00E-01	NT	NT	1.96E-03	3.07E-02
					TOTAL	6.46E-06		6.38E-02	

TABLE IV-4-3
Summary of Risk Calculations Associated with Ingestion of Off-Site Ground Water

Off-site resident (CTE)	MW-37	LADD	ADD	SFo	RfDo	Cancer Risk		HQ	
	max conc	Resident	Resident			Resident	frac of	Resident	frac of
Contaminant	mg/L	mg/kg/d	mg/kg/d	kg-d/mg	mg/kg-d		total risk		total HQ
Aldrin	5.00E-05	1.23E-07	9.59E-07	1.70E+01	3.00E-05	2.10E-06	9.53E-02	3.20E-02	2.27E-04
BHC, beta	5.00E-05	1.23E-07	9.59E-07	1.80E+00	NT	2.22E-07	1.01E-02	NT	NT
Bis(2-ethylhexyl)phthalate	1.10E-01	2.71E-04	2.11E-03	1.40E-02	2.00E-02	3.80E-06	1.73E-01	1.05E-01	7.48E-04
Bromodichloromethane	9.00E-04	2.22E-06	1.73E-05	6.20E-02	2.00E-02	1.38E-07	6.26E-03	8.63E-04	6.12E-06
Butylbenzylphthalate	5.50E-03	1.36E-05	1.05E-04	NT	2.00E-01	NT	NT	5.27E-04	3.74E-06
Chloroform	8.90E-03	2.19E-05	1.71E-04	6.10E-03	1.00E-02	1.34E-07	6.09E-03	1.71E-02	1.21E-04
Copper	4.00E-02	9.86E-05	7.67E-04	NT	4.00E-02	NT	NT	1.92E-02	1.36E-04
DDE	1.00E-04	2.47E-07	1.92E-06	3.40E-01	NT	8.38E-08	3.81E-03	NT	NT
DDT	1.00E-04	2.47E-07	1.92E-06	3.40E-01	5.00E-04	8.38E-08	3.81E-03	3.84E-03	2.72E-05
Dibutyl phthalate	6.30E-03	1.55E-05	1.21E-04	NT	1.00E-01	NT	NT	1.21E-03	8.57E-06
1,2-Dichloroethane	2.00E-03	4.93E-06	3.84E-05	9.10E-02	NT	4.49E-07	2.04E-02	NT	NT
1,2-Dichloroethylene (cis)	1.10E-02	2.71E-05	2.11E-04	NT	1.00E-02	NT	NT	2.11E-02	1.50E-04
Dieldrin	1.00E-04	2.47E-07	1.92E-06	1.60E+01	5.00E-05	3.95E-06	1.79E-01	3.84E-02	2.72E-04
Endosulfan I	5.00E-05	1.23E-07	9.59E-07	NT	6.00E-03	NT	NT	1.60E-04	1.13E-06
Endosulfan II	1.00E-04	2.47E-07	1.92E-06	NT	6.00E-03	NT	NT	3.20E-04	2.27E-06
HCH (gamma) Lindane	9.50E-06	2.34E-08	1.82E-07	1.30E+00	3.00E-04	3.05E-08	1.38E-03	6.07E-04	4.31E-06
Heptachlor	5.00E-05	1.23E-07	9.59E-07	4.50E+00	5.00E-04	5.55E-07	2.52E-02	1.92E-03	1.36E-05
Manganese	7.20E-01	1.78E-03	1.38E-02	NT	1.40E-01	NT	NT	9.86E-02	6.99E-04
Mercury (inorganic)	2.20E+00	5.42E-03	4.22E-02	NT	3.00E-04	NT	NT	1.41E+02	9.97E-01
Methoxychlor	5.00E-04	1.23E-06	9.59E-06	NT	5.00E-03	NT	NT	1.92E-03	1.36E-05
Methylene chloride	5.70E-03	1.41E-05	1.09E-04	7.50E-03	6.00E-02	1.05E-07	4.79E-03	1.82E-03	1.29E-05
Nickel	4.00E-02	9.86E-05	7.67E-04	NT	2.00E-02	NT	NT	3.84E-02	2.72E-04
PCBs (total)	2.02E-03	4.98E-06	3.87E-05	2.00E+00	NT	9.96E-06	4.53E-01	NT	NT
Tetrachloroethylene	2.20E-03	5.42E-06	4.22E-05	5.20E-02	1.00E-02	2.82E-07	1.28E-02	4.22E-03	2.99E-05
1,1,1-Trichloroethane	6.00E-04	1.48E-06	1.15E-05	NT	3.50E-02	NT	NT	3.29E-04	2.33E-06
Trichloroethene	4.00E-03	9.86E-06	7.67E-05	1.10E-02	6.00E-03	1.08E-07	4.93E-03	1.28E-02	9.06E-05
Zinc	1.60E-01	3.95E-04	3.07E-03	NT	3.00E-01	NT	NT	1.02E-02	7.25E-05
				TOTAL		2.20E-05		1.41E+02	
				excluding mercury				4.11E-01	

TABLE IV-4-4
Summary of Risk Calculations Associated with Dermal Contact with Off-Site Ground Water While Showering

Off-site resident (RME)	MW-37	Kp	tau	t*	B	Daevent	LADD	ADD	SFo	RfDo	Cancer Risk		HQ	
Contaminant	max conc mg/L					mg/cm2	Resident mg/kg/d	Resident mg/kg/d	kg-d/mg	mg/kg-d	Resident	frac of total risk	Resident	frac of total HQ
Aldrin	5.00E-05	1.60E-03	1.47E+01	3.60E+01	1.00E-01	4.24E-10	5.73E-08	1.34E-07	1.70E+01	3.00E-05	9.74E-07	8.19E-04	4.46E-03	3.50E-03
BHC, beta	5.00E-05	1.68E-02	5.20E+00	3.10E+00	6.76E-01	2.65E-09	3.57E-07	8.34E-07	1.80E+00	NT	6.43E-07	5.41E-04	NT	NT
Bis(2-ethylhexyl)phthalate	1.10E-01	3.89E-02	2.11E+01	1.01E+02	1.58E+01	2.72E-05	3.67E-03	8.55E-03	1.40E-02	2.00E-02	5.13E-05	4.32E-02	4.28E-01	3.35E-01
Bromodichloromethane	9.00E-04	5.27E-03	8.73E-01	2.10E+00	1.07E-02	6.13E-09	8.28E-07	1.93E-06	6.20E-02	2.00E-02	5.13E-08	4.32E-05	9.66E-05	7.57E-05
Butylbenzylphthalate	5.50E-03	3.20E-02	7.04E+00	3.73E+01	2.57E+00	6.46E-07	8.72E-05	2.04E-04	NT	2.00E-01	NT	NT	1.02E-03	7.98E-04
Chloroform	8.90E-03	8.63E-03	4.68E-01	1.12E+00	8.91E-03	7.27E-08	9.81E-06	2.29E-05	6.10E-03	1.00E-02	5.98E-08	5.03E-05	2.29E-03	1.80E-03
Copper	4.00E-02	1.00E-03				1.00E-08	1.35E-06	3.15E-06	NT	4.00E-02	NT	NT	7.88E-05	6.18E-05
DDE	1.00E-04	2.40E-01	7.60E+00	3.60E+01	4.90E+01	9.15E-08	1.23E-05	2.88E-05	3.40E-01	NT	4.20E-06	3.53E-03	NT	NT
DDT	1.00E-04	4.30E-01	1.27E+01	5.99E+01	2.30E+02	2.12E-07	2.86E-05	6.68E-05	3.40E-01	5.00E-04	9.73E-06	8.18E-03	1.34E-01	1.05E-01
Dibutyl phthalate	6.30E-03	3.30E-02	4.30E+00	2.90E+01	1.30E+00	5.96E-07	8.05E-05	1.88E-04	NT	1.00E-01	NT	NT	1.88E-03	1.47E-03
1,2-Dichloroethane	2.00E-03	5.30E-03	3.51E-01	8.43E-01	3.00E-03	8.68E-09	1.17E-06	2.74E-06	9.10E-02	NT	1.07E-07	8.97E-05	NT	NT
1,2-Dichloroethylene (cis)	1.10E-02	1.24E-02	3.41E-01	8.19E-01	9.55E-03	1.10E-07	1.49E-05	3.48E-05	NT	1.00E-02	NT	NT	3.48E-03	2.73E-03
Dieldrin	1.00E-04	1.60E-02	1.84E+01	9.40E+01	3.60E+00	9.49E-09	1.28E-06	2.99E-06	1.60E+01	5.00E-05	2.05E-05	1.73E-02	5.98E-02	4.69E-02
Endosulfan I	5.00E-05	1.38E-05	2.66E+01	6.38E+01	3.02E-04	4.90E-12	6.61E-10	1.54E-09	NT	6.00E-03	NT	NT	2.57E-07	2.02E-07
Endosulfan II	1.00E-04	1.38E-05	2.66E+01	6.38E+01	3.02E-04	9.80E-12	1.32E-09	3.09E-09	NT	6.00E-03	NT	NT	5.14E-07	4.04E-07
HCH (gamma) Lindane	9.50E-06	1.62E-02	5.14E+00	2.23E+00	6.31E-01	4.82E-10	6.50E-08	1.52E-07	1.30E+00	3.00E-04	8.46E-08	7.11E-05	5.06E-04	3.97E-04
Heptachlor	5.00E-05	1.10E-02	1.66E+01	9.40E+01	1.90E+00	3.09E-09	4.18E-07	9.75E-07	4.50E+00	5.00E-04	1.88E-06	1.58E-03	1.95E-03	1.53E-03
Manganese	7.20E-01	1.00E-03				1.80E-07	2.43E-05	5.67E-05	NT	1.40E-01	NT	NT	4.05E-04	3.18E-04
Mercury (inorganic)	2.20E+00	1.00E-03				5.50E-07	7.43E-05	1.73E-04	NT	3.00E-04	NT	NT	5.78E-01	4.53E-01
Methoxychlor	5.00E-04	2.44E-02	1.12E+01	5.75E+01	3.39E+00	5.66E-08	7.64E-06	1.78E-05	NT	5.00E-03	NT	NT	3.56E-03	2.80E-03
Methylene chloride	5.70E-03	4.53E-03	2.88E-01	6.92E-01	1.82E-03	1.92E-08	2.59E-06	6.04E-06	7.50E-03	6.00E-02	1.94E-08	1.63E-05	1.01E-04	7.90E-05
Nickel	4.00E-02	1.00E-03				1.00E-08	1.35E-06	3.15E-06	NT	2.00E-02	NT	NT	1.58E-04	1.24E-04
PCBs (total)	2.02E-03	4.95E-01	8.64E+00	4.08E+01	1.62E+02	4.06E-06	5.48E-04	1.28E-03	2.00E+00	NT	1.10E-03	9.22E-01	NT	NT
Tetrachloroethylene	2.20E-03	3.70E-01	9.00E-01	4.30E+00	2.50E-01	2.04E-07	2.75E-05	6.41E-05	5.20E-02	1.00E-02	1.43E-06	1.20E-03	6.41E-03	5.03E-03
1,1,1-Trichloroethane	6.00E-04	1.70E-02	5.70E-01	1.37E+00	3.10E-02	1.06E-08	1.44E-06	3.35E-06	NT	3.50E-02	NT	NT	9.58E-05	7.51E-05
Trichloroethene	4.00E-03	2.30E-01	5.54E-01	1.33E+00	2.60E-02	9.46E-07	1.28E-04	2.98E-04	1.10E-02	6.00E-03	1.41E-06	1.18E-03	4.97E-02	3.90E-02
Zinc	1.60E-01	1.00E-03				4.00E-08	5.40E-06	1.26E-05	NT	3.00E-01	NT	NT	4.20E-05	3.29E-05
										TOTAL	1.19E-03		1.27E+00 6.97E-01	

TABLE IV-4-4
Summary of Risk Calculations Associated with Dermal Contact with Off-Site Ground Water While Showering

Off-site resident (CTE)	MW-37	Kp	tau	t*	B	Daevent	LADD	ADD	SFo	RfDo	Cancer Risk		HQ	
	max conc						Resident	Resident			Resident	frac of	Resident	frac of
Contaminant	mg/L					mg/cm2	mg/kg/d	mg/kg/d	kg-d/mg	mg/kg-d		total risk		total HQ
Aldrin	5.00E-05	1.60E-03	1.47E+01	3.60E+01	1.00E-01	3.50E-10	1.49E-08	1.16E-07	1.70E+01	3.00E-05	2.54E-07	8.19E-04	3.87E-03	3.50E-03
BHC, beta	5.00E-05	1.68E-02	5.20E+00	3.10E+00	6.76E-01	2.18E-09	9.32E-08	7.25E-07	1.80E+00	NT	1.68E-07	5.41E-04	NT	NT
Bis(2-ethylhexyl)phthalate	1.10E-01	3.89E-02	2.11E+01	1.01E+02	1.58E+01	2.24E-05	9.56E-04	7.44E-03	1.40E-02	2.00E-02	1.34E-05	4.32E-02	3.72E-01	3.35E-01
Bromodichloromethane	9.00E-04	5.27E-03	8.73E-01	2.10E+00	1.07E-02	5.05E-09	2.16E-07	1.68E-06	6.20E-02	2.00E-02	1.34E-08	4.32E-05	8.40E-05	7.57E-05
Butylbenzylphthalate	5.50E-03	3.20E-02	7.04E+00	3.73E+01	2.57E+00	5.33E-07	2.28E-05	1.77E-04	NT	2.00E-01	NT	NT	8.85E-04	7.98E-04
Chloroform	8.90E-03	8.63E-03	4.68E-01	1.12E+00	8.91E-03	5.99E-08	2.56E-06	1.99E-05	6.10E-03	1.00E-02	1.56E-08	5.03E-05	1.99E-03	1.80E-03
Copper	4.00E-02	1.00E-03				6.80E-09	3.52E-07	2.74E-06	NT	4.00E-02	NT	NT	6.85E-05	6.18E-05
DDE	1.00E-04	2.40E-01	7.60E+00	3.60E+01	4.90E+01	7.54E-08	3.22E-06	2.51E-05	3.40E-01	NT	1.10E-06	3.53E-03	NT	NT
DDT	1.00E-04	4.30E-01	1.27E+01	5.99E+01	2.30E+02	1.75E-07	7.47E-06	5.81E-05	3.40E-01	5.00E-04	2.54E-06	8.18E-03	1.16E-01	1.05E-01
Dibutyl phthalate	6.30E-03	3.30E-02	4.30E+00	2.90E+01	1.30E+00	4.91E-07	2.10E-05	1.63E-04	NT	1.00E-01	NT	NT	1.63E-03	1.47E-03
1,2-Dichloroethane	2.00E-03	5.30E-03	3.51E-01	8.43E-01	3.00E-03	7.16E-09	3.06E-07	2.38E-06	9.10E-02	NT	2.78E-08	8.97E-05	NT	NT
1,2-Dichloroethylene (cis)	1.10E-02	1.24E-02	3.41E-01	8.19E-01	9.55E-03	9.11E-08	3.89E-06	3.03E-05	NT	1.00E-02	NT	NT	3.03E-03	2.73E-03
Dieldrin	1.00E-04	1.60E-02	1.84E+01	9.40E+01	3.60E+00	7.83E-09	3.34E-07	2.60E-06	1.60E+01	5.00E-05	5.35E-06	1.73E-02	5.20E-02	4.69E-02
Endosulfan I	5.00E-05	1.38E-05	2.66E+01	6.38E+01	3.02E-04	4.04E-12	1.73E-10	1.34E-09	NT	6.00E-03	NT	NT	2.24E-07	2.02E-07
Endosulfan II	1.00E-04	1.38E-05	2.66E+01	6.38E+01	3.02E-04	8.08E-12	3.45E-10	2.68E-09	NT	6.00E-03	NT	NT	4.47E-07	4.04E-07
HCH (gamma) Lindane	9.50E-06	1.62E-02	5.14E+00	2.23E+00	6.31E-01	3.97E-10	1.70E-08	1.32E-07	1.30E+00	3.00E-04	2.21E-08	7.11E-05	4.40E-04	3.97E-04
Heptachlor	5.00E-05	1.10E-02	1.66E+01	9.40E+01	1.90E+00	2.55E-09	1.09E-07	8.48E-07	4.50E+00	5.00E-04	4.91E-07	1.58E-03	1.70E-03	1.53E-03
Manganese	7.20E-01	1.00E-03				1.22E-07	6.34E-06	4.93E-05	NT	1.40E-01	NT	NT	3.52E-04	3.18E-04
Mercury (inorganic)	2.20E+00	1.00E-03				3.74E-07	1.94E-05	1.51E-04	NT	3.00E-04	NT	NT	5.02E-01	4.53E-01
Methoxychlor	5.00E-04	2.44E-02	1.12E+01	5.75E+01	3.39E+00	4.66E-08	1.99E-06	1.55E-05	NT	5.00E-03	NT	NT	3.10E-03	2.80E-03
Methylene chloride	5.70E-03	4.53E-03	2.88E-01	6.92E-01	1.82E-03	1.58E-08	6.76E-07	5.26E-06	7.50E-03	6.00E-02	5.07E-09	1.63E-05	8.76E-05	7.90E-05
Nickel	4.00E-02	1.00E-03				6.80E-09	3.52E-07	2.74E-06	NT	2.00E-02	NT	NT	1.37E-04	1.24E-04
PCBs (total)	2.02E-03	4.95E-01	8.64E+00	4.08E+01	1.62E+02	3.35E-06	1.43E-04	1.11E-03	2.00E+00	NT	2.86E-04	9.22E-01	NT	NT
Tetrachloroethylene	2.20E-03	3.70E-01	9.00E-01	4.30E+00	2.50E-01	1.38E-07	7.17E-06	5.58E-05	5.20E-02	1.00E-02	3.73E-07	1.20E-03	5.58E-03	5.03E-03
1,1,1-Trichloroethane	6.00E-04	1.70E-02	5.70E-01	1.37E+00	3.10E-02	8.78E-09	3.75E-07	2.92E-06	NT	3.50E-02	NT	NT	8.33E-05	7.51E-05
Trichloroethene	4.00E-03	2.30E-01	5.54E-01	1.33E+00	2.60E-02	7.80E-07	3.33E-05	2.59E-04	1.10E-02	6.00E-03	3.67E-07	1.18E-03	4.32E-02	3.90E-02
Zinc	1.60E-01	1.00E-03				2.72E-08	1.41E-06	1.10E-05	NT	3.00E-01	NT	NT	3.65E-05	3.29E-05
										TOTAL	3.10E-04		1.11E+00	
													6.06E-01	

TABLE IV-4-5
Summary of Risk Calculations Associated with Inhalation of Off-Site Ground Water Constituents While Showering

Off-site resident (RME)	MW-37				LADD	ADD	SFi	RfDi	Cancer Risk		HQ	
	max conc	H	MW	air conc	Resident	Resident			Resident	frac of	Resident	frac of
Contaminant	mg/L	atm-m3/mol-K		mg/m3	mg/kg/d	mg/kg/d	kg-d/mg	mg/kg-d		total risk		total HQ
Aldrin	5.00E-05	1.35E-07	3.65E+02	1.43E-07	2.10E-10	4.91E-10	1.71E+01	NT	3.60E-09	3.82E-04	NT	NT
BHC, beta	5.00E-05	3.46E-07	2.91E+02	4.11E-07	6.03E-10	1.41E-09	1.80E+00	NT	1.09E-09	1.15E-04	NT	NT
Bis(2-ethylhexyl)phthalate	1.10E-01	1.10E-08	3.91E+02	2.48E-05	3.65E-08	8.51E-08	NT	NT	NT	NT	NT	NT
Bromodichloromethane	9.00E-04	3.17E-03	1.64E+02	5.37E-03	7.89E-06	1.84E-05	NT	NT	NT	NT	NT	NT
Butylbenzylphthalate	5.50E-03	1.91E-06	3.12E+02	2.39E-04	3.51E-07	8.18E-07	NT	NT	NT	NT	NT	NT
Chloroform	8.90E-03	4.03E-03	1.19E+02	6.09E-02	8.94E-05	2.09E-04	8.05E-02	NT	7.19E-06	7.64E-01	NT	NT
Copper	4.00E-02		6.36E+01	0.00E+00	0.00E+00	0.00E+00	NT	NT	NT	NT	NT	NT
DDE	1.00E-04	1.24E-04	3.19E+02	1.78E-04	2.62E-07	6.11E-07	NT	NT	NT	NT	NT	NT
DDT	1.00E-04	5.37E-05	3.54E+02	9.27E-05	1.36E-07	3.17E-07	3.40E-01	NT	4.62E-08	4.91E-03	NT	NT
Dibutyl phthalate	6.30E-03	1.43E-06	2.78E+02	2.18E-04	3.19E-07	7.45E-07	NT	NT	NT	NT	NT	NT
1,2-Dichloroethane	2.00E-03	1.27E-03	9.90E+01	1.34E-02	1.97E-05	4.59E-05	9.10E-02	2.86E-03	1.79E-06	1.90E-01	1.61E-02	3.21E-05
1,2-Dichloroethylene (cis)	1.10E-02	4.51E-03	9.69E+01	8.18E-02	1.20E-04	2.80E-04	NT	NT	NT	NT	NT	NT
Dieldrin	1.00E-04	3.51E-09	3.81E+02	7.30E-09	1.07E-11	2.50E-11	1.61E+01	NT	1.72E-10	1.83E-05	NT	NT
Endosulfan I	5.00E-05	3.04E-08	4.07E+02	3.06E-08	4.49E-11	1.05E-10	NT	NT	NT	NT	NT	NT
Endosulfan II	1.00E-04	3.04E-08	4.07E+02	6.11E-08	8.97E-11	2.09E-10	NT	NT	NT	NT	NT	NT
HCH (gamma) Lindane	9.50E-06	6.78E-06	2.90E+02	1.49E-06	2.18E-09	5.09E-09	NT	NT	NT	NT	NT	NT
Heptachlor	5.00E-05	5.87E-06	3.73E+02	6.00E-06	8.81E-09	2.05E-08	NT	NT	NT	NT	NT	NT
Manganese	7.20E-01		5.49E+01	0.00E+00	0.00E+00	0.00E+00	NT	1.43E-05	NT	NT	0.00E+00	0.00E+00
Mercury (inorganic)	2.20E+00	7.10E-03	2.01E+02	1.25E+01	1.84E-02	4.29E-02	NT	8.57E-05	NT	NT	5.00E+02	1.00E+00
Methoxychlor	5.00E-04	6.33E-06	3.46E+02	6.71E-05	9.85E-08	2.30E-07	NT	NT	NT	NT	NT	NT
Methylene chloride	5.70E-03	2.83E-03	8.49E+01	4.35E-02	6.38E-05	1.49E-04	1.64E-03	8.57E-01	1.05E-07	1.11E-02	1.74E-04	3.47E-07
Nickel	4.00E-02		5.87E+01	0.00E+00	0.00E+00	0.00E+00	NT	NT	NT	NT	NT	NT
PCBs (total)	2.02E-03	3.79E-03	3.27E+02	9.15E-03	1.34E-05	3.13E-05	NT	NT	NT	NT	NT	NT
Tetrachloroethylene	2.20E-03	1.00E-02	1.66E+02	1.36E-02	2.00E-05	4.66E-05	2.03E-03	NT	4.06E-08	4.31E-03	NT	NT
1,1,1-Trichloroethane	6.00E-04	1.86E-02	1.33E+02	4.08E-03	5.99E-06	1.40E-05	NT	2.86E-01	NT	NT	4.88E-05	9.76E-08
Trichloroethene	4.00E-03	1.06E-02	1.31E+02	2.71E-02	3.98E-05	9.29E-05	6.00E-03	NT	2.39E-07	2.54E-02	NT	NT
Zinc	1.60E-01		6.54E+01	0.00E+00	0.00E+00	0.00E+00	NT	NT	NT	NT	NT	NT
								TOTAL	9.42E-06		5.00E+02	
								excluding mercury			1.63E-02	

TABLE IV-4-5
Summary of Risk Calculations Associated with Inhalation of Off-Site Ground Water Constituents While Showering

