Attachment 2
Detailed Risk and Hazard Results for Exposure to Groundwater

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Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

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Table 2-1
AMCO Summary Statistics and Exposure Point Concentrations for Groundwater Exposure Area
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value	Maximum Non-detected Value	Location of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Exposure Point Concentration	EPC Basis	Final Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
GrabShallowData combined with 2005-2006 ShallowZoneData															
Metals															
Aluminum	38	51	75	ug/L	215	62700	200	400	BPZ-01	3560	9820	12143	97.5% Chebyshev (Mean, Sd) UCL	12143	97.5% Chebyshev (Mean, Sd) UCL
Antimony	6	51	12	ug/L	1.7	4.7	1	4	BPZ-01	1.44	0.744	1.62	95% Student's-t UCL	1.62	95% Student's-t UCL
Arsenic	50	51	98	ug/L	1.3	1430	2	2	RMW-09-15	118	248	334	97.5% Chebyshev (Mean, Sd) UCL	334	97.5% Chebyshev (Mean, Sd) UCL
Barium	51	51	100	ug/L	17.1	828	NA	NA	RMW-02-13	140	177	179	95% H-UCL	179	95% H-UCL
Beryllium	8	51	16	ug/L	0.09	1.5	0.5	2	BPZ-01	0.622	0.307	0.809	95% Chebyshev (Mean, Sd) UCL	0.809	95% Chebyshev (Mean, Sd) UCL
Boron	18	18	100	ug/L	359	9560	NA	NA	BPZ-01	3010	2640	4307	95% Approximate Gamma UCL	4307	95% Approximate Gamma UCL
Cadmium	18	51	35	ug/L	0.03	5.8	1	2	BPZ-01	0.805	0.995	1.41	95% Chebyshev (Mean, Sd) UCL	1.41	95% Chebyshev (Mean, Sd) UCL
Chromium	36	51	71	ug/L	2.2	187	2	4	BPZ-01	15.9	33.3	21.7	95% H-UCL	21.7	95% H-UCL
Chromium (VI)	1	6	17	ug/L	0.35	0.35	0.2	1	RMW-06-15	0.275	0.199	0.63	95% Chebyshev (Mean, Sd) UCL	0.35	Maximum Result
Cobalt	47	51	92	ug/L	0.35	40.8	1	1	RMW-10-15	7.27	8.75	9.52	95% Approximate Gamma UCL	9.52	95% Approximate Gamma UCL
Copper	49	51	96	ug/L	1.8	1650	2	4	BMW-08	60.8	232	264	97.5% Chebyshev (Mean, Sd) UCL	264	97.5% Chebyshev (Mean, Sd) UCL
Iron	50	51	98	mg/L	0.103	105	0.1	0.1	BPZ-01	13.8	22.9	61.4	95% H-UCL	61.4	95% H-UCL
Lead	48	51	94	ug/L	0.23	1050	1	1	BPZ-01	41.9	154	50.9	95% H-UCL	50.9	95% H-UCL
Manganese	51	51	100	ug/L	44.2	13600	NA	NA	RMW-09-15	3410	3640	4534	95% Approximate Gamma UCL	4534	95% Approximate Gamma UCL
Mercury	17	51	33	ug/L	0.029	0.83	0.03	0.2	RMW-02-13	0.103	0.108	0.169	95% Chebyshev (Mean, Sd) UCL	0.169	95% Chebyshev (Mean, Sd) UCL
Molybdenum	4	18	22	ug/L	0.78	8.6	5	10	RMW-04-15	3.42	2.16	5.64	95% Chebyshev (Mean, Sd) UCL	5.64	95% Chebyshev (Mean, Sd) UCL
Nickel	51	51	100	ug/L	3.1	376	NA	NA	RMW-10-15	43.1	66.6	58.4	95% H-UCL	58.4	95% H-UCL
Selenium	22	51	43	ug/L	0.59	174	5	10	BMW-08	8.84	24.9	24.1	95% Chebyshev (Mean, Sd) UCL	24.1	95% Chebyshev (Mean, Sd) UCL
Silver	1	51	2	ug/L	0.12	0.12	0.5	2	RMW-01-17	0.625	0.241	0.682	95% Student's-t UCL	0.12	Maximum Result
Thallium	1	51	2	ug/L	0.05	0.05	1	2	RMW-10-15	0.628	0.239	0.685	95% Student's-t UCL	0.05	Maximum Result
Vanadium	46	51	90	ug/L	1.4	186	1	2	BPZ-01	13.9	28.4	38.8	97.5% Chebyshev (Mean, Sd) UCL	38.8	97.5% Chebyshev (Mean, Sd) UCL
Zinc	48	48	100	ug/L	5.6	6870	NA	NA	RMW-10-15	372	1270	2200	99% Chebyshev (Mean, Sd) UCL	2200	99% Chebyshev (Mean, Sd) UCL
Cyanide	3	6	50	ug/L	2.8	62.9	10	10	RMW-03-15	14.4	23.8	111	99% Chebyshev (Mean, Sd) UCL	62.9	Maximum Result
Pesticides/PCBs															
4,4'-DDD	20	44	45	ug/L	0.007	17	0.02	0.02	RMW-02-13	1.18	3.52	6.47	99% Chebyshev (Mean, Sd) UCL	6.47	99% Chebyshev (Mean, Sd) UCL
4,4'-DDE	17	44	39	ug/L	0.00022	2	0.02	0.02	RMW-02-13	0.132	0.388	0.714	99% Chebyshev (Mean, Sd) UCL	0.714	99% Chebyshev (Mean, Sd) UCL
4,4'-DDT	4	43	9	ug/L	0.0015	0.18	0.02	0.2	RMW-02-13	0.0186	0.0319	0.0398	95% Chebyshev (Mean, Sd) UCL	0.0398	95% Chebyshev (Mean, Sd) UCL
Aldrin	8	44	18	ug/L	0.014	1.4	0.01	0.01	RMW-02-13	0.0686	0.234	0.419	99% Chebyshev (Mean, Sd) UCL	0.419	99% Chebyshev (Mean, Sd) UCL
alpha-BHC	3	44	7	ug/L	0.0049	0.3	0.01	0.1	MW-12	0.0153	0.0454	0.0452	95% Chebyshev (Mean, Sd) UCL	0.0452	95% Chebyshev (Mean, Sd) UCL
alpha-Chlordane	4	43	9	ug/L	0.0035	0.01	0.01	0.1	RMW-01-17	0.00766	0.00962	0.014	95% Chebyshev (Mean, Sd) UCL	0.01	Maximum Result
Atrazine	1	50	2	ug/L	2	2	0.1	50	RMW-02-13	1.82	4.91	8.73	99% Chebyshev (Mean, Sd) UCL	2	Maximum Result
beta-BHC	4	44	9	ug/L	0.0075	1.1	0.01	0.1	MW-12	0.0343	0.165	0.282	99% Chebyshev (Mean, Sd) UCL	0.282	99% Chebyshev (Mean, Sd) UCL
delta-BHC	1	43	2	ug/L	0.012	0.012	0.01	0.1	RMW-03-15	0.0087	0.0116	0.0164	95% Chebyshev (Mean, Sd) UCL	0.012	Maximum Result
Diazinon	1	17	6	ug/L	0.69	0.69	0.05	0.5	MW-12	0.0832	0.167	0.26	95% Chebyshev (Mean, Sd) UCL	0.26	95% Chebyshev (Mean, Sd) UCL
Dieldrin	14	43	33	ug/L	0.0014	2.8	0.02	0.02	RMW-02-13	0.204	0.568	1.07	99% Chebyshev (Mean, Sd) UCL	1.07	99% Chebyshev (Mean, Sd) UCL
Endosulfan I	2	43	5	ug/L	0.022	0.127	0.01	0.1	MW-12	0.0103	0.0206	0.0239	95% Chebyshev (Mean, Sd) UCL	0.0239	95% Chebyshev (Mean, Sd) UCL
Endosulfan sulfate	5	44	11	ug/L	0.0011	0.077	0.02	0.2	RMW-02-13	0.0165	0.0217	0.0307	95% Chebyshev (Mean, Sd) UCL	0.0307	95% Chebyshev (Mean, Sd) UCL
Endrin	2	44	5	ug/L	0.0013	0.7	0.02	0.2	MW-12	0.0324	0.106	0.102	95% Chebyshev (Mean, Sd) UCL	0.102	95% Chebyshev (Mean, Sd) UCL
Endrin aldehyde	2	43	5	ug/L	0.0037	0.14	0.02	0.2	RMW-02-13	0.0179	0.0273	0.036	95% Chebyshev (Mean, Sd) UCL	0.036	95% Chebyshev (Mean, Sd) UCL
Endrin ketone	4	43	9	ug/L	0.00042	0.17	0.02	0.2	BMW-03	0.0207	0.0331	0.0709	99% Chebyshev (Mean, Sd) UCL	0.0709	99% Chebyshev (Mean, Sd) UCL
gamma-BHC	4	44	9	ug/L	0.0064	0.36	0.01	0.1	MW-12	0.0171	0.0542	0.0527	95% Chebyshev (Mean, Sd) UCL	0.0527	95% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	5	44	11	ug/L	0.0013	0.12	0.01	0.1	MW-12	0.0119	0.0227	0.0268	95% Chebyshev (Mean, Sd) UCL	0.0268	95% Chebyshev (Mean, Sd) UCL
Heptachlor	1	43	2	ug/L	0.0016	0.0016	0.01	0.1	RMW-03-15	0.00844	0.0116	0.0162	95% Chebyshev (Mean, Sd) UCL	0.0016	Maximum Result
Heptachlor epoxide	3	44	7	ug/L	0.00011	0.01	0.01	0.1	MW-12	0.00837	0.0115	0.016	95% Chebyshev (Mean, Sd) UCL	0.01	Maximum Result
Methoxychlor	1	44	2	ug/L	0.12	0.12	0.1	1	MW-12	0.0861	0.115	0.162	95% Chebyshev (Mean, Sd) UCL	0.12	Maximum Result
Aroclor-1260	2	43	5	ug/L	4.3	6.3	0.2	2	RMW-02-13	0.372	1.13	1.12	95% Chebyshev (Mean, Sd) UCL	1.12	95% Chebyshev (Mean, Sd) UCL
SVOCs/VOCs															
1,2-Dichlorobenzene	27	106	25	ug/L	0.7	7800	0.5	250	RGW-12	95.7	758	828	99% Chebyshev (Mean, Sd) UCL	828	99% Chebyshev (Mean, Sd) UCL
1,3-Dichlorobenzene	12	105	11	ug/L	0.14	360	0.5	400	RGW-12	6.23	40	30.6	97.5% Chebyshev (Mean, Sd) UCL	30.6	97.5% Chebyshev (Mean, Sd) UCL
1,4-Dioxane (p-dioxane)	40	78	51	ug/L	0.1	780	0.1	20000	RGW-16	369	1280	1810	99% Chebyshev (Mean, Sd) UCL	780	Maximum Result
2,4,6-Trichlorophenol	4	51	8	ug/L	0.2	10	0.04	50	RMW-02-13	2.1	4.96	6.44	97.5% Chebyshev (Mean, Sd) UCL	6.44	97.5% Chebyshev (Mean, Sd) UCL
2,4-Dimethylphenol	5	51	10	ug/L	110	300	5	20	RMW-02-13	25.4	71.2	87.7	97.5% Chebyshev (Mean, Sd) UCL	87.7	97.5% Chebyshev (Mean, Sd) UCL
2-Chlorophenol	3	51	6	ug/L	3	4.3	5	100	RMW-01-17	5.16	7.81	9.93	95% Chebyshev (Mean, Sd) UCL	4.3	Maximum Result
2-Methylnaphthalene	9	51	18	ug/L	2.1	860	5	20	RMW-02-13	50	164	194	97.5% Chebyshev (Mean, Sd) UCL	194	97.5% Chebyshev (Mean, Sd) UCL

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Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value	Maximum Non-detected Value	Location of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Exposure Point Concentration	EPC Basis	Final Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
2-Methylphenol	6	51	12	ug/L	110	540	5	20	MW-12	44.4	122	151	97.5% Chebyshev (Mean, Sd) UCL	151	97.5% Chebyshev (Mean, Sd) UCL
2-Nitroaniline	4	50	8	ug/L	0.3	10	0.1	200	RMW-02-13	10.5	19	37.2	99% Chebyshev (Mean, Sd) UCL	10	Maximum Result
3,4-Methylphenol	1	1	100	ug/L	840	840	NA	NA	MW-12	NA	NA	NA		840	Maximum Result
4-Chloro-3-methylphenol	3	51	6	ug/L	58	180	5	100	MW-12	11.4	30	37.6	97.5% Chebyshev (Mean, Sd) UCL	37.6	97.5% Chebyshev (Mean, Sd) UCL
4-Methylphenol	5	50	10	ug/L	310	960	5	20	RMW-02-13	62.3	191	231	97.5% Chebyshev (Mean, Sd) UCL	231	97.5% Chebyshev (Mean, Sd) UCL
Acenaphthene	4	50	8	ug/L	1.1	2	1	100	RMW-01-17	5.03	7.95	9.93	95% Chebyshev (Mean, Sd) UCL	2	Maximum Result
Benzo(a)anthracene	5	51	10	ug/L	0.04	0.9	0.01	50	RMW-02-13	1.77	4.87	8.55	99% Chebyshev (Mean, Sd) UCL	0.9	Maximum Result
Benzo(a)pyrene	6	51	12	ug/L	0.01	0.4	0.01	50	RMW-02-13	1.76	4.87	8.55	99% Chebyshev (Mean, Sd) UCL	0.4	Maximum Result
Benzo(b)fluoranthene	4	51	8	ug/L	0.02	0.5	0.01	50	RMW-02-13	1.76	4.87	8.55	99% Chebyshev (Mean, Sd) UCL	0.5	Maximum Result
Benzo(g,h,i)perylene	7	51	14	ug/L	0.01	0.2	0.01	50	RMW-02-13	1.75	4.88	8.54	99% Chebyshev (Mean, Sd) UCL	0.2	Maximum Result
Benzo(k)fluoranthene	3	51	6	ug/L	0.03	0.46	0.01	50	RMW-02-13	1.76	4.87	8.55	99% Chebyshev (Mean, Sd) UCL	0.46	Maximum Result
Biphenyl (diphenyl)	1	49	2	ug/L	1.3	1.3	5	100	RMW-02-13	5.23	7.97	10.2	95% Chebyshev (Mean, Sd) UCL	1.3	Maximum Result
bis(2-Chloroethoxy)methane	3	51	6	ug/L	0.02	0.2	0.1	50	BPZ-01	1.77	4.87	8.55	99% Chebyshev (Mean, Sd) UCL	0.2	Maximum Result
bis(2-Ethylhexyl)phthalate	5	51	10	ug/L	1	120	0.1	50	RMW-05-15	5.11	17.2	20.1	97.5% Chebyshev (Mean, Sd) UCL	20.1	97.5% Chebyshev (Mean, Sd) UCL
Caprolactam	1	49	2	ug/L	2.4	2.4	5	100	BMW-08	5.25	7.96	10.2	95% Chebyshev (Mean, Sd) UCL	2.4	Maximum Result
Carbazole	5	34	15	ug/L	0.1	39	0.04	1	RMW-02-13	1.55	6.88	13.3	99% Chebyshev (Mean, Sd) UCL	13.3	99% Chebyshev (Mean, Sd) UCL
Chrysene	3	51	6	ug/L	0.03	0.42	0.1	100	RMW-02-13	4.3	8.19	15.7	99% Chebyshev (Mean, Sd) UCL	0.42	Maximum Result
Dibenz(a,h)anthracene	1	51	2	ug/L	0.02	0.02	0.01	50	RMW-09-15	1.74	4.88	8.54	99% Chebyshev (Mean, Sd) UCL	0.02	Maximum Result
Diethylphthalate	1	50	2	ug/L	1	1	1	100	RMW-06-15	5.13	7.92	10	95% Chebyshev (Mean, Sd) UCL	1	Maximum Result
Di-n-butyl phthalate	1	50	2	ug/L	2.1	2.1	1	100	RMW-02-13	5.15	7.91	10	95% Chebyshev (Mean, Sd) UCL	2.1	Maximum Result
Fluoranthene	1	51	2	ug/L	1.1	1.1	1	100	RMW-02-13	5.08	7.85	9.87	95% Chebyshev (Mean, Sd) UCL	1.10	Maximum Result
Fluorene	1	50	2	ug/L	1	1	1	100	RMW-01-17	5.08	7.93	9.97	95% Chebyshev (Mean, Sd) UCL	1	Maximum Result
Hexachloroethane	3	51	6	ug/L	0.04	1	0.1	50	RMW-02-13	1.78	4.87	8.56	99% Chebyshev (Mean, Sd) UCL	1	Maximum Result
Indeno(1,2,3-c,d)pyrene	4	51	8	ug/L	0.01	0.2	0.01	50	RMW-02-13	1.75	4.87	8.54	99% Chebyshev (Mean, Sd) UCL	0.2	Maximum Result
Naphthalene	26	100	26	ug/L	0.2	670	0.5	20	RMW-02-13	38.7	115	153	99% Chebyshev (Mean, Sd) UCL	153	99% Chebyshev (Mean, Sd) UCL
Nitrobenzene	3	51	6	ug/L	1	2	0.1	50	RMW-01-17	1.91	4.84	8.66	99% Chebyshev (Mean, Sd) UCL	2	Maximum Result
N-Nitrosodi-n-propylamine	3	51	6	ug/L	0.3	2	0.01	50	RMW-01-17	1.82	4.86	8.59	99% Chebyshev (Mean, Sd) UCL	2	Maximum Result
N-Nitrosodiphenylamine	1	50	2	ug/L	1.2	1.2	5	100	RMW-02-13	5.17	7.9	10	95% Chebyshev (Mean, Sd) UCL	1.2	Maximum Result
Pentachlorophenol	7	51	14	ug/L	0.2	85	0.5	50	RMW-02-13	3.87	12.3	14.7	97.5% Chebyshev (Mean, Sd) UCL	14.7	97.5% Chebyshev (Mean, Sd) UCL
Phenanthrene	2	51	4	ug/L	2	2.6	1	100	RMW-02-13	5.05	7.85	9.84	95% Chebyshev (Mean, Sd) UCL	2.6	Maximum Result
Phenol	8	51	16	ug/L	1.1	190	5	20	MW-12	19.2	47	60.3	97.5% Chebyshev (Mean, Sd) UCL	60.3	97.5% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethane	56	106	53	ug/L	0.2	3200	0.5	10	MW-12	140	478	602	99% Chebyshev (Mean, Sd) UCL	602	99% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethene	23	105	22	ug/L	0.3	250	0.5	500	RMW-02-13	13.6	51.3	44.9	97.5% Chebyshev (Mean, Sd) UCL	44.9	97.5% Chebyshev (Mean, Sd) UCL
1,1,1-Trichloroethane	6	106	6	ug/L	1.4	960	0.5	500	MW-12	34.7	158	130	97.5% Chebyshev (Mean, Sd) UCL	130.3	97.5% Chebyshev (Mean, Sd) UCL
1,1,2,2-Tetrachloroethane	3	106	3	ug/L	0.09	18	0.5	400	RMW-02-13	2.72	19.5	14.5	97.5% Chebyshev (Mean, Sd) UCL	14.5	97.5% Chebyshev (Mean, Sd) UCL
1,1,2-Trichloroethane	5	106	5	ug/L	3.1	18	0.5	400	MW-12	2.91	19.5	14.7	97.5% Chebyshev (Mean, Sd) UCL	14.7	97.5% Chebyshev (Mean, Sd) UCL
1,2-Dibromo-3-chloropropane	1	102	1	ug/L	2.4	2.4	0.05	100	RGW-16	1.69	5.73	5.24	97.5% Chebyshev (Mean, Sd) UCL	2.4	Maximum Result
1,2-Dichloroethane	8	106	8	ug/L	0.4	30	0.5	400	MW-12	3.44	19.9	15.5	97.5% Chebyshev (Mean, Sd) UCL	15.5	97.5% Chebyshev (Mean, Sd) UCL
1,2-Dichloropropane	6	106	6	ug/L	0.2	5.1	0.5	400	MW-12	2.63	19.4	14.4	97.5% Chebyshev (Mean, Sd) UCL	5.1	Maximum Result
1,2,3-Trichlorobenzene	8	89	9	ug/L	0.2	20	0.5	25	RGW-12	1.12	2.79	3	97.5% Chebyshev (Mean, Sd) UCL	3.0	97.5% Chebyshev (Mean, Sd) UCL
1,2,4-Trichlorobenzene	8	105	8	ug/L	0.3	85	0.5	400	RGW-12	3.92	21.3	16.9	97.5% Chebyshev (Mean, Sd) UCL	16.9	97.5% Chebyshev (Mean, Sd) UCL
1,2,4-Trimethylbenzene	20	50	40	ug/L	0.2	650	0.5	10	MW-12	77.2	189	343	99% Chebyshev (Mean, Sd) UCL	343	99% Chebyshev (Mean, Sd) UCL
1,3,5-Trimethylbenzene	13	50	26	ug/L	0.2	200	0.5	10	MW-12	22.1	56.4	101	99% Chebyshev (Mean, Sd) UCL	101	99% Chebyshev (Mean, Sd) UCL
1,4-Dichlorobenzene	22	105	21	ug/L	0.2	3500	0.5	400	RGW-12	38.3	342	247	97.5% Chebyshev (Mean, Sd) UCL	247	97.5% Chebyshev (Mean, Sd) UCL
2-Chlorotoluene	2	50	4	ug/L	0.2	7.4	0.5	25	RGW-12	0.962	2.18	2.89	97.5% Chebyshev (Mean, Sd) UCL	2.89	97.5% Chebyshev (Mean, Sd) UCL
2-Hexanone	2	83	2	ug/L	8.9	9.6	4	400	RMW-02-13	8.63	24.9	20.5	95% Chebyshev (Mean, Sd) UCL	9.60	Maximum Result
2,2-Dichloropropane	1	50	2	ug/L	0.5	0.5	0.5	25	RMW-02-13	0.82	1.97	2.04	95% Chebyshev (Mean, Sd) UCL	0.5	Maximum Result
Acetone	32	106	30	ug/L	2.2	3300	4	5000	RMW-02-13	150	539	477	97.5% Chebyshev (Mean, Sd) UCL	477	97.5% Chebyshev (Mean, Sd) UCL
Benzene	49	106	46	ug/L	0.16	4000	0.5	500	MW-12	69.3	398	454	99% Chebyshev (Mean, Sd) UCL	454	99% Chebyshev (Mean, Sd) UCL
Bromoform	1	105	1	ug/L	12	12	0.5	400	RMW-02-13	2.57	19.5	14.5	97.5% Chebyshev (Mean, Sd) UCL	12	Maximum Result
Carbon disulfide	6	84	7	ug/L	0.19	3.1	0.5	400	MW-12	3.09	21.8	17.9	97.5% Chebyshev (Mean, Sd) UCL	3.1	Maximum Result
Carbon tetrachloride	1	106	1	ug/L	0.3	0.3	0.5	400	RGW-11	2.55	19.4	14.3	97.5% Chebyshev (Mean, Sd) UCL	0.3	Maximum Result
Chlorobenzene	27	106	25	ug/L	0.2	6700	0.5	400	RGW-12	110	665	752	99% Chebyshev (Mean, Sd) UCL	752	99% Chebyshev (Mean, Sd) UCL
Chloroethane	15	106	14	ug/L	0.2	680	0.5	250	RGW-03	22.5	89	108	99% Chebyshev (Mean, Sd) UCL	108	99% Chebyshev (Mean, Sd) UCL
Chloroform	3	105	3	ug/L	0.35	4.4	0.5	400	RGW-12	2.57	19.5	14.5	97.5% Chebyshev (Mean, Sd) UCL	4.4	Maximum Result
Chloromethane	8	106	8	ug/L	0.2	7.4	0.5	400	MW-12	2.71	19.4	14.5	97.5% Chebyshev (Mean, Sd) UCL	7.4	Maximum Result
cis-1,2-Dichloroethene	58	106	55	ug/L	0.28	90000	0.5	10	MW-12	2890	12700	15118	99% Chebyshev (Mean, Sd) UCL	15118	99% Chebyshev (Mean, Sd) UCL
cis-1,3-Dichloropropene	2	106	2	ug/L	0.74	4.2	0.5	400	RGW-16	2.59	19.4	14.4	97.5% Chebyshev (Mean, Sd) UCL	4.2	Maximum Result