Off-site resident (CTE)	MW-37				LADD	ADD	SFi	RfDi	Cancer Risk		HQ	
	max conc	H	MW	air conc	Resident	Resident			Resident	frac of	Resident	frac of
Contaminant	mg/L	atm-m3/mol-K		mg/m3	mg/kg/d	mg/kg/d	kg-d/mg	mg/kg-d		total risk		total HQ
Aldrin	5.00E-05	1.35E-07	3.65E+02	6.66E+02	1.50E-08	1.16E-07	1.71E+01	NT	2.56E-07	1.18E-01	NT	NT
BHC, beta	5.00E-05	3.46E-07	2.91E+02	7.46E+02	1.23E-10	9.57E-10	1.80E+00	NT	2.21E-10	1.02E-04	NT	NT
Bis(2-ethylhexyl)phthalate	1.10E-01	1.10E-08	3.91E+02	6.44E+02	7.44E-09	5.78E-08	NT	NT	NT	NT	NT	NT
Bromodichloromethane	9.00E-04	3.17E-03	1.64E+02	9.94E+02	1.61E-06	1.25E-05	NT	NT	NT	NT	NT	NT
Butylbenzylphthalate	5.50E-03	1.91E-06	3.12E+02	7.20E+02	7.16E-08	5.57E-07	NT	NT	NT	NT	NT	NT
Chloroform	8.90E-03	4.03E-03	1.19E+02	1.16E+03	1.82E-05	1.42E-04	8.05E-02	NT	1.47E-06	6.74E-01	NT	NT
Copper	4.00E-02		6.36E+01	1.60E+03	0.00E+00	0.00E+00	NT	NT	NT	NT	NT	NT
DDE	1.00E-04	1.24E-04	3.19E+02	7.13E+02	5.34E-08	4.15E-07	NT	NT	NT	NT	NT	NT
DDT	1.00E-04	5.37E-05	3.54E+02	6.76E+02	2.77E-08	2.16E-07	3.40E-01	NT	9.43E-09	4.33E-03	NT	NT
Dibutyl phthalate	6.30E-03	1.43E-06	2.78E+02	7.63E+02	6.51E-08	5.07E-07	NT	NT	NT	NT	NT	NT
1,2-Dichloroethane	2.00E-03	1.27E-03	9.90E+01	1.28E+03	4.02E-06	3.12E-05	9.10E-02	2.86E-03	3.66E-07	1.68E-01	1.09E-02	3.21E-05
1,2-Dichloroethylene (cis)	1.10E-02	4.51E-03	9.69E+01	1.29E+03	2.45E-05	1.90E-04	NT	NT	NT	NT	NT	NT
Dieldrin	1.00E-04	3.51E-09	3.81E+02	6.52E+02	2.18E-12	1.70E-11	1.61E+01	NT	3.52E-11	1.62E-05	NT	NT
Endosulfan I	5.00E-05	3.04E-08	4.07E+02	6.31E+02	9.15E-12	7.12E-11	NT	NT	NT	NT	NT	NT
Endosulfan II	1.00E-04	3.04E-08	4.07E+02	6.31E+02	1.83E-11	1.42E-10	NT	NT	NT	NT	NT	NT
HCH (gamma) Lindane	9.50E-06	6.78E-06	2.90E+02	7.47E+02	4.45E-10	3.46E-09	NT	NT	NT	NT	NT	NT
Heptachlor	5.00E-05	5.87E-06	3.73E+02	6.59E+02	1.80E-09	1.40E-08	NT	NT	NT	NT	NT	NT
Manganese	7.20E-01		5.49E+01	1.72E+03	0.00E+00	0.00E+00	NT	1.43E-05	NT	NT	0.00E+00	0.00E+00
Mercury (inorganic)	2.20E+00	7.10E-03	2.01E+02	8.99E+02	3.75E-03	2.92E-02	NT	8.57E-05	NT	NT	3.40E+02	1.00E+00
Methoxychlor	5.00E-04	6.33E-06	3.46E+02	6.85E+02	2.01E-08	1.56E-07	NT	NT	NT	NT	NT	NT
Methylene chloride	5.70E-03	2.83E-03	8.49E+01	1.38E+03	1.30E-05	1.01E-04	1.64E-03	8.57E-01	2.14E-08	9.81E-03	1.18E-04	3.47E-07
Nickel	4.00E-02		5.87E+01	1.66E+03	0.00E+00	0.00E+00	NT	NT	NT	NT	NT	NT
PCBs (total)	2.02E-03	3.79E-03	3.27E+02	7.04E+02	2.74E-06	2.13E-05	NT	NT	NT	NT	NT	NT
Tetrachloroethylene	2.20E-03	1.00E-02	1.66E+02	9.88E+02	4.08E-06	3.17E-05	2.03E-03	NT	8.28E-09	3.80E-03	NT	NT
1,1,1-Trichloroethane	6.00E-04	1.86E-02	1.33E+02	1.10E+03	1.22E-06	9.50E-06	NT	2.86E-01	NT	NT	3.32E-05	9.76E-08
Trichloroethene	4.00E-03	1.06E-02	1.31E+02	1.11E+03	8.13E-06	6.32E-05	6.00E-03	NT	4.88E-08	2.24E-02	NT	NT
Zinc	1.60E-01		6.54E+01	1.57E+03	0.00E+00	0.00E+00	NT	NT	NT	NT	NT	NT
								TOTAL	2.18E-06		3.40E+02	
								excluding mercury			1.11E-02	

TABLE IV-4-6
Summary of Risk Calculations Associated with Surface Water and Sediment Exposure Pathways

Dermal contact with surface water (RME)						LADD	ADD			Cancer Risk		Hazard Quotient	
Contaminant	CW mg/L	Kp cm/hr	tau hr	t* hr	B	Age-Adjusted mg/kg/d	Child mg/kg/d	SFo kg-d/mg	RfDo mg/kg-d	Rec Visitor Age-Adjusted	frac of total risk	Rec Visitor Child	frac of total HQ
Copper	1.09E-02	1.00E-03				1.19E-07	4.48E-07	NT	4.00E-02	NT	NT	1.12E-05	8.82E-04
HCH (gamma) Lindane	1.50E-05	1.62E-02	5.14E+00	2.23E+00	6.31E-01	5.78E-08	2.17E-07	1.30E+00	3.00E-04	7.52E-08	1.41E-01	7.23E-04	5.70E-02
Mercury (methyl)	3.76E-03	1.00E-03				4.11E-08	1.54E-07	NT	1.00E-04	NT	NT	1.54E-03	1.21E-01
PCBs (total)	3.10E-04	4.95E-01	8.64E+00	4.08E+01	1.62E+02	1.34E-07	5.02E-07	2.00E+00	NT	2.68E-07	5.04E-01	NT	NT
Tetrachloroethylene	7.00E-04	3.70E-01	9.00E-01	4.30E+00	2.50E-01	2.83E-06	1.06E-05	5.20E-02	1.00E-02	1.47E-07	2.77E-01	1.06E-03	8.36E-02
Trichloroethene	9.20E-04	2.30E-01	5.54E-01	1.33E+00	2.60E-02	1.59E-06	5.96E-06	1.10E-02	6.00E-03	1.75E-08	3.29E-02	9.93E-04	7.82E-02
								TOTAL (dermal)		5.07E-07		4.33E-03	

Ingestion of surface water (RME)		LADD	ADD			Cancer Risk		Hazard Quotient	
Contaminant	CW mg/L	Age-Adjusted mg/kg/d	Child mg/kg/d	SFo kg-d/mg	RfDo mg/kg-d	Rec Visitor Age-Adjusted	frac of total risk	Rec Visitor Child	frac of total HQ
Copper	1.09E-02	3.81E-07	2.39E-06	NT	4.00E-02	NT	NT	5.99E-05	4.72E-03
HCH (gamma) Lindane	1.50E-05	5.23E-10	3.29E-09	1.30E+00	3.00E-04	6.80E-10	1.28E-03	1.10E-05	8.63E-04
Mercury (methyl)	3.76E-03	1.31E-07	8.24E-07	NT	1.00E-04	NT	NT	8.24E-03	6.49E-01
PCBs (total)	3.10E-04	1.08E-08	6.79E-08	2.00E+00	NT	2.16E-08	4.07E-02	NT	NT
Tetrachloroethylene	7.00E-04	2.44E-08	1.53E-07	5.20E-02	1.00E-02	1.27E-09	2.39E-03	1.53E-05	1.21E-03
Trichloroethene	9.20E-04	3.21E-08	2.02E-07	1.10E-02	6.00E-03	3.53E-10	6.64E-04	3.36E-05	2.65E-03
				TOTAL (ingestion)		2.39E-08		8.36E-03	
				TOTAL (surface water)		5.31E-07		1.27E-02	

Ingestion of sediment (RME)		LADD	ADD			Cancer Risk		Hazard Quotient	
Contaminant	CSed mg/kg	Age-Adjusted mg/kg/d	Child mg/kg/d	SFo kg-d/mg	RfDo mg/kg-d	Rec Visitor Age-Adjusted	frac of total risk	Rec Visitor Child	frac of total HQ
Arsenic	6.02E-01	6.46E-08	5.28E-07	1.50E+00	NT	9.69E-08	1.48E-01	NT	NT
Benzo[a]pyrene	6.33E-01	6.80E-08	5.55E-07	7.30E+00	NT	4.96E-07	7.56E-01	NT	NT
Benzo[b]fluoranthene	8.05E-01	8.65E-08	7.06E-07	7.30E-01	NT	6.31E-08	9.62E-02	NT	NT
Chromium	2.09E+01	2.24E-06	1.83E-05	NT	5.00E-03	NT	NT	3.66E-03	1.00E+00
				TOTAL (sediment)		6.56E-07		3.66E-03	

TABLE IV-4-6
Summary of Risk Calculations Associated with Surface Water and Sediment Exposure Pathways

Dermal contact with surface water (CTE)						LADD	ADD			Cancer Risk		Hazard Quotient	
Contaminant	CW mg/L	Kp cm/hr	tau hr	t* hr	B	Age-Adjusted mg/kg/d	Child mg/kg/d	SFo kg-d/mg	RfDo mg/kg-d	Rec Visitor Age-Adjusted	frac of total risk	Rec Visitor Child	frac of total HQ
Copper	1.09E-02	1.00E-03				5.13E-08	1.88E-07	NT	4.00E-02	NT	NT	4.71E-06	4.62E-04
HCH (gamma) Lindane	1.50E-05	1.62E-02	5.14E+00	2.23E+00	6.31E-01	2.49E-08	9.12E-08	1.30E+00	3.00E-04	3.23E-08	1.33E-01	3.04E-04	2.99E-02
Mercury (methyl)	3.76E-03	1.00E-03				1.77E-08	6.48E-08	NT	1.00E-04	NT	NT	6.48E-04	6.36E-02
PCBs (total)	3.10E-04	4.95E-01	8.64E+00	4.08E+01	1.62E+02	5.76E-08	2.11E-07	2.00E+00	NT	1.15E-07	4.75E-01	NT	NT
Tetrachloroethylene	7.00E-04	3.70E-01	9.00E-01	4.30E+00	2.50E-01	1.22E-06	4.46E-06	5.20E-02	1.00E-02	6.33E-08	2.61E-01	4.46E-04	4.38E-02
Trichloroethene	9.20E-04	2.30E-01	5.54E-01	1.33E+00	2.60E-02	6.83E-07	2.50E-06	1.10E-02	6.00E-03	7.51E-09	3.10E-02	4.17E-04	4.10E-02
								TOTAL (dermal)		2.18E-07		1.82E-03	

Ingestion of surface water (CTE)		LADD	ADD			Cancer Risk		Hazard Quotient	
Contaminant	CW mg/L	Age-Adjusted mg/kg/d	Child mg/kg/d	SFo kg-d/mg	RfDo mg/kg-d	Rec Visitor Age-Adjusted	frac of total risk	Rec Visitor Child	frac of total HQ
Copper	1.09E-02	3.81E-07	2.39E-06	NT	4.00E-02	NT	NT	5.99E-05	5.88E-03
HCH (gamma) Lindane	1.50E-05	5.23E-10	3.29E-09	1.30E+00	3.00E-04	6.80E-10	2.81E-03	1.10E-05	1.08E-03
Mercury (methyl)	3.76E-03	1.31E-07	8.24E-07	NT	1.00E-04	NT	NT	8.24E-03	8.09E-01
PCBs (total)	3.10E-04	1.08E-08	6.79E-08	2.00E+00	NT	2.16E-08	8.93E-02	NT	NT
Tetrachloroethylene	7.00E-04	2.44E-08	1.53E-07	5.20E-02	1.00E-02	1.27E-09	5.24E-03	1.53E-05	1.51E-03
Trichloroethene	9.20E-04	3.21E-08	2.02E-07	1.10E-02	6.00E-03	3.53E-10	1.46E-03	3.36E-05	3.30E-03
				TOTAL (ingestion)		2.39E-08		8.36E-03	
				TOTAL (surface water)		2.42E-07		1.02E-02	

Ingestion of sediment (CTE)		LADD	ADD			Cancer Risk		Hazard Quotient	
Contaminant	CSed mg/kg	Age-Adjusted mg/kg/d	Child mg/kg/d	SFo kg-d/mg	RfDo mg/kg-d	Rec Visitor Age-Adjusted	frac of total risk	Rec Visitor Child	frac of total HQ
Arsenic	6.02E-01	1.61E-08	1.32E-07	1.50E+00	NT	2.42E-08	1.48E-01	NT	NT
Benzo[a]pyrene	6.33E-01	1.70E-08	1.39E-07	7.30E+00	NT	1.24E-07	7.56E-01	NT	NT
Benzo[b]fluoranthene	8.05E-01	2.16E-08	1.77E-07	7.30E-01	NT	1.58E-08	9.62E-02	NT	NT
Chromium	2.09E+01	5.60E-07	4.57E-06	NT	5.00E-03	NT	NT	9.15E-04	1.00E+00
				TOTAL (sediment)		1.64E-07		9.15E-04	

TABLE IV-4-7
Summary of Risk Calculations Associated with Utility/Construction Worker Exposure to Waste Material

Construction Worker (RME)	95% UCL				Inhalation					Soil ingestion		Cancer risk	
Contaminant	waste conc mg/kg	VP mm Hg	Da cm2/sec	ER g/sec	Cair mg/m3	LADD mg/kg/d	SFi kg-d/mg	Cancer risk	LADD mg/kg-d	SFo kg-d/mg	Cancer risk	Total	frac of total risk
1,2-Dichloroethylene (cis)	7.00E+01	NV	7.36E-02	0.00E+00	0.00E+00	0.00E+00	NT	NT	4.70E-08	NT	NT	NT	NT
1,2-Dichloroethylene (trans)	7.00E+01	NV	7.07E-02	0.00E+00	0.00E+00	0.00E+00	NT	NT	4.70E-08	NT	NT	NT	NT
2-Butanone	2.10E+03	9.08E+01	8.08E-02	1.39E+00	8.72E+01	4.87E-03	NT	NT	1.41E-06	NT	NT	NT	NT
Antimony	9.63E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	6.46E-08	NT	NT	NT	NT
Benzene	3.00E+01	7.50E+01	8.80E-02	1.24E+00	7.80E+01	4.36E-03	2.90E-02	1.26E-04	2.01E-08	2.90E-02	5.84E-10	1.26E-04	7.70E-01
Benzo[k]fluoranthene	3.80E+01	3.90E-10	2.26E-02	2.08E-11	1.31E-09	7.33E-14	6.10E-02	4.47E-15	2.55E-08	7.30E-02	1.86E-09	1.86E-09	1.13E-05
Bis(2-ethylhexyl)phthalate	6.50E+03	1.00E-02	3.51E-02	8.27E-04	5.20E-02	2.91E-06	NT	NT	4.36E-06	1.40E-02	6.11E-08	6.11E-08	3.72E-04
Chromium	1.24E+03	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	4.10E+01	0.00E+00	8.32E-07	NT	NT	0.00E+00	0.00E+00
Cobalt	1.92E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	1.29E-08	NT	NT	NT	NT
Copper	3.34E+03	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	2.24E-06	NT	NT	NT	NT
Dibutyl phthalate	3.10E+03	7.00E-05	4.38E-02	4.13E-06	2.59E-04	1.45E-08	NT	NT	2.08E-06	NT	NT	NT	NT
Ethylbenzene	3.10E+03	7.00E+00	7.50E-02	1.57E-01	9.90E+00	5.53E-04	NT	NT	2.08E-06	NT	NT	NT	NT
Fluoranthene	1.20E+00	9.23E-06	3.02E-02	3.96E-07	2.49E-05	1.39E-09	NT	NT	8.05E-10	NT	NT	NT	NT
Lead	5.90E+03	NV	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	3.96E-06	NT	NT	NT	NT
Naphthalene	1.60E+02	7.80E-02	5.90E-02	2.12E-03	1.33E-01	7.44E-06	NT	NT	1.07E-07	NT	NT	NT	NT
PCBs (total)	2.60E+01	NV	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	1.74E-08	2.00E+00	3.49E-08	3.49E-08	2.12E-04
Phenanthrene	9.30E-01	1.50E-04	1.80E-04	5.66E-06	3.56E-04	1.99E-08	NT	NT	6.24E-10	NT	NT	NT	NT
Phenol	1.70E+02	4.00E-01	8.20E-02	7.97E-03	5.01E-01	2.80E-05	NT	NT	1.14E-07	NT	NT	NT	NT
Pyrene	1.20E+00	4.50E-06	2.72E-02	1.93E-07	1.21E-05	6.78E-10	NT	NT	8.05E-10	NT	NT	NT	NT
Selenium	4.75E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	3.19E-08	NT	NT	NT	NT
Silver	3.65E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	2.45E-08	NT	NT	NT	NT
Styrene	2.30E+03	5.00E+00	7.10E-02	1.10E-01	6.94E+00	3.88E-04	NT	NT	1.54E-06	NT	NT	NT	NT
Tetrachloroethylene	3.10E+03	1.40E+01	7.20E-02	4.92E-01	3.09E+01	1.73E-03	2.03E-03	3.51E-06	2.08E-06	5.20E-02	1.08E-07	3.62E-06	2.20E-02
Thallium	5.84E-01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	3.92E-10	NT	NT	NT	NT
Tin	3.54E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	2.38E-08	NT	NT	NT	NT
Toluene	1.50E+04	2.10E+01	8.70E-02	4.10E-01	2.58E+01	1.44E-03	NT	NT	1.01E-05	NT	NT	NT	NT
Trichloroethene	3.30E+03	5.80E+01	7.90E-02	1.61E+00	1.01E+02	5.67E-03	6.00E-03	3.40E-05	2.21E-06	1.10E-02	2.44E-08	3.41E-05	2.07E-01
Vanadium	3.88E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	2.60E-08	NT	NT	NT	NT
Xylenes (total)	1.60E+04	9.00E+00	1.80E-04	2.02E-01	1.27E+01	7.11E-04	NT	NT	1.07E-05	NT	NT	NT	NT
Zinc	5.57E+03	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	3.74E-06	NT	NT	NT	NT
							TOTAL	1.64E-04			2.31E-07	1.64E-04	

TABLE IV-4-7
Summary of Risk Calculations Associated with Utility/Construction Worker Exposure to Waste Material

Utility Worker (CTE)	95% UCL				Inhalation				Soil ingestion			Cancer risk	
Contaminant	waste conc mg/kg	VP mm Hg	Da cm2/sec	ER g/sec	Cair mg/m3	LADD mg/kg/d	SFi kg-d/mg	Cancer risk	LADD mg/kg-d	SFo kg-d/mg	Cancer risk	Total	frac of total risk
1,2-Dichloroethylene (cis)	7.00E+01	NV	7.36E-02	0.00E+00	0.00E+00	0.00E+00	NT	NT	9.78E-09	NT	NT	NT	NT
1,2-Dichloroethylene (trans)	7.00E+01	NV	7.07E-02	0.00E+00	0.00E+00	0.00E+00	NT	NT	9.78E-09	NT	NT	NT	NT
2-Butanone	2.10E+03	9.08E+01	8.08E-02	1.39E+00	8.72E+01	2.44E-03	NT	NT	2.94E-07	NT	NT	NT	NT
Antimony	9.63E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	1.35E-08	NT	NT	NT	NT
Benzene	3.00E+01	7.50E+01	8.80E-02	1.24E+00	7.80E+01	2.18E-03	2.90E-02	6.32E-05	4.19E-09	2.90E-02	1.22E-10	6.32E-05	7.71E-01
Benzo[k]fluoranthene	3.80E+01	3.90E-10	2.26E-02	2.08E-11	1.31E-09	3.66E-14	6.10E-02	2.23E-15	5.31E-09	7.30E-02	3.88E-10	3.88E-10	4.73E-06
Bis(2-ethylhexyl)phthalate	6.50E+03	1.00E-02	3.51E-02	8.27E-04	5.20E-02	1.45E-06	NT	NT	9.09E-07	1.40E-02	1.27E-08	1.27E-08	1.55E-04
Chromium	1.24E+03	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	4.10E+01	0.00E+00	1.73E-07	NT	NT	0.00E+00	0.00E+00
Cobalt	1.92E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	2.68E-09	NT	NT	NT	NT
Copper	3.34E+03	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	4.67E-07	NT	NT	NT	NT
Dibutyl phthalate	3.10E+03	7.00E-05	4.38E-02	4.13E-06	2.59E-04	7.25E-09	NT	NT	4.33E-07	NT	NT	NT	NT
Ethylbenzene	3.10E+03	7.00E+00	7.50E-02	1.57E-01	9.90E+00	2.77E-04	NT	NT	4.33E-07	NT	NT	NT	NT
Fluoranthene	1.20E+00	9.23E-06	3.02E-02	3.96E-07	2.49E-05	6.95E-10	NT	NT	1.68E-10	NT	NT	NT	NT
Lead	5.90E+03	NV	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	8.25E-07	NT	NT	NT	NT
Naphthalene	1.60E+02	7.80E-02	5.90E-02	2.12E-03	1.33E-01	3.72E-06	NT	NT	2.24E-08	NT	NT	NT	NT
PCBs (total)	2.60E+01	NV	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	3.63E-09	2.00E+00	7.27E-09	7.27E-09	8.86E-05
Phenanthrene	9.30E-01	1.50E-04	1.80E-04	5.66E-06	3.56E-04	9.95E-09	NT	NT	1.30E-10	NT	NT	NT	NT
Phenol	1.70E+02	4.00E-01	8.20E-02	7.97E-03	5.01E-01	1.40E-05	NT	NT	2.38E-08	NT	NT	NT	NT
Pyrene	1.20E+00	4.50E-06	2.72E-02	1.93E-07	1.21E-05	3.39E-10	NT	NT	1.68E-10	NT	NT	NT	NT
Selenium	4.75E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	6.64E-09	NT	NT	NT	NT
Silver	3.65E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	5.10E-09	NT	NT	NT	NT
Styrene	2.30E+03	5.00E+00	7.10E-02	1.10E-01	6.94E+00	1.94E-04	NT	NT	3.21E-07	NT	NT	NT	NT
Tetrachloroethylene	3.10E+03	1.40E+01	7.20E-02	4.92E-01	3.09E+01	8.64E-04	2.03E-03	1.75E-06	4.33E-07	5.20E-02	2.25E-08	1.78E-06	2.17E-02
Thallium	5.84E-01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	8.17E-11	NT	NT	NT	NT
Tin	3.54E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	4.95E-09	NT	NT	NT	NT
Toluene	1.50E+04	2.10E+01	8.70E-02	4.10E-01	2.58E+01	7.20E-04	NT	NT	2.10E-06	NT	NT	NT	NT
Trichloroethene	3.30E+03	5.80E+01	7.90E-02	1.61E+00	1.01E+02	2.84E-03	6.00E-03	1.70E-05	4.61E-07	1.10E-02	5.07E-09	1.70E-05	2.08E-01
Vanadium	3.88E+01	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	5.42E-09	NT	NT	NT	NT
Xylenes (total)	1.60E+04	9.00E+00	1.80E-04	2.02E-01	1.27E+01	3.56E-04	NT	NT	2.24E-06	NT	NT	NT	NT
Zinc	5.57E+03	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	NT	NT	7.79E-07	NT	NT	NT	NT
							TOTAL	8.20E-05			4.81E-08	8.20E-05	

TABLE IV-4-8
Summary of Risk Calculations Associated with Utility/Construction Worker Soil Ingestion Exposure Pathway