Table 2-1
AMCO Summary Statistics and Exposure Point Concentrations for Groundwater Exposure Area
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value	Maximum Non-detected Value	Location of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Exposure Point Concentration	EPC Basis	Final Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Cyclohexane	5	66	8	ug/L	0.21	16	0.5	400	RMW-02-13	4.07	24.7	23.0	97.5% Chebyshev (Mean, Sd) UCL	16	Maximum Result
Ethyl tert-butyl ether (ETBE)	1	79	1	ug/L	1.2	1.2	0.5	200	MW-12	7.46	15.1	18.1	97.5% Chebyshev (Mean, Sd) UCL	1.2	Maximum Result
Ethylbenzene	24	106	23	ug/L	0.2	4000	0.5	500	MW-12	86.7	424	496	99% Chebyshev (Mean, Sd) UCL	496	99% Chebyshev (Mean, Sd) UCL
Isopropyl ether	1	6	17	ug/L	430	430	4	8	RMW-02-13	73.7	175	783	99% Chebyshev (Mean, Sd) UCL	430	Maximum Result
Isopropylbenzene (cumene)	18	106	17	ug/L	0.2	46	0.5	500	RGW-12	9.07	34	29.7	97.5% Chebyshev (Mean, Sd) UCL	29.7	97.5% Chebyshev (Mean, Sd) UCL
m,p-Xylene	22	56	39	ug/L	0.2	4000	0.5	5	RMW-02-13	192	664	1075	99% Chebyshev (Mean, Sd) UCL	1075	99% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	18	105	17	ug/L	0.82	3800	4	100	RMW-02-13	132	574	482	97.5% Chebyshev (Mean, Sd) UCL	482	97.5% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	8	84	10	ug/L	1200	40000	4	5000	MW-12	755	4440	5570	99% Chebyshev (Mean, Sd) UCL	5570	99% Chebyshev (Mean, Sd) UCL
Methyl tert-butyl ether	21	106	20	ug/L	0.2	83	0.5	400	RMW-02-13	6.95	25.5	22.4	97.5% Chebyshev (Mean, Sd) UCL	22.4	97.5% Chebyshev (Mean, Sd) UCL
Methylcyclohexane	3	66	5	ug/L	4.8	36	0.5	400	RMW-02-13	6.08	29	28.4	97.5% Chebyshev (Mean, Sd) UCL	28.4	97.5% Chebyshev (Mean, Sd) UCL
Methylene chloride	20	106	19	ug/L	0.39	110	0.5	25	RMW-02-13	2.51	10.9	9.11	97.5% Chebyshev (Mean, Sd) UCL	9.11	97.5% Chebyshev (Mean, Sd) UCL
n-Butylbenzene	7	50	14	ug/L	0.4	23	0.5	10	MW-12	1.9	4.77	6.12	97.5% Chebyshev (Mean, Sd) UCL	6.12	97.5% Chebyshev (Mean, Sd) UCL
n-Propylbenzene	13	50	26	ug/L	0.5	150	0.5	10	RGW-12	13	30.7	56.1	99% Chebyshev (Mean, Sd) UCL	56.1	99% Chebyshev (Mean, Sd) UCL
o-Xylene	19	56	34	ug/L	0.2	1600	0.5	10	RMW-02-13	100	300	499	99% Chebyshev (Mean, Sd) UCL	499	99% Chebyshev (Mean, Sd) UCL
p-Cymene (p-Isopropyltoluene)	12	50	24	ug/L	0.4	210	0.5	10	MW-12	15.7	44.6	78.6	99% Chebyshev (Mean, Sd) UCL	78.6	99% Chebyshev (Mean, Sd) UCL
sec-Butylbenzene	10	50	20	ug/L	0.3	13	0.5	25	RMW-01-17	2.09	4.02	5.64	97.5% Chebyshev (Mean, Sd) UCL	5.64	97.5% Chebyshev (Mean, Sd) UCL
Styrene	2	105	2	ug/L	23	37	0.5	400	MW-12	3.11	19.9	15.2	97.5% Chebyshev (Mean, Sd) UCL	15.2	97.5% Chebyshev (Mean, Sd) UCL
tert-Butyl alcohol	20	63	32	ug/L	10	260	10	1000	BPZ-01	53.2	98.2	130	97.5% Chebyshev (Mean, Sd) UCL	130	97.5% Chebyshev (Mean, Sd) UCL
tert-Butylbenzene	4	50	8	ug/L	0.7	2.1	0.5	25	RMW-02-13	0.916	1.98	2.14	95% Chebyshev (Mean, Sd) UCL	2.10	Maximum Result
Tetrachloroethene	11	106	10	ug/L	0.15	12	0.5	400	RGW-12	2.75	19.4	14.5	97.5% Chebyshev (Mean, Sd) UCL	12	Maximum Result
Toluene	31	106	29	ug/L	0.2	31000	0.5	110	RMW-02-13	1600	5440	6856	99% Chebyshev (Mean, Sd) UCL	6856	99% Chebyshev (Mean, Sd) UCL
trans-1,2-Dichloroethene	30	106	28	ug/L	0.16	4000	0.5	500	MW-12	63.4	401	451	99% Chebyshev (Mean, Sd) UCL	451	99% Chebyshev (Mean, Sd) UCL
trans-1,3-Dichloropropene	2	106	2	ug/L	0.36	4.1	0.5	500	RMW-10-15	4.94	30.9	23.7	97.5% Chebyshev (Mean, Sd) UCL	4.1	Maximum Result
Trichloroethene	34	106	32	ug/L	0.2	880	0.5	100	RGW-09	11.9	85.5	63.8	97.5% Chebyshev (Mean, Sd) UCL	63.8	97.5% Chebyshev (Mean, Sd) UCL
Vinyl chloride	41	106	39	ug/L	0.2	8400	0.5	400	MW-12	378	1470	1799	99% Chebyshev (Mean, Sd) UCL	1799	99% Chebyshev (Mean, Sd) UCL
Xylenes, total	10	50	20	ug/L	0.25	4600	0.5	0.5	RMW-02-13	267	948	1600	99% Chebyshev (Mean, Sd) UCL	1600	99% Chebyshev (Mean, Sd) UCL
Dioxins/Furans															
1,2,3,4,6,7,8-HpCDD	4	6	67	pg/L	33.4	634	1.76	11.2	RMW-02-13	222	302	2910	95% Adjusted Gamma UCL	634	Maximum Result
1,2,3,4,6,7,8-HpCDF	2	6	33	pg/L	115	147	0.835	19.7	RMW-02-13	46.7	66.2	557	95% Adjusted Gamma UCL	147	Maximum Result
1,2,3,4,7,8,9-HpCDF	3	6	50	pg/L	1.83	14.1	1.25	15.7	RMW-02-13	6.11	5.85	10.9	95% Student's-t UCL	10.9	95% Student's-t UCL
1,2,3,4,7,8-HxCDD	2	6	33	pg/L	2.77	5.3	1.45	10.7	RMW-02-13	2.64	2.22	4.46	95% Student's-t UCL	4.46	95% Student's-t UCL
1,2,3,4,7,8-HxCDF	2	6	33	pg/L	1.79	15.7	0.839	13.4	RMW-02-13	4.49	5.95	16.4	95% Approximate Gamma UCL	15.7	Maximum Result
1,2,3,6,7,8-HxCDD	3	6	50	pg/L	2.44	20	1.45	9	RMW-02-13	7.51	8.5	14.5	95% Student's-t UCL	14.5	95% Student's-t UCL
1,2,3,6,7,8-HxCDF	2	6	33	pg/L	1.35	4.56	0.886	3.86	RMW-02-13	1.73	1.51	2.97	95% Student's-t UCL	2.97	95% Student's-t UCL
1,2,3,7,8,9-HxCDD	2	6	33	pg/L	4.89	13	1.47	10.6	RMW-02-13	4.27	4.77	8.19	95% Student's-t UCL	8.19	95% Student's-t UCL
1,2,3,7,8,9-HxCDF	1	6	17	pg/L	6.5	6.5	1.18	7.3	RMW-02-13	2.22	2.4	6.05	95% Approximate Gamma UCL	6.05	95% Approximate Gamma UCL
1,2,3,7,8-PeCDD	2	6	33	pg/L	1.13	4.3	1.02	3.8	RMW-02-13	1.59	1.41	3.44	95% Approximate Gamma UCL	3.44	95% Approximate Gamma UCL
1,2,3,7,8-PeCDF	2	6	33	pg/L	1.37	4.3	1.32	3.8	RMW-02-13	1.67	1.37	3.36	95% Approximate Gamma UCL	3.36	95% Approximate Gamma UCL
2,3,4,6,7,8-HxCDF	1	6	17	pg/L	6.6	6.6	0.869	6.27	RMW-02-13	2.31	2.37	4.26	95% Student's-t UCL	4.26	95% Student's-t UCL
2,3,4,7,8-PeCDF	2	6	33	pg/L	1.71	5.5	1.28	9.72	RMW-02-13	2.6	2.06	4.29	95% Student's-t UCL	4.29	95% Student's-t UCL
2,3,7,8-TCDF	1	6	17	pg/L	4.25	4.25	2.33	4.6	RMW-02-13	2.05	1.14	3.27	95% Approximate Gamma UCL	3.27	95% Approximate Gamma UCL
OCDD	4	6	67	pg/L	312	10500	10.5	35.2	RMW-02-13	3710	5270	62100	95% Adjusted Gamma UCL	10500	Maximum Result
OCDF	4	6	67	pg/L	33.4	1050	3.4	21	RMW-02-13	383	519	5090	95% Adjusted Gamma UCL	1050	Maximum Result

Notes:
EPC = exposure point concentration
a) For a discussion of reporting limits, please see Section 6.1.2 Reporting Limits, of Appendix H, Human Health Risk Assessment.
b) one-half the detection limit is used for non-detects to calculate this statistic.

Table 2-2
Groundwater Exposure Assumptions - Future Residents
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Parameter		Units	Reasonable Maximum Exposure (RME) Scenario: Residential Adult		Residential Child		Intake Equation
Ingestion of Groundwater							
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		Chemical specific		$\frac{C_{gw} \times IngR \times EF \times ED}{BW \times AT}$
Ingestion Rate	IngR	L/day	2	EPA, 1989	1	EPA, 1989	
Exposure Frequency	EF	days/year	350	EPA, 1989	350	EPA, 1989	
Exposure Duration	ED	years	24	EPA, 1989	6	EPA, 1989	
Body Weight	BW	kg	70	EPA, 1989	15	EPA, 2004[b]	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	8,760	EPA, 1989	2,190	EPA, 1989	
Inhalation of VOCs in Groundwater							
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		Chemical specific		$\frac{C_{gw} \times InhR \times VF \times ET \times EF \times ED}{BW \times AT}$
Inhalation Rate	InhR	m^3/day	20	EPA, 1989	10	EPA, 1989	
Volatilization Factor	VF	L/m^3	0.5	EPA, 2004[b]	0.5	EPA, 2004[b]	
Exposure Time	ET	hours/day	24	EPA, 1989	24	EPA, 1989	
Exposure Frequency	EF	days/year	350	EPA, 1989	350	EPA, 1989	
Exposure Duration	ED	years	24	EPA, 1989	6	EPA, 1989	
Body Weight	BW	kg	70	EPA, 1989	15	EPA, 1989	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	8,760	EPA, 1989	2,190	EPA, 1989	
Dermal Contact with Groundwater While Showering							
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		Chemical specific		$\frac{DA_{event} \times SA \times EF \times ED}{BW \times AT}$
Absorbed dose per event per area of skin exposed	DA_{event}	mg/cm^2-event	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	Where for Organics:
Event Duration	t_{event}	hours/event	0.58	EPA, 2004[a]	1	EPA, 2004[a]	
Time to reach steady state	t*	hours	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	
Skin Permeability Constant for chemicals in groundwater	K_P	cm/hour	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	If $t_{event} > t^*$
Lag time per event	τ	hours/event	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	$DA_{event} = FA \times K_p \times C_{gw} \left[\frac{t_{event}}{1+B} + 2\tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$
Dimensionless coefficient	B	cm/hour	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	
Fraction Absorbed	FA	unitless	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	
Skin Surface Area	SA	cm^2/day	18,000	EPA, 1997	6,600	EPA, 2004[a]	If $t_{event} < t^*$
Exposure Frequency	EF	days/year	350	EPA, 1989	350	EPA, 1989	$DA_{event} = 2\ FA \times K_p \times C_{gw} \sqrt{\frac{6\tau \times t_{event}}{\Pi}}$
Exposure Duration	ED	years	24	EPA, 1989	6	EPA, 1989	
Body Weight	BW	kg	70	EPA, 1997	15	EPA, 1989	For Inorganics:
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	$DA_{event} = K_p \times C_{gw} \times t_{event}$
Averaging Time for noncarcinogens	AT_{NC}	days	8,760	EPA, 1989	2,190	EPA, 1989	

Notes:
AT_C = 70 years x 365 days/year
AT_{NC} = ED (years) x 365 days/year
RME = Reasonable maximum exposure.
EPA, 1989: Risk Assessment Guidance for Superfund (RAGS) Volume I Human Health Evaluation Manual Part A.
EPA, 1997: Exposure Factors Handbook. Volume I, General Factors. August.
EPA, 2004[a]: RAGS Part E, Supplemental Guidance for Dermal Risk Assessment.
EPA, 2004[b]: User's Guide and Background Technical Document for Preliminary Remediation Goals Table. Region 9. October.