Construction Worker (RME) Contaminant	95% UCL soil (0-15 ft) mg/kg	LADD Worker mg/kg/d	ADD Worker mg/kg/d	SFo kg-d/mg	RfDo mg/kg-d	Cancer Risk Worker	frac of total risk
Aluminum	1.05E+04	7.75E-05	6.60E-02	NT	1.00E+00	NT	NT
Antimony	1.19E+01	8.82E-08	7.51E-05	NT	4.00E-04	NT	NT
Aroclor 1254	4.76E-01	3.52E-09	2.99E-06	NT	2.00E-05	NT	NT
Arsenic	1.79E+00	1.32E-08	1.12E-05	1.50E+00	NT	1.98E-08	1.82E-02
Benz[a]anthracene	1.57E+01	1.16E-07	9.87E-05	7.30E-01	NT	8.46E-08	7.78E-02
Benzene	1.40E-02	1.03E-10	8.81E-08	2.90E-02	NT	3.00E-12	2.76E-06
Benzo[a]pyrene	4.84E-01	3.57E-09	3.04E-06	7.30E+00	NT	2.61E-08	2.40E-02
Benzo[b]fluoranthene	5.59E-01	4.12E-09	3.51E-06	7.30E-01	NT	3.01E-09	2.77E-03
Benzo[k]fluoranthene	5.84E-01	4.31E-09	3.67E-06	7.30E-02	NT	3.15E-10	2.90E-04
Beryllium	5.43E-01	4.01E-09	3.41E-06	4.30E+00	5.00E-03	1.72E-08	1.59E-02
Bis(2-ethylhexyl)phthalate	5.42E-01	4.00E-09	3.40E-06	1.40E-02	2.00E-02	5.60E-11	5.15E-05
Cadmium	3.42E+00	2.52E-08	2.15E-05	NT	5.00E-04	NT	NT
Carbazole	5.05E+01	3.73E-07	3.18E-04	2.00E-02	NT	7.46E-09	6.87E-03
Chlordane	1.77E+00	1.30E-08	1.11E-05	1.30E+00	6.00E-05	1.69E-08	1.56E-02
Chromium	7.40E+01	5.46E-07	4.65E-04	NT	5.00E-03	NT	NT
Chrysene	4.02E+01	2.97E-07	2.53E-04	7.30E-03	NT	2.17E-09	1.99E-03
Copper	2.24E+02	1.65E-06	1.41E-03	NT	4.00E-02	NT	NT
Dibenz[ah]anthracene	1.56E+01	1.15E-07	9.78E-05	7.30E+00	NT	8.38E-07	7.72E-01
Dibenzofuran	3.76E-01	2.77E-09	2.36E-06	NT	4.00E-03	NT	NT
Ethylbenzene	6.94E-02	5.12E-10	4.36E-07	NT	1.00E-01	NT	NT
Indeno[1,2,3-cd]pyrene	1.23E+01	9.05E-08	7.70E-05	7.30E-01	NT	6.60E-08	6.08E-02
Lead	4.13E+01	3.05E-07	2.59E-04	NT	NT	NT	NT
Manganese	2.82E+02	2.08E-06	1.78E-03	NT	1.40E-01	NT	NT
4-Methylphenol	1.23E+01	9.05E-08	7.70E-05	NT	5.00E-03	NT	NT
Nickel	4.58E+01	3.38E-07	2.88E-04	NT	2.00E-02	NT	NT
PCBs (total)	3.03E-01	2.24E-09	1.91E-06	2.00E+00	NT	4.47E-09	4.12E-03
Silver	5.21E+00	3.85E-08	3.28E-05	NT	5.00E-03	NT	NT
Tetrachloroethylene	2.10E-02	1.55E-10	1.32E-07	5.20E-02	1.00E-02	8.08E-12	7.43E-06
Thallium	2.91E+00	2.15E-08	1.83E-05	NT	8.00E-05	NT	NT
Trichloroethene	2.17E-02	1.60E-10	1.37E-07	1.10E-02	6.00E-03	1.76E-12	1.62E-06
Vanadium	2.56E+01	1.89E-07	1.61E-04	NT	7.00E-03	NT	NT
Xylenes (total)	9.65E-02	7.12E-10	6.07E-07	NT	2.00E+00	NT	NT
Zinc	1.74E+02	1.29E-06	1.10E-03	NT	3.00E-01	NT	NT
				TOTAL RISK		1.09E-06	

TABLE IV-4-8
Summary of Risk Calculations Associated with Utility/Construction Worker Soil Ingestion Exposure Pathway

Utility Worker (CTE) Contaminant	95% UCL soil (0-15 ft) mg/kg	LADD Worker mg/kg/d	ADD Worker mg/kg/d	SFo kg-d/mg	RfDo mg/kg-d	Cancer Risk Worker	Cancer Risk frac of total risk
Aluminum	1.05E+04	1.47E-06	7.50E-03	NT	1.00E+00	NT	NT
Antimony	1.19E+01	1.67E-09	8.53E-06	NT	4.00E-04	NT	NT
Aroclor 1254	4.76E-01	6.66E-11	3.40E-07	NT	2.00E-05	NT	NT
Arsenic	1.79E+00	2.50E-10	1.28E-06	1.50E+00	NT	3.74E-10	3.45E-04
Benz[a]anthracene	1.57E+01	2.19E-09	1.12E-05	7.30E-01	NT	1.60E-09	1.47E-03
Benzene	1.40E-02	1.96E-12	1.00E-08	2.90E-02	NT	5.68E-14	5.23E-08
Benzo[a]pyrene	4.84E-01	6.77E-11	3.46E-07	7.30E+00	NT	4.94E-10	4.55E-04
Benzo[b]fluoranthene	5.59E-01	7.81E-11	3.99E-07	7.30E-01	NT	5.70E-11	5.25E-05
Benzo[k]fluoranthene	5.84E-01	8.17E-11	4.17E-07	7.30E-02	NT	5.96E-12	5.49E-06
Beryllium	5.43E-01	7.59E-11	3.88E-07	4.30E+00	5.00E-03	3.26E-10	3.00E-04
Bis(2-ethylhexyl)phthalate	5.42E-01	7.57E-11	3.87E-07	1.40E-02	2.00E-02	1.06E-12	9.76E-07
Cadmium	3.42E+00	4.78E-10	2.44E-06	NT	5.00E-04	NT	NT
Carbazole	5.05E+01	7.06E-09	3.61E-05	2.00E-02	NT	1.41E-10	1.30E-04
Chlordane	1.77E+00	2.47E-10	1.26E-06	1.30E+00	6.00E-05	3.21E-10	2.95E-04
Chromium	7.40E+01	1.04E-08	5.29E-05	NT	5.00E-03	NT	NT
Chrysene	4.02E+01	5.62E-09	2.87E-05	7.30E-03	NT	4.10E-11	3.78E-05
Copper	2.24E+02	3.13E-08	1.60E-04	NT	4.00E-02	NT	NT
Dibenz[ah]anthracene	1.56E+01	2.17E-09	1.11E-05	7.30E+00	NT	1.59E-08	1.46E-02
Dibenzofuran	3.76E-01	5.25E-11	2.69E-07	NT	4.00E-03	NT	NT
Ethylbenzene	6.94E-02	9.70E-12	4.96E-08	NT	1.00E-01	NT	NT
Indeno[1,2,3-cd]pyrene	1.23E+01	1.71E-09	8.76E-06	7.30E-01	NT	1.25E-09	1.15E-03
Lead	4.13E+01	5.77E-09	2.95E-05	NT	NT	NT	NT
Manganese	2.82E+02	3.95E-08	2.02E-04	NT	1.40E-01	NT	NT
4-Methylphenol	1.23E+01	1.71E-09	8.76E-06	NT	5.00E-03	NT	NT
Nickel	4.58E+01	6.40E-09	3.27E-05	NT	2.00E-02	NT	NT
PCBs (total)	3.03E-01	4.24E-11	2.17E-07	2.00E+00	NT	8.48E-11	7.80E-05
Silver	5.21E+00	7.28E-10	3.72E-06	NT	5.00E-03	NT	NT
Tetrachloroethylene	2.10E-02	2.94E-12	1.50E-08	5.20E-02	1.00E-02	1.53E-13	1.41E-07
Thallium	2.91E+00	4.07E-10	2.08E-06	NT	8.00E-05	NT	NT
Trichloroethene	2.17E-02	3.04E-12	1.55E-08	1.10E-02	6.00E-03	3.34E-14	3.07E-08
Vanadium	2.56E+01	3.58E-09	1.83E-05	NT	7.00E-03	NT	NT
Xylenes (total)	9.65E-02	1.35E-11	6.89E-08	NT	2.00E+00	NT	NT
Zinc	1.74E+02	2.44E-08	1.24E-04	NT	3.00E-01	NT	NT
				TOTAL RISK		2.06E-08	

TABLE IV-4-9
Summary of Fetal Blood Lead Concentrations for an On-Site Female Worker

RME Scenario	95% UCL	PbB (fetal)
	soil (0-1 ft)	On-site Worker
Contaminant	mg/kg	ug/dL
Lead	5.30E+01	1.96E+00

CTE Scenario		
	soil (0-1 ft)	On-site Worker
Contaminant	mg/kg	ug/dL
Lead	5.30E+01	1.85E+00

APPENDIX V-1

Breeding Bird Species Potentially Present in the Site Vicinity

APPENDIX V-1. Breeding Bird Species Potentially Present in the Site Vicinity		
Common Name	**Scientific Name**	**Breeding Status[a]**
Great blue heron (SC)[b]	*Ardea herodias*	Pr
Canada goose	*Branta canadensis*	C
Wood duck	*Aix sponsa*	C
Mallard	*Anas platyrhynchos*	Pr
Turkey vulture	*Cathartes aura*	C
Broad-winged hawk	*Buteo platypterus*	Pr
Red-tailed hawk	*Buteo jamaicensis*	C
American kestrel	*Falco sparverius*	Po
Ruffed grouse	*Bonasa umbellus*	C
Wild turkey	*Meleagris gallopavo*	Po
Killdeer	*Charadrius vociferus*	Pr
Spotted sandpiper	*Actitis macularia*	Pr
American woodcock	*Scolopax minor*	Pr
Rock dove	*Columba livia*	C
Mourning dove	*Zenaida macroura*	C
Black-billed cuckoo	*Coccyzus erythropthalmus*	Po
Yellow-billed cuckoo	*Coccyzus americanus*	Po
Great horned owl	*Bubo virginianus*	Po
Barred owl	*Strix varia*	Po
Common nighthawk (SC)	*Chordeiles minor*	Po
Whip-poor-will (SC)	*Caprimulgus vociferus*	Pr
Chimney swift	*Chaetura pelagica*	Pr
Ruby-throated hummingbird	*Archilochus colubris*	Po
Belted kingfisher	*Ceryle alcyon*	Pr
Red-headed woodpecker (E)	*Melanerpes erythrocephalus*	Po
Downy woodpecker	*Picoides pubescens*	Pr
Hairy woodpecker	*Picoides villosus*	Po
Northern flicker	*Colaptes auratus*	Pr
Pileated woodpecker	*Dryocopus pileatus*	Po
Eastern wood-pewee	*Contopus virens*	Pr
Willow flycatcher	*Empidonax traillii*	C

APPENDIX V-1. Breeding Bird Species Potentially Present in the Site Vicinity		
Common Name	**Scientific Name**	**Breeding Status[a]**
Least flycatcher	*Empidonax minimus*	Pr
Eastern phoebe	*Sayornis phoebe*	C
Great crested flycatcher	*Myiarchus crinitus*	Pr
Eastern kingbird	*Tyrannus tyrannus*	C
Tree swallow	*Tachycineta bicolor*	C
Bank swallow	*Riparia riparia*	C
Barn swallow	*Hirundo rustica*	C
Blue jay	*Cyanocitta cristata*	C
American crow	*Corvus brachyrhynchos*	C
Black-capped chickadee	*Parus atricapillus*	C
Tufted timouse	*Parus bicolor*	C
White-breasted nuthatch	*Sitta carolinensis*	C
House wren	*Troglodytes aedon*	C
Blue-gray gnatcatcher	*Polioptila caerulea*	Pr
Eastern bluebird	*Sialia sialis*	C
Veery	*Catharus fuscescens*	Pr
Hermit thrush	*Catharus guttatus*	Pr
Wood thrush	*Hylocichla mustelina*	Pr
American robin	*Turdus migratorius*	C
Gray catbird	*Dumetella carolinensis*	C
Northern mockingbird	*Mimus polyglottos*	C
Brown thrasher	*Toxostoma rufum*	Pr
Cedar waxwing	*Bombycilla cedrorum*	C
European starling	*Sturnus vulgaris*	C
Solitary vireo	*Vireo solitarius*	Po
Yellow-throated vireo	*Vireo flavifrons*	Pr
Warbling vireo	*Vireo gilvus*	Pr
Red-eyed vireo	*Vireo olivaceus*	Pr
Blue-winged warbler	*Vermivora pinus*	Pr
Nashville warbler	*Vermivora ruficapilla*	Po
Yellow warbler	*Dendroica petechia*	Pr

APPENDIX V-1. Breeding Bird Species Potentially Present in the Site Vicinity		
Common Name	**Scientific Name**	**Breeding Status[a]**
Chestnut-sided warbler	*Dendroica pensylvanica*	Pr
Magnolia warbler	*Dendroica magnolia*	Po
Black-throated blue warbler	*Dendroica caerulescens*	Po
Black-throated green warbler	*Dendroica virens*	Pr
Blackburnian warbler	*Dendroica fusca*	C
Prairie warbler	*Dendroica discolor*	Pr
Black-and-white warbler	*Mniotilta varia*	Pr
American redstart	*Setophaga ruticilla*	Pr
Worm-eating warbler	*Helmitheros vermivorus*	Pr
Ovenbird	*Seiurus aurocapillus*	Pr
Louisiana waterthrush	*Seiurus motacilla*	Pr
Common yellowthroat	*Geothlypis trichas*	Pr
Canada warbler	*Wilsonia canadensis*	Pr
Scarlet tanager	*Piranga olivacea*	Pr
Northern cardinal	*Cardinalis cardinalis*	C
Rose-breasted grosbeak	*Pheucticus ludovicianus*	Pr
Indigo bunting	*Passerina cyanea*	Pr
Rufous-sided towhee	*Pipilo erythrophthalmus*	Pr
Chipping sparrow	*Spizella passerina*	C
Field sparrow	*Spizella pusilla*	C
Savannah sparrow (SC)	*Passerculus sandwichensis*	Pr
Song sparrow	*Melospiza melodia*	C
Bobolink	*Dolichonyx oryzivorus*	Pr
Red-winged blackbird	*Agelaius phoeniceus*	C
Eastern meadowlark	*Sturnella magna*	C
Common grackle	*Quiscalus quiscula*	C
Brown-headed cowbird	*Molothrus ater*	Pr
Northern oriole	*Icterus galbula*	Pr
Purple finch	*Carpodacus purpureus*	Pr
House finch	*Carpodacus mexicanus*	C
American goldfinch	*Carduelis tristis*	C

APPENDIX V-1. Breeding Bird Species Potentially Present in the Site Vicinity		
Common Name	**Scientific Name**	**Breeding Status[a]**
House sparrow	*Passer domesticus*	C

[a] C - Confirmed breeding; Pr - Probable breeding; Po - Possible breeding (from Bevier [1994] for survey block 49E).
[b] E - State Endangered; SC - State Special Concern (CTDEP 1995).

APPENDIX V-2

Wintering Bird Species Potentially Present in the Site Vicinity

APPENDIX V-2. Wintering Bird Species - Litchfield Hills, Connecticut Christmas Bird Count Plot							
Common Name	**Scientific Name**	**1995-1996**	**1994-1995**	**1993-1994**	**1992-1993**	**1991-1992**	**5-Year Average**
European starling	*Sturnus vulgaris*	2,528	4,488	3,611	2,943	1,777	3,069.4
American crow	*Corvus brachyrhynchos*	5,087	3,010	1,219	1,172	3,705	2,838.6
Canada goose	*Branta canadensis*	360	2,310	2,075	691	1,915	1,470.2
Black-capped chickadee	*Parus atricapillus*	1,484	1,840	1,208	1,099	1,353	1,396.8
House finch	*Carpodacus mexicanus*	547	983	1,256	1,874	1,533	1,238.6
Dark-eyed junco	*Junco hyemalis*	396	965	701	938	1,230	846.0
Mallard	*Anas platyrhynchos*	696	923	811	436	561	685.4
American goldfinch	*Carduelis tristis*	176	353	247	305	1,985	613.2
House sparrow	*Passer domesticus*	469	936	309	592	699	601.0
Common merganser	*Mergus merganser*	28	234	167	33	2,158	524.0
Blue jay	*Cyanocitta cristata*	513	593	316	516	499	487.4
Mourning dove	*Zenaida macroura*	422	404	365	691	389	454.2
Ring-billed gull	*Larus delawarensis*	109	606	245	100	1,023	416.6
American robin	*Turdus migratorius*	61	514	335	292	782	396.8
Rock dove	*Columba livia*	457	395	176	304	249	316.2
Tufted titmouse	*Parus bicolor*	223	389	266	309	221	281.6
American tree sparrow	*Spizella arborea*	342	240	268	220	272	268.4
Herring gull	*Larus argentatus*	43	237	162	254	472	233.6
Cedar waxwing	*Bombycilla cedrorum*	64	325	132	321	296	227.6
Wild turkey	*Meleagris gallopavo*	455	155	277	131	28	209.2
White-breasted nuthatch	*Sitta carolinensis*	188	271	125	203	207	198.8
Eastern bluebird	*Sialia sialis*	211	173	64	196	262	181.2

APPENDIX V-2. Wintering Bird Species - Litchfield Hills, Connecticut Christmas Bird Count Plot							
Common Name	**Scientific Name**	**1995-1996**	**1994-1995**	**1993-1994**	**1992-1993**	**1991-1992**	**5-Year Average**
Northern cardinal	*Cardinalis cardinalis*	194	134	146	204	117	159.0
White-throated sparrow	*Zonotrichia albicollis*	37	199	49	289	101	135.0
American coot	*Fulica americana*	81	450	55	0	64	130.0
Brown-headed cowbird	*Molothrus ater*	5	459	12	2	139	123.4
Horned lark (T)[a]	*Eremophila alpestris*	153	214	124	0	100	118.2
Downy woodpecker	*Picoides pubescens*	116	136	85	113	120	114.0
American black duck	*Anas rubripes*	186	72	171	29	63	104.2
Song sparrow	*Melospiza melodia*	59	79	53	107	80	75.6
Golden-crowned kinglet	*Regulus satrapa*	39	38	23	70	95	53.0
Northern mockingbird	*Mimus polyglottos*	43	49	9	51	66	43.6
Red-tailed hawk	*Buteo jamaicensis*	40	44	19	46	57	41.2
Pine siskin	*Carduelis pinus*	25	6	99	0	53	36.6
Red-breasted nuthatch	*Sitta canadensis*	23	34	42	26	16	28.2
Hooded merganser	*Lophodytes cucullatus*	9	30	23	5	43	22.0
Hairy woodpecker	*Picoides villosus*	30	35	6	18	15	20.8
Evening grosbeak	*Coccothraustes vespertina*	32	0	55	0	11	19.6
Common goldeneye	*Bucephala clangula*	1	21	28	0	44	18.8
Great black-backed gull	*Larus marinus*	9	19	22	30	8	17.6
Common redpoll	*Carduelis flammea*	37	0	51	0	0	17.6
Eastern screech-owl	*Otus asio*	30	20	11	14	9	16.8
Purple finch	*Carpodacus purpureus*	32	9	4	26	7	15.6
Mute swan	*Cygnus olor*	21	19	12	0	20	14.4

APPENDIX V-2. Wintering Bird Species - Litchfield Hills, Connecticut Christmas Bird Count Plot							
Common Name	Scientific Name	1995-1996	1994-1995	1993-1994	1992-1993	1991-1992	5-Year Average
Red-bellied woodpecker	*Melanerpes carolinus*	17	16	13	12	12	14.0
Brown creeper	*Certhia americana*	11	15	4	17	15	12.4
Swamp sparrow	*Melospiza georgiana*	5	14	11	15	12	11.4
Ring-necked duck	*Aythya collaris*	13	11	23	3	2	10.4
Great horned owl	*Bubo virginianus*	9	19	6	10	6	10.0
Ruffed grouse	*Bonasa umbellus*	7	14	5	9	14	9.8
Ruddy duck	*Oxyura jamaicensis*	0	15	2	0	30	9.4
Common grackle	*Quiscalus quiscula*	1	41	1	0	4	9.4
Northern flicker	*Colaptes auratus*	6	18	2	6	7	7.8
Belted kingfisher	*Ceryle alcyon*	7	10	0	9	11	7.4
Lesser scaup	*Aythya affinis*	1	17	0	1	11	6.0
Ring-necked pheasant	*Phasianus colchicus*	14	5	1	4	6	6.0
Red-winged blackbird	*Agelaius phoeniceus*	0	0	25	1	0	5.2
Carolina wren	*Thryothorus ludovicianus*	0	2	4	12	7	5.0
Sharp-shinned hawk (T)	*Accipiter striatus*	3	4	4	3	11	5.0
Pileated woodpecker	*Dryocopus pileatus*	12	8	0	3	2	5.0
Greater scaup	*Aythya marila*	0	16	0	0	3	3.8
Common raven (SC)	*Corvus corax*	3	8	0	3	2	3.2
Winter wren	*Troglodytes troglodytes*	1	5	0	9	1	3.2
Snow bunting	*Plectrophenax nivalis*	12	1	0	1	0	2.8
Hermit thrush	*Catharus guttatus*	1	3	2	4	3	2.6
Turkey vulture	*Cathartes aura*	3	6	1	2	1	2.6

APPENDIX V-2. Wintering Bird Species - Litchfield Hills, Connecticut Christmas Bird Count Plot							
Common Name	**Scientific Name**	**1995-1996**	**1994-1995**	**1993-1994**	**1992-1993**	**1991-1992**	**5-Year Average**
Northern saw-whet owl (SC)	*Aegolius acadicus*	0	2	0	5	5	2.4
American wigeon	*Anas americana*	0	4	7	0	0	2.2
Bald eagle (E)	*Haliaeetus leucocephalus*	2	2	2	0	5	2.2
Field sparrow	*Spizella pusilla*	1	1	0	6	3	2.2
Rusty blackbird	*Euphagus carolinus*	0	11	0	0	0	2.2
Northern shrike	*Lanius excubitor*	10	0	0	0	0	2.0
Barred owl	*Strix varia*	1	2	1	3	2	1.8
American kestrel	*Falco sparverius*	0	1	1	2	4	1.6
Cooper's hawk (T)	*Accipiter cooperii*	3	1	2	1	1	1.6
Great blue heron (SC)	*Ardea herodias*	0	1	1	3	3	1.6
Gray catbird	*Dumetella carolinensis*	1	4	1	2	0	1.6
Northern pintail	*Anas acuta*	2	1	0	0	3	1.2
Ruby-crowned kinglet	*Regulus calendula*	1	1	0	3	0	1.0
Bufflehead	*Bucephala albeola*	0	3	2	0	0	1.0
Red-shouldered hawk (SC)	*Buteo lineatus*	1	1	1	0	1	0.8
Northern shoveler	*Anas clypeata*	0	0	2	2	0	0.8
Pied-billed grebe (E)	*Podilymbus podiceps*	0	1	0	1	2	0.8
Green-winged teal	*Anas crecca*	1	1	0	0	2	0.8
Long-eared owl (E)	*Asio otus*	0	1	0	2	0	0.6
Gadwall	*Anas strepera*	3	0	0	0	0	0.6
Canvasback	*Aythya valisineria*	0	3	0	0	0	0.6
Monk parakeet	*Myiopsitta monachus*	1	1	1	0	0	0.6

APPENDIX V-2. Wintering Bird Species - Litchfield Hills, Connecticut Christmas Bird Count Plot							
Common Name	**Scientific Name**	**1995-1996**	**1994-1995**	**1993-1994**	**1992-1993**	**1991-1992**	**5-Year Average**
Yellow-bellied sapsucker	*Sphyrapicus varius*	1	0	0	0	1	0.4
Eastern pheobe	*Sayornis phoebe*	2	0	0	0	0	0.4
Oldsquaw	*Clangula hyemalis*	0	0	0	2	0	0.4
Marsh wren	*Cistothorus palustris*	0	0	0	1	1	0.4
Savannah sparrow (SC)	*Passerculus sandwichensis*	0	1	1	0	0	0.4
Yellow-rumped warbler	*Dendroica coronata*	1	0	1	0	0	0.4
Snow goose	*Chen caerulescens*	2	0	0	0	0	0.4
Common snipe	*Gallinago gallinago*	1	0	0	0	1	0.4
Common yellowthroat	*Geothlypis trichas*	0	0	2	0	0	0.4
Wood duck	*Aix sponsa*	0	2	0	0	0	0.4
Wilson's warbler	*Wilsonia pusilla*	0	1	0	0	0	0.2
Red crossbill	*Loxia curvirostra*	1	0	0	0	0	0.2
Common loon (SC)	*Gavia immer*	0	0	0	0	1	0.2
Redhead	*Aythya americana*	0	1	0	0	0	0.2
Rufous-sided towhee	*Pipilo erythrophthalmus*	1	0	0	0	0	0.2
White-crowned sparrow	*Zonotrichia leucophrys*	0	0	0	1	0	0.2
Red-throated loon	*Gavia stellata*	0	1	0	0	0	0.2
Pine warbler	*Dendroica pinus*	0	0	0	0	1	0.2
House wren	*Troglodytes aedon*	0	0	0	1	0	0.2
Northern goshawk	*Accipiter gentilis*	1	0	0	0	0	0.2
Palm warbler	*Dendroica palmarum*	0	0	0	1	0	0.2
Northern oriole	*Icterus galbula*	0	0	0	0	1	0.2

APPENDIX V-2. Wintering Bird Species - Litchfield Hills, Connecticut Christmas Bird Count Plot							
Common Name	**Scientific Name**	**1995-1996**	**1994-1995**	**1993-1994**	**1992-1993**	**1991-1992**	**5-Year Average**
Northern harrier (E)	*Circus cyaneus*	0	1	0	0	0	0.2
Total Species		82	88	73	72	80	79.0
Total Individuals		16,224	22,708	15,563	14,810	23,041	18,469.2

[a] E - State Endangered; T - State Threatened; SC - State Special Concern (CTDEP 1995).