Table 2-3
Groundwater Exposure Assumptions - Trench Workers
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Reasonable Maximum Exposure (RME) Scenario			Intake Equation
		Units	Trench Worker		
Inhalation of VOCs in Groundwater While Working in a Trench					
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		
Concentration (VOCs) in breathing zone	C_{air}	ug/m^3	Chemical specific	CalEPA, 2006	
Total emission rate	Ei	mg/s	Chemical specific	CalEPA, 2006	$\frac{C_{air} \times InhR \times ET \times EF \times ED \times CF_1}{BW \times AT}$
Inhalation Rate	InhR	m^3/hour	2.5	CalEPA, 2005	
Assumed velocity of air in the trench	u	m/s	0.152	CalEPA, 2006	
Mixing Height (adult breating zone)	H	m	1.83	CalEPA, 2006	
Width of trench perpendicular to wind direction	W	m	3.05	CalEPA, 2006	
Overall mass transfer coefficient	Ki	cm/s	Chemical specific	CalEPA, 2006	
Bottom area of the trench covered with contaminated water	A_w	cm^2	65,032	CalEPA, 2006	$C_{air} = \frac{E_i \times CF_2}{u \times H \times W}$
Exposure Time	ET	hours/day	8	CalEPA, 2005	
Exposure Frequency	EF	days/year	90	CalEPA, 2006	
Exposure Duration	ED	years	1	CalEPA, 2006	
Conversion Factor$_1$	CF_1	mg/ug	0.001		
Conversion Factor$_2$	CF_2	ug/mg	1000		$E_i = K_i \times A_w \times C_{gw}$
Body Weight	BW	kg	70	EPA, 1989	
Averaging Time for carcinogens	ATc	days	25,550	EPA, 1989	
Averaging Time for noncarcinogens	ATnc	days	365	CalEPA, 2006	
Dermal Contact with Groundwater While Working in a Trench					
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		
Absorbed dose per event per area of skin exposed	DA_{event}	mg/cm^2-event	Chemical specific	EPA, 2004	$\frac{DA_{event} \times SA \times EF \times ED}{BW \times AT}$
Event Duration	t_{event}	hours/event	8	CalEPA, 2005	For Organics:
Time to reach steady state	t*	hours	Chemical specific	EPA, 2004	
Skin Permeability Constant for chemicals in groundwater	K_P	cm/hour	Chemical specific	EPA, 2004	If t_{event} < t*
Lag time per event	τ	hours/event	Chemical specific	EPA, 2004	$DA_{event} = FA \times K_p C_{gw} \left[\frac{t_{event}}{1+B} + 2\tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$
Dimensionless coefficient	B	cm/hour	Chemical specific	EPA, 2004	
Fraction Absorbed	FA	unitless	Chemical specific	EPA, 2004	
Skin Surface Area	SA	cm^2/day	5,700	CalEPA, 2005	If t_{event} > t*
Exposure Frequency	EF	days/year	90	CalEPA, 2006	$DA_{event} = 2\ FA \times K_p \times C_{gw} \sqrt{\frac{6\tau \times t_{event}}{\Pi}}$
Exposure Duration	ED	years	1	CalEPA, 2006	
Body Weight	BW	kg	70	EPA, 1989	For Inorganics:
Averaging Time for carcinogens	ATc	days	25,550	EPA, 1989	$DA_{event} = K_p \times C_{gw} \times t_{event}$
Averaging Time for noncarcinogens	ATnc	days	365	CalEPA, 2006	

Notes:
RME = Reasonable maximum exposure.
EPA, 1989: Risk Assessment Guidance for Superfund (RAGS) Volume I Human Health Evaluation Manual Part A.
EPA, 2004: RAGS Part E, Supplemental Guidance for Dermal Risk Assessment.
CalEPA, DTSC, HERD, 2005: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Military Facilities.
CalEPA, DTSC, HERD, 2006: Memorandum: Risk Assessment Issues, PAHs and Exposure Routes…,T.Taros, Staff Toxicologist, DTSC, 8810 Cal Center Drive, Sacramento, CA. August 11.

Table 2-4
Dermal Permeability Constants and Volatile Compounds - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Kp[a] (cm/hr)	Volatility[b]
Metals		
Aluminum	1.0E-03	NV
Antimony	1.0E-03	NV
Arsenic	1.0E-03	NV
Barium	1.0E-03	NV
Beryllium	1.0E-03	NV
Boron	1.0E-03	NV
Cadmium	1.0E-03	NV
Chromium	1.0E-03	NV
Chromium (VI)	2.0E-03	NV
Cobalt	4.0E-04	NV
Copper	1.0E-03	NV
Iron	1.0E-03	NV
Lead	1.0E-04	NV
Manganese	1.0E-03	NV
Mercury	1.0E-03	NV
Molybdenum	1.0E-03	NV
Nickel	2.0E-04	NV
Selenium	1.0E-03	NV
Silver	6.0E-04	NV
Thallium	1.0E-03	NV
Vanadium	1.0E-03	NV
Zinc	6.0E-04	NV
Cyanide	1.0E-03	NV
Pesticides/PCBs		
4,4'-DDD	1.8E-01	NV
4,4'-DDE	1.6E-01	NV
4,4'-DDT	2.7E-01	NV
Aldrin	1.4E-03	NV
alpha-BHC	1.1E-02	NV
alpha-Chlordane	3.4E-02	NV
Atrazine	5.2E-03	NV
beta-BHC	1.1E-02	NV
delta-BHC	1.1E-02	NV
Diazinon	1.0E-02	NV
Dieldrin	1.2E-02	NV
Endosulfan I	2.8E-03	NV
Endosulfan II	1.8E-03	NV
Endosulfan sulfate	NA	NV
Endrin	1.2E-02	NV
Endrin aldehyde	NA	NV
Endrin ketone	NA	NV
gamma-BHC	1.1E-02	NV
gamma-Chlordane	3.4E-02	NV
Heptachlor	8.6E-03	NV
Heptachlor epoxide	2.0E-02	NV
Methoxychlor	4.1E-02	NV

Table 2-4
Dermal Permeability Constants and Volatile Compounds - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Kp[a] (cm/hr)	Volatility[b]
Aroclor-1260	7.5E-01	NV
SVOCs/VOCs		
1,4-Dioxane (p-dioxane)	3.3E-04	NV
2,4,6-Trichlorophenol	3.5E-02	NV
2,4-Dimethylphenol	1.1E-02	NV
2-Chlorophenol	8.0E-03	V
2-Methylnaphthalene	8.9E-02	V
2-Methylphenol	7.7E-03	NV
2-Nitroaniline	4.4E-03	NV
3,4-methylphenol	7.7E-03	NV
4-Chloro-3-methylphenol	NA	NV
4-Methylphenol	7.7E-03	NV
Acenaphthene	1.3E-01	V
Acenaphthylene	1.4E-01	V
Anthracene	2.3E-01	V
Benzo(a)anthracene	4.7E-01	NV
Benzo(a)pyrene	7.0E-01	NV
Benzo(b)fluoranthene	7.0E-01	NV
Benzo(g,h,i)perylene	1.1E+00	NV
Benzo(k)fluoranthene	6.6E-01	NV
Biphenyl (Diphenyl)	9.2E-02	NV
bis(2-Chloroethoxy)methane	1.2E-03	V
bis(2-Ethylhexyl)phthalate	2.5E-02	NV
Bromoform	2.2E-03	V
Caprolactam	1.0E-03	NV
Carbazole	5.2E-02	NV
Chrysene	4.7E-01	NV
Dibenz(a,h)anthracene	1.5E+00	NV
Diethylphthalate	3.9E-03	NV
Di-n-butyl phthalate	2.4E-02	NV
Fluoranthene	2.2E-01	NV
Fluorene	1.7E-01	V
Hexachloroethane	3.0E-02	NV
Indeno(1,2,3-c,d)pyrene	1.0E+00	NV
Naphthalene	4.7E-02	V
Nitrobenzene	5.4E-03	V
N-Nitrosodi-n-propylamine	2.3E-03	NV
N-Nitrosodiphenylamine	2.6E-02	NV
Pentachlorophenol	3.9E-01	NV
Phenanthrene	1.4E-01	NV
Pyrene	3.2E-01	V
1,1,1-Trichloroethane	1.3E-02	V
1,1,2,2-Tetrachloroethane	6.9E-03	V
1,1,2-Trichloroethane	6.4E-03	V
1,1-Dichloroethane	6.7E-03	V
1,1-Dichloroethene	1.2E-02	V
1,2,3-Trichlorobenzene	NA	V

Table 2-4
Dermal Permeability Constants and Volatile Compounds - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Kp[a] (cm/hr)	Volatility[b]
1,2,4-Trichlorobenzene	6.6E-02	V
1,2,4-Trimethylbenzene	8.4E-02	V
1,2-Dibromo-3-chloropropane	6.8E-03	V
1,2-Dichlorobenzene	4.1E-02	V
1,2-Dichloroethane	6.7E-03	V
1,2-Dichloropropane	7.8E-03	V
1,3,5-Trimethylbenzene	6.1E-02	V
1,3-Dichlorobenzene	5.8E-02	V
1,4-Dichlorobenzene	4.2E-02	V
2-Chlorotoluene	NA	V
2-Hexanone	3.5E-03	V
2,2-Dichloropropane	NA	V
Acetone	5.2E-04	V
Benzene	1.5E-02	V
Carbon disulfide	1.7E-02	V
Carbon tetrachloride	1.6E-02	V
Chlorobenzene	2.8E-02	V
Chloroethane	6.1E-03	V
Chloroform	6.8E-03	V
Chloromethane	3.3E-03	V
cis-1,2-Dichloroethene	1.1E-02	V
cis-1,3-Dichloropropene	4.3E-03	V
Cyclohexane	1.0E-01	V
Ethyl tert-butyl ether (ETBE)	NA	V
Ethylbenzene	4.9E-02	V
Isopropyl ether	NA	V
Isopropylbenzene (cumene)	8.8E-02	V
Methyl acetate	8.0E-04	V
Methyl ethyl ketone	9.6E-04	V
Methyl isobutyl ketone	2.7E-03	V
Methyl tert-butyl ether	2.1E-03	V
Methylcyclohexane	1.1E-01	V
Methylene chloride	3.5E-03	V
n-Butylbenzene	NA	V
n-Propylbenzene	NA	V
p-Cymene (p-isopropyltoluene)	NA	V
Phenol	4.3E-03	NV
sec-Butylbenzene	NA	V
Styrene	3.7E-02	V
tert-Butylbenzene	NA	V
tert-Butyl alcohol	NA	V
Tetrachloroethene	3.3E-02	V
Toluene	3.1E-02	V
trans-1,2-Dichloroethene	7.7E-03	V
trans-1,3-Dichloropropene	4.3E-03	V
Trichloroethene	1.2E-02	V
Vinyl chloride	5.6E-03	V

Table 2-4
Dermal Permeability Constants and Volatile Compounds - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Kp[a] (cm/hr)	Volatility[b]
m,p-Xylene	5.3E-02	V
o-Xylene	7.0E-02	V
Xylenes, total	5.3E-02	V
Dioxans/Furans		
1,2,3,4,6,7,8-HpCDD	8.1E-01	NV
1,2,3,4,6,7,8-HpCDF	8.1E-01	NV
1,2,3,4,7,8,9-HpCDF	8.1E-01	NV
1,2,3,4,7,8-HxCDD	8.1E-01	NV
1,2,3,4,7,8-HxCDF	8.1E-01	NV
1,2,3,6,7,8-HxCDD	8.1E-01	NV
1,2,3,6,7,8-HxCDF	8.1E-01	NV
1,2,3,7,8,9-HxCDD	8.1E-01	NV
1,2,3,7,8,9-HxCDF	8.1E-01	NV
1,2,3,7,8-PeCDD	8.1E-01	NV
1,2,3,7,8-PeCDF	8.1E-01	NV
2,3,4,6,7,8-HxCDF	8.1E-01	NV
2,3,4,7,8-PeCDF	8.1E-01	NV
2,3,7,8-TCDF	8.1E-01	NV
OCDF	8.1E-01	NV
OCDD	8.1E-01	NV

Notes:
NA = no Kp value available
NV = Nonvolatile, V = Volatile
[a] EPA RAGS Part E, 2004
[b] EPA Region 9 PRGs, 2004

Table 2-5
Exposure Point Concentrations for Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis
Metals			
Aluminum	mg/L	9.40E+00	97.5% Chebyshev (Mean, Sd) UCL
Antimony	mg/L	1.51E-03	95% Student's-t UCL
Arsenic	mg/L	2.87E-01	95% H-UCL
Barium	mg/L	1.68E-01	95% H-UCL
Beryllium	mg/L	7.64E-04	95% Chebyshev (Mean, Sd) UCL
Boron	mg/L	4.31E+00	95% Approximate Gamma UCL
Cadmium	mg/L	1.26E-03	95% Chebyshev (Mean, Sd) UCL
Chromium	mg/L	3.57E-02	97.5% Chebyshev (Mean, Sd) UCL
Chromium (VI)	mg/L	3.50E-04	Maximum Result
Cobalt	mg/L	8.89E-03	95% Approximate Gamma UCL
Copper	mg/L	4.66E-02	95% H-UCL
Iron	mg/L	5.35E+01	95% Chebyshev (MVUE) UCL
Lead	mg/L	4.00E-02	95% H-UCL
Manganese	mg/L	4.33E+00	95% Approximate Gamma UCL
Mercury	mg/L	1.21E-04	95% Student's-t UCL
Molybdenum	mg/L	5.64E-03	95% Chebyshev (Mean, Sd) UCL
Nickel	mg/L	5.46E-02	95% H-UCL
Selenium	mg/L	1.89E-02	95% Chebyshev (Mean, Sd) UCL
Silver	mg/L	1.20E-04	Maximum Result
Thallium	mg/L	5.00E-05	Maximum Result
Vanadium	mg/L	3.19E-02	97.5% Chebyshev (Mean, Sd) UCL
Zinc	mg/L	3.03E-01	95% H-UCL
Cyanide	mg/L	6.29E-02	Maximum Result
Pesticides/PCBs			
4,4'-DDD	mg/L	5.00E-03	99% Chebyshev (Mean, Sd) UCL
4,4'-DDE	mg/L	7.76E-04	97.5% Chebyshev (Mean, Sd) UCL
4,4'-DDT	mg/L	1.80E-04	Maximum Result
Aldrin	mg/L	4.05E-04	97.5% Chebyshev (Mean, Sd) UCL
alpha-BHC	mg/L	3.00E-04	Maximum Result
alpha-Chlordane	mg/L	3.34E-04	97.5% Chebyshev (Mean, Sd) UCL
Atrazine	mg/L	2.00E-03	Maximum Result
beta-BHC	mg/L	3.69E-04	97.5% Chebyshev (Mean, Sd) UCL
delta-BHC	mg/L	1.60E-04	Maximum Result
Diazinon	mg/L	2.60E-04	95% Chebyshev (Mean, Sd) UCL
Dieldrin	mg/L	9.24E-04	97.5% Chebyshev (Mean, Sd) UCL
Endosulfan I	mg/L	3.31E-04	97.5% Chebyshev (Mean, Sd) UCL
Endosulfan II	mg/L	2.30E-04	Maximum Result
Endosulfan sulfate	mg/L	9.20E-05	Maximum Result
Endrin	mg/L	6.46E-04	97.5% Chebyshev (Mean, Sd) UCL
Endrin aldehyde	mg/L	1.40E-04	Maximum Result
Endrin ketone	mg/L	1.70E-04	Maximum Result
gamma-BHC	mg/L	3.28E-04	97.5% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	mg/L	2.50E-04	Maximum Result
Heptachlor	mg/L	1.11E-04	97.5% Chebyshev (Mean, Sd) UCL
Heptachlor epoxide	mg/L	1.20E-04	Maximum Result
Methoxychlor	mg/L	1.20E-04	Maximum Result

Table 2-5
Exposure Point Concentrations for Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis
Aroclor-1260	mg/L	9.63E-04	95% Chebyshev (Mean, Sd) UCL
SVOCs/VOCs			
1,4-Dioxane (p-dioxane)	mg/L	7.80E-01	Maximum Result
2,4,6-Trichlorophenol	mg/L	7.14E-03	97.5% Chebyshev (Mean, Sd) UCL
2,4-Dimethylphenol	mg/L	7.87E-02	97.5% Chebyshev (Mean, Sd) UCL
2-Chlorophenol	mg/L	4.30E-03	Maximum Result
2-Methylnaphthalene	mg/L	2.26E-01	99% Chebyshev (Mean, Sd) UCL
2-Methylphenol	mg/L	1.23E-01	97.5% Chebyshev (Mean, Sd) UCL
2-Nitroaniline	mg/L	1.00E-02	Maximum Result
3,4-methylphenol	mg/L	8.40E-01	Maximum Result
4-Chloro-3-methylphenol	mg/L	2.38E-02	95% Chebyshev (Mean, Sd) UCL
4-Methylphenol	mg/L	1.94E-01	97.5% Chebyshev (Mean, Sd) UCL
Acenaphthene	mg/L	4.50E-03	Maximum Result
Acenaphthylene	mg/L	9.54E-03	97.5% Chebyshev (Mean, Sd) UCL
Anthracene	mg/L	3.20E-03	Maximum Result
Benzo(a)anthracene	mg/L	9.00E-04	Maximum Result
Benzo(a)pyrene	mg/L	5.00E-04	Maximum Result
Benzo(b)fluoranthene	mg/L	7.60E-04	Maximum Result
Benzo(g,h,i)perylene	mg/L	2.00E-04	Maximum Result
Benzo(k)fluoranthene	mg/L	4.60E-04	Maximum Result
Biphenyl (Diphenyl)	mg/L	1.30E-03	Maximum Result
bis(2-Chloroethoxy)methane	mg/L	2.00E-04	Maximum Result
bis(2-Ethylhexyl)phthalate	mg/L	1.69E-02	97.5% Chebyshev (Mean, Sd) UCL
Bromoform	mg/L	1.20E-02	Maximum Result
Caprolactam	mg/L	2.40E-03	Maximum Result
Carbazole	mg/L	1.25E-02	99% Chebyshev (Mean, Sd) UCL
Chrysene	mg/L	1.10E-03	Maximum Result
Dibenz(a,h)anthracene	mg/L	4.50E-05	Maximum Result
Diethylphthalate	mg/L	1.03E-02	95% Chebyshev (Mean, Sd) UCL
Di-n-butyl phthalate	mg/L	1.17E-02	95% Chebyshev (Mean, Sd) UCL
Fluoranthene	mg/L	2.40E-03	Maximum Result
Fluorene	mg/L	2.60E-03	Maximum Result
Hexachloroethane	mg/L	1.00E-03	Maximum Result
Indeno(1,2,3-c,d)pyrene	mg/L	2.00E-04	Maximum Result
Naphthalene	mg/L	1.36E-01	99% Chebyshev (Mean, Sd) UCL
Nitrobenzene	mg/L	2.00E-03	Maximum Result
N-Nitrosodi-n-propylamine	mg/L	2.00E-03	Maximum Result
N-Nitrosodiphenylamine	mg/L	1.20E-03	Maximum Result
Pentachlorophenol	mg/L	1.13E-02	97.5% Chebyshev (Mean, Sd) UCL
Phenanthrene	mg/L	6.00E-03	Maximum Result
Pyrene	mg/L	2.40E-03	Maximum Result
1,1-Dichloroethane	mg/L	5.57E-01	99% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethene	mg/L	4.16E-02	97.5% Chebyshev (Mean, Sd) UCL
1,1,1-Trichloroethane	mg/L	1.18E-01	97.5% Chebyshev (Mean, Sd) UCL
1,1,2-Trichloroethane	mg/L	1.33E-02	97.5% Chebyshev (Mean, Sd) UCL
1,1,2,2-Tetrachloroethane	mg/L	1.29E-02	97.5% Chebyshev (Mean, Sd) UCL
1,2,3-Trichlorobenzene	mg/L	2.72E-03	97.5% Chebyshev (Mean, Sd) UCL