APPENDIX V-3

Benthic Macroinvertebrate Survey Data for Branch Brook and the Naugatuck River – Spring and Fall 1994

TABLE 5-2
SPRING MACROINVERTEBRATE SAMPLING
SUMMARY OF RESULTS FOR BRANCH BROOK AND NAUGATUCK RIVER
MAY 19 AND 20, 1994
Envirite Facility
Thomaston, Connecticut

INSECT TAXA	SAMPLING STATIONS							
	BB-R1	BB-A1	BB-A2	BB-A3	NR-R1	NR-A1	NR-A2	NR-A3
Coleoptera (beetles)								
Berosus	0	0	0	0	11	2	2	1
Stenelmis	0	0	0	0	0	0	1	1
Diptera (flies and midges)								
Antocha	0	1	0	1	0	1	4	11
Clinocera	0	0	0	1	0	0	0	0
Heterodromia	0	0	0	0	1	0	0	0
Chironomidae								
Ablabesmyia	3	1	0	3	1	0	0	0
Cricotopus	0	0	0	0	4	4	3	4
Cryptochironomus	0	0	0	0	0	2	0	2
Diamesa	0	0	0	0	0	0	4	0
Dicrotendipes	0	0	0	0	3	3	0	0
Orthocladius	0	0	0	0	9	13	19	8
Polypedilum	0	0	0	0	10	9	4	10
Tanytarsus	0	0	0	0	0	1	0	0
Thienemannimyia	0	0	0	0	1	0	1	1
Simuiidae	0	0	0	0	0	0	5	0
Tipulidae	0	0	6	1	0	0	0	0
pupae	1	0	1	1	5	4	12	4
Ephemeroptera (mayflies)								
Acentrella	5	1	0	1	4	9	34	5
Baetis	0	0	0	0	9	20	25	8
Caenis	0	0	0	0	1	2	0	0
Dannella	0	0	0	0	0	0	1	2
Drunella	46	57	91	60	0	0	0	0
Ephemerella	3	0	0	2	2	0	0	0
Eurylophella	0	0	0	0	4	7	2	0
Isonychia	3	2	8	10	7	7	8	5
Serratella	0	2	3	1	0	0	0	0
Stenacron	0	0	0	0	0	1	0	1
Stenonema	1	1	0	0	18	16	7	11
Megaloptera (dobsonflies)								
Corydalus	0	0	0	0	0	0	0	2
Nigronia	0	2	8	5	0	0	0	0
Odonata (damselflies and dragonflies)								
Argia	0	0	0	0	1	1	0	0
Boyeria	0	0	1	0	0	0	0	0
Enallagma	0	0	0	0	0	1	0	0
Gomphus	0	0	0	0	0	0	0	1
Plecoptera (stoneflies)								
Acroneuria	12	4	0	1	0	0	0	0
Trichoptera (caddisflies)								
Cheumatopsyche	13	2	3	6	17	14	13	43
Chimarra	4	0	1	2	0	0	0	0
Dolophilodes	0	0	0	0	0	0	1	0
Hydropsyche	26	16	16	12	8	5	9	13

TABLE 5-2
SPRING MACROINVERTEBRATE SAMPLING
SUMMARY OF RESULTS FOR BRANCH BROOK AND NAUGATUCK RIVER
MAY 19 AND 20, 1994
Envirite Facility
Thomaston, Connecticut

INSECT TAXA	SAMPLING STATIONS							
	BB-R1	BB-A1	BB-A2	BB-A3	NR-R1	NR-A1	NR-A2	NR-A3
Trichoptera (caddisflies), Cont.								
Polycentropus	0	0	0	0	0	0	1	0
Pycnopsyche	0	1	2	0	0	0	0	0
Rhyacophila	0	3	0	0	0	0	0	0
Hydroptilidae	0	0	0	0	0	0	0	1
pupae	0	0	0	0	0	0	0	2
TOTAL INSECT TAXA	**10**	**13**	**10**	**14**	**18**	**19**	**19**	**19**
TOTAL INSECT SPECIMENS	**117**	**93**	**140**	**107**	**116**	**122**	**156**	**136**

NON-INSECT TAXA	SAMPLING STATIONS							
	BB-R1	BB-A1	BB-A2	BB-A3	NR-R1	NR-A1	NR-A2	NR-A3
Annelida (segmented worms)								
Oligochaeta	0	1	0	2	1	4	2	2
Hirudinae	0	0	0	0	0	1	0	0
Mollusca (clams and snails)								
Pisidiidae	0	0	0	0	1	0	0	0
Physa	1	0	0	0	0	0	0	0
Gyraulus	1	1	1	0	0	0	0	0
Crustacea								
Amphipoda	0	0	0	0	0	2	0	0
TOTAL NON-INSECT TAXA	**2**	**2**	**1**	**1**	**2**	**3**	**1**	**1**
TOTAL NON-INSECT SPECIMENS	**2**	**2**	**1**	**2**	**2**	**7**	**2**	**2**

TOTAL TAXA	**12**	**15**	**11**	**15**	**20**	**22**	**20**	**20**
TOTAL SPECIMENS	**119**	**95**	**141**	**109**	**118**	**129**	**158**	**138**

TABLE 5-6
FALL MACROINVERTEBRATE SAMPLING
SUMMARY OF RESULTS FOR BRANCH BROOK AND NAUGATUCK RIVER
OCTOBER 18 AND 19, 1994
Envirite Facility
Thomaston, Connecticut

INSECT TAXA	SAMPLING STATIONS							
	BB-R1	BB-A1	BB-A2	BB-A3	NR-R1	NR-A1	NR-A2	NR-A3
Coleoptera (beetles)								
Berosus	4	0	0	1	4	0	0	1
Dubiraphia	0	0	1	0	0	0	0	0
Ectopria	1	0	0	0	0	0	0	0
Optioservus	0	0	1	0	1	0	2	1
Diptera (flies and midges)								
Chironomidae	3	1	1	4	5	0	7	23
Prosimulium	3	0	0	0	1	0	0	0
Antocha	0	0	0	0	0	0	1	2
Ephemeroptera (mayflies)								
Arthroplia	0	17	0	0	0	0	0	0
Cloeon	0	0	0	0	2	2	4	5
Pseudocloeon	0	0	0	0	1	0	0	2
Ephemerella	0	0	3	0	0	0	0	0
Isonychia	5	0	0	14	1	22	4	12
Serratella	0	4	0	0	0	0	0	0
Stenonema	4	4	7	3	3	15	3	5
Megaloptera (dobsonflies)								
Corydalus	0	0	0	0	1	1	1	0
Nigronia	3	4	12	7	0	0	0	0
Odonata (damselflies and dragonflies)								
Boyeria	0	0	2	0	0	0	0	0
Ophiogomuphus	0	0	0	0	1	0	0	0
Plecoptera (stoneflies)								
Acroneuria	16	10	4	6	0	0	0	0
Taeniopteryx	0	0	0	0	0	0	0	2
Trichoptera (caddisflies)								
Cheumatopsyche	32	28	23	30	19	21	12	14
Chimarra	7	4	1	3	0	0	0	0
Glossosoma	0	1	0	0	0	0	0	0
Hydropsyche	43	48	26	48	66	53	127	55
Leucotrichia	0	0	0	0	1	3	3	4
Rhyacophila	0	1	0	0	0	0	0	0
TOTAL INSECT TAXA	**11**	**11**	**11**	**9**	**13**	**7**	**10**	**12**
TOTAL INSECT SPECIMENS	**121**	**122**	**81**	**116**	**106**	**117**	**164**	**126**

TABLE 5-6
FALL MACROINVERTEBRATE SAMPLING
SUMMARY OF RESULTS FOR BRANCH BROOK AND NAUGATUCK RIVER
OCTOBER 18 AND 19, 1994
Envirite Facility
Thomaston, Connecticut

NON-INSECT TAXA	SAMPLING STATIONS							
	BB-R1	BB-A1	BB-A2	BB-A3	NR-R1	NR-A1	NR-A2	NR-A3
Annelida (segmented worms)								
Oligochaeta	1	1	1	1	1	0	1	2
Mollusca (clams and snails)								
Helisoma	1	0	1	1	1	0	1	1
Ferrissia	0	0	0	0	1	0	0	0
Pisidium	3	0	1	0	0	0	0	0
TOTAL NON-INSECT TAXA	**3**	**1**	**3**	**2**	**3**	**0**	**2**	**2**
TOTAL NON-INSECT SPECIMENS	**5**	**1**	**3**	**2**	**3**	**0**	**2**	**3**

TOTAL TAXA	14	12	14	11	16	7	12	14
TOTAL SPECIMENS	126	123	84	118	109	117	166	129

APPENDIX V-4

Sediment Benchmark Calculations – Equilibrium Partitioning

APPENDIX V-5. Sediment Benchmark Calculations - Equilibrium Partitioning					
Chemical	**Water Criterion (μg/L)**	**Log K_{ow}[a]**	**Log K_{oc}**	**foc**	**Benchmark (mg/kg)[c]**
BRANCH BROOK					
Benzo(a)pyrene	0.016	6.11	6.60	0.004	0.255
Pyrene	13	5.11	5.02[b]	0.004	5.45
NAUGATUCK RIVER					
Benzo(a)pyrene	0.016	6.11	6.60	0.007	0.446
Bromodichloromethane	2,984	2.10	2.06	0.007	2.40
Pyrene	13	5.11	5.02[b]	0.007	9.53

[a] From USEPA (1995a).
[b] Calculated from log K_{ow} values per USEPA (1996c).

APPENDIX V-5

Derivation of Ingestion Benchmarks

Ingestion Toxicological Benchmarks for Selected Receptor Species Antimony				
Test Species ***Receptor Species***	**LOAEL** **(mg/kg/d)**	**NOAEL** **(mg/kg/d)**	**Toxicity Benchmark** **(mg/kg/d)**	**Body Weight** **(kg)**[a]
Mouse *Meadow vole* *Red fox*	--	0.35[b]	0.35 0.34 0.10	0.032 0.037 4.54
Northern bobwhite *American robin* *Red-tailed hawk*	--	474[cd]	474 474 474	--- --- ---

[a] Body weights for the mouse were from Sample et al. (1996) and for the receptor species were from Table V-24.
[b] ATSDR (1990a).
[c] Opresko et al. (1995).
[d] Subchronic value divided by 10 (Sample et al. 1996).

Ingestion Toxicological Benchmarks for Selected Receptor Species Cadmium				
Test Species ***Receptor Species***	**LOAEL** **(mg/kg/d)**	**NOAEL** **(mg/kg/d)**	**Toxicity Benchmark** **(mg/kg/d)**	**Body Weight** **(kg)**[a]
Rat *Meadow vole*	--	1.5[b]	1.50 2.63	0.350 0.037
Dog *Red fox*	--	0.75[b]	0.75 0.97	12.7 4.54
Mallard *American robin* *Red-tailed hawk*	--	1.45[c]	1.45 1.45 1.45	--- --- ---

[a] Body weights for the rat and dog were from Sample et al. (1996) and for the receptor species were from Table V-24.
[b] ATSDR (1993).
[c] Sample et al. (1996).

Ingestion Toxicological Benchmarks for Selected Receptor Species Chromium				
Test Species ***Receptor Species***	**LOAEL** **(mg/kg/d)**	**NOAEL** **(mg/kg/d)**	**Toxicity Benchmarks** **(mg/kg/d)**	**Body Weight** **(kg)**[a]
Rat	--	3.28[b]	3.28	0.350
Meadow vole			5.75	0.037
Red fox			1.73	4.54
American black duck	5.0[b]	1.0[b]	1.00	---
American robin			1.00	---
Red-tailed hawk			1.00	---

[a] Body weights for the rat were from Sample et al. (1996) and for the receptor species were from Table V-24.

[b] Sample et al. (1996).

Ingestion Toxicological Benchmarks for Selected Receptor Species Copper				
Test Species ***Receptor Species***	**LOAEL** **(mg/kg/d)**	**NOAEL** **(mg/kg/d)**	**Toxicity Benchmark** **(mg/kg/d)**	**Body Weight** **(kg)**[a]
Mink *Meadow vole* *Red fox*	--	12.9[b]	12.9 29.4 8.8	1.00 0.037 4.54
Chicken (chicks) *American robin* *Red-tailed hawk*	--	47.0[c]	47.0 47.0 47.0	--- --- ---

[a] Body weights for the mink were from Sample et al. (1996) and for the receptor species were from Table V-24.
[b] ATSDR (1989).
[c] Sample et al. (1996).

Ingestion Toxicological Benchmarks for Selected Receptor Species Lead				
Test Species ***Receptor Species***	**LOAEL** **(mg/kg/d)**	**NOAEL** **(mg/kg/d)**	**Toxicity Benchmark** **(mg/kg/d)**	**Body Weight** **(kg)**[a]
Rat *Meadow vole* *Red fox*	--	8.0[b]	8.0 14.0 4.2	0.350 0.037 4.54
American kestrel *American robin* *Red-tailed hawk*	--	3.85[b]	3.85 3.85 3.85	--- --- ---

[a] Body weights for the rat were from Sample et al. (1996) and for the receptor species were from Table V-24.

[b] Sample et al. (1996).

Ingestion Toxicological Benchmarks for Selected Receptor Species Nickel				
Test Species ***Receptor Species***	**LOAEL** **(mg/kg/d)**	**NOAEL** **(mg/kg/d)**	**Toxicity Benchmark** **(mg/kg/d)**	**Body Weight** **(kg)**[a]
Rat *Meadow vole* *Red fox*	80	40[b]	40.0 70.1 21.1	0.350 0.037 4.54
Mallard (ducklings) *American robin* *Red-tailed hawk*	107	77.4[b]	77.4 77.4 77.4	--- --- ---

[a] Body weights for the rat were from Sample et al. (1996) and for the receptor species were from Table V-24.

[b] Sample et al. (1996).

Ingestion Toxicological Benchmarks for Selected Receptor Species Silver				
Test Species ***Receptor Species***	**LOAEL** **(mg/kg/d)**	**NOAEL** **(mg/kg/d)**	**Toxicity Benchmark** **(mg/kg/d)**	**Body Weight** **(kg)**[a]
Rat *Meadow vole* *Red fox*	--	18.1[bc]	18.1 31.7 9.5	0.350 0.037 4.54
No Data for Birds	--	--	--	--

[a] Body weights for the rat were from Sample et al. (1996) and for the receptor species were from Table V-24.
[b] ATSDR (1990b).
[c] Subchronic value divided by 10 (Sample et al. 1996).

Ingestion Toxicological Benchmarks for Selected Receptor Species Vanadium				
Test Species ***Receptor Species***	**LOAEL** **(mg/kg/d)**	**NOAEL** **(mg/kg/d)**	**Toxicity Benchmark** **(mg/kg/d)**	**Body Weight** **(kg)**[a]
Rat *Meadow vole* *Red fox*	2.1[b]	0.21[b]	0.21 0.34 0.10	0.260 0.037 4.54
Mallard *American robin* *Red-tailed hawk*	--	11.4[b]	11.4 11.4 11.4	--- --- ---

[a] Body weights for the rat were from Sample et al. (1996) and for the receptor species were from Table V-24.

[b] Sample et al. (1996).

Ingestion Toxicological Benchmarks for Selected Receptor Species Zinc				
Test Species ***Receptor Species***	**LOAEL** **(mg/kg/d)**	**NOAEL** **(mg/kg/d)**	**Toxicity Benchmark** **(mg/kg/d)**	**Body Weight** **(kg)**[a]
Rat *Meadow vole*	320[c]	160[c]	160 281	0.350 0.037
Dog *Red fox*	--	25[b]	25.0 32.3	12.7 4.54
Chicken *American robin* *Red-tailed hawk*	--	31[b]	31.0 31.0 31.0	--- --- ---

[a] Body weights for the rat and dog were from Sample et al. (1996) and for the receptor species were from Table V-24.
[b] Eisler (1993).
[c] Sample et al. (1996).

Ingestion Toxicological Benchmarks for Selected Receptor Species Benzo(a)pyrene				
Test Species ***Receptor Species***	**LOAEL** **(mg/kg/d)**	**NOAEL** **(mg/kg/d)**	**Toxicity Benchmark** **(mg/kg/d)**	**Body Weight** **(kg)**[a]
Mouse *Meadow vole* *Red fox*	10[b]	1.0[b]	1.00 0.96 0.29	0.032 0.037 4.54
No Data for Birds	--	--	--	--

[a] Body weights for the mouse were from Sample et al. (1996) and for the receptor species were from Table V-24.

[b] Sample et al. (1996).

APPENDIX VI-1

Results of Additional Soil Sampling for Hexavalent Chromium

ENVIRON

Privileged and Confidential
Attorney Work Product

June 24, 2008

Geoffrey Stengel, Jr.
Envirite Corporation
490 Norristown Road, Suite 252
Blue Bell, Pennsylvania

Re: Results of a Limited Soil Investigation
198 Old Waterbury Road, Thomaston, Connecticut

Dear Mr. Stengel:

The purpose of this letter is to provide the results of a soil sampling program conducted by ENVIRON International Corporation (ENVIRON) at 198 Old Waterbury Road in Thomaston, Connecticut ("Site" or "Property"). The purpose of this program was to evaluate the presence of total chromium and hexavalent chromium in areas that reflected the presence of chromium but not the type in prior samples from the RCRA Facility Investigation (RFI). Sample locations are shown in Figure 1. ENVIRON's investigation included the completion and sampling of eight soil borings.

Background

Based on the results of the revision to the Public Health and Environment Risk Evaluation (PHERE), ENVIRON identified eight total chromium samples exceeding the two times the Connecticut Department of Environmental Protection (CTDEP) Remediation Standard Regulations (RSRs) Direct Exposure Criteria (DEC) for hexavalent chromium. Because we did not have data regarding whether the chromium detected in soil was in the trivalent or hexavalent state, we had conservatively assumed that all of it was hexavalent. However, should that chromium actually had been trivalent rather than hexavalent, then a different (and less conservative) DEC would apply. To evaluate this possibility, ENVIRON conducted a new subsurface investigation to speciate the chromium detected at the original eight sampling locations.

Field Activities

ENVIRON's soil investigation was conducted on May 27, 2008. Eight soil borings – ENV-F-10, ENV-G-1, ENV-G-7, ENV-P-6, ENV-P-8, ENV-P-9, ENV-R-1, and ENV-R-13 – were completed at the former boring locations (F-10, G-1, G-7, P-6, P-8, P-9, R-1, and R-13), as shown on Figure 1. The borings were located to evaluate the concentrations of hexavalent chromium in soil. Each boring was completed using direct push equipment operated by Geosearch, Inc., a licensed drilling contractor. Continuous soil samples were collected during the advancement of each boring. Consistent with the original sampling from the RFI, the borings will be advanced to one foot for six of the borings (F-10, G-1, G-7, P-8, R-1, and R-13) and to five feet for two of the borings (P-6 and P-9). The samples were logged and screened on site for the presence of organic vapors using a photoionization detector (PID), and were examined for the presence of visual or olfactory indications of impacts. Each sample delivered to Phoenix Environmental Laboratories, Inc. (Phoenix) of Manchester, Connecticut for analysis was analyzed (a) for total chromium using United States Environmental Protection Agency (USEPA) Method

6010B/6020 and (b) for hexavalent chromium using Connecticut Reasonable Confidence Protocols (CT-RCP) 7196A. Upon completion of each location, the borings were backfilled.

Results and Conclusions

No physical evidence of contamination was observed during completion of the borings or sample collection. Table 1 summarizes the concentrations of total chromium and hexavalent chromium detected in the soil samples. Chromium was detected in all nine samples at concentrations ranging from 30.4 mg/kg to 1,930 mg/kg. Hexavalent chromium was detected in three samples at concentrations ranging from 1.72 mg/kg to 1.99 mg/kg. None of the concentrations detected were above the Connecticut RSR Industrial/Commercial Direct Exposure Criteria (I/C DEC) for total chromium or hexavalent chromium of 51,000 mg/kg and 100 mg/kg, respectively.

Based on the sampling results, none of the locations previously identified as having concentrations of above the hexavalent chromium DEC, currently have concentrations of hexavalent chromium above the DEC. Therefore, for purposes of revisions to the PHERE, the results of the prior soil sampling should be disregarded to the extent they referenced any hexavalent standards since in all likelihood the DEC trivalent standards should have been applied.

If you have any questions about the information contained in this report, please do not hesitate to call us.