Table 2-5
Exposure Point Concentrations for Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis
1,2,4-Trichlorobenzene	mg/L	1.51E-02	97.5% Chebyshev (Mean, Sd) UCL
1,2,4-Trimethylbenzene	mg/L	2.78E-01	99% Chebyshev (Mean, Sd) UCL
1,2-Dibromo-3-chloropropane	mg/L	2.40E-03	Maximum Result
1,2-Dichlorobenzene	mg/L	7.34E-01	99% Chebyshev (Mean, Sd) UCL
1,2-Dichloroethane	mg/L	1.44E-02	97.5% Chebyshev (Mean, Sd) UCL
1,2-Dichloropropane	mg/L	5.10E-03	Maximum Result
1,3-Dichlorobenzene	mg/L	2.71E-02	97.5% Chebyshev (Mean, Sd) UCL
1,3,5-Trimethylbenzene	mg/L	1.10E-01	99% Chebyshev (Mean, Sd) UCL
1,4-Dichlorobenzene	mg/L	2.18E-01	97.5% Chebyshev (Mean, Sd) UCL
2-Chlorotoluene	mg/L	2.89E-03	97.5% Chebyshev (Mean, Sd) UCL
2-Hexanone	mg/L	2.35E-02	95% Chebyshev (Mean, Sd) UCL
2,2-Dichloropropane	mg/L	5.00E-04	Maximum Result
Acetone	mg/L	4.85E-01	97.5% Chebyshev (Mean, Sd) UCL
Benzene	mg/L	4.00E-01	99% Chebyshev (Mean, Sd) UCL
Carbon disulfide	mg/L	3.10E-03	Maximum Result
Carbon tetrachloride	mg/L	3.00E-04	Maximum Result
Chlorobenzene	mg/L	6.74E-01	99% Chebyshev (Mean, Sd) UCL
Chloroethane	mg/L	9.74E-02	99% Chebyshev (Mean, Sd) UCL
Chloroform	mg/L	4.40E-03	Maximum Result
Chloromethane	mg/L	7.40E-03	Maximum Result
cis-1,2-Dichloroethene	mg/L	1.37E+01	99% Chebyshev (Mean, Sd) UCL
cis-1,3-Dichloropropene	mg/L	4.20E-03	Maximum Result
Cyclohexane	mg/L	1.80E-02	Maximum Result
Ethyl tert-butyl ether (ETBE)	mg/L	1.20E-03	Maximum Result
Ethylbenzene	mg/L	4.49E-01	99% Chebyshev (Mean, Sd) UCL
Isopropyl ether	mg/L	4.30E-01	Maximum Result
Isopropylbenzene (cumene)	mg/L	2.71E-02	97.5% Chebyshev (Mean, Sd) UCL
Methyl acetate	mg/L	2.25E-02	97.5% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	mg/L	4.30E-01	97.5% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	mg/L	4.86E+00	99% Chebyshev (Mean, Sd) UCL
Methyl tert-butyl ether	mg/L	2.01E-02	97.5% Chebyshev (Mean, Sd) UCL
Methylcyclohexane	mg/L	2.45E-02	97.5% Chebyshev (Mean, Sd) UCL
Methylene chloride	mg/L	8.19E-03	97.5% Chebyshev (Mean, Sd) UCL
n-Butylbenzene	mg/L	6.12E-03	97.5% Chebyshev (Mean, Sd) UCL
n-Propylbenzene	mg/L	5.61E-02	99% Chebyshev (Mean, Sd) UCL
p-Cymene (p-isopropyltoluene)	mg/L	7.86E-02	99% Chebyshev (Mean, Sd) UCL
Phenol	mg/L	4.80E-02	97.5% Chebyshev (Mean, Sd) UCL
sec-Butylbenzene	mg/L	5.64E-03	97.5% Chebyshev (Mean, Sd) UCL
Styrene	mg/L	1.39E-02	97.5% Chebyshev (Mean, Sd) UCL
tert-Butylbenzene	mg/L	2.10E-03	Maximum Result
tert-Butyl alcohol	mg/L	1.17E-01	97.5% Chebyshev (Mean, Sd) UCL
Tetrachloroethene	mg/L	1.20E-02	Maximum Result
Toluene	mg/L	6.11E+00	99% Chebyshev (Mean, Sd) UCL
trans-1,2-Dichloroethene	mg/L	4.01E-01	99% Chebyshev (Mean, Sd) UCL
trans-1,3-Dichloropropene	mg/L	4.10E-03	Maximum Result
Trichloroethene	mg/L	5.70E-02	97.5% Chebyshev (Mean, Sd) UCL
Vinyl chloride	mg/L	1.63E+00	99% Chebyshev (Mean, Sd) UCL

Table 2-5
Exposure Point Concentrations for Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis
m,p-Xylene	mg/L	9.44E-01	99% Chebyshev (Mean, Sd) UCL
o-Xylene	mg/L	4.45E-01	99% Chebyshev (Mean, Sd) UCL
Xylenes, total	mg/L	1.60E+00	99% Chebyshev (Mean, Sd) UCL
Dioxans/Furans			
1,2,3,4,6,7,8-HpCDD	mg/L	4.64E-07	99% Chebyshev (Mean, Sd) UCL
1,2,3,4,6,7,8-HpCDF	mg/L	9.49E-08	99% Chebyshev (Mean, Sd) UCL
1,2,3,4,7,8,9-HpCDF	mg/L	9.79E-09	99% Chebyshev (Mean, Sd) UCL
1,2,3,4,7,8-HxCDD	mg/L	2.62E-09	95% Chebyshev (Mean, Sd) UCL
1,2,3,4,7,8-HxCDF	mg/L	8.49E-09	99% Chebyshev (Mean, Sd) UCL
1,2,3,6,7,8-HxCDD	mg/L	1.33E-08	99% Chebyshev (Mean, Sd) UCL
1,2,3,6,7,8-HxCDF	mg/L	1.62E-09	95% Chebyshev (Mean, Sd) UCL
1,2,3,7,8,9-HxCDD	mg/L	4.40E-09	95% Chebyshev (Mean, Sd) UCL
1,2,3,7,8,9-HxCDF	mg/L	3.87E-09	99% Chebyshev (Mean, Sd) UCL
1,2,3,7,8-PeCDD	mg/L	1.08E-09	95% H-UCL
1,2,3,7,8-PeCDF	mg/L	2.28E-09	95% Chebyshev (Mean, Sd) UCL
2,3,4,6,7,8-HxCDF	mg/L	3.94E-09	99% Chebyshev (Mean, Sd) UCL
2,3,4,7,8-PeCDF	mg/L	2.64E-09	95% Chebyshev (Mean, Sd) UCL
2,3,7,8-TCDF	mg/L	1.68E-09	95% Chebyshev (Mean, Sd) UCL
OCDF	mg/L	7.44E-07	99% Chebyshev (Mean, Sd) UCL
OCDD	mg/L	2.18E-06	95% Hall's Bootstrap UCL

Table 2-6
Risk Calculation Worksheet for Groundwater - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for dermal exposure	ET_d	0.58	hr/day
Exposure Time for inhalation of volatiles	ET_i	24	hr/day
Exposure Duration	ED	24	years
Ingestion Rate	IngR	2	L/day
Inhalation Rate	InhR	0.83	m3/hr
Volatilization Factor	VFw	0.5	L/m3
Skin Surface Area	SA	18000	cm2
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor 1	CF1	1.00E-03	L/cm3
Conversion Factor 2	CF2	1.00E+06	cm3/m3
Conversion Factor 3	CF3	2.74E-03	yr/day
Constituent Specific Permeability Constant	Kp	Chemical Specific	cm/hr

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cw [mg/L]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Metals											
Aluminum	9.40E+00	8.83E-02	NA		4.61E-04	NA		NV	NA		
Antimony	1.51E-03	1.42E-05	NA		7.41E-08	NA		NV	NA		
Arsenic	2.87E-01	2.69E-03	1.50E+00	4.04E-03	1.41E-05	1.50E+00	2.11E-05	NV	1.51E+01		**4.06E-03**
Barium	1.68E-01	1.57E-03	NA		8.22E-06	NA		NV	NA		
Beryllium	7.64E-04	7.18E-06	NA		3.75E-08	NA		NV	8.40E+00		
Boron	4.31E+00	4.05E-02	NA		2.11E-04	NA		NV	NA		
Cadmium	1.26E-03	1.18E-05	NA		6.16E-08	NA		NV	6.30E+00		
Chromium	3.57E-02	3.35E-04	NA		1.75E-06	NA		NV	NA		
Chromium (VI)	3.50E-04	3.29E-06	5.00E-01	1.64E-06	3.43E-08	5.00E-01	1.72E-08	NV	2.94E-01		**1.66E-06**
Cobalt	8.89E-03	8.35E-05	NA		1.74E-07	NA		NV	3.15E+00		
Copper	4.66E-02	4.38E-04	NA		2.28E-06	NA		NV	NA		
Iron	5.35E+01	5.03E-01	NA		2.62E-03	NA		NV	NA		
Lead	4.00E-02	3.76E-04	NA		1.96E-07	NA		NV	NA		
Manganese	4.33E+00	4.07E-02	NA		2.12E-04	NA		NV	NA		
Mercury	1.21E-04	1.14E-06	NA		5.93E-09	NA		NV	NA		
Molybdenum	5.64E-03	5.29E-05	NA		2.76E-07	NA		NV	NA		
Nickel	5.46E-02	5.13E-04	NA		5.35E-07	NA		NV	9.10E-01		
Selenium	1.89E-02	1.78E-04	NA		9.27E-07	NA		NV	NA		
Silver	1.20E-04	1.13E-06	NA		3.53E-09	NA		NV	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Thallium	5.00E-05	4.70E-07	NA		2.45E-09	NA		NV	NA		
Vanadium	3.19E-02	3.00E-04	NA		1.57E-06	NA		NV	NA		
Zinc	3.03E-01	2.85E-03	NA		8.91E-06	NA		NV	NA		
Cyanide	6.29E-02	5.91E-04	NA		3.08E-06	NA		NV	NA		
Pesticides/PCBs											
4,4'-DDD	5.00E-03	4.69E-05	2.40E-01	1.13E-05	3.27E-04	2.40E-01	7.84E-05	NV	2.42E-01		**8.97E-05**
4,4'-DDE	7.76E-04	7.29E-06	3.40E-01	2.48E-06	4.45E-05	3.40E-01	1.51E-05	NV	3.40E-01		**1.76E-05**
4,4'-DDT	1.80E-04	1.69E-06	3.40E-01	5.75E-07	1.94E-05	3.40E-01	6.58E-06	NV	3.40E-01		**7.16E-06**
Aldrin	4.05E-04	3.80E-06	1.70E+01	6.46E-05	3.44E-07	1.70E+01	5.85E-06	NV	1.72E+01		**7.04E-05**
alpha-BHC	3.00E-04	2.82E-06	6.30E+00	1.78E-05	1.24E-06	6.30E+00	7.82E-06	NV	6.30E+00		**2.56E-05**
alpha-Chlordane	3.34E-04	3.14E-06	1.30E+00	4.08E-06	6.45E-06	1.30E+00	8.38E-06	NV	3.50E-01		**1.25E-05**
Atrazine	2.00E-03	1.88E-05	2.30E-01	4.32E-06	2.40E-06	2.30E-01	5.53E-07	NV	NA		**4.87E-06**
beta-BHC	3.69E-04	3.46E-06	1.80E+00	6.23E-06	1.53E-06	1.80E+00	2.75E-06	NV	1.86E+00		**8.98E-06**
delta-BHC	1.60E-04	1.50E-06	NA		6.62E-07	NA		NV	NA		
Diazinon	2.60E-04	2.44E-06	NA		1.09E-06	NA		NV	NA		
Dieldrin	9.24E-04	8.68E-06	1.60E+01	1.39E-04	5.97E-06	1.60E+01	9.55E-05	NV	1.61E+01		**2.34E-04**
Endosulfan I	3.31E-04	3.11E-06	NA		7.41E-07	NA		NV	NA		
Endosulfan II	2.30E-04	2.16E-06	NA		3.21E-07	NA		NV	NA		
Endosulfan sulfate	9.20E-05	8.64E-07	NA		NA	NA		NV	NA		
Endrin	6.46E-04	6.07E-06	NA		4.18E-06	NA		NV	NA		
Endrin aldehyde	1.40E-04	1.32E-06	NA		NA	NA		NV	NA		
Endrin ketone	1.70E-04	1.60E-06	NA		NA	NA		NV	NA		
gamma-BHC	3.28E-04	3.08E-06	1.10E+00	3.38E-06	1.36E-06	1.10E+00	1.49E-06	NV	1.09E+00		**4.88E-06**
gamma-Chlordane	2.50E-04	2.35E-06	1.20E+00	2.82E-06	4.83E-06	1.20E+00	5.79E-06	NV	3.50E-01		**8.61E-06**
Heptachlor	1.11E-04	1.04E-06	4.50E+00	4.68E-06	4.88E-07	4.50E+00	2.20E-06	NV	4.55E+00		**6.88E-06**
Heptachlor epoxide	1.20E-04	1.13E-06	9.10E+00	1.03E-05	1.73E-06	9.10E+00	1.57E-05	NV	9.10E+00		**2.60E-05**
Methoxychlor	1.20E-04	1.13E-06	NA		2.66E-06	NA		NV	NA		
Aroclor-1260	9.63E-04	9.04E-06	2.00E+00	1.81E-05	3.20E-04	2.00E+00	6.39E-04	NV	2.00E+00		**6.58E-04**
SVOCs/VOCs											
1,4-Dioxane (p-dioxane)	7.80E-01	7.33E-03	2.70E-02	1.98E-04	2.62E-05	2.70E-02	7.08E-07	NV	2.70E-02		**1.99E-04**
2,4,6-Trichlorophenol	7.14E-03	6.71E-05	7.00E-02	4.69E-06	5.15E-05	7.00E-02	3.60E-06	NV	7.00E-02		**8.30E-06**
2,4-Dimethylphenol	7.87E-02	7.39E-04	NA		1.10E-04	NA		NV	NA		
2-Chlorophenol	4.30E-03	4.04E-05	NA		4.55E-06	NA		2.01E-04	NA		
2-Methylnaphthalene	2.26E-01	2.12E-03	NA		2.91E-03	NA		1.05E-02	NA		
2-Methylphenol	1.23E-01	1.15E-03	NA		1.10E-04	NA		NV	NA		
2-Nitroaniline	1.00E-02	9.39E-05	NA		6.24E-06	NA		NV	NA		
3,4-methylphenol	8.40E-01	7.89E-03	NA		7.49E-04	NA		NV	NA		
4-Chloro-3-methylphenol	2.38E-02	2.24E-04	NA		NA	NA		NV	NA		
4-Methylphenol	1.94E-01	1.82E-03	NA		1.73E-04	NA		NV	NA		
Acenaphthene	4.50E-03	4.23E-05	NA		9.33E-05	NA		2.11E-04	NA		
Acenaphthylene	9.54E-03	8.96E-05	NA		2.07E-04	NA		4.46E-04	NA		
Anthracene	3.20E-03	3.01E-05	NA		1.31E-04	NA		1.50E-04	NA		
Benzo(a)anthracene	9.00E-04	8.45E-06	1.20E+00	1.01E-05	1.06E-04	1.20E+00	1.28E-04	NV	3.85E-01		**1.38E-04**
Benzo(a)pyrene	5.00E-04	4.70E-06	1.20E+01	5.64E-05	1.01E-04	1.20E+01	1.21E-03	NV	3.85E+00		**1.27E-03**
Benzo(b)fluoranthene	7.60E-04	7.14E-06	1.20E+00	8.57E-06	1.56E-04	1.20E+00	1.87E-04	NV	3.85E-01		**1.96E-04**
Benzo(g,h,i)perylene	2.00E-04	1.88E-06	NA		7.32E-05	NA		NV	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Benzo(k)fluoranthene	4.60E-04	4.32E-06	1.20E+00	5.19E-06	8.91E-05	1.20E+00	1.07E-04	NV	3.85E-01		**1.12E-04**
Biphenyl (Diphenyl)	1.30E-03	1.22E-05	NA		1.86E-05	NA		NV	NA		
bis(2-Chloroethoxy)methane	2.00E-04	1.88E-06	NA		4.32E-08	NA		9.36E-06	NA		
bis(2-Ethylhexyl)phthalate	1.69E-02	1.59E-04	1.40E-02	2.22E-06	3.03E-04	1.40E-02	4.25E-06	NV	8.40E-03		**6.47E-06**
Bromoform	1.20E-02	1.13E-04	1.10E-02	1.24E-06	7.77E-06	1.10E-02	8.55E-08	5.61E-04	3.85E-03	2.16E-06	**3.49E-06**
Caprolactam	2.40E-03	2.25E-05	NA		2.89E-07	NA		NV	NA		
Carbazole	1.25E-02	1.18E-04	NA		1.11E-04	NA		NV	NA		
Chrysene	1.10E-03	1.03E-05	1.20E-01	1.24E-06	1.30E-04	1.20E-01	1.56E-05	NV	3.85E-02		**1.68E-05**
Dibenz(a,h)anthracene	4.50E-05	4.23E-07	7.30E+00	3.09E-06	1.41E-05	7.30E+00	1.03E-04	NV	4.20E+00		**1.06E-04**
Diethylphthalate	1.03E-02	9.68E-05	NA		9.70E-06	NA		NV	NA		
Di-n-butyl phthalate	1.17E-02	1.09E-04	NA		8.72E-05	NA		NV	NA		
Fluoranthene	2.40E-03	2.25E-05	NA		1.12E-04	NA		NV	NA		
Fluorene	2.60E-03	2.44E-05	NA		7.49E-05	NA		1.22E-04	NA		
Hexachloroethane	1.00E-03	9.39E-06	3.90E-02	3.66E-07	7.96E-06	3.90E-02	3.11E-07	NV	3.85E-01		6.77E-07
Indeno(1,2,3-c,d)pyrene	2.00E-04	1.88E-06	1.20E+00	2.25E-06	4.11E-05	1.20E+00	4.93E-05	NV	3.85E-01		**5.16E-05**
Naphthalene	1.36E-01	1.28E-03	1.20E-01	1.54E-04	8.44E-04	1.20E-01	1.01E-04	6.37E-03	1.19E-01	7.58E-04	**1.01E-03**
Nitrobenzene	2.00E-03	1.88E-05	NA		1.38E-06	NA		9.36E-05	1.40E-01	1.31E-05	**1.31E-05**
N-Nitrosodi-n-propylamine	2.00E-03	1.88E-05	7.00E+00	1.32E-04	6.24E-07	7.00E+00	4.37E-06	NV	7.00E+00		**1.36E-04**
N-Nitrosodiphenylamine	1.20E-03	1.13E-05	9.00E-03	1.01E-07	6.46E-06	9.00E-03	5.82E-08	NV	9.10E-03		1.60E-07
Pentachlorophenol	1.13E-02	1.06E-04	1.20E-01	1.27E-05	1.27E-03	1.20E-01	1.53E-04	NV	1.79E-02		**1.66E-04**
Phenanthrene	6.00E-03	5.64E-05	NA		1.53E-04	NA		NV	NA		
Pyrene	2.40E-03	2.25E-05	NA		1.65E-04	NA		1.12E-04	NA		
1,1,1-Trichloroethane	1.18E-01	1.11E-03	NA		2.09E-04	NA		5.52E-03	NA		
1,1,2,2-Tetrachloroethane	1.29E-02	1.21E-04	2.00E-01	2.43E-05	1.52E-05	2.00E-01	3.04E-06	6.04E-04	2.03E-01	1.23E-04	**1.50E-04**
1,1,2-Trichloroethane	1.33E-02	1.25E-04	7.20E-02	9.01E-06	1.16E-05	7.20E-02	8.37E-07	6.23E-04	5.70E-02	3.55E-05	**4.54E-05**
1,1-Dichloroethane	5.57E-01	5.23E-03	5.70E-03	2.98E-05	4.08E-04	5.70E-03	2.32E-06	2.61E-02	5.70E-03	1.49E-04	**1.81E-04**
1,1-Dichloroethene	4.16E-02	3.91E-04	NA		5.38E-05	NA		1.94E-03	9.10E-02	1.77E-04	**1.77E-04**
1,2,3-Trichlorobenzene	2.72E-03	2.56E-05	NA		NA	NA		1.27E-04	NA		
1,2,4-Trichlorobenzene	1.51E-02	1.42E-04	2.90E-02	4.11E-06	1.85E-04	2.90E-02	5.37E-06	7.06E-04	NA		**9.48E-06**
1,2,4-Trimethylbenzene	2.78E-01	2.61E-03	NA		2.91E-03	NA		1.30E-02	NA		
1,2-Dibromo-3-chloropropane	2.40E-03	2.25E-05	7.00E+00	1.58E-04	4.30E-06	7.00E+00	3.01E-05	1.12E-04	7.00E+00	7.86E-04	**9.74E-04**
1,2-Dichlorobenzene	7.34E-01	6.90E-03	NA		4.48E-03	NA		3.44E-02	NA		
1,2-Dichloroethane	1.44E-02	1.35E-04	9.10E-02	1.23E-05	1.05E-05	9.10E-02	9.57E-07	6.72E-04	9.10E-02	6.11E-05	**7.44E-05**
1,2-Dichloropropane	5.10E-03	4.79E-05	3.60E-02	1.72E-06	4.76E-06	3.60E-02	1.71E-07	2.39E-04	3.50E-02	8.35E-06	**1.02E-05**
1,3,5-Trimethylbenzene	1.10E-01	1.04E-03	NA		8.40E-04	NA		5.16E-03	NA		
1,3-Dichlorobenzene	2.71E-02	2.55E-04	NA		2.34E-04	NA		1.27E-03	NA		
1,4-Dichlorobenzene	2.18E-01	2.05E-03	5.40E-03	1.10E-05	1.36E-03	5.40E-03	7.36E-06	1.02E-02	3.85E-02	3.92E-04	**4.11E-04**
2-Chlorotoluene	2.89E-03	2.71E-05	NA		NA	NA		1.35E-04	NA		
2-Hexanone	2.35E-02	2.21E-04	NA		9.19E-06	NA		1.10E-03	NA		
2,2-Dichloropropane	5.00E-04	4.70E-06	NA		NA	NA		2.34E-05	NA		
Acetone	4.85E-01	4.56E-03	NA		2.19E-05	NA		2.27E-02	NA		
Benzene	4.00E-01	3.76E-03	1.00E-01	3.76E-04	5.73E-04	1.00E-01	5.73E-05	1.87E-02	1.02E-01	1.90E-03	**2.33E-03**
Carbon disulfide	3.10E-03	2.91E-05	NA		5.09E-06	NA		1.45E-04	NA		
Carbon tetrachloride	3.00E-04	2.82E-06	1.50E-01	4.23E-07	7.47E-07	1.50E-01	1.12E-07	1.40E-05	1.47E-01	2.06E-06	**2.60E-06**
Chlorobenzene	6.74E-01	6.33E-03	NA		2.25E-03	NA		3.15E-02	NA		
Chloroethane	9.74E-02	9.15E-04	NA		5.33E-05	NA		4.56E-03	2.90E-03	1.32E-05	**1.32E-05**

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Chloroform	4.40E-03	4.13E-05	3.10E-02	1.28E-06	3.73E-06	3.10E-02	1.16E-07	2.06E-04	1.86E-02	3.82E-06	**5.21E-06**
Chloromethane	7.40E-03	6.95E-05	NA		2.03E-06	NA		3.46E-04	NA		
cis-1,2-Dichloroethene	1.37E+01	1.29E-01	NA		1.61E-02	NA		6.42E-01	NA		
cis-1,3-Dichloropropene	4.20E-03	3.95E-05	1.00E-01	3.95E-06	2.13E-06	1.00E-01	2.13E-07	1.96E-04	5.60E-02	1.10E-05	**1.52E-05**
Cyclohexane	1.80E-02	1.69E-04	NA		1.78E-04	NA		8.42E-04	NA		
Ethyl tert-butyl ether (ETBE)	1.20E-03	1.13E-05	NA		NA	NA		5.61E-05	NA		
Ethylbenzene	4.49E-01	4.22E-03	1.10E-02	4.64E-05	2.52E-03	1.10E-02	2.77E-05	2.10E-02	8.75E-03	1.84E-04	**2.58E-04**
Isopropyl ether	4.30E-01	4.04E-03	NA		NA	NA		2.01E-02	NA		
Isopropylbenzene (cumene)	2.71E-02	2.54E-04	NA		2.97E-04	NA		1.27E-03	NA		
Methyl acetate	2.25E-02	2.12E-04	NA		1.68E-06	NA		1.05E-03	NA		
Methyl ethyl ketone	4.30E-01	4.04E-03	NA		3.79E-05	NA		2.01E-02	NA		
Methyl isobutyl ketone	4.86E+00	4.56E-02	NA		1.42E-03	NA		2.27E-01	NA		
Methyl tert-butyl ether	2.01E-02	1.89E-04	1.80E-03	3.40E-07	4.35E-06	1.80E-03	7.84E-09	9.42E-04	9.10E-04	8.57E-07	**1.21E-06**
Methylcyclohexane	2.45E-02	2.30E-04	NA		2.87E-04	NA		1.15E-03	NA		
Methylene chloride	8.19E-03	7.69E-05	1.40E-02	1.08E-06	2.86E-06	1.40E-02	4.00E-08	3.83E-04	3.50E-03	1.34E-06	**2.46E-06**
n-Butylbenzene	6.12E-03	5.74E-05	NA		NA	NA		2.86E-04	NA		
n-Propylbenzene	5.61E-02	5.27E-04	NA		NA	NA		2.63E-03	NA		
p-Cymene (p-isopropyltoluene)	7.86E-02	7.38E-04	NA		NA	NA		3.67E-03	NA		
Phenol	4.80E-02	4.51E-04	NA		2.19E-05	NA		NV	NA		
sec-Butylbenzene	5.64E-03	5.30E-05	NA		NA	NA		2.64E-04	NA		
Styrene	1.39E-02	1.31E-04	NA		5.82E-05	NA		6.51E-04	NA		
tert-Butylbenzene	2.10E-03	1.97E-05	NA		NA	NA		9.82E-05	NA		
tert-Butyl alcohol	1.17E-01	1.10E-03	NA		NA	NA		5.47E-03	NA		
Tetrachloroethene	1.20E-02	1.13E-04	5.40E-01	6.09E-05	6.66E-05	5.40E-01	3.59E-05	5.61E-04	2.07E-02	1.16E-05	**1.08E-04**
Toluene	6.11E+00	5.74E-02	NA		1.98E-02	NA		2.86E-01	NA		
trans-1,2-Dichloroethene	4.01E-01	3.77E-03	NA		3.33E-04	NA		1.88E-02	NA		
trans-1,3-Dichloropropene	4.10E-03	3.85E-05	1.00E-01	3.85E-06	2.08E-06	1.00E-01	2.08E-07	1.92E-04	5.60E-02	1.07E-05	**1.48E-05**
Trichloroethene	5.70E-02	5.35E-04	5.90E-03	3.16E-06	9.20E-05	5.90E-03	5.43E-07	2.66E-03	7.00E-03	1.86E-05	**2.23E-05**
Vinyl chloride	1.63E+00	1.53E-02	7.20E-01	1.10E-02	8.08E-04	7.20E-01	5.82E-04	7.61E-02	2.73E-01	2.08E-02	**3.24E-02**
m,p-Xylenes	9.44E-01	8.87E-03	NA		NA	NA		4.42E-02	NA		
o-Xylene	4.45E-01	4.18E-03	NA		3.58E-03	NA		2.08E-02	NA		
Xylenes, total	1.60E+00	1.50E-02	NA		9.71E-03	NA		7.49E-02	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	4.64E-07	4.36E-09	1.50E+03	6.54E-06	1.68E-07	1.50E+03	2.53E-04	NV	1.50E+03		**2.59E-04**
1,2,3,4,6,7,8-HpCDF	9.49E-08	8.92E-10	1.50E+03	1.34E-06	3.11E-08	1.50E+03	4.66E-05	NV	1.50E+03		**4.79E-05**
1,2,3,4,7,8,9-HpCDF	9.79E-09	9.20E-11	1.50E+03	1.38E-07	3.20E-09	1.50E+03	4.80E-06	NV	1.50E+03		**4.94E-06**
1,2,3,4,7,8-HxCDD	2.62E-09	2.46E-11	1.50E+04	3.70E-07	7.62E-10	1.50E+04	1.14E-05	NV	1.50E+04		**1.18E-05**
1,2,3,4,7,8-HxCDF	8.49E-09	7.98E-11	1.50E+04	1.20E-06	2.23E-09	1.50E+04	3.34E-05	NV	1.50E+04		**3.46E-05**
1,2,3,6,7,8-HxCDD	1.33E-08	1.25E-10	1.50E+04	1.87E-06	3.86E-09	1.50E+04	5.79E-05	NV	1.50E+04		**5.98E-05**
1,2,3,6,7,8-HxCDF	1.62E-09	1.52E-11	1.50E+04	2.28E-07	4.24E-10	1.50E+04	6.35E-06	NV	1.50E+04		**6.58E-06**
1,2,3,7,8,9-HxCDD	4.40E-09	4.14E-11	1.50E+04	6.20E-07	1.28E-09	1.50E+04	1.92E-05	NV	1.50E+04		**1.98E-05**
1,2,3,7,8,9-HxCDF	3.87E-09	3.63E-11	1.50E+04	5.45E-07	1.01E-09	1.50E+04	1.52E-05	NV	1.50E+04		**1.57E-05**
1,2,3,7,8-PeCDD	1.08E-09	1.01E-11	1.50E+05	1.52E-06	2.51E-10	1.50E+05	3.77E-05	NV	1.50E+05		**3.92E-05**
1,2,3,7,8-PeCDF	2.28E-09	2.14E-11	7.50E+03	1.61E-07	4.78E-10	7.50E+03	3.59E-06	NV	7.50E+03		**3.75E-06**
2,3,4,6,7,8-HxCDF	3.94E-09	3.70E-11	1.50E+04	5.56E-07	1.03E-09	1.50E+04	1.55E-05	NV	1.50E+04		**1.61E-05**
2,3,4,7,8-PeCDF	2.64E-09	2.48E-11	7.50E+04	1.86E-06	5.53E-10	7.50E+04	4.15E-05	NV	7.50E+04		**4.33E-05**

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
2,3,7,8-TCDF	1.68E-09	1.58E-11	1.50E+04	2.37E-07	2.82E-10	1.50E+04	4.23E-06	NV	1.50E+04		**4.47E-06**
OCDF	7.44E-07	6.98E-09	1.50E+01	1.05E-07	3.04E-07	1.50E+01	4.56E-06	NV	1.50E+01		**4.66E-06**
OCDD	2.18E-06	2.05E-08	1.50E+01	3.07E-07	9.87E-07	1.50E+01	1.48E-05	NV	1.50E+01		**1.51E-05**
			Total Risk:	1.67E-02		**Total Risk:**	4.30E-03		**Total Risk:**	2.54E-02	**4.64E-02**

Total Estimated Carcinogenic Risk Across All Exposure Routes : **4.6E-02**

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constant.

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

NV = Chemical classified as Nonvolatile thus no CDI was calculated.

Table 2-7
Risk Calculation Worksheet for Groundwater - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult
Exposure Scenario/Exposure Area Description		
Site Risks		

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for dermal exposure	ET_d	0.58	hr/day
Exposure Time for inhalation of volatiles	ET_i	24	hr/day
Exposure Duration	ED	24	years
Ingestion Rate	IngR	2	L/day
Inhalation Rate	InhR	0.83	m3/hr
Volatilization Factor	VFw	0.5	L/m3
Skin Surface Area	SA	18000	cm2
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor 1	CF1	1.00E-03	L/cm3
Conversion Factor 2	CF2	1.00E+06	cm3/m3
Conversion Factor 3	CF3	2.74E-03	yr/day
Constituent Specific Permeability Constant	Kp	Chemical Specific	cm/hr

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	9.40E+00	2.57E-01	1.00E+00	2.57E-01	1.34E-03	1.00E+00	1.34E-03	NV	1.40E-03		**2.59E-01**
Antimony	1.51E-03	4.14E-05	4.00E-04	1.04E-01	2.16E-07	4.00E-04	5.41E-04	NV	NA		**1.04E-01**
Arsenic	2.87E-01	7.86E-03	3.00E-04	2.62E+01	4.10E-05	3.00E-04	1.37E-01	NV	4.29E-06		**2.63E+01**
Barium	1.68E-01	4.59E-03	2.00E-01	2.30E-02	2.40E-05	2.00E-01	1.20E-04	NV	1.43E-04		2.31E-02
Beryllium	7.64E-04	2.09E-05	2.00E-03	1.05E-02	1.09E-07	2.00E-03	5.46E-05	NV	2.00E-06		1.05E-02
Boron	4.31E+00	1.18E-01	2.00E-01	5.90E-01	6.16E-04	2.00E-01	3.08E-03	NV	5.70E-03		**5.93E-01**
Cadmium	1.26E-03	3.44E-05	5.00E-04	6.88E-02	1.80E-07	5.00E-04	3.59E-04	NV	2.86E-06		6.92E-02
Chromium	3.57E-02	9.78E-04	NA		5.10E-06	NA		NV	NA		
Chromium (VI)	3.50E-04	9.59E-06	3.00E-03	3.20E-03	1.00E-07	3.00E-03	3.34E-05	NV	2.86E-05		3.23E-03
Cobalt	8.89E-03	2.44E-04	3.00E-04	8.12E-01	5.09E-07	3.00E-04	1.70E-03	NV	1.71E-06		**8.14E-01**
Copper	4.66E-02	1.28E-03	4.00E-02	3.19E-02	6.66E-06	4.00E-02	1.67E-04	NV	NA		3.21E-02
Iron	5.35E+01	1.47E+00	7.00E-01	2.09E+00	7.65E-03	7.00E-01	1.09E-02	NV	NA		**2.11E+00**
Lead	4.00E-02	1.10E-03	NA		5.72E-07	NA		NV	NA		
Manganese	4.33E+00	1.19E-01	2.40E-02	4.94E+00	6.19E-04	2.40E-02	2.58E-02	NV	1.43E-05		**4.97E+00**
Mercury	1.21E-04	3.32E-06	3.00E-04	1.11E-02	1.73E-08	3.00E-04	5.77E-05	NV	NA		1.11E-02
Molybdenum	5.64E-03	1.54E-04	5.00E-03	3.09E-02	8.06E-07	5.00E-03	1.61E-04	NV	NA		3.10E-02
Nickel	5.46E-02	1.50E-03	2.00E-02	7.48E-02	1.56E-06	2.00E-02	7.81E-05	NV	2.57E-05		7.49E-02
Selenium	1.89E-02	5.18E-04	5.00E-03	1.04E-01	2.70E-06	5.00E-03	5.41E-04	NV	5.71E-03		**1.04E-01**
Silver	1.20E-04	3.29E-06	5.00E-03	6.58E-04	1.03E-08	5.00E-03	2.06E-06	NV	NA		6.60E-04
Thallium	5.00E-05	1.37E-06	6.60E-05	2.08E-02	7.15E-09	6.60E-05	1.08E-04	NV	NA		2.09E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Vanadium	3.19E-02	8.75E-04	5.00E-03	1.75E-01	4.57E-06	5.00E-03	9.14E-04	NV	NA		**1.76E-01**
Zinc	3.03E-01	8.30E-03	3.00E-01	2.77E-02	2.60E-05	3.00E-01	8.67E-05	NV	NA		2.78E-02
Cyanide	6.29E-02	1.72E-03	2.00E-02	8.62E-02	9.00E-06	2.00E-02	4.50E-04	NV	NA		8.66E-02
Pesticides/PCBs											
4,4'-DDD	5.00E-03	1.37E-04	NA		9.53E-04	NA		NV	NA		
4,4'-DDE	7.76E-04	2.13E-05	NA		1.30E-04	NA		NV	NA		
4,4'-DDT	1.80E-04	4.93E-06	5.00E-04	9.86E-03	5.65E-05	5.00E-04	1.13E-01	NV	NA		**1.23E-01**
Aldrin	4.05E-04	1.11E-05	3.00E-05	3.69E-01	1.00E-06	3.00E-05	3.34E-02	NV	NA		**4.03E-01**
alpha-BHC	3.00E-04	8.22E-06	5.00E-04	1.64E-02	3.62E-06	5.00E-04	7.24E-03	NV	NA		2.37E-02
alpha-Chlordane	3.34E-04	9.15E-06	5.00E-04	1.83E-02	1.88E-05	5.00E-04	3.76E-02	NV	2.00E-04		5.59E-02
Atrazine	2.00E-03	5.48E-05	3.50E-02	1.57E-03	7.01E-06	3.50E-02	2.00E-04	NV	NA		1.77E-03
beta-BHC	3.69E-04	1.01E-05	NA		4.45E-06	NA		NV	NA		
delta-BHC	1.60E-04	4.38E-06	NA		1.93E-06	NA		NV	NA		
Diazinon	2.60E-04	7.11E-06	7.00E-04	1.02E-02	3.18E-06	7.00E-04	4.55E-03	NV	NA		1.47E-02
Dieldrin	9.24E-04	2.53E-05	5.00E-05	5.06E-01	1.74E-05	5.00E-05	3.48E-01	NV	NA		**8.54E-01**
Endosulfan I	3.31E-04	9.07E-06	6.00E-03	1.51E-03	2.16E-06	6.00E-03	3.60E-04	NV	NA		1.87E-03
Endosulfan II	2.30E-04	6.30E-06	6.00E-03	1.05E-03	9.37E-07	6.00E-03	1.56E-04	NV	NA		1.21E-03
Endosulfan sulfate	9.20E-05	2.52E-06	6.00E-03	4.20E-04	NA	6.00E-03		NV	NA		4.20E-04
Endrin	6.46E-04	1.77E-05	3.00E-04	5.90E-02	1.22E-05	3.00E-04	4.06E-02	NV	NA		9.96E-02
Endrin aldehyde	1.40E-04	3.84E-06	3.00E-04	1.28E-02	NA	3.00E-04		NV	NA		1.28E-02
Endrin ketone	1.70E-04	4.66E-06	3.00E-04	1.55E-02	NA	3.00E-04		NV	NA		1.55E-02
gamma-BHC	3.28E-04	8.97E-06	3.00E-04	2.99E-02	3.95E-06	3.00E-04	1.32E-02	NV	NA		4.31E-02
gamma-Chlordane	2.50E-04	6.85E-06	5.00E-04	1.37E-02	1.41E-05	5.00E-04	2.82E-02	NV	2.00E-04		4.19E-02
Heptachlor	1.11E-04	3.03E-06	3.00E-05	1.01E-01	1.42E-06	3.00E-05	4.75E-02	NV	NA		**1.49E-01**
Heptachlor epoxide	1.20E-04	3.29E-06	1.30E-05	2.53E-01	5.04E-06	1.30E-05	3.87E-01	NV	NA		**6.40E-01**
Methoxychlor	1.20E-04	3.29E-06	2.00E-05	1.64E-01	7.77E-06	2.00E-05	3.88E-01	NV	NA		**5.53E-01**
Aroclor-1260	9.63E-04	2.64E-05	2.00E-05	1.32E+00	9.33E-04	2.00E-05	4.66E+01	NV	NA		**4.79E+01**
SVOCs/VOCs											
1,4-Dioxane (p-dioxane)	7.80E-01	2.14E-02	1.00E-01	2.14E-01	7.65E-05	1.00E-01	7.65E-04	NV	8.57E-01		**2.14E-01**
2,4,6-Trichlorophenol	7.14E-03	1.96E-04	1.00E-03	1.96E-01	1.50E-04	1.00E-03	1.50E-01	NV	NA		**3.46E-01**
2,4-Dimethylphenol	7.87E-02	2.16E-03	2.00E-02	1.08E-01	3.20E-04	2.00E-02	1.60E-02	NV	NA		**1.24E-01**
2-Chlorophenol	4.30E-03	1.18E-04	5.00E-03	2.36E-02	1.33E-05	5.00E-03	2.65E-03	5.87E-04	NA		2.62E-02
2-Methylnaphthalene	2.26E-01	6.18E-03	4.00E-03	1.54E+00	8.49E-03	4.00E-03	2.12E+00	3.08E-02	NA		**3.67E+00**
2-Methylphenol	1.23E-01	3.37E-03	5.00E-02	6.73E-02	3.20E-04	5.00E-02	6.39E-03	NV	1.71E-01		7.37E-02
2-Nitroaniline	1.00E-02	2.74E-04	1.00E-02	2.74E-02	1.82E-05	1.00E-02	1.82E-03	NV	1.43E-05		2.92E-02
3,4-methylphenol	8.40E-01	2.30E-02	5.00E-03	4.60E+00	2.19E-03	5.00E-03	4.37E-01	NV	1.71E-01		**5.04E+00**
4-Chloro-3-methylphenol	2.38E-02	6.52E-04	NA		NA	NA		NV	NA		
4-Methylphenol	1.94E-01	5.31E-03	5.00E-03	1.06E+00	5.04E-04	5.00E-03	1.01E-01	NV	1.71E-01		**1.16E+00**
Acenaphthene	4.50E-03	1.23E-04	6.00E-02	2.05E-03	2.72E-04	6.00E-02	4.54E-03	6.14E-04	NA		6.59E-03
Acenaphthylene	9.54E-03	2.61E-04	NA		6.04E-04	NA		1.30E-03	NA		
Anthracene	3.20E-03	8.77E-05	3.00E-01	2.92E-04	3.82E-04	3.00E-01	1.27E-03	4.37E-04	NA		1.57E-03
Benzo(a)anthracene	9.00E-04	2.47E-05	NA		3.10E-04	NA		NV	NA		
Benzo(a)pyrene	5.00E-04	1.37E-05	NA		2.95E-04	NA		NV	NA		
Benzo(b)fluoranthene	7.60E-04	2.08E-05	NA		4.55E-04	NA		NV	NA		
Benzo(g,h,i)perylene	2.00E-04	5.48E-06	NA		2.13E-04	NA		NV	NA		
Benzo(k)fluoranthene	4.60E-04	1.26E-05	NA		2.60E-04	NA		NV	NA		
Biphenyl (Diphenyl)	1.30E-03	3.56E-05	5.00E-02	7.12E-04	5.43E-05	5.00E-02	1.09E-03	NV	NA		1.80E-03