Sincerely,

Alan Kao, PhD
Principal

Carolyn E. Snyder
Senior Associate

Attachment

TABLE 1
Soil Analytical Results
Former Envirite Facility
198 Old Waterbury Road
Thomaston, Connecticut

Location		**ENV-P-9**	**ENV-P-8**	**ENV-P-6**	**ENV-P-6 (duplicate)**	**ENV-R-1**	**ENV-G-1**	**ENV-R-13**	**ENV-G-7**	**ENV-F-10**
Depth (feet below ground surface)		**4-5**	**0-1**	**4-5**	**4-5**	**0-1**	**0-1**	**0-1**	**0-1**	**0-1**
Sample Date	**I/C DEC**	**3/11/2008**	**3/11/2008**	**3/11/2008**	**3/11/2008**	**3/11/2008**	**3/11/2008**	**3/11/2008**	**3/11/2008**	**3/11/2008**
Chromium, Total	51,000	1,930	510	33.1	30.4	42.3	66.4	33.9	61.1	528
Chromium, Hexavalent	100	<0.74	1.99	1.72	<0.88	<1.03	<0.39	<0.94	<0.89	1.93

Notes:
< - Constituent was not detected at the minimum laboratory reporting limit shown.
I/C DEC - Industrial/Commercial Direct Exposure Critieria

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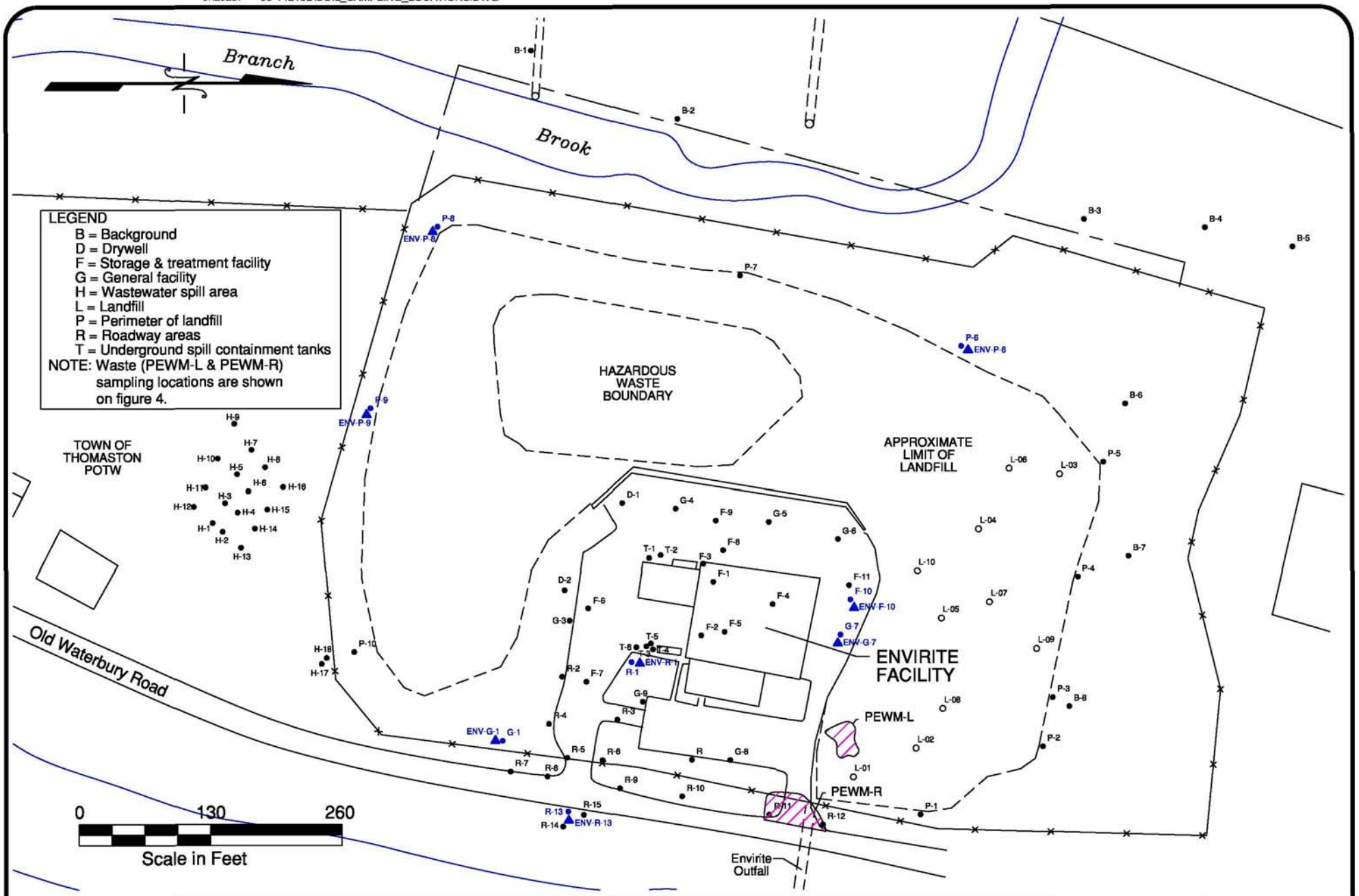

ENVIRON

SOIL SAMPLING LOCATIONS
ENVIRITE CORPORATION, THOMASTON, CONNECTICUT

Figure 1

APPENDIX VI-2

Summary of 2003 Ground Water Monitoring

ENVIRON

May 25, 2005

MEMORANDUM

To: Ray Cody

From: Alan Kao

Cc: Tom Yablonski
Ken Nisly

Subject: Former Envirite Facility, Thomaston, Connecticut
Summary of Recent Monitoring Results and Proposed Alternative Surface Water Protection Criteria

A. Background

On March 1, 2000, Envirite submitted to both USEPA and CTDEP a revised *Public Health and Environmental Risk Evaluation* (PHERE) document for Envirite's Thomaston, Connecticut site. As you know, ground water conditions at the Thomaston site have been affected by the presence of two piles of Pre-Envirite Waste Material (PEWM) – one pile situated beneath the landfill (PEWM-L) within the saturated zone, and a second pile situated adjacent to and beneath the roadway (PEWM-R) partially within the vadose (unsaturated) zone.

The ground water data provided in the PHERE were collected in 1994 and described the 1995 RCRA Facility Investigation (RFI) report. In a memorandum dated November 25, 2002, ENVIRON compared these data with Media Protection Standards (MPS) proposed in the PHERE, as well as numerical criteria provided by CTDEP's Remediation Standard Regulations (RSRs).[1] Based on this comparison, certain chemicals were identified that had concentrations that exceeded the RSR criteria and/or MPS.

Due to the age of the ground water data used in the PHERE, Envirite requested additional time to conduct ground water monitoring in order to evaluate current conditions at the site. In a letter

[1] It should be noted that Envirite's legal counsel had advised that, according to the Regulations of Connecticut State Agencies (RCSA) Section 22a-133k-1(b), the RSRs do not apply to areas that are affected by discharges allowed under a ground water discharge permit issued pursuant to Section 22a-430. Envirite has held a ground water discharge permit since 1984 at the Thomaston facility. Thus, while compliance with RSRs is one indicator of potential need for remediation to CTDEP, USEPA, and Envirite, these regulations are not strictly applicable to ground water constituent levels at the Thomaston facility.

dated January 22, 2003, USEPA agreed to allow Envirite sufficient time to conduct four rounds of quarterly monitoring, the results of which would be used to determine whether concentrations of ground water constituents continued to exceed the RSR criteria. The 2003 ground water sampling included an expanded number of target analytes than are included in the regular quarterly monitoring being performed at the site under post-closure requirements. Regular post-closure monitoring continues to be performed, and now includes additional data for 2004 and the first quarter of 2005.

This memorandum presents the following:

- A summary of the results from the four quarters of ground water and surface water data collected in 2003, as well as updated data for certain constituents collected during the site's regular quarterly monitoring in 2004-05 as part of post-closure requirements
- A presentation of Envirite's proposed approach for complying with the RSRs, which includes the development of Alternative Surface Water Protection Criteria (see Attachment A)

B. Compliance with CTDEP Remediation Standard Regulations

Ground water in GB areas at the site is potentially subject to two remediation criteria:

- Industrial Volatilization Criteria (IVC)[2] – the 95% UCL of all sample locations must be less than the IVC for at least four consecutive quarterly sampling periods and each sample must be less than two times the IVC; if the ground water data exceed the IVC for ground water, the facility also has the option of meeting the IVC for soil vapor[3,4]
- Surface Water Protection Criteria (SWPC)[5] – the average concentration from all sample locations must be less than the SWPC for at least four consecutive quarterly sampling periods

Compliance with the RSRs is evaluated by comparing ground water concentration data collected over four consecutive quarters with each applicable criteria. This memorandum presents a summary of the data for four quarterly rounds of ground water sampling collected in 2003, as well as recent rounds of quarterly sampling conducted in 2004-05 as part of the site's regular post-monitoring requirements. A more detailed presentation and discussion of these data is provided in Attachment B.

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[2] Appendix E to Sections 22a-133k-1 through 22a-133k-3 of the RCSA; Volatilization Criteria for Ground Water

[3] Appendix F to Sections 22a-133k-1 through 22a-133k-3 of the RCSA; Volatilization Criteria for Soil Vapor

[4] According to Section 22a-133k-3(c)(3)(A), remediation of a volatile organic substance to the volatilization criterion for ground water shall not be required if the concentration of such substance in soil vapors below a building is equal to or less than the applicable volatilization criterion for soil vapor.

[5] Appendix D to Sections 22a-133k-1 through 22a-133k-3 of the RCSA; Surface Water Protection Criteria for Substances in Ground Water

C. Proposed Approach for Complying with Ground Water RSRs

Envirite proposes the following approach for complying with the ground water RSRs:

1. Volatilization Criteria (VC)

The volatilization criteria are only applicable if ground water is less than 30 feet below ground surface and a building is present within 30 feet of the VC exceedance area. Envirite would consider a proposal to remove the building and place an Environmental Land Use Restriction (ELUR) on the property restricting future building construction. This would qualify the site for an exemption from the VC.[6]

Based on our discussions with you, we understand that the CTDEP's Water Quality goals for GB aquifers is "to prevent further degradation of ground water quality", which you have indicated would not permit the PEWM-R pile (situated in the unsaturated zone) to remain in place, regardless of institutional controls placed on the site by Envirite. As such, Envirite would consider a plan to excavate the PEWM-R pile situated in the unsaturated zone adjacent to and beneath the roadway.

2. Surface Water Protection Criteria (SWPC)

Once the ELUR is in place, the only applicable RSR criteria would be the SWPC. As shown in Table 1, the SWPC were exceeded for copper and zinc in 2003. However, based on more recent sampling data from 2004-05, the site is currently in compliance with the numerical SWPC for copper and is approaching the numerical SWPC for zinc (Table 1). It should be noted that zinc was detected in background wells, suggesting the presence of upgradient sources. Half of the background samples in which zinc was detected were at concentrations that exceed the SWPC.

ENVIRON developed Alternative Surface Water Criteria for zinc for this site. Using the procedures provided in Section 22a-133k-3(b)(3) of the RCSA, an Alternative SWPC for zinc of 257 μg/L was developed. Details of the calculation of this Alternative SWPC are provided in Attachment A. Monitoring data from 2004-05 (ranging from 158 to 161 μg/L) are in compliance with this alternative criterion. Historical monitoring data for zinc (taken from previous annual monitoring reports and summarized in Table 2) are presented in Figure 1.

[6] Sections 22a-133k-3(c)(5) of the RCSA; Volatilization Criteria for Ground Water – Exemption from volatilization criteria. "The volatilization criteria do not apply to ground water polluted with volatile organic substances…if no building exists over the ground water polluted with volatile organic substances at a concentration above the applicable volatilization criteria, and (i) it has been documented that best efforts have been made to ensure that each owner of any parcel of land or portion thereof overlying such polluted ground water records an environmental land use restriction which ensures that no building is constructed over such polluted ground water".

TABLE 1
Comparison of Copper and Zinc Ground Water Monitoring Data With Surface Water Protection Criteria

Period	Copper		Zinc	
	Annual Avg (µg/L)	SWPC (µg/L)	Annual Avg (µg/L)	SWPC (µg/L)
1Q03-4Q03	115	48	288	123 (Proposed Alternative SWPC is 257 µg/L)
2Q03-1Q04	99		303	
3Q03-2Q04	67		277	
4Q03-3Q04	50		181	
1Q04-4Q04	27		161	
2Q04-1Q05	36		158	

Note: Based on the average of data collected from MW-30, 31S, 33, 41S, 41D, 41B, 42, 43S, 43D, 44D, and 44B. For the period 1Q03-4Q03, data were collected from background wells MW-32D, 32S, 55B, and 63, which had an average zinc concentration of 107 µg/L, with four of the eight samples each exceeding the SWPC of 123 µg/L. No more recent background data are available.

D. Closure

Based on a review of quarterly monitoring data collected from 2003-05, only one metal (zinc) is in exceedance of the numerical Surface Water Protection Criteria.

Envirite would consider the following proposals for Media Protection Standards for the site:

- Remediation of the PEWM-R pile near the roadway in order to meet CTDEP's Water Quality goals.
- Removal of the on-site building and placement of an Environmental Land Use Restriction on the property restricting future building construction. This would exempt the site from applicability of the Volatilization Criteria.
- Compliance of the ground water at the site with the Surface Water Protection Criteria, for all compounds except for zinc. For zinc, an alternative SWPC of 257 µg/L is proposed.

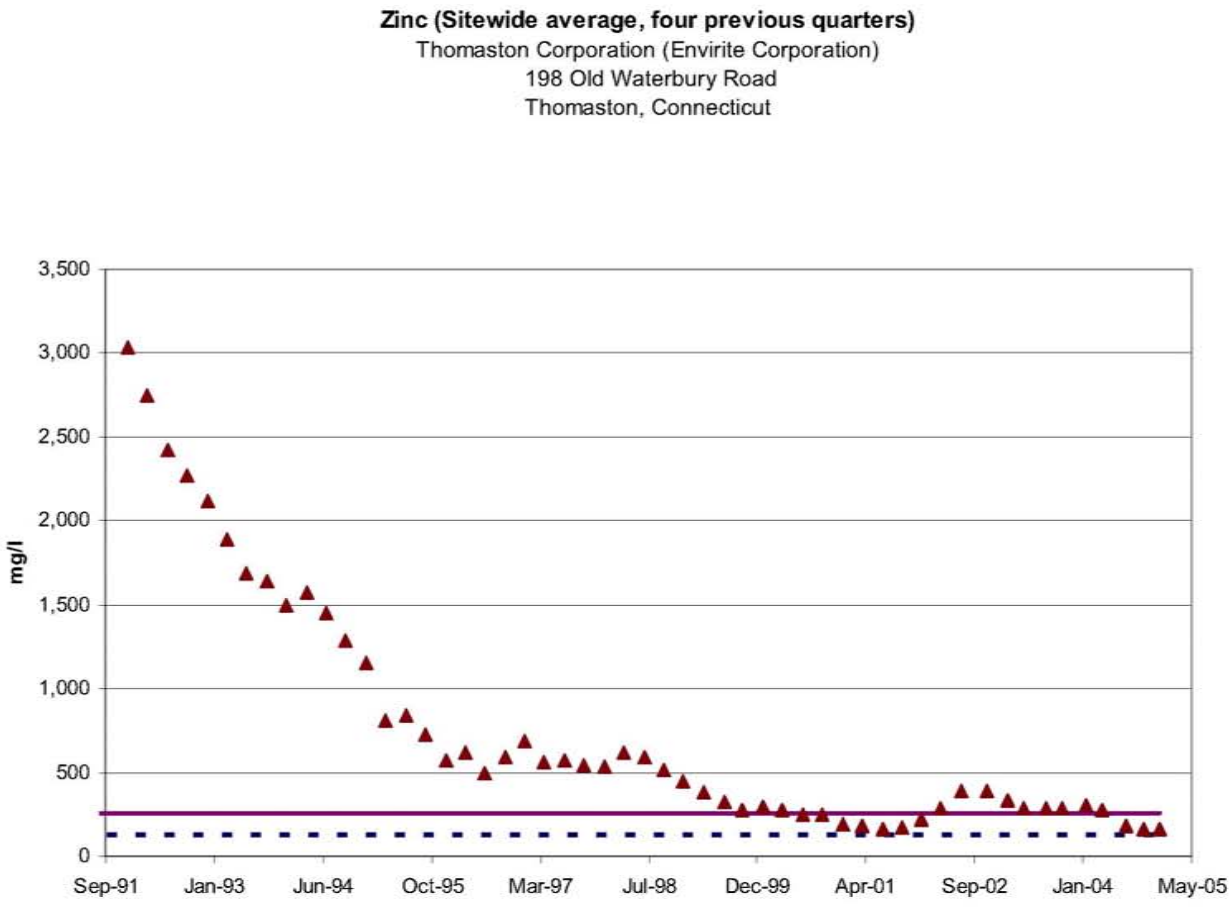


Figure 1. Downward trend in site-wide average zinc concentration (based on data presented in previous annual reports). Average concentration for the most recent four quarters (2Q04 to 1Q05) is 158 µg/L, which exceeds the numerical SWPC of 123 µg/L (dashed line), but is lower than the proposed Alternative SWPC of 257 µg/L (solid line).

TABLE 2
SUMMARY OF ZINC CONCENTRATION DATA (ug/L)

	MW-30	MW-31S	MW-33	MW-41S	MW-41D	MW-41B	MW-42S	MW-43S	MW-43D	MW-44D	MW-44B	Average
Jan-91	50	40	50	160	30		400	980	27,000	8,600		
Apr-91	80	190	50	100	30		270	860	23,000	6,100		
Jul-91	80	90	50	120	30		190	700	22,000	5,800		
Oct-91												
Jan-92	60	80	50	70	20		180	520	17,000	4,200		3,034
Apr-92	70	40	60	80	30		240	730	17,000	4,600		2,744
Jul-92	70	300	60	50	20		170	560	15,000	4,100		2,421
Oct-92	50	400	300	70	20		130	530	11,000	3,700		2,266
Jan-93	60	28	35	150	32	31	110	620	12,000	4,600	3,400	2,117
Apr-93	59	55	89	220	46	120	210	750	9,200	4,400	2,800	1,889
Jul-93	50	240	180	80	20	40	290	580	8,800	2,700	2,800	1,690
Oct-93	100	50	60	130	20	30	630	1,100	11,000	1,600	2,800	1,644
Jan-94	91	41	59	150	10	29	360	1,100	10,000	780	2,200	1,502
Apr-94	1,092	4,300	160	250	120	60	340	750	10,000	1,600	2,300	1,570
Jul-94	64	410	48	150	19	54	340	1,100	5,200	1,000	2,100	1,450
Oct-94	36	310	25	290	25	35	570	2,000	5,100	600	1,500	1,290
Jan-95	96	76	39	340	31	15	800	1,200	5,500	310	450	1,155
Apr-95	58	40	26	190	14	16	610	730	3,300	270	480	808
Jul-95	44	230	31	91	12	30	400	540	8,900	400	1,200	840
Oct-95	49	54	15	120		48	890	690	2,200	220	300	722
Jan-96	42	40	24	260	14	41	660			81	120	573
Apr-96	69	410	29	140	14	33	490	380	5,900	86	160	621
Jul-96	78	210	23	120	26	40	500	320	5,100	120	270	497
Oct-96	56	73	27	110	22	81	340	390	7,000	740	340	595
Jan-97	72	98	18	100	11	22	310	390	4,600	520	440	688
Apr-97	35	68	43	44	28	39	190	300	510	370	500	561
Jul-97	290	310	280	450	400	430	530	290	2,600	970	930	577
Oct-97	110	330	110	240	56	170	430	620	3,800	470	1,200	539
Jan-98	100			120	140	230	240	650	2,500	300	810	529
Apr-98	20	200	34	190	39	63	440	510	3,400	340	840	623
Jul-98	59	180	45	140	31	34	320	710	3,200	400	1,000	591
Oct-98	46	76	20	150	57	57	360	490	2,400	180	700	520
Jan-99	10	48		250	68	46	500	420	500	67	620	448
Apr-99	76	290	12	180	14	24	290	170	1,600	58	320	377
Jul-99	67	770	31	150	66	44	370	210	1,800	120	290	326
Oct-99	120	770	14	110	30	75	210	230	420	77	270	275
Jan-00		36	29	32		22	130	290	2,300	97	290	298
Apr-00	100	46		54		18	150	220	720	110	280	279
Jul-00		43					53	280	820	100	260	252
Oct-00	62	90		18	14		79	280	740	140	260	247
Jan-01	130	67	24	45	24	21	160	350	720	57	270	194
Apr-01	18	130		42	36	28	120	170	510	68	160	177
Jul-01	54	98	22	65	41	42	170	220	680	100	200	159
Oct-01	49	470	26	50	23	41	170	200	800	120	440	168
Jan-02	14	1,900		78	17	12	430	210	1,000	35	340	224
Apr-02	350	310	53	230	110	140	620	350	1,500	250	410	289
Jul-02	190	2,100	100	180	180	150	570	400	1,500	260	400	390
Nov-02	130	78		38	18	14	330	190	1,200	70	87	394
Jan-03	9	79		69	38	49	220	100	610	45	100	329
Apr-03	82	320		59	26	3	340	250	1,200	27	63	290
Jul-03	130	3,400		96	100	86	280	260	690	180	250	283
Oct-03	44	120		100	40	100	170	220	1,200	92		288
Jan-04	110	39		57	150	320	280	270	370	180	100	303
Apr-04	18	180		3	3	120	91	110	620	120	120	277
Jul-04	23	990		3	3	71	82	83	190	120	130	181
Oct-04	86	55		50	57	140	150	140	440	190	180	161
Jan-05	42	420	16	48	17	37	150	130	650	240	180	158

ATTACHMENT A
Calculation of Alternative SWPC for Zinc

Section 22a-133k-3(b)(3) of the Regulations of Connecticut State Agencies; Alternative Surface-Water Protection Criteria states that:

> "An alternative surface-water protection criterion may be calculated for a substance in Appendix D of the most recent Water Quality Standards by multiplying the lower of the human health or aquatic life criterion for such substance in said Appendix D by [(0.25 x 7Q10)/Q_{plume}] where Q_{plume} is equal to the average daily discharge of polluted ground water from the subject ground-water plume."

The parameters used to calculate Alternative SWPC for zinc in the Naugatuck River are provided below in Tables A-1 and A-2:

TABLE A-1
Development of Alternative Surface Water Protection Criterion Dilution Factor for Zinc

Parameter	Symbol	Units	Value		Source/Comment
			Min	Max	
Aquifer Characteristics					
Hydraulic Gradient	i	ft/ft	0.001	0.01	RCRA Facility Investigation. Phase I Report. Vol I. March 1995. Page 17 and Table 3-2 (Pump Test Results and Mean K for Shallow and Deep Overburden Borehole Tests)
Hydraulic Conductivity	K	ft/sec	1.80E-03	1.40E-02	
Porosity	n	---	0.25		
Ground Water Flow Velocity	v	ft/sec	7.20E-06	5.60E-04	v = K* i/n
Mean Ground Water Flow Velocity	v	ft/sec	6.35E-05		Geometric mean
Naugatuck River Discharge					
Plume Depth	B	ft	30	50	RCRA Facility Investigation. Phase I Report. Vol I. March 1995.
Plume Width	L	ft	150		Estimate of the distance where contaminated GW discharges to the river, based on distance between MW-43 and MW-42 well clusters, where zinc exceedances continue to be observed.
Ground Water Discharge Rate	Q_{plume}	ft^3/sec	0.29	0.48	Q_{GW} (ft^3/sec) = B * L * v
Average Ground Water Discharge Rate	Q_{plume}	ft^3/sec	0.38		
Seven Day, Ten Year Low Flow Condition	7Q10	ft^3/sec	6.02		Per CTDEP (Art Mauger)
Dilution Factor	DF	NA	4.0		DF = 0.25 * 7Q10 / Q_{plume} *(R.C.S.A. 22a-133k-3(b)-3A)*

TABLE A-2
Development of Alternative Surface Water Protection Criterion for Zinc

Parameter	Units	Value
Aquatic Human Health Criteria (Fish Consumption Only)	µg/L	65
Aquatic Life Criteria	µg/L	65
Minimum of Human Health and Aquatic Life Criteria	µg/L	65
Dilution Factor	unitless	4.0
Surface Water Protection Criterion	µg/L	123
Alternative Surface Water Protection Criterion	µg/L	257
Annual Average Zinc Concentration (2004-05)	µg/L	158-161

ATTACHMENT B
Summary of 2003 Monitoring Data

The purpose of the 2003 monitoring program is to evaluate the current compliance status of the site's ground water with respect to the RSRs (based on proposed RSR revisions). The ground water and surface water monitoring data collected during the four quarters of 2003 are presented in Tables 1-4. The monitoring well network is shown in Figure 1. As discussed below, we have concluded that only one chemical of potential concern remains with respect to ground water (i.e., zinc).

1. GA Wells

Among the three GA wells monitored (MW-36, MW-37B, and MW-37D), only two VOCs were detected in 2003 – bis(2-ethylhexyl)phthalate and bromoform. Bromoform was only detected during one of the four quarters (1Q03), at concentrations that are below the RSR criteria. Bis(2-ethylhexyl)phthalate was also only detected during one of the four quarters (3Q03), with the sample from one well (MW-37D) at a concentration of 4.6 μg/L, which is slightly higher than two times the GWPC (4 μg/L). Based on the sample population and low frequency of detection, the results for bromoform and bis(2-ethylhexyl)phthalate in these wells do not represent statistically significant exceedances of the GWPC. Thus, the ground water in the GA wells is likely in compliance with the RSRs.

2. GB Wells

Among the 15 GB wells monitored (MW-30, MW-31B, MW-31D, MW-31S, MW-41B, MW-41D, MW-41S, MW-42S, MW-43D, MW-43S, MW-44B, MW-44D, MW-51B, MW-52D, and MW-53D), the following two constituents exceeded the Industrial Volatilization Criteria:

- Vinyl chloride: The 95% UCL of the data collected over the four quarters in 2003 (195 μg/L) exceeds the proposed IVC (52 μg/L). In addition, data from MW-30 and MW-31S (ranging from 120 to 460 μg/L) exceed two times the IVC (104 μg/L).

- Trichloroethylene (TCE): The 95% UCL of the data collected over the four quarters in 2003 (139 μg/L) exceeds the proposed IVC (67 μg/L). In addition, data collected from MW-30, MW-31B, and MW-52D (ranging from 300 to 970 μg/L) exceed two times the IVC (134 μg/L).

The following five constituents exceeded the Residential Volatilization Criteria, but are below Industrial Volatilization Criteria:

- Vinyl chloride: The 95% UCL of the data collected over the four quarters in 2003 (195 μg/L) exceeds the proposed RVC (1.6 μg/L). In addition, data collected from MW-30, MW-31B, MW-31D, MW-31S, MW-43D, MW-52D,

and MW-53D (ranging from 5 to 460 μg/L) exceed two times the RVC (3.6 μg/L).

- Trichloroethylene (TCE): The 95% UCL of the data collected over the four quarters in 2003 (139 μg/L) exceeds the proposed RVC (27 μg/L). In addition, data collected from MW-30, MW-31B, MW-43D, MW-51B, and MW-52D (ranging from 62 to 970 μg/L) exceed two times the RVC (54 μg/L).

- cis-1,2-Dichloroethylene (cis-1,2-DCE): The 95% UCL of the data collected over the four quarters in 2003 (1,480 μg/L) exceeds the proposed RVC (830 μg/L). In addition, data collected from MW-30 and MW-31S (ranging from 1,700 to 5,900 μg/L) exceed two times the RVC (1,660 μg/L).

- 1,2-Dichloroethane (1,2-DCA): Data collected from MW-30 and MW-31S (ranging from 15 to 21 μg/L) exceed two times the RVC (13 μg/L).

- Toluene: Data collected from MW-31S (ranging from 15,000 to 19,000 μg/L) exceed two times the RVC (14,200 μg/L).

The volatilization criteria are only applicable if ground water is less than 30 feet below ground surface and a building is present within 30 feet of the VC exceedance area. Envirite would consider a proposal to remove the building and place an ELUR on the property restricting future building construction. This would qualify the site for an exemption from the VC.

The following five constituents exceeded the Surface Water Protection Criteria:

- Phenanthrene: The average of the data collected over the four quarters in 2003 (0.2 μg/L) slightly exceeds the SWPC (0.1 μg/L). Phenanthrene was detected in only two out of 53 samples collected. This "exceedance" is strongly influenced by the method detection limits used in the analysis (0.3 μg/L), which exceeds the SWPC at both the MDL and one half the MDL. Based on the low frequency of detection (less than four percent), Envirite does not believe these results represent a true "exceedance" of the SWPC.

- Heptachlor epoxide: The average of the data collected over the four quarters in 2003 (0.06 μg/L) slightly exceeds the SWPC (0.05 μg/L). Heptachlor epoxide was detected in only two out of 54 samples collected. This "exceedance" is strongly influenced by the method detection limits used in the analysis (0.05 μg/L for most samples, but 2 μg/L for one sample). If the detection limit for the one sample had been 0.05 μg/L instead of 2 μg/L, and assuming a nondetect for that sample, the average would have been 0.045 μg/L, which is below the SWPC. Based on the low frequency of detection (less than four percent), Envirite does not believe these results represent a true "exceedance" of the SWPC. Furthermore, heptachlor epoxide was only detected in one well (MW-31S) at

levels that exceeded the SWPC; all other wells were either nondetect or at levels below the SWPC, including wells downgradient of MW-31S (e.g., MW-41S, MW-42S). Because the concentrations upgradient of the point at which ground water discharges to surface water are less than the SWPC, the SWPC are satisfied.

- Polychlorinated biphenyls (PCBs): The average of the data collected over the four quarters in 2003 (0.98 μg/L) slightly exceeds the SWPC (0.5 μg/L). PCBs were only detected in one well (MW-31S) at levels that exceeded the SWPC; all other wells were either nondetect or at levels below the SWPC, including wells downgradient of MW-31S (e.g., MW-41S, MW-42S). Because the concentrations upgradient of the point at which ground water discharges to surface water are less than the SWPC, the SWPC are satisfied.

- Copper: The average of the data collected over the four quarters in 2003 (88 μg/L) exceeds the SWPC (48 μg/L). The highest concentrations were observed in MW-43D and MW-43S, on the southern (downgradient) border of the site. However, based on more recent data collected during the first three quarters of 2004 as part of Envirite's regular post-closure monitoring, the average of the data collected over the four most recent quarters (4Q03 through 3Q04) is 46 μg/L, which is slightly below the SWPC, driven largely by a single high value of 1,300 μg/L observed in one well (MW-43D) in one quarter (4Q03) (the values in subsequent quarters were 22, 61, and 74 μg/L, respectively). We anticipate the average concentration to continue to decrease over time and remain below the SWPC.

- Zinc: The average of the data collected over the four quarters in 2003 (244 μg/L) exceeds the SWPC (123 μg/L). The highest concentrations were observed in MW-42S, MW-43D, and MW-43S, on the southern (downgradient) border of the site. However, based on more recent data collected during the first three quarters of 2004 as part of Envirite's regular post-closure monitoring, the average of the data collected over the four most recent quarters (4Q03 through 3Q04) is 163 μg/L, which is lower than 2003, but still above the SWPC. The exceedance of the SWPC is driven by concentrations in one well (MW-43D), which had values for 4Q03 through 1Q05 of 1,200, 370, 620, 190, 440, and 650 μg/L, respectively. Excluding this well, the average zinc concentration is 118 μg/L, which is below the SWPC. Furthermore, as discussed below in Section C.3, zinc was detected in upgradient background wells, and half of the background samples had zinc concentrations that exceed the SWPC. Nonetheless, the concentrations site-wide appear to be decreasing with time (see Figure 2), and we anticipate the average concentration would eventually be below the SWPC through natural attenuation, depending on the contributions from upgradient sources.

Based on the above discussion, and considering the site to be industrial, the only three chemicals of potential concern are vinyl chloride, TCE, and zinc. With the proposed removal of the building and placement of an ELUR on the property restricting future

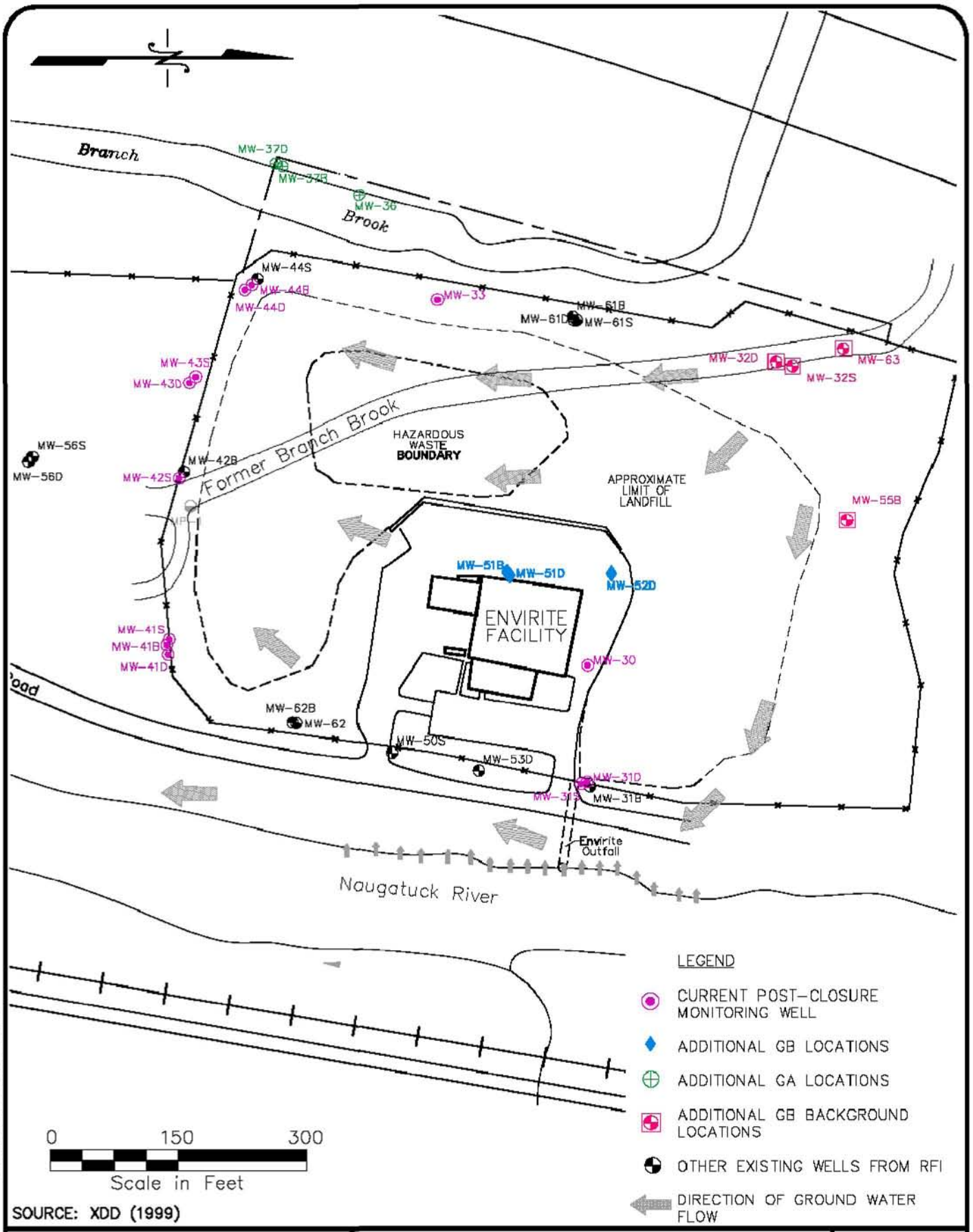
building construction, the site would qualify for an exemption from the VC. As such, zinc is the only remaining chemical of potential concern.

3. Background Wells

Among the four background wells monitored (MW-32D, MW-32S, MW-55B, and MW-63), three VOCs (bis(2-ethylhexyl)phthalate, bromoform, and dibromochloromethane) and three metals (copper, lead, and zinc) were detected. It should be noted that half of the background samples in which zinc was detected were at concentrations that exceed the SWPC.

4. Surface Water Samples

Surface water samples were collected during each of the four quarters at locations upstream and downstream of the Envirite facility. No VOCs were detected in any of the surface water samples. Five metals were detected in both upstream and downstream samples – barium, iron, manganese, sodium, and zinc.



SOURCE: XDD (1999)

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ENVIRON

2003 MONITORING NETWORK
ENVIRITE CORPORATION
THOMASTON, CONNECTICUT

Figure 1

TABLE 1. SUMMARY OF ANALYTICAL RESULTS, GB WELLS
Expanded Monitoring
Thomaston, Connecticut
2003

CTDEP CRITERIA (ug/L)[1,2]					WELL		MW-30				MW-21S				MW-31D			
					Post-Close?[8]		yes				no				no			
RVC	2 x RVC	IVC	2 x IVC	SWPC	Analyte	Post-Close?[8]	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
ug/L	ug/L	ug/L	ug/L	ug/L	Volatile Organic Compounds		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2	4	64	128	NE	1,1,1,2-Tetrachloroethane	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
6,500	13,000	16,000	32,000	62,000	1,1,1-Trichloroethane	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1.8	3.6	54	108	110	1,1,2,2-Tetrachloroethane	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
220	440	29,000	58,000	1,260	1,1,2-Trichloroethane	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3,000	6,000	41,000	82,000	NE	1,1-Dichloroethane	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
190	380	920	1,840	96	1,1-Dichloroethene	yes	10	BDL	11	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	BDL
NE	NE	NE	NE	NE	1,1-Dichloropropene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	1,2,3-Trichlorobenzene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	1,2,3-Trichloropropane	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	1,2,4-Trichlorobenzene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	1,2,4-Trimethylbenzene	no	BDL	1	BDL	BDL	BDL	1	—	—	BDL	BDL	BDL	1
NE	NE	NE	NE	NE	1,2-Dibromo-3-Chloropropane	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	1,2-Dibromoethane	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
30,500	61,000	50,000	100,000	170,000	1,2-Dichlorobenzene	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6.5	13	68	136	2,970	1,2-Dichloroethane	yes	15	BDL	11	BDL	BDL	3	BDL	BDL	2	1	1	1
7.4	14.8	58	116	NE	1,2-Dichloropropane	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
280	560	3,900	7,800	NE	1,3,5-Trimethylbenzene	no	1	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
24,200	48,400	50,000	100,000	26,000	1,3-Dichlorobenzene	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	1,3-Dichloropropane	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
11	22	360	720	34,000	1,3-Dichloropropene	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
50,000	100,000	50,000	100,000	26,000	1,4-Dichlorobenzene	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	2,2-Dichloropropane	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
50,000	100,000	50,000	100,000	NE	2-Butanone	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	2-Chloroethyl vinyl ether	yes	BDL	BDL	BDL	BDL	—	BDL	BDL	BDL	—	BDL	BDL	BDL
NE	NE	NE	NE	NE	2-Chlorotoluene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	2-Hexanone	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	4-Chlorotoluene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	4-Methyl-2-Pentanone	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
50,000	100,000	50,000	100,000	NE	Acetone	no	BDL	BDL	BDL	BDL	BDL	3	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	Acrolein	yes	BDL	BDL	BDL	BDL	—	BDL	BDL	BDL	—	BDL	BDL	BDL
NE	NE	NE	NE	20	Acrylonitrile	yes	BDL	BDL	BDL	BDL	—	BDL	BDL	BDL	—	BDL	BDL	BDL
130	260	310	620	710	Benzene	yes	18	9	13	8	BDL	2	BDL	BDL	1	3	2	1
NE	NE	NE	NE	0.3	Benzo[a]pyrene	no	0.15	BDL	BDL	BDL	BDL	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	0.3	Benzo[b]fluoranthene	no	0.16	BDL	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	0.3	Benzo[k]fluoranthene	no	BDL	BDL	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	59	Bis(2-ethylhexyl)phthalate	no	—	—	—	—	—	—	—	—	—	—	—	—
NE	NE	NE	NE	NE	Bromobenzene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	Bromochloromethane	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
2.3	4.6	73	146	NE	Bromodichloromethane	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
75	150	2,300	4,600	10,800	Bromoform	yes	2	BDL	BDL	BDL	2	BDL	BDL	BDL	2	BDL	BDL	BDL
NE	NE	NE	NE	NE	Bromomethane	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5.3	10.6	14	28	132	Carbon Tetrachloride	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,800	3,600	23,000	46,000	420,000	Chlorobenzene	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12,000	24,000	29,000	58,000	NE	Chloroethane	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	52	62	124	14,100	Chloroform	yes	3	BDL	4	BDL	24	1	BDL	BDL	BDL	BDL	BDL	BDL
390	780	5,500	11,000	NE	Chloromethane	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
830	1,660	11,000	22,000	NE	cis-1,2-Dichloroethene	no	3,200	1,600	2,500	1,400	BDL	230	—	—	64	110	140	66
NE	NE	NE	NE	1,020	Dibromochloromethane	yes	BDL	BDL	BDL	BDL	1	BDL	BDL	BDL	1	BDL	BDL	BDL
NE	NE	NE	NE	NE	Dibromomethane	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
93	186	1,200	2,400	NE	Dichlorodifluoromethane	yes	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
2,700	5,400	36,000	72,000	580,000	Ethylbenzene	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	Hexachlorobutadiene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
2,800	5,600	6,800	13,600	NE	Isopropylbenzene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
160	320	2,200	4,400	48,000	Methylene Chloride	yes	4	7	4	5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21,000	42,000	50,000	100,000	NE	Methyl-tert-butyl-ether	yes	BDL	BDL	BDL	BDL	3	1	—	—	1	1	1	BDL
NE	NE	NE	NE	NE	Naphthalene	no	BDL	2	BDL	BDL	BDL	5	—	—	BDL	1	BDL	3
1,500	3,000	21,000	42,000	NE	n-Butylbenzene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	N-nitrosodimethylamine	no	16	BDL	33	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	n-Propylbenzene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	0.1	Phenanthrene[5]	no	BDL	BDL	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	p-Isopropyltoluene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
1,500	3,000	20,000	40,000	NE	sec-Butylbenzene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
3,100	6,200	42,000	84,000	NE	Styrene	yes	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	tert-Butylbenzene	no	BDL	BDL	BDL	BDL	BDL	BDL	—	—	BDL	BDL	BDL	BDL
340	680	810	1,620	88	Tetrachloroethylene	yes	290	160	290	210	8	42	260	240	120	7	8	2
7,100	14,200	41,000	82,000	4,000,000	Toluene	yes	BDL	1	BDL	BDL	BDL	1	BDL	BDL	BDL	1	1	BDL
1,000	2,000	13,000	26,000	NE	trans-1,2-Dichloroethene	yes	11	BDL	7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	54	67	134	2,340	Trichloroethene	yes	**900**	**490**	**970**	**890**	14	**78**	**300**	**300**	34	29	43	11
1,300	2,600	4,200	8,400	NE	Trichlorofluoromethane	yes	BDL	BDL	BDL	5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1.6	3.2	52	104	15,750	Vinyl Chloride	yes	**310**	**120**	**220**	**130**	BDL	**14**	**93**	**90**	**7**	**5**	**16**	1.5
8,700	17,400	48,000	96,000	NE	Xylenes (total)	yes	14	6	10	5	BDL	1	—	—	BDL	1	BDL	BDL
					Pesticides and PCBs													
NE	NE	NE	NE	NE	4,4'-DDE	no	—	BDL	BDL	BDL	—	—	—	—	—	BDL	BDL	BDL
NE	NE	NE	NE	NE	4,4'-DDT	no	—	BDL	BDL	BDL	—	—	—	—	—	BDL	BDL	BDL
NE	NE	NE	NE	NE	Aldrin	no	BDL	BDL	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	beta-BHC	no	—	BDL	BDL	BDL	—	—	—	—	—	BDL	BDL	BDL
NE	NE	NE	NE	0.1	Dieldrin	no	BDL	BDL	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	Endosulfan sulfate	no	—	—	—	—	—	—	—	—	—	—	—	—
NE	NE	NE	NE	0.05	Heptachlor	no	BDL	BDL	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	0.05	Heptachlor Epoxide	no	BDL	BDL	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	0.5	PCBs (total)	no	—	0.14	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
					Metals													
NE	NE	NE	NE	4	Arsenic-Low Level, Dissolved	no	BDL	BDL	6	BDL	—	—	—	—	BDL	BDL	BDL	7
NE	NE	NE	NE	NE	Barium, Dissolved	yes	21	97	140	18	38	46	290	32	42	30	540	31
NE	NE	NE	NE	4	Beryllium-Dissolved	no	BDL	BDL	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	6	Cadmium, Dissolved	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	110 (CrVI)	Chromium, Dissolved	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	48	Copper, Dissolved	yes	10	15	BDL	BDL	BDL	14	15	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	Iron, Dissolved	yes	10	BDL	BDL	24	15	BDL	BDL	42	35	BDL	120	130
NE	NE	NE	NE	13	Lead, Dissolved	no	BDL	BDL	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	Manganese, Dissolved	yes	4,200	2,800	3,800	2,800	78	1,300	1,600	1,400	BDL	240	640	460
NE	NE	NE	NE	0.4	Mercury, Dissolved	no	BDL	BDL	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	880	Nickel, Dissolved	yes	87	28	71	63	190	27	44	41	BDL	89	110	72
NE	NE	NE	NE	12	Silver, Dissolved	no	BDL	BDL	BDL	BDL	—	—	—	—	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	Sodium, Dissolved	yes	660,000	500,000	590,000	600,000	110,000	320,000	260,000	380,000	32,000	57,000	67,000	89,000
NE	NE	NE	NE	123	Zinc, Dissolved	yes	9	82	130	44	100	6	260	26	BDL	17	32	52

Analyte	MW-31S 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	MW-41S 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	MW-41D 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Post-Close?[8]	yes				yes				yes			
Volatile Organic Compounds	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
1,1,1,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloropropene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2,3-Trichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2,3-Trichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2,4-Trichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2,4-Trimethylbenzene	190	160	430	370	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dibromo-3-Chloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dibromoethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichloroethane	3	BDL	21	10	BDL	BDL	BDL	1	BDL	BDL	BDL	BDL
1,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,3,5-Trimethylbenzene	51	48	140	110	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,3-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,3-Dichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,3-Dichloropropene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,4-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2-Butanone	2,500	5,400	33,000	16,000	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2-Chloroethyl vinyl ether	BDL	BDL	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2-Chlorotoluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2-Hexanone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4-Chlorotoluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4-Methyl-2-Pentanone	9,600	12,000	47,000	39,000	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Acetone	940	980	4,800	2,900	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Acrolein	BDL	BDL	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Acrylonitrile	BDL	BDL	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene	25	43	170	120	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzo[a]pyrene	0.09	BDL	—	0.03	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzo[b]fluoranthene	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzo[k]fluoranthene	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bis(2-ethylhexyl)phthalate	—	—	—	—	—	—	—	—	—	—	—	—
Bromobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bromochloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bromodichloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bromoform	BDL	BDL	BDL	BDL	1	BDL	BDL	BDL	1	BDL	BDL	BDL
Bromomethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Carbon Tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
cis-1,2-Dichloroethene	920	1,700	5,000	4,300	40	44	33	58	17	18	19	19
Dibromochloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	BDL	BDL	BDL
Dibromomethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodifluoromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	1,400	1,500	4,800	4,300	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Hexachlorobutadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Isopropylbenzene	67	64	170	160	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylene Chloride	BDL	6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methyl-tert-butyl-ether	1	2	5	3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Naphthalene	44	55	100	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
n-Butylbenzene	2	BDL	5	5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
N-nitrosodimethylamine	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
n-Propylbenzene	26	BDL	60	53	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Phenanthrene[5]	0.33	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
p-Isopropyltoluene	5	5	10	11	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
sec-Butylbenzene	2	BDL	4	3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Styrene	BDL	BDL	8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
tert-Butylbenzene	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene	37	54	45	6	3	5	3	4	5	5	6	6
Toluene	2,200	5,100	15,000	15,000	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
trans-1,2-Dichloroethene	4	BDL	17	10	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Trichloroethene	6	18	21	3	11	12	8	13	7	8	8	8
Trichlorofluoromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Vinyl Chloride	**210**	**190**	**490**	**300**	1	1	BDL	2	1	BDL	BDL	1
Xylenes (total)	3,300	3,900	13,900	11,800	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pesticides and PCBs												
4,4'-DDE	—	BDL	BDL	BDL	—	BDL	BDL	BDL	—	BDL	BDL	BDL
4,4'-DDT	—	1	1	2	—	BDL	BDL	BDL	—	BDL	BDL	BDL
Aldrin	BDL	BDL	0.110	0.370	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
beta-BHC	—	BDL	0.250	2.100	—	BDL	BDL	BDL	—	BDL	BDL	BDL
Dieldrin	BDL	BDL	BDL	2.300	BDL	BDL	BDL	0.003	BDL	BDL	0.003	0.002
Endosulfan sulfate	—	—	—	—	—	—	—	—	—	—	—	—
Heptachlor	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Heptachlor Epoxide	BDL	BDL	0.27	0.90	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
PCBs (total)	10	7	17	15	BDL	BDL	BDL	0.073	BDL	BDL	BDL	BDL
Metals												
Arsenic-Low Level, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Barium, Dissolved	150	210	1,400	140	33	38	190	45	35	150	180	34
Beryllium-Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cadmium, Dissolved	BDL	8	51	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium, Dissolved	BDL	BDL	68	24	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Copper, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron, Dissolved	42,000	39,000	230,000	52,000	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Lead, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Manganese, Dissolved	3,900	4,600	19,000	6,900	180	43	82	150	800	850	1,100	610
Mercury, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nickel, Dissolved	32	32	270	89	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Silver, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sodium, Dissolved	56,000	71,000	64,000	63,000	30,000	24,000	27,000	33,000	33,000	30,000	29,000	33,000
Zinc, Dissolved	79	320	3,400	120	43	BDL	88	100	38	26	100	40