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
bis(2-Chloroethoxy)methane	2.00E-04	5.48E-06	3.00E-03	1.83E-03	1.26E-07	3.00E-03	4.20E-05	2.73E-05	NA		1.87E-03
bis(2-Ethylhexyl)phthalate	1.69E-02	4.63E-04	2.00E-02	2.32E-02	8.85E-04	2.00E-02	4.43E-02	NV	NA		6.74E-02
Bromoform	1.20E-02	3.29E-04	2.00E-02	1.64E-02	2.27E-05	2.00E-02	1.13E-03	1.64E-03	NA		1.76E-02
Caprolactam	2.40E-03	6.58E-05	5.00E-01	1.32E-04	8.42E-07	5.00E-01	1.68E-06	NV	NA		1.33E-04
Carbazole	1.25E-02	3.43E-04	NA		3.24E-04	NA		NV	NA		
Chrysene	1.10E-03	3.01E-05	NA		3.79E-04	NA		NV	NA		
Dibenz(a,h)anthracene	4.50E-05	1.23E-06	NA		4.10E-05	NA		NV	NA		
Diethylphthalate	1.03E-02	2.82E-04	8.00E-01	3.53E-04	2.83E-05	8.00E-01	3.54E-05	NV	NA		3.88E-04
Di-n-butyl phthalate	1.17E-02	3.19E-04	1.00E-01	3.19E-03	2.54E-04	1.00E-01	2.54E-03	NV	NA		5.74E-03
Fluoranthene	2.40E-03	6.58E-05	4.00E-02	1.64E-03	3.27E-04	4.00E-02	8.19E-03	NV	NA		9.83E-03
Fluorene	2.60E-03	7.12E-05	4.00E-02	1.78E-03	2.19E-04	4.00E-02	5.46E-03	3.55E-04	NA		7.24E-03
Hexachloroethane	1.00E-03	2.74E-05	1.00E-03	2.74E-02	2.32E-05	1.00E-03	2.32E-02	NV	NA		5.06E-02
Indeno(1,2,3-c,d)pyrene	2.00E-04	5.48E-06	NA		1.20E-04	NA		NV	NA		
Naphthalene	1.36E-01	3.73E-03	2.00E-02	1.87E-01	2.46E-03	2.00E-02	1.23E-01	1.86E-02	8.57E-04	2.17E+01	**2.20E+01**
Nitrobenzene	2.00E-03	5.48E-05	2.00E-03	2.74E-02	4.01E-06	2.00E-03	2.01E-03	2.73E-04	2.57E-03	1.06E-01	**1.36E-01**
N-Nitrosodi-n-propylamine	2.00E-03	5.48E-05	NA		1.82E-06	NA		NV	NA		
N-Nitrosodiphenylamine	1.20E-03	3.29E-05	2.00E-02	1.64E-03	1.89E-05	2.00E-02	9.43E-04	NV	2.00E-02		2.59E-03
Pentachlorophenol	1.13E-02	3.09E-04	3.00E-02	1.03E-02	3.71E-03	3.00E-02	1.24E-01	NV	3.00E-02		**1.34E-01**
Phenanthrene	6.00E-03	1.64E-04	NA		4.46E-04	NA		NV	NA		
Pyrene	2.40E-03	6.58E-05	3.00E-02	2.19E-03	4.82E-04	3.00E-02	1.61E-02	3.27E-04	NA		1.83E-02
1,1,1-Trichloroethane	1.18E-01	3.23E-03	2.00E+00	1.62E-03	6.10E-04	2.00E+00	3.05E-04	1.61E-02	1.43E+00	1.13E-02	1.32E-02
1,1,2,2-Tetrachloroethane	1.29E-02	3.54E-04	4.00E-03	8.85E-02	4.43E-05	4.00E-03	1.11E-02	1.76E-03	6.00E-02	2.94E-02	**1.29E-01**
1,1,2-Trichloroethane	1.33E-02	3.65E-04	4.00E-03	9.13E-02	3.39E-05	4.00E-03	8.48E-03	1.82E-03	NA		9.98E-02
1,1-Dichloroethane	5.57E-01	1.53E-02	2.00E-01	7.63E-02	1.19E-03	2.00E-01	5.95E-03	7.60E-02	NA		8.22E-02
1,1-Dichloroethene	4.16E-02	1.14E-03	5.00E-02	2.28E-02	1.57E-04	5.00E-02	3.14E-03	5.67E-03	2.00E-02	2.84E-01	**3.10E-01**
1,2,3-Trichlorobenzene	2.72E-03	7.46E-05	NA		NA	NA		3.72E-04	NA		
1,2,4-Trichlorobenzene	1.51E-02	4.13E-04	1.00E-02	4.13E-02	5.40E-04	1.00E-02	5.40E-02	2.06E-03	5.71E-04	3.60E+00	**3.70E+00**
1,2,4-Trimethylbenzene	2.78E-01	7.61E-03	7.00E-03	1.09E+00	8.49E-03	7.00E-03	1.21E+00	3.79E-02	NA		**2.30E+00**
1,2-Dibromo-3-chloropropane	2.40E-03	6.58E-05	2.00E-04	3.29E-01	1.25E-05	2.00E-04	6.27E-02	3.27E-04	5.71E-05	5.73E+00	**6.12E+00**
1,2-Dichlorobenzene	7.34E-01	2.01E-02	9.00E-02	2.24E-01	1.31E-02	9.00E-02	1.45E-01	1.00E-01	5.71E-02	1.75E+00	**2.12E+00**
1,2-Dichloroethane	1.44E-02	3.94E-04	2.00E-02	1.97E-02	3.07E-05	2.00E-02	1.53E-03	1.96E-03	6.86E-01	2.86E-03	2.41E-02
1,2-Dichloropropane	5.10E-03	1.40E-04	9.00E-02	1.55E-03	1.39E-05	9.00E-02	1.54E-04	6.96E-04	1.14E-03	6.09E-01	**6.11E-01**
1,3,5-Trimethylbenzene	1.10E-01	3.02E-03	1.00E-02	3.02E-01	2.45E-03	1.00E-02	2.45E-01	1.50E-02	NA		**5.47E-01**
1,3-Dichlorobenzene	2.71E-02	7.42E-04	NA		6.82E-04	NA		3.70E-03	NA		
1,4-Dichlorobenzene	2.18E-01	5.97E-03	7.00E-02	8.53E-02	3.97E-03	7.00E-02	5.68E-02	2.97E-02	2.29E-01	1.30E-01	**2.72E-01**
2-Chlorotoluene	2.89E-03	7.91E-05	2.00E-02	3.95E-03	NA	2.00E-02		3.94E-04	NA		3.95E-03
2-Hexanone	2.35E-02	6.45E-04	5.00E-03	1.29E-01	2.68E-05	5.00E-03	5.36E-03	3.21E-03	8.57E-03	3.75E-01	**5.09E-01**
2,2-Dichloropropane	5.00E-04	1.37E-05	NA		NA	NA		6.82E-05	NA		
Acetone	4.85E-01	1.33E-02	9.00E-01	1.48E-02	6.38E-05	9.00E-01	7.09E-05	6.62E-02	8.86E+00	7.48E-03	2.23E-02
Benzene	4.00E-01	1.10E-02	4.00E-03	2.74E+00	1.67E-03	4.00E-03	4.18E-01	5.46E-02	8.57E-03	6.37E+00	**9.53E+00**
Carbon disulfide	3.10E-03	8.49E-05	1.00E-01	8.49E-04	1.49E-05	1.00E-01	1.49E-04	4.23E-04	2.00E-01	2.11E-03	3.11E-03
Carbon tetrachloride	3.00E-04	8.22E-06	4.00E-03	2.05E-03	2.18E-06	4.00E-03	5.44E-04	4.09E-05	1.14E-02	3.58E-03	6.18E-03
Chlorobenzene	6.74E-01	1.85E-02	2.00E-02	9.23E-01	6.57E-03	2.00E-02	3.28E-01	9.20E-02	1.43E-02	6.44E+00	**7.69E+00**
Chloroethane	9.74E-02	2.67E-03	NA		1.55E-04	NA		1.33E-02	2.86E+00	4.65E-03	4.65E-03
Chloroform	4.40E-03	1.21E-04	1.00E-02	1.21E-02	1.09E-05	1.00E-02	1.09E-03	6.00E-04	2.80E-02	2.14E-02	3.46E-02
Chloromethane	7.40E-03	2.03E-04	NA		5.91E-06	NA		1.01E-03	2.57E-02	3.93E-02	3.93E-02
cis-1,2-Dichloroethene	1.37E+01	3.76E-01	1.00E-02	3.76E+01	4.69E-02	1.00E-02	4.69E+00	1.87E+00	NA		**4.23E+01**

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
cis-1,3-Dichloropropene	4.20E-03	1.15E-04	3.00E-02	3.84E-03	6.22E-06	3.00E-02	2.07E-04	5.73E-04	5.71E-03	1.00E-01	**1.04E-01**
Cyclohexane	1.80E-02	4.93E-04	NA		5.20E-04	NA		2.46E-03	1.71E+00	1.43E-03	1.43E-03
Ethyl tert-butyl ether (ETBE)	1.20E-03	3.29E-05	NA		NA	NA		1.64E-04	NA		
Ethylbenzene	4.49E-01	1.23E-02	1.00E-01	1.23E-01	7.34E-03	1.00E-01	7.34E-02	6.12E-02	2.86E-01	2.14E-01	**4.11E-01**
Isopropyl ether	4.30E-01	1.18E-02	NA		NA	NA		5.87E-02	NA		
Isopropylbenzene (cumene)	2.71E-02	7.41E-04	1.00E-01	7.41E-03	8.66E-04	1.00E-01	8.66E-03	3.69E-03	1.14E-01	3.23E-02	4.84E-02
Methyl acetate	2.25E-02	6.17E-04	1.00E+00	6.17E-04	4.90E-06	1.00E+00	4.90E-06	3.07E-03	NA		6.22E-04
Methyl ethyl ketone	4.30E-01	1.18E-02	6.00E-01	1.96E-02	1.11E-04	6.00E-01	1.84E-04	5.87E-02	1.43E+00	4.11E-02	6.09E-02
Methyl isobutyl ketone	4.86E+00	1.33E-01	8.00E-02	1.66E+00	4.15E-03	8.00E-02	5.19E-02	6.63E-01	8.57E-01	7.73E-01	**2.49E+00**
Methyl tert-butyl ether	2.01E-02	5.52E-04	NA		1.27E-05	NA		2.75E-03	8.57E-01	3.21E-03	3.21E-03
Methylcyclohexane	2.45E-02	6.72E-04	NA		8.38E-04	NA		3.35E-03	8.60E-01	3.89E-03	3.89E-03
Methylene chloride	8.19E-03	2.24E-04	6.00E-02	3.74E-03	8.34E-06	6.00E-02	1.39E-04	1.12E-03	2.86E-01	3.91E-03	7.79E-03
n-Butylbenzene	6.12E-03	1.68E-04	4.00E-02	4.19E-03	NA	4.00E-02		8.34E-04	NA		4.19E-03
n-Propylbenzene	5.61E-02	1.54E-03	4.00E-02	3.85E-02	NA	4.00E-02		7.66E-03	NA		3.85E-02
p-Cymene (p-isopropyltoluene)	7.86E-02	2.15E-03	NA		NA	NA		1.07E-02	NA		
Phenol	4.80E-02	1.32E-03	3.00E-01	4.39E-03	6.38E-05	3.00E-01	2.13E-04	NV	5.71E-02		4.60E-03
sec-Butylbenzene	5.64E-03	1.54E-04	4.00E-02	3.86E-03	NA	4.00E-02		7.69E-04	4.00E-02	1.92E-02	2.31E-02
Styrene	1.39E-02	3.81E-04	2.00E-01	1.91E-03	1.70E-04	2.00E-01	8.48E-04	1.90E-03	2.57E-01	7.39E-03	1.01E-02
tert-Butylbenzene	2.10E-03	5.75E-05	4.00E-02	1.44E-03	NA	4.00E-02		2.87E-04	NA		1.44E-03
tert-Butyl alcohol	1.17E-01	3.20E-03	1.00E-01	3.20E-02	NA	1.00E-01		1.59E-02	2.60E-03	6.13E+00	**6.17E+00**
Tetrachloroethene	1.20E-02	3.29E-04	1.00E-02	3.29E-02	1.94E-04	1.00E-02	1.94E-02	1.64E-03	1.00E-02	1.64E-01	**2.16E-01**
Toluene	6.11E+00	1.67E-01	8.00E-02	2.09E+00	5.77E-02	8.00E-02	7.22E-01	8.34E-01	8.57E-02	9.73E+00	**1.25E+01**
trans-1,2-Dichloroethene	4.01E-01	1.10E-02	2.00E-02	5.50E-01	9.72E-04	2.00E-02	4.86E-02	5.48E-02	1.71E-02	3.19E+00	**3.79E+00**
trans-1,3-Dichloropropene	4.10E-03	1.12E-04	3.00E-02	3.74E-03	6.07E-06	3.00E-02	2.02E-04	5.59E-04	5.71E-03	9.79E-02	**1.02E-01**
Trichloroethene	5.70E-02	1.56E-03	3.00E-04	5.20E+00	2.68E-04	3.00E-04	8.95E-01	7.77E-03	1.00E-02	7.77E-01	**6.87E+00**
Vinyl chloride	1.63E+00	4.46E-02	3.00E-03	1.49E+01	2.36E-03	3.00E-03	7.86E-01	2.22E-01	2.86E-02	7.77E+00	**2.34E+01**
m,p-Xylenes	9.44E-01	2.59E-02	2.00E-01	1.29E-01	NA	2.00E-01		1.29E-01	2.00E-01	6.44E-01	**7.73E-01**
o-Xylene	4.45E-01	1.22E-02	2.00E-01	6.09E-02	1.04E-02	2.00E-01	5.22E-02	6.07E-02	2.00E-01	3.03E-01	**4.17E-01**
Xylenes, total	1.60E+00	4.38E-02	2.00E-01	2.19E-01	2.83E-02	2.00E-01	1.42E-01	2.18E-01	2.86E-02	7.64E+00	**8.00E+00**
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	4.64E-07	1.27E-08	NA		4.91E-07	NA		NV	1.14E-08		
1,2,3,4,6,7,8-HpCDF	9.49E-08	2.60E-09	NA		9.06E-08	NA		NV	1.14E-08		
1,2,3,4,7,8,9-HpCDF	9.79E-09	2.68E-10	NA		9.34E-09	NA		NV	1.14E-08		
1,2,3,4,7,8-HxCDD	2.62E-09	7.19E-11	NA		2.22E-09	NA		NV	1.14E-08		
1,2,3,4,7,8-HxCDF	8.49E-09	2.33E-10	NA		6.49E-09	NA		NV	1.14E-08		
1,2,3,6,7,8-HxCDD	1.33E-08	3.64E-10	NA		1.13E-08	NA		NV	1.14E-08		
1,2,3,6,7,8-HxCDF	1.62E-09	4.43E-11	NA		1.24E-09	NA		NV	1.14E-08		
1,2,3,7,8,9-HxCDD	4.40E-09	1.21E-10	NA		3.73E-09	NA		NV	1.14E-08		
1,2,3,7,8,9-HxCDF	3.87E-09	1.06E-10	NA		2.95E-09	NA		NV	1.14E-08		
1,2,3,7,8-PeCDD	1.08E-09	2.96E-11	NA		7.32E-10	NA		NV	1.14E-08		
1,2,3,7,8-PeCDF	2.28E-09	6.25E-11	NA		1.40E-09	NA		NV	1.14E-08		
2,3,4,6,7,8-HxCDF	3.94E-09	1.08E-10	NA		3.01E-09	NA		NV	1.14E-08		
2,3,4,7,8-PeCDF	2.64E-09	7.22E-11	NA		1.61E-09	NA		NV	1.14E-08		
2,3,7,8-TCDF	1.68E-09	4.60E-11	NA		8.23E-10	NA		NV	1.14E-08		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
OCDF	7.44E-07	2.04E-08	NA		8.86E-07	NA		NV	1.14E-08		
OCDD	2.18E-06	5.97E-08	NA		2.88E-06	NA		NV	1.14E-08		
			Total Hazard Index:	1.16E+02		Total Hazard Index:	6.15E+01		Total Hazard Index:	8.49E+01	**2.62E+02**

Total Estimated Hazard Index Across All Exposure Routes : 262

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constan

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

NV = Chemical classified as Nonvolatile thus no CDI was calculated.