Analyte	MW-41S 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	MW-42S[3] 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	MW-42S DUP[3] 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Post-Close?[8]	yes				yes				yes			
Volatile Organic Compounds	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
1,1,1,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloropropene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2,3-Trichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2,3-Trichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2,4-Trichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2,4-Trimethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dibromo-3-Chloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dibromoethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,3,5-Trimethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,3-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,3-Dichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,3-Dichloropropene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,4-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2-Butanone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2-Chloroethyl vinyl ether	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2-Chlorotoluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2-Hexanone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4-Chlorotoluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4-Methyl-2-Pentanone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Acetone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Acrolein	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Acrylonitrile	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzo[a]pyrene	0.05	BDL	BDL	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzo[b]fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzo[k]fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bis(2-ethylhexyl)phthalate	—	—	—	—	—	—	—	—	—	—	—	—
Bromobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bromochloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bromodichloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bromoform	1	BDL	BDL	BDL	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bromomethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Carbon Tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL	BDL	1	1	1	BDL	1	BDL	BDL	BDL
Chloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
cis-1,2-Dichloroethene	8	6	3	3	10	10	11	4	9	10	9	4
Dibromochloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromomethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodifluoromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Hexachlorobutadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Isopropylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylene Chloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methyl-tert-butyl-ether	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Naphthalene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
n-Butylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
N-nitrosodimethylamine	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
n-Propylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Phenanthrene[5]	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
p-Isopropyltoluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
sec-Butylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Styrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
tert-Butylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene	3	3	2	2	6	5	7	4	6	4	5	4
Toluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
trans-1,2-Dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Trichloroethene	4	3	2	2	7	7	9	4	7	6	7	4
Trichlorofluoromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Vinyl Chloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Xylenes (total)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pesticides and PCBs												
4,4'-DDE	—	BDL	BDL	BDL	—	BDL	BDL	BDL	—	BDL	BDL	BDL
4,4'-DDT	—	BDL	BDL	BDL	—	BDL	BDL	BDL	—	BDL	BDL	BDL
Aldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
beta-BHC	—	BDL	BDL	BDL	—	BDL	BDL	BDL	—	BDL	BDL	BDL
Dieldrin	BDL	BDL	0.003	0.002	0.012	0.014	0.012	0.015	0.010	0.013	0.013	0.010
Endosulfan sulfate	—	—	—	—	—	—	—	—	—	—	—	—
Heptachlor	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Heptachlor Epoxide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
PCBs (total)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Metals												
Arsenic-Low Level, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Barium, Dissolved	68	62	160	56	56	100	210	34	55	66	230	35
Beryllium-Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cadmium, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	6	BDL	BDL	BDL	BDL	BDL
Chromium, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Copper, Dissolved	45	20	12	BDL	43	54	BDL	26	22	38	BDL	32
Iron, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Lead, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Manganese, Dissolved	100	45	13	11	100	100	110	61	100	97	160	55
Mercury, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nickel, Dissolved	BDL	BDL	BDL	BDL	61	60	71	46	74	81	66	52
Silver, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sodium, Dissolved	38,000	28,000	25,000	26,000	75,000	88,000	55,000	60,000	74,000	87,000	62,000	57,000
Zinc, Dissolved	69	59	96	100	220	340	260	170	220	290	370	220

Notes:

IVC	Industrial Volatilization Criteria[7]
RVC	Residential Volatilization Criteria[7]
SWPC	Surface Water Protection Criteria
NE	Not established
BDL	Below Detection Limit
Bold/Ital (yellow)	values indicate data that exceed two times both the IVC and RVC
Bold/Ital (blue)	values indicate data that exceed two times the RVC, but are below two times the IVC
Bold/Ital (pink)	values indicate data where the 95% UCL exceeds both the RVC and IVC
Bold/Ital (green)	values indicate data where the 95% UCL exceeds the RVC, but is below the IVC
Bold/Ital (grey)	values indicate data where the average exceeds the SWPC

Footnotes:
[1] Both the 95% upper confidence limit (UCL) and arithmetic mean (AVG) were calculated from samples collected at the listed GB wells, and the average of detected values for MW-42S and MW-42S (dup).
[2] Compliance with the IVC and RVC is demonstrated when the 95% UCL of the arithmetic mean of sample concentrations (for a minimum of 4 consecutive quarters) is less than or equal to the standard AND no single sample exceeds twice the standard.
Compliance with the SWPC is demonstrated when the AVG of sample concentrations is less than or equal to the standard.
[3] MW-42S and MW-42S (dup) are counted together as a single well when calculating the number of detects.
[4] MW-42S and MW-42S (dup) are counted together as a single well when calculating the number of samples.
[5] The detection limit for phenanthrene assumed to be 0.5 ug/L for the 2nd quarter 2003 for listed GB well
[6] No monitoring data were collected for MW-44B (the dedicated bailer was inoperable during the sampling event) and MW-52S (well obstruction prevented sampling) in the 4th Quarter 2
[7] Volatilization criteria shown in this table based on revisions proposed by CTDEP in March 20X
[8] Post closure monitoring wells and analytes labeled "yes" refer to wells and analytes included in regular post-closure monitoring; wells and analytes labeled "no" were included in 2003 expanded monitoring program

TABLE 1. SUMMARY OF ANALYTICAL RESULTS, GB WELLS
Expanded Monitoring
Thomaston, Connecticut
2003

RVC (ug/L)	2 x RVC (ug/L)	IVC (ug/L)	2 x IVC (ug/L)	SWPC (ug/L)	Analyte	MW-43D 1st Qtr (ug/L)
					Volatile Organic Compounds	
2	4	64	128	NE	1,1,1,2-Tetrachloroethane	BDL
6,500	13,000	16,000	32,000	62,000	1,1,1-Trichloroethane	BDL
1.8	3.6	54	108	110	1,1,2,2-Tetrachloroethane	BDL
220	440	29,000	58,000	1,260	1,1,2-Trichloroethane	BDL
3,000	6,000	41,000	82,000	NE	1,1-Dichloroethane	BDL
190	380	920	1,840	96	1,1-Dichloroethene	BDL
NE	NE	NE	NE	NE	1,1-Dichloropropene	BDL
NE	NE	NE	NE	NE	1,2,3-Trichlorobenzene	BDL
NE	NE	NE	NE	NE	1,2,3-Trichloropropane	BDL
NE	NE	NE	NE	NE	1,2,4-Trichlorobenzene	BDL
NE	NE	NE	NE	NE	1,2,4-Trimethylbenzene	BDL
NE	NE	NE	NE	NE	1,2-Dibromo-3-Chloropropane	BDL
NE	NE	NE	NE	NE	1,2-Dibromoethane	BDL
30,500	61,000	50,000	100,000	170,000	1,2-Dichlorobenzene	BDL
6.5	13	68	136	2,970	1,2-Dichloroethane	1
7.4	14.8	58	116	NE	1,2-Dichloropropane	BDL
280	560	3,900	7,800	NE	1,3,5-Trimethylbenzene	BDL
24,200	48,400	50,000	100,000	26,000	1,3-Dichlorobenzene	BDL
NE	NE	NE	NE	NE	1,3-Dichloropropane	BDL
11	22	360	720	34,000	1,3-Dichloropropene	BDL
50,000	100,000	50,000	100,000	26,000	1,4-Dichlorobenzene	BDL
NE	NE	NE	NE	NE	2,2-Dichloropropane	BDL
50,000	100,000	50,000	100,000	NE	2-Butanone	BDL
NE	NE	NE	NE	NE	2-Chloroethyl vinyl ether	BDL
NE	NE	NE	NE	NE	2-Chlorotoluene	BDL
NE	NE	NE	NE	NE	2-Hexanone	BDL
NE	NE	NE	NE	NE	4-Chlorotoluene	BDL
NE	NE	NE	NE	NE	4-Methyl-2-Pentanone	BDL
50,000	100,000	50,000	100,000	NE	Acetone	BDL
NE	NE	NE	NE	NE	Acrolein	BDL
NE	NE	NE	NE	20	Acrylonitrile	BDL
130	260	310	620	710	Benzene	1
NE	NE	NE	NE	0.3	Benzo(a)pyrene	BDL
NE	NE	NE	NE	0.3	Benzo(b)fluoranthene	BDL
NE	NE	NE	NE	0.3	Benzo(k)fluoranthene	BDL
NE	NE	NE	NE	59	Bis(2-ethylhexyl)phthalate	—
NE	NE	NE	NE	NE	Bromobenzene	BDL
NE	NE	NE	NE	NE	Bromochloromethane	BDL
2.3	4.6	73	146	NE	Bromodichloromethane	BDL
75	150	2,300	4,600	10,800	Bromoform	1
NE	NE	NE	NE	NE	Bromomethane	BDL
5.3	10.6	14	28	132	Carbon Tetrachloride	BDL
1,800	3,600	23,000	46,000	420,000	Chlorobenzene	BDL
12,000	24,000	29,000	58,000	NE	Chloroethane	BDL
26	52	62	124	14,100	Chloroform	2
390	780	5,500	11,000	NE	Chloromethane	BDL
830	1,660	11,000	22,000	NE	cis-1,2-Dichloroethene	110
NE	NE	NE	NE	1,020	Dibromochloromethane	BDL
NE	NE	NE	NE	NE	Dibromomethane	BDL
93	186	1,200	2,400	NE	Dichlorodifluoromethane	BDL
2,700	5,400	36,000	72,000	580,000	Ethylbenzene	BDL
NE	NE	NE	NE	NE	Hexachlorobutadiene	BDL
2,800	5,600	6,800	13,600	NE	Isopropylbenzene	BDL
160	320	2,200	4,400	48,000	Methylene Chloride	1
21,000	42,000	50,000	100,000	NE	Methyl-tert-butyl-ether	BDL
NE	NE	NE	NE	NE	Naphthalene	BDL
1,500	3,000	21,000	42,000	NE	n-Butylbenzene	BDL
NE	NE	NE	NE	NE	N-nitrosodimethylamine	BDL
NE	NE	NE	NE	NE	n-Propylbenzene	BDL
NE	NE	NE	NE	0.1	Phenanthrene[5]	BDL
NE	NE	NE	NE	NE	p-Isopropyltoluene	BDL
1,500	3,000	20,000	40,000	NE	sec-Butylbenzene	BDL
3,100	6,200	42,000	84,000	NE	Styrene	BDL
NE	NE	NE	NE	NE	tert-Butylbenzene	BDL
340	680	810	1,620	88	Tetrachloroethylene	30
7,100	14,200	41,000	82,000	4,000,000	Toluene	BDL
1,000	2,000	13,000	26,000	NE	trans-1,2-Dichloroethene	BDL
27	54	67	134	2,340	Trichloroethene	60
1,300	2,600	4,200	8,400	NE	Trichlorofluoromethane	BDL
1.6	3.2	52	104	15,750	Vinyl Chloride	6
8,700	17,400	48,000	96,000	NE	Xylenes (total)	BDL
					Pesticides and PCBs	
NE	NE	NE	NE	NE	4,4'-DDE	—
NE	NE	NE	NE	NE	4,4'-DDT	—
NE	NE	NE	NE	NE	Aldrin	BDL
NE	NE	NE	NE	NE	beta-BHC	—
NE	NE	NE	NE	0.1	Dieldrin	BDL
NE	NE	NE	NE	NE	Endosulfan sulfate	—
NE	NE	NE	NE	0.05	Heptachlor	BDL
NE	NE	NE	NE	0.05	Heptachlor Epoxide	BDL
NE	NE	NE	NE	0.5	PCBs (total)	BDL
					Metals	
NE	NE	NE	NE	4	Arsenic-Low Level, Dissolved	BDL
NE	NE	NE	NE	NE	Barium, Dissolved	11
NE	NE	NE	NE	4	Beryllium-Dissolved	BDL
NE	NE	NE	NE	6	Cadmium, Dissolved	BDL
NE	NE	NE	NE	110 (Cr VI)	Chromium, Dissolved	BDL
NE	NE	NE	NE	48	Copper, Dissolved	BDL
NE	NE	NE	NE	NE	Iron, Dissolved	BDL
NE	NE	NE	NE	13	Lead, Dissolved	BDL
NE	NE	NE	NE	NE	Manganese, Dissolved	1,200
NE	NE	NE	NE	0.4	Mercury, Dissolved	BDL
NE	NE	NE	NE	880	Nickel, Dissolved	160
NE	NE	NE	NE	12	Silver, Dissolved	BDL
NE	NE	NE	NE	NE	Sodium, Dissolved	130,000
NE	NE	NE	NE	123	Zinc, Dissolved	610

Notes:
IVC — Industrial Volatilization Criteria[7]
RVC — Residential Volatilization Criteria[7]
SWPC — Surface Water Protection Criteria
NE — Not established
BDL — Below Detection Limit
Bolded (yellow) values indicate data that exceed two times both the IVC and RVC
Bolded (cyan) values indicate data that exceed two times the RVC, but are below two times the IVC
Bolded (pink) values indicate data where the 95% UCL exceeds both the RVC and IVC
Bolded (green) values indicate data where the 95% UCL exceeds the RVC, but is below the IVC
Bolded (grey) values indicate data where the average exceeds the SWPC

Footnotes:
[1] Both the 95% upper confidence limit (UCL) and arithmetic mean (AVG) were calculated from samples collected at the listed GB wells, and the average of detected values for MW-42S and MW-42S (dup).
[2] Compliance with the IVC and RVC is demonstrated when the 95% UCL of the arithmetic mean of sample concentrations (for a minimum of 4 consecutive quarters) is less than or equal to the standard AND no single sample exceeds twice the standard.
Compliance with the SWPC is demonstrated when the AVG of sample concentrations is less than or equal to the standard.
[3] MW-42S and MW-42S (dup) are counted together as a single well when calculating the number of detects.
[4] MW-42S and MW-42S (dup) are counted together as a single well when calculating the number of samples.
[5] The detection limit for phenanthrene assumed to be 0.5 ug/L for the 2nd quarter 2003 for listed GB well
[6] No monitoring data were collected for MW-44B (the dedicated bailer was inoperable during the sampling event) and MW-52S (well obstruction prevented sampling) in the 4th Quarter 2
[7] Volatilization criteria shown in this table based on revisions proposed by CTDEP in March 20X
[8] Post closure monitoring wells and analytes labeled "yes" refer to wells and analytes included in regular post-closure monitoring; wells and analytes labeled "no" were included in 2003 expanded monitoring program

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, GA WELLS
Expanded Monitoring
Thomaston, Connecticut
2003

CTDEP CRITERIA (ug/L)[1,2]									WELL	MW-36				MW-37B				MW-37D				Detects						Samples						UCL		AVG	
									Post-Closure[3]	yes				no				no																				
GWPC	2 x GWPC	RVC	2 x RVC	IVC	2 x IVC	SWPC	Analyte	Post-Closure[3] Date	1st Qtr	2nd Qtr	3rd Qtr[3]	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Combined	PHERE	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Combined	PHERE	Combined	PHERE	Combined	PHERE
ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	Volatile Organic Compounds		ug/L	ug/L	ug/L		ug/L	ug/L	ug/L		ug/L	ug/L	ug/L														ug/L	ug/L	ug/L	ug/L
1	2	2	4	84	168	NE	1,1,1,2-Tetrachloroethane	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
200	400	6,500	13,000	18,000	32,000	52,000	1,1,1-Trichloroethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	1	3	3	2	3	11	7	BDL	5	BDL	4
0.5	1	1.8	3.6	54	108	110	1,1,2,2-Tetrachloroethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
5	10	220	440	29,000	58,000	1,260	1,1,2-Trichloroethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
70	140	3,000	6,000	41,000	82,000	NE	1,1-Dichloroethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	—
7	14	190	380	920	1,840	36	1,1-Dichloroethene	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	NE	NE	1,1-Dichloropropene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	NE	NE	1,2,3-Trichlorobenzene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	NE	NE	1,2,3-Trichloropropane	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
70	140	NE	NE	NE	NE	NE	1,2,4-Trichlorobenzene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	—
350	700	NE	NE	NE	NE	NE	1,2,4-Trimethylbenzene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
in review	in review	NE	NE	NE	NE	NE	1,2-Dibromo-3-Chloropropane	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
in review	in review	NE	NE	NE	NE	NE	1,2-Dibromoethane	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
600	1,200	30,500	61,000	50,000	100,000	170,000	1,2-Dichlorobenzene	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
1	2	6.5	13	88	176	2,970	1,2-Dichloroethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	2	3	3	2	3	11	7	BDL	5	BDL	4
5	10	7.4	14.8	58	116	NE	1,2-Dichloropropane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	—
350	700	280	560	3,900	7,800	NE	1,3,5-Trimethylbenzene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
600	1,200	24,200	48,400	50,000	100,000	26,000	1,3-Dichlorobenzene	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	NE	NE	1,3-Dichloropropane	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
0.5	1	11	22	360	720	34,000	1,3-dichloropropene	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
75	150	50,000	100,000	50,000	100,000	26,000	1,4-Dichlorobenzene	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	NE	NE	2,2-Dichloropropane	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
400	800	50,000	100,000	50,000	100,000	NE	2-Butanone	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	—
NE	NE	NE	NE	NE	NE	NE	2-Chloroethyl vinyl ether	no	BDL	BDL	—	BDL	—	BDL	—	—	—	BDL	—	—	0	0	0	0	0	0	1	3	—	1	5	7	BDL	—	BDL	—
NE	NE	NE	NE	NE	NE	NE	2-Chlorotoluene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	NE	NE	2-Hexanone	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	—	BDL	—
NE	NE	NE	NE	NE	NE	NE	4-Chlorotoluene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	NE	NE	4-Methyl-2-Pentanone	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	—	BDL	—
700	1,400	50,000	100,000	50,000	100,000	NE	Acetone	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	—
NE	NE	NE	NE	NE	NE	NE	Acrolein	yes	BDL	BDL	—	BDL	—	BDL	—	—	—	BDL	—	—	0	0	0	0	0	0	1	3	—	1	5	—	BDL	—	BDL	—
0.5	1	NE	NE	NE	NE	20	Acrylonitrile	yes	BDL	BDL	—	BDL	—	BDL	—	—	—	BDL	—	—	0	0	0	0	0	0	1	3	—	1	5	—	BDL	—	BDL	—
1	2	130	260	310	620	710	Benzene	yes	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
0.2	0	NE	NE	NE	NE	0	Benzo[a]pyrene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	BDL
0.1	0	NE	NE	NE	NE	0	Benzo[b]fluoranthene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	BDL
0.5	1	NE	NE	NE	NE	0	Benzo[k]fluoranthene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	BDL
2	4	NE	NE	NE	NE	39	Bis(2-ethylhexyl)phthalate	no	BDL	BDL	—	BDL	BDL	BDL	3	BDL	BDL	BDL	5	BDL	0	0	2	0	2	5	1	3	2	3	11	8	2.2	110	1.6	39
NE	NE	NE	NE	NE	NE	NE	Bromobenzene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	NE	NE	Bromochloromethane	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
0.6	1	2.3	4.6	73	146	NE	Bromodichloromethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	1	3	3	2	3	11	7	BDL	5	BDL	—
4	8	75	150	2,300	4,600	10,800	Bromoform	yes	BDL	BDL	—	BDL	1	BDL	BDL	1	2	BDL	BDL	BDL	2	0	0	0	2	0	3	3	2	3	11	7	1	BDL	0	BDL
10	20	NE	NE	NE	NE	NE	Bromomethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	—
5	10	5.3	10.6	14	28	132	Carbon Tetrachloride	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
100	200	1,600	3,600	23,000	46,000	420,000	Chlorobenzene	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
NE	NE	12,000	24,000	29,000	58,000	NE	Chloroethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	—
6	12	26	52	62	124	14,100	Chloroform	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	2	3	3	2	3	11	7	BDL	6.7	BDL	5.6
3	5	390	780	5,500	11,000	NE	Chloromethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	—
70	140	830	1,660	11,000	22,000	NE	cis-1,2-Dichloroethene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
0.5	1	NE	NE	NE	NE	1,020	Dibromochloromethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
in review	in review	NE	NE	NE	NE	NE	Dibromomethane	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
NE	NE	93	186	1,200	2,400	NE	Dichlorodifluoromethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
700	1,400	2,700	5,400	36,000	72,000	580,000	Ethylbenzene	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
0.5	1	NE	NE	NE	NE	NE	Hexachlorobutadiene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	—
30	60	2,600	5,600	6,800	13,600	NE	Isopropylbenzene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
5	10	160	320	2,200	4,400	46,000	Methylene Chloride	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	1	3	3	2	3	11	7	BDL	5.3	BDL	5.1
100	200	21,000	42,000	50,000	100,000	NE	Methyl-tert-butyl-ether	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
280	560	NE	NE	NE	NE	NE	Naphthalene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	—
61	122	1,500	3,000	21,000	42,000	NE	n-Butylbenzene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	NE	NE	N-nitrosodimethylamine	no	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	0	—	—	—	—	—	8	—	—	—	—
61	122	NE	NE	NE	NE	NE	n-Propylbenzene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
200	400	NE	NE	NE	NE	0	Pentachlorophenol	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	BDL
70	140	NE	NE	NE	NE	NE	p-Isopropyltoluene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
61	122	1,500	3,000	20,000	42,000	NE	sec-Butylbenzene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
100	200	3,100	6,200	42,000	84,000	NE	Styrene	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	—
61.0	122	NE	NE	NE	NE	NE	tert-Butylbenzene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
5	10	340	680	810	1,620	88	Tetrachloroethylene	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	2	3	3	2	3	11	7	BDL	5	BDL	4
1,000	2,000	7,100	14,200	41,000	82,000	4,000,000	Toluene	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
100	200	1,000	2,000	13,000	26,000	NE	trans-1,3-Dichloropropene	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	—	BDL	—	BDL	—
5	10	27	54	67	134	2,340	Trichloroethene	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	2	3	3	2	3	11	7	BDL	5	BDL	4.5
1,300	2,600	1,300	2,600	4,200	8,400	NE	Trichlorofluoromethane	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	1	BDL	—	BDL	—
2	4	1.9	3.2	52	104	15,750	Vinyl Chloride	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	7	BDL	BDL	BDL	BDL
530	1,060	8,700	17,400	48,000	96,000	NE	Xylenes (total)	yes	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	—
							Pesticides and PCBs																														
0.1	0.2	NE	NE	NE	NE	NE	4,4'-DDE	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	1	3	3	2	3	11	8	BDL	5	BDL	—
0.1	0.2	NE	NE	NE	NE	NE	4,4'-DDT	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	1	3	3	2	3	11	8	BDL	5	BDL	—
in review	in review	NE	NE	NE	NE	NE	Aldrin	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	1	3	3	2	3	11	8	BDL	—	BDL	—
in review	in review	NE	NE	NE	NE	NE	beta-BHC	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	1	3	3	2	3	11	8	BDL	—	BDL	—
0.002	0.004	NE	NE	NE	NE	0.10	Dieldrin	no	BDL	BDL	—	0.003	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	1	1	1	3	3	2	3	11	8	0.003	5	0.002	3
42.0	84.0	NE	NE	NE	NE	NE	Endosulfan sulfate	no	BDL	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	0	1	—	—	—	1	3	—	BDL	BDL	—
0.4	0.8	NE	NE	NE	NE	0.05	Heptachlor	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	1	3	3	2	3	11	8	BDL	5	BDL	3
0.2	0.4	NE	NE	NE	NE	0.05	Heptachlor Epoxide	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	3	BDL	BDL	BDL	BDL
0.5	1.0	NE	NE	NE	NE	0.5	PCBs (total)	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	1	3	3	2	3	11	8	BDL	125	BDL	63
							Metals																														
50	100	NE	NE	NE	NE	4	Arsenic-Low Level, Dissolved	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	BDL
1,000	2,000	NE	NE	NE	NE	NE	Barium, Dissolved	yes	28	190	—	48	—	—	—	—	—	—	—	—	1	1	0	1	3	6	1	1	—	1	3	8	190	BDL	87	—
4	8	NE	NE	NE	NE	4	Beryllium, Dissolved	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	BDL
5	10	NE	NE	NE	NE	8	Cadmium, Dissolved	yes	BDL	BDL	—	BDL	BDL	BDL	—	—	BDL	BDL	—	—	0	0	0	0	0	0	3	3	—	1	7	8	BDL	BDL	BDL	BDL
50 (Cr Total)	100	NE	NE	NE	NE	110 (Cr VI)	Chromium, Dissolved	no	BDL	BDL	—	BDL	—	—	—	—	—	—	—	—	0	0	0	0	0	0	1	1	—	1	3	8	BDL	BDL	BDL	BDL
1,300	2,600	NE	NE	NE	NE	46	Copper, Dissolved	yes	BDL	10	—	48	BDL	BDL	—	—	—	11	—	—	0	2	0	0	2	1	3	3	1	1	7	8	9	31	7	15
NE	NE	NE	NE	NE	NE	NE	Iron, Dissolved	yes	—	BDL	—	BDL	—	—	—	—	—	—	—	—	0	0	0	0	0	5	1	1	—	1	3	8	BDL	—	BDL	—
15	30	NE	NE	NE	NE	13	Lead, Dissolved	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	NE	NE	Manganese, Dissolved	yes	1,100	BDL	—	11	—	—	—	—	—	—	—	—	1	0	0	1	2	5	1	1	—	1	3	8	1,100	—	371	—
2	4	NE	NE	NE	NE	0.4	Mercury, Dissolved	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	1	3	3	2	3	11	8	BDL	2,200	BDL	441
100	200	NE	NE	NE	NE	880	Nickel, Dissolved	yes	—	BDL	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	0	1	1	—	1	3	8	BDL	30	BDL	19
36	72	NE	NE	NE	NE	12	Silver, Dissolved	no	BDL	BDL	—	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	3	3	2	3	11	8	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	NE	NE	Sodium, Dissolved	yes	79,000	33,000	—	45,000	—	—	—	—	—	—	—	—	1	1	0	1	3	6	1	1	—	1	3	6	79,000	—	52,300	—
5,000	10,000	NE	NE	NE	NE	125	Zinc, Dissolved	yes	79	19	—	47	—	—	—	—	—	—	—	—	1	1	0	1	3	6	1	1	—	1	3	8	79	200	48	91

Notes:
GWPS: Ground Water Protection Standard
IVC: Industrial Volatilization Criteria[1,2]
RVC: Residential Volatilization Criteria[1,2]
SWPC: Surface Water Protection Criteria[2]
NE: Not Established
BDL: Below Detection Limit
Bolded values indicate non-compliance with one or more of the applicable CTDEP criteria.

Footnotes:
[1] Both the 95% upper confidence limit (UCL) and arithmetic mean (AVG) were calculated from samples collected the following GA wells: MW-36, MW-37B, MW-37D.
[2] Compliance with the IVC and RVC is demonstrated when the 95% UCL of the arithmetic mean of sample concentrations (for a minimum of 4 consecutive quarters) is less than or equal to the standard AND no single sample exceeds twice the standard.
Compliance with the SWPC is demonstrated when the AVG of sample concentrations is less than or equal to the standard.
[3] No monitoring data were collected for MW-36 in the 3rd Quarter 2003 as the well was dry.
[4] Volatilization criteria shown in this table based on revisions proposed by CTDEP in March 2003.

TABLE 3. SUMMARY OF ANALYTICAL RESULTS, BACKGROUND GB WELLS
Expanded Monitoring
Thomaston, Connecticut
2003

CTDEP CRITERIA (ug/L)[1,2]							WELL	MW-32D				MW-32S				MW-55B				MW-63				Detects						Samples						UCL		AVG	
							Post-Close[3]	no				no				no				no																			
RVC	2 x RVC	IVC	2 x IVC	SWPC	Analyte	Post-Close[3]	Date	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Combined	PHERE	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Combined	PHERE	Combined	PHERE	Combined	PHERE
ug/L	ug/L	ug/L	ug/L	ug/L	Volatile Organic Compounds			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L													ug/L	ug/L	ug/L	ug/L
3	4	54	108	NE	1,1,1,2-Tetrachloroethane	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
6,500	13,000	19,000	32,000	82,000	1,1,1-Trichloroethane	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
1.8	3.6	54	108	110	1,1,2,2-Tetrachloroethane	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
220	440	29,000	58,000	1,290	1,1,2-Trichloroethane	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
3,000	6,000	41,000	82,000	NE	1,1-Dichloroethane	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	—
190	380	820	1,640	95	1,1-Dichloroethene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	1,1-Dichloropropene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	1,2,3-Trichlorobenzene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	1,2,3-Trichloropropane	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	1,2,4-Trichlorobenzene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
NE	NE	NE	NE	NE	1,2,4-Trimethylbenzene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	1,2-Dibromo-3-Chloropropane	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	1,2-Dibromoethane	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
30,500	61,000	50,000	100,000	170,000	1,2-Dichlorobenzene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
6.5	13	88	138	2,970	1,2-Dichloroethane	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
7.4	14.8	59	118	NE	1,2-Dichloropropane	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	—
260	520	3,900	7,800	NE	1,3,5-Trimethylbenzene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
24,300	48,600	50,000	100,000	28,000	1,3-Dichlorobenzene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	1,3-Dichloropropane	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
11	22	360	720	34,000	1,3-dichloropropene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
50,000	100,000	50,000	100,000	28,000	1,4-Dichlorobenzene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	2,2-Dichloropropane	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
50,000	100,000	50,000	100,000	NE	2-Butanone	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	—
NE	NE	NE	NE	NE	2-Chloroethyl vinyl ether	yes		—	BDL	—	—	—	BDL	—	—	—	BDL	—	—	—	BDL	—	—	0	0	0	0	0	0	—	4	—	—	4	0	BDL	—	BDL	—
NE	NE	NE	NE	NE	2-Chlorotoluene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	2-Hexanone	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
NE	NE	NE	NE	NE	4-Chlorotoluene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	4-Methyl-2-Pentanone	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
50,000	100,000	50,000	100,000	NE	Acetone	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	—
NE	NE	NE	NE	NE	Acrolein	yes		—	BDL	—	—	—	BDL	—	—	—	BDL	—	—	—	BDL	—	—	0	0	0	0	0	0	—	4	—	—	4	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	Acrylonitrile	yes		—	BDL	—	—	—	BDL	—	—	—	BDL	—	—	—	BDL	—	—	0	0	0	0	0	0	—	4	—	—	4	—	BDL	—	BDL	—
130	260	310	620	710,000	Benzene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
NE	NE	NE	NE	0.30	Benzo[a]pyrene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.04	0	0	1	0	1	1	4	4	4	4	19	0	0.07	—	0.05	4
NE	NE	NE	NE	0.30	Benzo[b]fluoranthene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	4
NE	NE	NE	NE	0.30	Benzo[k]fluoranthene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	4
NE	NE	NE	NE	59	Bis(2-ethylhexyl)phthalate	no		3	BDL	4	BDL	BDL	BDL	3	BDL	BDL	BDL	5	BDL	BDL	BDL	6	BDL	1	0	4	0	5	4	4	4	4	4	19	0	3	—	2	4
NE	NE	NE	NE	NE	Bromobenzene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	Bromochloromethane	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
2.3	4.6	73	146	NE	Bromodichloromethane	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
78	150	2,300	4,600	10,800	Bromoform	yes		1	BDL	BDL	BDL	2	BDL	BDL	BDL	1	BDL	BDL	BDL	2	BDL	BDL	BDL	4	0	0	0	4	0	4	4	4	4	19	0	1	BDL	1	BDL
NE	NE	NE	NE	NE	Bromomethane	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
5.3	10.6	14	28	132	Carbon Tetrachloride	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
1,800	3,600	23,000	46,000	420,000	Chlorobenzene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
12,000	24,000	29,000	58,000	NE	Chloroethane	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
26	52	52	104	14,100	Chloroform	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
390	780	5,500	11,000	NE	Chloromethane	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
930	1,860	11,000	22,000	NE	cis-1,2-Dichloroethene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	1,000	Dibromochloromethane	yes		BDL	BDL	BDL	BDL	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	BDL	BDL	BDL	2	0	0	0	2	0	4	4	4	4	19	—	0.45	—	0.38	—
NE	NE	NE	NE	NE	Dibromomethane	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
93	186	1,200	2,400	NE	Dichlorodifluoromethane	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
2,700	5,400	36,000	72,000	580,000	Ethylbenzene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
NE	NE	NE	NE	NE	Hexachlorobutadiene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
2,600	5,600	6,800	13,600	NE	Isopropylbenzene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
160	320	2,200	4,400	48,000	Methylene Chloride	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	5	BDL	4
21,000	42,000	50,000	100,000	NE	Methyl-tert-butyl-ether	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	Naphthalene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
1,500	3,000	21,000	42,000	NE	n-Butylbenzene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	NE	N-nitrosodimethylamine	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
NE	NE	NE	NE	NE	n-Propylbenzene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
NE	NE	NE	NE	0.05	Phenanthrene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	4
NE	NE	NE	NE	NE	p-Isopropyltoluene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
1,500	3,000	20,000	40,000	NE	sec-Butylbenzene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
3,100	6,200	42,000	84,000	NE	Styrene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	—
NE	NE	NE	NE	NE	tert-Butylbenzene	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
340	680	910	1,820	55	Tetrachloroethylene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
7,100	14,200	41,000	82,000	4,000,000	Toluene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
1,000	2,000	13,000	26,000	NE	trans-1,2-Dichloroethene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
27	54	67	134	2,340	Trichloroethylene	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
1,300	2,600	4,200	8,400	NE	Trichlorofluoromethane	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	—	BDL	—	BDL	—
1.8	3.2	104	208	15,750	Vinyl Chloride	yes		BDL	BDL	52	104	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	BDL
8,700	17,400	48,000	96,000	NE	Xylenes (total)	yes		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	BDL	BDL	—
					Pesticides and PCBs																																		
NE	NE	NE	NE	NE	4,4'-DDE	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
NE	NE	NE	NE	NE	4,4'-DDT	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
NE	NE	NE	NE	NE	Aldrin	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
NE	NE	NE	NE	NE	beta-BHC	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	—
NE	NE	NE	NE	0.10	Dieldrin	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	1	1	4	4	4	4	19	0	0.001	—	0.001	BDL
NE	NE	NE	NE	NE	Endosulfan sulfate	no		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	0	—	—	—	—	—	4	—	—	—	—
NE	NE	NE	NE	0.05	Heptachlor	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	BDL
NE	NE	NE	NE	0.05	Heptachlor Epoxide	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	BDL
NE	NE	NE	NE	0.53	PCBs (total)	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	63
					Metals																																		
NE	NE	NE	NE	4	Arsenic-Low Level, Dissolved	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	2	4	4	4	4	19	0	BDL	—	BDL	9
NE	NE	NE	NE	NE	Barium, Dissolved	yes		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	2	—	—	—	—	—	0	—	—	—	—
NE	NE	NE	NE	4	Beryllium-Dissolved	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	BDL
NE	NE	NE	NE	5	Cadmium, Dissolved	yes		BDL	BDL	—	—	BDL	BDL	—	—	BDL	BDL	—	—	BDL	BDL	—	—	0	0	0	0	0	0	4	4	—	—	8	0	BDL	—	BDL	BDL
NE	NE	NE	NE	110 (Cr VI)	Chromium, Dissolved	yes		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	2	4	—	—	—	—	0	—	—	—	167
NE	NE	NE	NE	48	Copper, Dissolved	yes		BDL	15	BDL	—	BDL	13	BDL	—	BDL	12	BDL	—	BDL	17	—	—	0	4	0	0	4	6	4	4	4	—	12	0	17	—	10	467
NE	NE	NE	NE	NE	Iron, Dissolved	yes		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	0	—	—	—	—	—	0	—	—	—	—
NE	NE	NE	NE	13	Lead, Dissolved	no		300	BDL	BDL	BDL	8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	2	0	0	0	2	2	4	4	4	4	19	0	80	—	39	55
NE	NE	NE	NE	NE	Manganese, Dissolved	yes		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	6	—	—	—	—	—	0	—	—	—	—
NE	NE	NE	NE	0	Mercury, Dissolved	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	BDL
NE	NE	NE	NE	880	Nickel, Dissolved	yes		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	3	—	—	—	—	—	0	—	—	—	109
NE	NE	NE	NE	12	Silver, Dissolved	no		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0	0	0	0	0	0	4	4	4	4	19	0	BDL	—	BDL	BDL
NE	NE	NE	NE	NE	Sodium, Dissolved	yes		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	6	—	—	—	—	—	0	—	—	—	—
NE	NE	NE	NE	123	Zinc, Dissolved	yes		—	25	130	—	—	30	190	—	—	21	110	—	—	180	170	—	0	4	4	0	8	8	—	4	4	—	8	0	—	—	107	363

Notes:
IVC — Industrial Volatilization Criteria
RVC — Residential Volatilization Criteria
SWPC — Surface Water Protection Criteria
NE — Not established
BDL — Below Detection Limit
Bolded values indicate non-compliance with one or more of the applicable CTDEP criteria.

Footnotes:
[1] Both the 95% upper confidence limit (UCL) and arithmetic mean (AVG) were calculated from samples collected at the listed GB wells.
[2] Compliance with the IVC and RVC is demonstrated when the 95% UCL of the arithmetic mean of sample concentrations (for a minimum of 4 consecutive quarters) is less than or equal to the standard AND no single sample exceeds twice the standard.
Compliance with the SWPC is demonstrated when the AVG of sample concentrations is less than or equal to the standard.
[3] Volatilization criteria shown in this table based on revisions proposed by CTDEP in March 2003.

TABLE 4. SUMMARY OF ANALYTICAL RESULTS, BRANCH BROOK (SURFACE WATER
Expanded Monitoring
Thomaston, Connecticut
3rd Quarter 2003

CTDEP Class A Surface Water Criteria[1,2]				Branch Brook Sample	SW-DN				SW-UP			
Aquatic Life Criteria		Human Health Criteria										
Acute	Chronic	Consumption of Organisms Only	Consumption of Water and Organisms	Date	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
ug/L	ug/L	ug/L	ug/L	Volatile Organic Compounds	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
NE	NE	NE	NE	1,1,1,2-Tetrachloroethane	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	1,1,1-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	11	0.17	1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	42	0.60	1,1,2-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	1,1-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	3	0.1	1,1-Dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	1,1-Dichloropropene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	1,2,3-Trichlorobenzene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	1,2,3-Trichloropropane	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	940	70	1,2,4-Trichlorobenzene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	1,2,4-Trimethylbenzene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	1,2-Dibromo-3-Chloropropane	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	1,2-Dibromoethane	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	17,000	2,700	1,2-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	99	0.38	1,2-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	39	0.52	1,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	1,3,5-Trimethylbenzene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	2,600	400	1,3-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	1,3-Dichloropropane	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	1,700	10	1,3-dichloropropene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	2,600	400	1,4-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	2,2-Dichloropropane	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	2-Butanone	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	2-Chloroethyl vinyl ether	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	2-Chlorotoluene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	2-Hexanone	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	4-Chlorotoluene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	4-Methyl-2-Pentanone	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	Acetone	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	780	320	Acrolein	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	0.66	0.06	Acrylonitrile	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	71	1.20	Benzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	0.05	0.00	Benzo[a]pyrene	---	---	---	---	---	---	---	---
NE	NE	0.49	0.04	Benzo[b]fluoranthene	---	---	---	---	---	---	---	---
NE	NE	0.49	0.04	Benzo[k]fluoranthene	---	---	---	---	---	---	---	---
NE	NE	NE	NE	Bis(2-ethylhexyl)phthalate	---	---	---	---	---	---	---	---
NE	NE	NE	NE	Bromobenzene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	Bromochloromethane	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	Bromodichloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	360	4	Bromoform	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	Bromomethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	4	0.25	Carbon Tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	21,000	100	Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	Chloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	470	6	Chloroform	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	Chloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	cis-1,2-Dichloroethene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	Dibromochloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	Dibromomethane	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	Dichlorodifluoromethane	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	29,000	700	Ethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	50	0.44	Hexachlorobutadiene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	Isopropylbenzene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	1,600	5	Methylene Chloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	Methyl-tert-butyl-ether	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	20,513	677	Naphthalene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	n-Butylbenzene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	16	5	N-nitrosodimethylamine	---	---	---	---	---	---	---	---
NE	NE	NE	NE	n-Propylbenzene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	49	4	Phenanthrene	---	---	---	---	---	---	---	---
NE	NE	NE	NE	p-Isopropyltoluene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	sec-Butylbenzene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	Styrene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	NE	NE	tert-Butylbenzene	BDL	BDL	---	---	BDL	BDL	---	---
NE	NE	9	0.80	Tetrachloroethylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	200,000	1,000	Toluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	140,000	100	trans-1,2-Dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	81	3	Trichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	Trichlorofluoromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	525	2	Vinyl Chloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NE	NE	NE	NE	Xylenes (total)	BDL	BDL	---	---	BDL	BDL	---	---
				Pesticides, PCBs								
NE	NE	0.0006	0.0006	4,4'-DDE	---	---	---	---	---	---	---	---
0.55	0.001	0.0006	0.0006	4,4'-DDT	---	---	---	---	---	---	---	---
1.5	NE	0.0001	0.0001	Aldrin	---	---	---	---	---	---	---	---
NE	NE	NE	NE	beta-BHC	---	---	---	---	---	---	---	---
0.24	0.056	0.0001	0.0001	Dieldrin	---	---	---	---	---	---	---	---
0.26	0.038	0.0002	0.0002	Heptachlor	---	---	---	---	---	---	---	---
0.26	0.038	0.0001	0.0001	Heptachlor Epoxide	---	---	---	---	---	---	---	---
NE	0.014	0.0002	0.0002	PCBs (total)	---	---	---	---	---	---	---	---
				Metals								
340 (Arsenic III)	150 (Arsenic III)	0.021 (Arsenic III)	0.011 (Arsenic III)	Arsenic-Low Level, Dissolved	---	---	---	---	---	---	---	---
NE	NE	NE	NE	Barium, Dissolved	14	18	150	15	15	16	180	12
NE	NE	0.1300	0.0077	Beryllium-Dissolved	---	---	---	---	---	---	---	---
2.02	1.35	10,769	5	Cadmium, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16 (Cr VI)	11 (Cr VI)	2019 (Cr VI)	100 (Cr VI)	Chromium, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.3	4.8	NE	1,300	Copper, Dissolved	BDL	10	BDL	BDL	BDL	11	BDL	BDL
NE	NE	NE	NE	Iron, Dissolved	67	85	160	150	67	49	150	100
30	1.2	NE	15	Lead, Dissolved	---	---	---	---	---	---	---	---
NE	NE	NE	NE	Manganese, Dissolved	55	91	19	BDL	56	48	27	BDL
1.4	0.77	0.05	0.05	Mercury, Dissolved	---	---	---	---	---	---	---	---
260.5	28.9	4,600	610	Nickel, Dissolved	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1.02	NE	107,692	175	Silver, Dissolved	---	---	---	---	---	---	---	---
NE	NE	NE	NE	Sodium, Dissolved	12,000	9,200	12,000	12,000	13,000	8,500	12,000	11,000
65	65	68,740	9,100	Zinc, Dissolved	28	BDL	52	37	42	BDL	71	69

Notes:
CTDEP Connecticut Department of Environmental Protectio
NE Not establishec
BDL Below Detection Limi

Footnotes:
[1] Samples were collected from Branch Brook, a Class B/A surface water and therefore is required to meet CTDEP Class A surface water quality standards (footnote
[2] Class A Surface Waters are designated for: habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry and agricul (State of Connecticut Surface Water Quality Standards, Effective December 17, 2002)
[3] Biological integrity is impaired when the ambient concentration exceeds the acute value on more than 5% of the year and the chronic value more than 50% of the ye
[4] The criteria for ammonia (mg/L as N) vary in response to ambient surface water temperature (T, degrees C) and pH. Biological integrity is considered impaired wl

a. The one-hour average concentration of total ammonia exceeds:
$[0.275 / 1 + 10^{(7.204-pH)}] + [39/ (1 + 10^{(pH-7.204)})]$ when salmonids are present
- or -
$[0.411 / 1 + 10^{(7.204-pH)}] + [58.4/ (1 + 10^{(pH-7.204)})]$ when salmonids are absent

b. The four-day average concentration of total ammonia exceeds 2.5 times the value obtained from the formula (c) below.

c. The 30-day average concentration of total ammonia exceeds
$[0.0577 / 1 + 10^{(7.688 - pH)}] + [2.487 / 1 + 10^{(pH-7.688)}] \times [MIN (2.85, 1.45(10^{0.028(25-T)})]$ when early life stages are present
- or -
$[0.0577 / 1 + 10^{(7.688 - pH)}] + [2.487 / 1 + 10^{(pH-7.688)}] \times [1.45(10^{0.028 (25 - MAX (T,7))})]$ when early life stages are absent

TABLE 5. SUMMARY OF ANALYTICAL RESULTS, QA/QC SAMPLES
Expanded Monitoring
Thomaston, Connecticut
2003

Sample Description	Equipment Blank				Field Blank				Trip Blank			
Date	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Volatile Organic Compounds	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
1,1,1,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloropropene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
1,2,3-Trichlorobenzene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
1,2,3-Trichloropropane	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
1,2,4-Trichlorobenzene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
1,2,4-Trimethylbenzene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
1,2-Dibromo-3-Chloropropane	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
1,2-Dibromoethane	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
1,2-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,3,5-Trimethylbenzene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
1,3-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,3-Dichloropropane	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
1,3-dichloropropene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,4-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
2-Butanone	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
2-Chloroethyl vinyl ether	BDL	BDL	BDL	BDL	---	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2-Chlorotoluene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
2-Hexanone	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
4-Chlorotoluene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
4-Methyl-2-Pentanone	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Acetone	10	BDL	BDL	BDL	9	---	---	---	BDL	BDL	BDL	---
Acrolein	BDL	BDL	BDL	BDL	---	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Acrylonitrile	BDL	BDL	BDL	BDL	---	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzo[a]pyrene	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
Benzo[b]fluoranthene	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
Benzo[k]fluoranthene	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
Bis(2-ethylhexyl)phthalate	---	BDL	6	2	---	---	---	---	---	---	---	---
Bromobenzene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Bromochloromethane	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Bromodichloromethane	2	BDL	BDL	4	2	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bromoform	1	BDL	BDL	1	1	BDL	BDL	BDL	BDL	BDL	2	BDL
Bromomethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Carbon Tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	30	1	15	3	30	BDL	12	BDL	BDL	BDL	BDL	BDL
Chloromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
cis-1,2-Dichloroethene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Dibromochloromethane	BDL	BDL	BDL	4	BDL	BDL	BDL	BDL	BDL	BDL	2	BDL
Dibromomethane	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Dichlorodifluoromethane	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Ethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Hexachlorobutadiene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Isopropylbenzene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Methylene Chloride	11	2	2	BDL	10	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methyl-tert-butyl-ether	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Naphthalene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
n-Butylbenzene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
N-nitrosodimethylamine	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
n-Propylbenzene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Phenanthrene	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
p-Isopropyltoluene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
sec-Butylbenzene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Styrene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
tert-Butylbenzene	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Tetrachloroethylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Toluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
trans-1,2-Dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Trichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Trichlorofluoromethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Vinyl Chloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Xylenes (total)	BDL	BDL	BDL	BDL	BDL	---	---	---	BDL	BDL	BDL	---
Pesticides, PCBs												
4,4'-DDE	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
4,4'-DDT	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
Aldrin	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
beta-BHC	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
Dieldrin	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
Heptachlor	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
Heptachlor Epoxide	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
PCBs (total)	---	BDL	BDL	BDL	---	---	---	---	---	---	---	---
Metals												
Arsenic-Low Level, Water	BDL	BDL	BDL	BDL	BDL	---	---	---	---	---	---	---
Barium, Water	BDL	BDL	7	130	BDL	13	8	130	---	---	---	---
Beryllium, Water	BDL	BDL	BDL	BDL	BDL	---	---	---	---	---	---	---
Cadmium, Water	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	---	---	---	---
Chromium, Water	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	---	---	---	---
Copper, Water	BDL	BDL	BDL	81	BDL	10	BDL	80	---	---	---	---
Iron, Water	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	---	---	---	---
Lead-Low Level, Water	BDL	BDL	BDL	BDL	BDL	---	---	---	---	---	---	---
Manganese, Water	BDL	BDL	BDL	20	BDL	BDL	BDL	23	---	---	---	---
Mercury, Water	BDL	BDL	BDL	BDL	BDL	---	---	---	---	---	---	---
Nickel, Water	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	---	---	---	---
Silver, Water	BDL	BDL	BDL	BDL	BDL	---	---	---	---	---	---	---
Sodium, Water	430	160	1,400	20,000	640	690	1,200	20,000	---	---	---	---
Zinc, Water	19	BDL	51	130	5	BDL	27	48	---	---	---	---
Total Parameters Detected	**7**	**3**	**6**	**10**	**7**	**3**	**4**	**5**	**0**	**0**	**2**	**0**

Notes:
BDL Below Detection Limit
--- Not Tested