Table 2-8
Risk Calculation Worksheet for Groundwater - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child
Exposure Scenario/Exposure Area Description		
Site Risks		

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for dermal exposure	ET_d	1.0	hr/day
Exposure Time for inhalation of volatiles	ET_i	24	hr/day
Exposure Duration	ED	6	years
Ingestion Rate	IngR	1	L/day
Inhalation Rate	InhR	0.42	m3/hr
Volatilization Factor	VFw	0.5	L/m3
Skin Surface Area	SA	6600	cm2
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor 1	CF1	1.00E-03	L/cm3
Conversion Factor 2	CF2	1.00E+06	cm3/m3
Conversion Factor 3	CF3	2.74E-03	yr/day
Constituent Specific Permeability Constant	Kp	Chemical Specific	cm/hr

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cw [mg/L]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Metals											
Aluminum	9.40E+00	5.15E-02	NA		3.40E-04	NA		NV	NA		
Antimony	1.51E-03	8.29E-06	NA		5.47E-08	NA		NV	NA		
Arsenic	2.87E-01	1.57E-03	1.50E+00	2.36E-03	1.04E-05	1.50E+00	1.56E-05	NV	1.51E+01		**2.37E-03**
Barium	1.68E-01	9.19E-04	NA		6.06E-06	NA		NV	NA		
Beryllium	7.64E-04	4.19E-06	NA		2.76E-08	NA		NV	8.40E+00		
Boron	4.31E+00	2.36E-02	NA		1.56E-04	NA		NV	NA		
Cadmium	1.26E-03	6.88E-06	NA		4.54E-08	NA		NV	6.30E+00		
Chromium	3.57E-02	1.96E-04	NA		1.29E-06	NA		NV	NA		
Chromium (VI)	3.50E-04	1.92E-06	5.00E-01	9.59E-07	2.53E-08	5.00E-01	1.27E-08	NV	2.94E-01		9.72E-07
Cobalt	8.89E-03	4.87E-05	NA		1.29E-07	NA		NV	3.15E+00		
Copper	4.66E-02	2.55E-04	NA		1.68E-06	NA		NV	NA		
Iron	5.35E+01	2.93E-01	NA		1.93E-03	NA		NV	NA		
Lead	4.00E-02	2.19E-04	NA		1.45E-07	NA		NV	NA		
Manganese	4.33E+00	2.37E-02	NA		1.57E-04	NA		NV	NA		
Mercury	1.21E-04	6.63E-07	NA		4.38E-09	NA		NV	NA		
Molybdenum	5.64E-03	3.09E-05	NA		2.04E-07	NA		NV	NA		
Nickel	5.46E-02	2.99E-04	NA		3.95E-07	NA		NV	9.10E-01		
Selenium	1.89E-02	1.04E-04	NA		6.83E-07	NA		NV	NA		
Silver	1.20E-04	6.58E-07	NA		2.60E-09	NA		NV	NA		
Thallium	5.00E-05	2.74E-07	NA		1.81E-09	NA		NV	NA		
Vanadium	3.19E-02	1.75E-04	NA		1.16E-06	NA		NV	NA		
Zinc	3.03E-01	1.66E-03	NA		6.57E-06	NA		NV	NA		
Cyanide	6.29E-02	3.45E-04	NA		2.27E-06	NA		NV	NA		

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Pesticides/PCBs											
4,4'-DDD	5.00E-03	2.74E-05	2.40E-01	6.57E-06	1.84E-04	2.40E-01	4.41E-05	NV	2.42E-01		**5.06E-05**
4,4'-DDE	7.76E-04	4.25E-06	3.40E-01	1.45E-06	2.50E-05	3.40E-01	8.51E-06	NV	3.40E-01		**9.95E-06**
4,4'-DDT	1.80E-04	9.86E-07	3.40E-01	3.35E-07	1.09E-05	3.40E-01	3.70E-06	NV	3.40E-01		**4.03E-06**
Aldrin	4.05E-04	2.22E-06	1.70E+01	3.77E-05	1.93E-07	1.70E+01	3.28E-06	NV	1.72E+01		**4.10E-05**
alpha-BHC	3.00E-04	1.64E-06	6.30E+00	1.04E-05	6.98E-07	6.30E+00	4.39E-06	NV	6.30E+00		**1.48E-05**
alpha-Chlordane	3.34E-04	1.83E-06	1.30E+00	2.38E-06	3.62E-06	1.30E+00	4.71E-06	NV	3.50E-01		**7.08E-06**
Atrazine	2.00E-03	1.10E-05	2.30E-01	2.52E-06	1.35E-06	2.30E-01	3.11E-07	NV	NA		**2.83E-06**
beta-BHC	3.69E-04	2.02E-06	1.80E+00	3.64E-06	8.57E-07	1.80E+00	1.54E-06	NV	1.86E+00		**5.18E-06**
delta-BHC	1.60E-04	8.77E-07	NA		3.72E-07	NA		NV	NA		
Diazinon	2.60E-04	1.42E-06	NA		6.13E-07	NA		NV	NA		
Dieldrin	9.24E-04	5.06E-06	1.60E+01	8.10E-05	3.35E-06	1.60E+01	5.36E-05	NV	1.61E+01		**1.35E-04**
Endosulfan I	3.31E-04	1.81E-06	NA		4.16E-07	NA		NV	NA		
Endosulfan II	2.30E-04	1.26E-06	NA		1.80E-07	NA		NV	NA		
Endosulfan sulfate	9.20E-05	5.04E-07	NA		NA	NA		NV	NA		
Endrin	6.46E-04	3.54E-06	NA		2.35E-06	NA		NV	NA		
Endrin aldehyde	1.40E-04	7.67E-07	NA		NA	NA		NV	NA		
Endrin ketone	1.70E-04	9.32E-07	NA		NA	NA		NV	NA		
gamma-BHC	3.28E-04	1.79E-06	1.10E+00	1.97E-06	7.62E-07	1.10E+00	8.38E-07	NV	1.09E+00		**2.81E-06**
gamma-Chlordane	2.50E-04	1.37E-06	1.20E+00	1.64E-06	2.71E-06	1.20E+00	3.25E-06	NV	3.50E-01		**4.90E-06**
Heptachlor	1.11E-04	6.07E-07	4.50E+00	2.73E-06	2.74E-07	4.50E+00	1.23E-06	NV	4.55E+00		**3.96E-06**
Heptachlor epoxide	1.20E-04	6.58E-07	9.10E+00	5.98E-06	9.70E-07	9.10E+00	8.82E-06	NV	9.10E+00		**1.48E-05**
Methoxychlor	1.20E-04	6.58E-07	NA		1.50E-06	NA		NV	NA		
Aroclor-1260	9.63E-04	5.27E-06	2.00E+00	1.05E-05	1.80E-04	2.00E+00	3.59E-04	NV	2.00E+00		**3.70E-04**
SVOCs/VOCs											
1,4-Dioxane (p-dioxane)	7.80E-01	4.27E-03	2.70E-02	1.15E-04	1.54E-05	2.70E-02	4.16E-07	NV	2.70E-02		**1.16E-04**
2,4,6-Trichlorophenol	7.14E-03	3.91E-05	7.00E-02	2.74E-06	2.89E-05	7.00E-02	2.02E-06	NV	7.00E-02		**4.76E-06**
2,4-Dimethylphenol	7.87E-02	4.31E-04	NA		6.17E-05	NA		NV	NA		
2-Chlorophenol	4.30E-03	2.36E-05	NA		2.55E-06	NA		1.19E-04	NA		
2-Methylnaphthalene	2.26E-01	1.24E-03	NA		1.63E-03	NA		6.23E-03	NA		
2-Methylphenol	1.23E-01	6.73E-04	NA		6.16E-05	NA		NV	NA		
2-Nitroaniline	1.00E-02	5.48E-05	NA		3.51E-06	NA		NV	NA		
3,4-methylphenol	8.40E-01	4.60E-03	NA		4.21E-04	NA		NV	NA		
4-Chloro-3-methylphenol	2.38E-02	1.30E-04	NA		NA	NA		NV	NA		
4-Methylphenol	1.94E-01	1.06E-03	NA		9.70E-05	NA		NV	NA		
Acenaphthene	4.50E-03	2.47E-05	NA		5.24E-05	NA		1.24E-04	NA		
Acenaphthylene	9.54E-03	5.23E-05	NA		1.16E-04	NA		2.63E-04	NA		
Anthracene	3.20E-03	1.75E-05	NA		7.36E-05	NA		8.84E-05	NA		
Benzo(a)anthracene	9.00E-04	4.93E-06	1.20E+00	5.92E-06	5.97E-05	1.20E+00	7.17E-05	NV	3.85E-01		**7.76E-05**
Benzo(a)pyrene	5.00E-04	2.74E-06	1.20E+01	3.29E-05	5.69E-05	1.20E+01	6.82E-04	NV	3.85E+00		**7.15E-04**
Benzo(b)fluoranthene	7.60E-04	4.16E-06	1.20E+00	5.00E-06	8.76E-05	1.20E+00	1.05E-04	NV	3.85E-01		**1.10E-04**
Benzo(g,h,i)perylene	2.00E-04	1.10E-06	NA		4.11E-05	NA		NV	NA		
Benzo(k)fluoranthene	4.60E-04	2.52E-06	1.20E+00	3.02E-06	5.01E-05	1.20E+00	6.01E-05	NV	3.85E-01		**6.31E-05**
Biphenyl (Diphenyl)	1.30E-03	7.12E-06	NA		1.05E-05	NA		NV	NA		
bis(2-Chloroethoxy)methane	2.00E-04	1.10E-06	NA		2.43E-08	NA		5.52E-06	NA		
bis(2-Ethylhexyl)phthalate	1.69E-02	9.27E-05	1.40E-02	1.30E-06	1.70E-04	1.40E-02	2.39E-06	NV	8.40E-03		**3.68E-06**
Bromoform	1.20E-02	6.58E-05	1.10E-02	7.23E-07	4.36E-06	1.10E-02	4.80E-08	3.31E-04	3.85E-03	1.28E-06	**2.05E-06**
Caprolactam	2.40E-03	1.32E-05	NA		1.62E-07	NA		NV	NA		
Carbazole	1.25E-02	6.86E-05	NA		6.25E-05	NA		NV	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Chrysene	1.10E-03	6.03E-06	1.20E-01	7.23E-07	7.30E-05	1.20E-01	8.76E-06	NV	3.85E-02		**9.49E-06**
Dibenz(a,h)anthracene	4.50E-05	2.47E-07	7.30E+00	1.80E-06	7.90E-06	7.30E+00	5.77E-05	NV	4.20E+00		**5.95E-05**
Diethylphthalate	1.03E-02	5.64E-05	NA		5.45E-06	NA		NV	NA		
Di-n-butyl phthalate	1.17E-02	6.38E-05	NA		4.90E-05	NA		NV	NA		
Fluoranthene	2.40E-03	1.32E-05	NA		6.31E-05	NA		NV	NA		
Fluorene	2.60E-03	1.42E-05	NA		4.21E-05	NA		7.18E-05	NA		
Hexachloroethane	1.00E-03	5.48E-06	3.90E-02	2.14E-07	4.47E-06	3.90E-02	1.74E-07	NV	3.85E-01		3.88E-07
Indeno(1,2,3-c,d)pyrene	2.00E-04	1.10E-06	1.20E+00	1.32E-06	2.31E-05	1.20E+00	2.77E-05	NV	3.85E-01		**2.90E-05**
Naphthalene	1.36E-01	7.47E-04	1.20E-01	8.96E-05	4.74E-04	1.20E-01	5.69E-05	3.76E-03	1.19E-01	4.48E-04	**5.94E-04**
Nitrobenzene	2.00E-03	1.10E-05	NA		7.73E-07	NA		5.52E-05	1.40E-01	7.73E-06	**7.73E-06**
N-Nitrosodi-n-propylamine	2.00E-03	1.10E-05	7.00E+00	7.67E-05	3.51E-07	7.00E+00	2.45E-06	NV	7.00E+00		**7.92E-05**
N-Nitrosodiphenylamine	1.20E-03	6.58E-06	9.00E-03	5.92E-08	3.63E-06	9.00E-03	3.27E-08	NV	9.10E-03		9.19E-08
Pentachlorophenol	1.13E-02	6.18E-05	1.20E-01	7.42E-06	7.15E-04	1.20E-01	8.58E-05	NV	1.79E-02		**9.32E-05**
Phenanthrene	6.00E-03	3.29E-05	NA		8.59E-05	NA		NV	NA		
Pyrene	2.40E-03	1.32E-05	NA		9.29E-05	NA		6.63E-05	NA		
1,1,1-Trichloroethane	1.18E-01	6.47E-04	NA		1.18E-04	NA		3.26E-03	NA		
1,1,2,2-Tetrachloroethane	1.29E-02	7.08E-05	2.00E-01	1.42E-05	8.53E-06	2.00E-01	1.71E-06	3.57E-04	2.03E-01	7.24E-05	**8.83E-05**
1,1,2-Trichloroethane	1.33E-02	7.30E-05	7.20E-02	5.26E-06	6.53E-06	7.20E-02	4.70E-07	3.68E-04	5.70E-02	2.10E-05	**2.67E-05**
1,1-Dichloroethane	5.57E-01	3.05E-03	5.70E-03	1.74E-05	2.36E-04	5.70E-03	1.34E-06	1.54E-02	5.70E-03	8.77E-05	**1.06E-04**
1,1-Dichloroethene	4.16E-02	2.28E-04	NA		3.11E-05	NA		1.15E-03	9.10E-02	1.04E-04	**1.04E-04**
1,2,3-Trichlorobenzene	2.72E-03	1.49E-05	NA		NA	NA		7.52E-05	NA		
1,2,4-Trichlorobenzene	1.51E-02	8.27E-05	2.90E-02	2.40E-06	1.04E-04	2.90E-02	3.02E-06	4.17E-04	NA		**5.42E-06**
1,2,4-Trimethylbenzene	2.78E-01	1.52E-03	NA		1.63E-03	NA		7.67E-03	NA		
1,2-Dibromo-3-chloropropane	2.40E-03	1.32E-05	7.00E+00	9.21E-05	2.41E-06	7.00E+00	1.69E-05	6.63E-05	7.00E+00	4.64E-04	**5.73E-04**
1,2-Dichlorobenzene	7.34E-01	4.02E-03	NA		2.52E-03	NA		2.03E-02	NA		
1,2-Dichloroethane	1.44E-02	7.87E-05	9.10E-02	7.16E-06	6.08E-06	9.10E-02	5.54E-07	3.97E-04	9.10E-02	3.61E-05	**4.38E-05**
1,2-Dichloropropane	5.10E-03	2.79E-05	3.60E-02	1.01E-06	2.67E-06	3.60E-02	9.62E-08	1.41E-04	3.50E-02	4.93E-06	**6.03E-06**
1,3,5-Trimethylbenzene	1.10E-01	6.04E-04	NA		4.72E-04	NA		3.04E-03	NA		
1,3-Dichlorobenzene	2.71E-02	1.48E-04	NA		1.31E-04	NA		7.48E-04	NA		
1,4-Dichlorobenzene	2.18E-01	1.19E-03	5.40E-03	6.45E-06	7.65E-04	5.40E-03	4.13E-06	6.02E-03	3.85E-02	2.32E-04	**2.42E-04**
2-Chlorotoluene	2.89E-03	1.58E-05	NA		NA	NA		7.97E-05	NA		
2-Hexanone	2.35E-02	1.29E-04	NA		5.32E-06	NA		6.50E-04	NA		
2,2-Dichloropropane	5.00E-04	2.74E-06	NA		NA	NA		1.38E-05	NA		
Acetone	4.85E-01	2.66E-03	NA		1.32E-05	NA		1.34E-02	NA		
Benzene	4.00E-01	2.19E-03	1.00E-01	2.19E-04	3.38E-04	1.00E-01	3.38E-05	1.10E-02	1.02E-01	1.12E-03	**1.37E-03**
Carbon disulfide	3.10E-03	1.70E-05	NA		2.99E-06	NA		8.56E-05	NA		
Carbon tetrachloride	3.00E-04	1.64E-06	1.50E-01	2.47E-07	4.19E-07	1.50E-01	6.29E-08	8.28E-06	1.47E-01	1.22E-06	**1.53E-06**
Chlorobenzene	6.74E-01	3.69E-03	NA		1.26E-03	NA		1.86E-02	NA		
Chloroethane	9.74E-02	5.34E-04	NA		3.17E-05	NA		2.69E-03	2.90E-03	7.80E-06	**7.80E-06**
Chloroform	4.40E-03	2.41E-05	3.10E-02	7.47E-07	2.09E-06	3.10E-02	6.49E-08	1.22E-04	1.86E-02	2.25E-06	**3.07E-06**
Chloromethane	7.40E-03	4.05E-05	NA		1.23E-06	NA		2.04E-04	NA		
cis-1,2-Dichloroethene	1.37E+01	7.52E-02	NA		9.31E-03	NA		3.79E-01	NA		
cis-1,3-Dichloropropene	4.20E-03	2.30E-05	1.00E-01	2.30E-06	1.20E-06	1.00E-01	1.20E-07	1.16E-04	5.60E-02	6.50E-06	**8.92E-06**
Cyclohexane	1.80E-02	9.86E-05	NA		1.02E-04	NA		4.97E-04	NA		
Ethyl tert-butyl ether (ETBE)	1.20E-03	6.58E-06	NA		NA	NA		3.31E-05	NA		
Ethylbenzene	4.49E-01	2.46E-03	1.10E-02	2.71E-05	1.45E-03	1.10E-02	1.59E-05	1.24E-02	8.75E-03	1.08E-04	**1.51E-04**
Isopropyl ether	4.30E-01	2.36E-03	NA		NA	NA		1.19E-02	NA		
Isopropylbenzene (cumene)	2.71E-02	1.48E-04	NA		1.67E-04	NA		7.47E-04	NA		
Methyl acetate	2.25E-02	1.23E-04	NA		1.01E-06	NA		6.22E-04	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Methyl ethyl ketone	4.30E-01	2.36E-03	NA		2.29E-05	NA		1.19E-02	NA		
Methyl isobutyl ketone	4.86E+00	2.66E-02	NA		8.24E-04	NA		1.34E-01	NA		
Methyl tert-butyl ether	2.01E-02	1.10E-04	1.80E-03	1.99E-07	2.55E-06	1.80E-03	4.60E-09	5.56E-04	9.10E-04	5.06E-07	7.09E-07
Methylcyclohexane	2.45E-02	1.34E-04	NA		1.66E-04	NA		6.77E-04	NA		
Methylene chloride	8.19E-03	4.49E-05	1.40E-02	6.28E-07	1.68E-06	1.40E-02	2.36E-08	2.26E-04	3.50E-03	7.91E-07	**1.44E-06**
n-Butylbenzene	6.12E-03	3.35E-05	NA		NA	NA		1.69E-04	NA		
n-Propylbenzene	5.61E-02	3.08E-04	NA		NA	NA		1.55E-03	NA		
p-Cymene (p-isopropyltoluene)	7.86E-02	4.30E-04	NA		NA	NA		2.17E-03	NA		
Phenol	4.80E-02	2.63E-04	NA		1.27E-05	NA		NV	NA		
sec-Butylbenzene	5.64E-03	3.09E-05	NA		NA	NA		1.56E-04	NA		
Styrene	1.39E-02	7.63E-05	NA		3.34E-05	NA		3.85E-04	NA		
tert-Butylbenzene	2.10E-03	1.15E-05	NA		NA	NA		5.80E-05	NA		
tert-Butyl alcohol	1.17E-01	6.41E-04	NA		NA	NA		3.23E-03	NA		
Tetrachloroethene	1.20E-02	6.58E-05	5.40E-01	3.55E-05	3.74E-05	5.40E-01	2.02E-05	3.31E-04	2.07E-02	6.84E-06	**6.25E-05**
Toluene	6.11E+00	3.35E-02	NA		1.14E-02	NA		1.69E-01	NA		
trans-1,2-Dichloroethene	4.01E-01	2.20E-03	NA		1.93E-04	NA		1.11E-02	NA		
trans-1,3-Dichloropropene	4.10E-03	2.25E-05	1.00E-01	2.25E-06	1.17E-06	1.00E-01	1.17E-07	1.13E-04	5.60E-02	6.34E-06	**8.70E-06**
Trichloroethene	5.70E-02	3.12E-04	5.90E-03	1.84E-06	5.17E-05	5.90E-03	3.05E-07	1.57E-03	7.00E-03	1.10E-05	**1.32E-05**
Vinyl chloride	1.63E+00	8.91E-03	7.20E-01	6.42E-03	4.82E-04	7.20E-01	3.47E-04	4.49E-02	2.73E-01	1.23E-02	**1.90E-02**
m,p-Xylenes	9.44E-01	5.17E-03	NA		NA	NA		2.61E-02	NA		
o-Xylene	4.45E-01	2.44E-03	NA		2.07E-03	NA		1.23E-02	NA		
Xylenes, total	1.60E+00	8.77E-03	NA		5.59E-03	NA		4.42E-02	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	4.64E-07	2.54E-09	1.50E+03	3.82E-06	9.46E-08	1.50E+03	1.42E-04	NV	1.50E+03		**1.46E-04**
1,2,3,4,6,7,8-HpCDF	9.49E-08	5.20E-10	1.50E+03	7.80E-07	1.74E-08	1.50E+03	2.62E-05	NV	1.50E+03		**2.69E-05**
1,2,3,4,7,8,9-HpCDF	9.79E-09	5.36E-11	1.50E+03	8.05E-08	1.80E-09	1.50E+03	2.70E-06	NV	1.50E+03		**2.78E-06**
1,2,3,4,7,8-HxCDD	2.62E-09	1.44E-11	1.50E+04	2.16E-07	4.28E-10	1.50E+04	6.42E-06	NV	1.50E+04		**6.64E-06**
1,2,3,4,7,8-HxCDF	8.49E-09	4.65E-11	1.50E+04	6.98E-07	1.25E-09	1.50E+04	1.87E-05	NV	1.50E+04		**1.94E-05**
1,2,3,6,7,8-HxCDD	1.33E-08	7.28E-11	1.50E+04	1.09E-06	2.17E-09	1.50E+04	3.25E-05	NV	1.50E+04		**3.36E-05**
1,2,3,6,7,8-HxCDF	1.62E-09	8.86E-12	1.50E+04	1.33E-07	2.38E-10	1.50E+04	3.57E-06	NV	1.50E+04		**3.70E-06**
1,2,3,7,8,9-HxCDD	4.40E-09	2.41E-11	1.50E+04	3.62E-07	7.18E-10	1.50E+04	1.08E-05	NV	1.50E+04		**1.11E-05**
1,2,3,7,8,9-HxCDF	3.87E-09	2.12E-11	1.50E+04	3.18E-07	5.69E-10	1.50E+04	8.53E-06	NV	1.50E+04		**8.85E-06**
1,2,3,7,8-PeCDD	1.08E-09	5.91E-12	1.50E+05	8.87E-07	1.41E-10	1.50E+05	2.11E-05	NV	1.50E+05		**2.20E-05**
1,2,3,7,8-PeCDF	2.28E-09	1.25E-11	7.50E+03	9.37E-08	2.69E-10	7.50E+03	2.01E-06	NV	7.50E+03		**2.11E-06**
2,3,4,6,7,8-HxCDF	3.94E-09	2.16E-11	1.50E+04	3.24E-07	5.80E-10	1.50E+04	8.71E-06	NV	1.50E+04		**9.03E-06**
2,3,4,7,8-PeCDF	2.64E-09	1.44E-11	7.50E+04	1.08E-06	3.11E-10	7.50E+04	2.33E-05	NV	7.50E+04		**2.44E-05**
2,3,7,8-TCDF	1.68E-09	9.20E-12	1.50E+04	1.38E-07	1.59E-10	1.50E+04	2.38E-06	NV	1.50E+04		**2.52E-06**
OCDF	7.44E-07	4.07E-09	1.50E+01	6.11E-08	1.71E-07	1.50E+01	2.56E-06	NV	1.50E+01		**2.62E-06**
OCDD	2.18E-06	1.19E-08	1.50E+01	1.79E-07	5.54E-07	1.50E+01	8.32E-06	NV	1.50E+01		**8.50E-06**
			Total Risk:	9.74E-03		**Total Risk:**	2.44E-03		**Total Risk:**	1.50E-02	**2.72E-02**

Total Estimated Carcinogenic Risk Across All Exposure Routes : 2.7E-02

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constant.

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

NV = Chemical classified as Nonvolatile thus no CDI was calculated.

Table 2-9
Risk Calculation Worksheet for Groundwater - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for dermal exposure	ET_d	1	hr/day
Exposure Time for inhalation of volatiles	ET_i	24	hr/day
Exposure Duration	ED	6	years
Ingestion Rate	IngR	1	L/day
Inhalation Rate	InhR	0.42	m3/hr
Volatilization Factor	VFw	0.5	L/m3
Skin Surface Area	SA	6600	cm2
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor 1	CF1	1.00E-03	L/cm3
Conversion Factor 2	CF2	1.00E+06	cm3/m3
Conversion Factor 3	CF3	2.74E-03	yr/day
Constituent Specific Permeability Constant	Kp	Chemical Specific	cm/hr

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	9.40E+00	6.01E-01	1.00E+00	6.01E-01	3.96E-03	1.00E+00	3.96E-03	NV	1.40E-03		**6.05E-01**
Antimony	1.51E-03	9.67E-05	4.00E-04	2.42E-01	6.38E-07	4.00E-04	1.59E-03	NV	NA		**2.43E-01**
Arsenic	2.87E-01	1.83E-02	3.00E-04	6.11E+01	1.21E-04	3.00E-04	4.03E-01	NV	4.29E-06		**6.15E+01**
Barium	1.68E-01	1.07E-02	2.00E-01	5.36E-02	7.07E-05	2.00E-01	3.54E-04	NV	1.43E-04		5.39E-02
Beryllium	7.64E-04	4.88E-05	2.00E-03	2.44E-02	3.22E-07	2.00E-03	1.61E-04	NV	2.00E-06		2.46E-02
Boron	4.31E+00	2.75E-01	2.00E-01	1.38E+00	1.82E-03	2.00E-01	9.09E-03	NV	5.70E-03		**1.39E+00**
Cadmium	1.26E-03	8.03E-05	1.10E-05	7.30E+00	5.30E-07	1.10E-05	4.82E-02	NV	2.86E-06		**7.35E+00**
Chromium	3.57E-02	2.28E-03	NA		1.51E-05	NA		NV	NA		
Chromium (VI)	3.50E-04	2.24E-05	3.00E-03	7.46E-03	2.95E-07	3.00E-03	9.84E-05	NV	2.86E-05		7.56E-03
Cobalt	8.89E-03	5.68E-04	3.00E-04	1.89E+00	1.50E-06	3.00E-04	5.00E-03	NV	1.71E-06		**1.90E+00**
Copper	4.66E-02	2.98E-03	4.00E-02	7.44E-02	1.97E-05	4.00E-02	4.91E-04	NV	NA		7.49E-02
Iron	5.35E+01	3.42E+00	7.00E-01	4.89E+00	2.26E-02	7.00E-01	3.22E-02	NV	NA		**4.92E+00**
Lead	4.00E-02	2.56E-03	NA		1.69E-06	NA		NV	NA		
Manganese	4.33E+00	2.77E-01	2.40E-02	1.15E+01	1.83E-03	2.40E-02	7.61E-02	NV	1.43E-05		**1.16E+01**
Mercury	1.21E-04	7.74E-06	3.00E-04	2.58E-02	5.11E-08	3.00E-04	1.70E-04	NV	NA		2.60E-02
Molybdenum	5.64E-03	3.60E-04	5.00E-03	7.21E-02	2.38E-06	5.00E-03	4.76E-04	NV	NA		7.25E-02
Nickel	5.46E-02	3.49E-03	1.10E-02	3.17E-01	4.61E-06	1.10E-02	4.19E-04	NV	2.57E-05		**3.18E-01**
Selenium	1.89E-02	1.21E-03	5.00E-03	2.42E-01	7.97E-06	5.00E-03	1.59E-03	NV	5.71E-03		**2.43E-01**
Silver	1.20E-04	7.67E-06	5.00E-03	1.53E-03	3.04E-08	5.00E-03	6.08E-06	NV	NA		1.54E-03
Thallium	5.00E-05	3.20E-06	6.60E-05	4.84E-02	2.11E-08	6.60E-05	3.20E-04	NV	NA		4.87E-02
Vanadium	3.19E-02	2.04E-03	5.00E-03	4.08E-01	1.35E-05	5.00E-03	2.70E-03	NV	NA		**4.11E-01**
Zinc	3.03E-01	1.94E-02	3.00E-01	6.46E-02	7.67E-05	3.00E-01	2.56E-04	NV	NA		6.48E-02
Cyanide	6.29E-02	4.02E-03	2.00E-02	2.01E-01	2.65E-05	2.00E-02	1.33E-03	NV	NA		**2.02E-01**
Pesticides/PCBs											
4,4'-DDD	5.00E-03	3.19E-04	NA		2.14E-03	NA		NV	NA		
4,4'-DDE	7.76E-04	4.96E-05	NA		2.92E-04	NA		NV	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
4,4'-DDT	1.80E-04	1.15E-05	5.00E-04	2.30E-02	1.27E-04	5.00E-04	2.54E-01	NV	NA		**2.77E-01**
Aldrin	4.05E-04	2.59E-05	3.00E-05	8.62E-01	2.25E-06	3.00E-05	7.51E-02	NV	NA		**9.37E-01**
alpha-BHC	3.00E-04	1.92E-05	5.00E-04	3.84E-02	8.14E-06	5.00E-04	1.63E-02	NV	NA		5.46E-02
alpha-Chlordane	3.34E-04	2.13E-05	3.30E-05	6.47E-01	4.22E-05	3.30E-05	1.28E+00	NV	2.00E-04		**1.93E+00**
Atrazine	2.00E-03	1.28E-04	6.00E-03	2.13E-02	1.58E-05	6.00E-03	2.63E-03	NV	NA		2.39E-02
beta-BHC	3.69E-04	2.36E-05	NA		1.00E-05	NA		NV	NA		
delta-BHC	1.60E-04	1.02E-05	NA		4.34E-06	NA		NV	NA		
Diazinon	2.60E-04	1.66E-05	7.00E-04	2.37E-02	7.15E-06	7.00E-04	1.02E-02	NV	NA		3.39E-02
Dieldrin	9.24E-04	5.90E-05	5.00E-05	1.18E+00	3.91E-05	5.00E-05	7.82E-01	NV	NA		**1.96E+00**
Endosulfan I	3.31E-04	2.12E-05	6.00E-03	3.53E-03	4.85E-06	6.00E-03	8.09E-04	NV	NA		4.34E-03
Endosulfan II	2.30E-04	1.47E-05	6.00E-03	2.45E-03	2.10E-06	6.00E-03	3.51E-04	NV	NA		2.80E-03
Endosulfan sulfate	9.20E-05	5.88E-06	6.00E-03	9.80E-04	NA	6.00E-03		NV	NA		9.80E-04
Endrin	6.46E-04	4.13E-05	3.00E-04	1.38E-01	2.74E-05	3.00E-04	9.12E-02	NV	NA		**2.29E-01**
Endrin aldehyde	1.40E-04	8.95E-06	3.00E-04	2.98E-02	NA	3.00E-04		NV	NA		2.98E-02
Endrin ketone	1.70E-04	1.09E-05	3.00E-04	3.62E-02	NA	3.00E-04		NV	NA		3.62E-02
gamma-BHC	3.28E-04	2.09E-05	3.00E-04	6.98E-02	8.88E-06	3.00E-04	2.96E-02	NV	NA		9.94E-02
gamma-Chlordane	2.50E-04	1.60E-05	3.30E-05	4.84E-01	3.16E-05	3.30E-05	9.59E-01	NV	2.00E-04		**1.44E+00**
Heptachlor	1.11E-04	7.08E-06	3.00E-05	2.36E-01	3.20E-06	3.00E-05	1.07E-01	NV	NA		**3.43E-01**
Heptachlor epoxide	1.20E-04	7.67E-06	1.30E-05	5.90E-01	1.13E-05	1.30E-05	8.70E-01	NV	NA		**1.46E+00**
Methoxychlor	1.20E-04	7.67E-06	2.00E-05	3.84E-01	1.75E-05	2.00E-05	8.73E-01	NV	NA		**1.26E+00**
Aroclor-1260	9.63E-04	6.15E-05	2.00E-05	3.08E+00	2.10E-03	2.00E-05	1.05E+02	NV	NA		**1.08E+02**
SVOCs/VOCs											
1,4-Dioxane (p-dioxane)	7.80E-01	4.99E-02	1.00E-01	4.99E-01	1.80E-04	1.00E-01	1.80E-03	NV	8.57E-01		**5.00E-01**
2,4,6-Trichlorophenol	7.14E-03	4.56E-04	1.00E-03	4.56E-01	3.37E-04	1.00E-03	3.37E-01	NV	NA		**7.94E-01**
2,4-Dimethylphenol	7.87E-02	5.03E-03	2.00E-02	2.51E-01	7.20E-04	2.00E-02	3.60E-02	NV	NA		**2.87E-01**
2-Chlorophenol	4.30E-03	2.75E-04	5.00E-03	5.50E-02	2.98E-05	5.00E-03	5.96E-03	1.39E-03	NA		6.09E-02
2-Methylnaphthalene	2.26E-01	1.44E-02	4.00E-03	3.60E+00	1.91E-02	4.00E-03	4.77E+00	7.27E-02	NA		**8.37E+00**
2-Methylphenol	1.23E-01	7.86E-03	5.00E-02	1.57E-01	7.18E-04	5.00E-02	1.44E-02	NV	1.71E-01		**1.71E-01**
2-Nitroaniline	1.00E-02	6.39E-04	1.00E-02	6.39E-02	4.09E-05	1.00E-02	4.09E-03	NV	1.43E-05		6.80E-02
3,4-methylphenol	8.40E-01	5.37E-02	5.00E-03	1.07E+01	4.91E-03	5.00E-03	9.82E-01	NV	1.71E-01		**1.17E+01**
4-Chloro-3-methylphenol	2.38E-02	1.52E-03	NA		NA	NA		NV	NA		
4-Methylphenol	1.94E-01	1.24E-02	5.00E-03	2.48E+00	1.13E-03	5.00E-03	2.26E-01	NV	1.71E-01		**2.70E+00**
Acenaphthene	4.50E-03	2.88E-04	6.00E-02	4.79E-03	6.12E-04	6.00E-02	1.02E-02	1.45E-03	NA		1.50E-02
Acenaphthylene	9.54E-03	6.10E-04	NA		1.36E-03	NA		3.07E-03	NA		
Anthracene	3.20E-03	2.05E-04	3.00E-01	6.82E-04	8.59E-04	3.00E-01	2.86E-03	1.03E-03	NA		3.55E-03
Benzo(a)anthracene	9.00E-04	5.75E-05	NA		6.97E-04	NA		NV	NA		
Benzo(a)pyrene	5.00E-04	3.20E-05	NA		6.63E-04	NA		NV	NA		
Benzo(b)fluoranthene	7.60E-04	4.86E-05	NA		1.02E-03	NA		NV	NA		
Benzo(g,h,i)perylene	2.00E-04	1.28E-05	NA		4.79E-04	NA		NV	NA		
Benzo(k)fluoranthene	4.60E-04	2.94E-05	NA		5.84E-04	NA		NV	NA		
Biphenyl (Diphenyl)	1.30E-03	8.31E-05	5.00E-02	1.66E-03	1.22E-04	5.00E-02	2.44E-03	NV	NA		4.10E-03
bis(2-Chloroethoxy)methane	2.00E-04	1.28E-05	3.00E-03	4.26E-03	2.83E-07	3.00E-03	9.44E-05	6.44E-05	NA		4.36E-03
bis(2-Ethylhexyl)phthalate	1.69E-02	1.08E-03	2.00E-02	5.41E-02	1.99E-03	2.00E-02	9.94E-02	NV	NA		**1.53E-01**
Bromoform	1.20E-02	7.67E-04	2.00E-02	3.84E-02	5.09E-05	2.00E-02	2.55E-03	3.87E-03	NA		4.09E-02
Caprolactam	2.40E-03	1.53E-04	5.00E-01	3.07E-04	1.89E-06	5.00E-01	3.78E-06	NV	NA		3.11E-04
Carbazole	1.25E-02	8.01E-04	NA		7.29E-04	NA		NV	NA		
Chrysene	1.10E-03	7.03E-05	NA		8.52E-04	NA		NV	NA		
Dibenz(a,h)anthracene	4.50E-05	2.88E-06	NA		9.22E-05	NA		NV	NA		
Diethylphthalate	1.03E-02	6.59E-04	8.00E-01	8.23E-04	6.36E-05	8.00E-01	7.95E-05	NV	NA		9.03E-04
Di-n-butyl phthalate	1.17E-02	7.45E-04	1.00E-01	7.45E-03	5.71E-04	1.00E-01	5.71E-03	NV	NA		1.32E-02
Fluoranthene	2.40E-03	1.53E-04	4.00E-02	3.84E-03	7.36E-04	4.00E-02	1.84E-02	NV	NA		2.22E-02
Fluorene	2.60E-03	1.66E-04	4.00E-02	4.16E-03	4.91E-04	4.00E-02	1.23E-02	8.38E-04	NA		1.64E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Hexachloroethane	1.00E-03	6.39E-05	1.00E-03	6.39E-02	5.22E-05	1.00E-03	5.22E-02	NV	NA		**1.16E-01**
Indeno(1,2,3-c,d)pyrene	2.00E-04	1.28E-05	NA		2.69E-04	NA		NV	NA		
Naphthalene	1.36E-01	8.71E-03	2.00E-02	4.35E-01	5.53E-03	2.00E-02	2.77E-01	4.39E-02	8.57E-04	5.12E+01	**5.19E+01**
Nitrobenzene	2.00E-03	1.28E-04	2.00E-03	6.39E-02	9.02E-06	2.00E-03	4.51E-03	6.44E-04	2.57E-03	2.51E-01	**3.19E-01**
N-Nitrosodi-n-propylamine	2.00E-03	1.28E-04	NA		4.09E-06	NA		NV	NA		
N-Nitrosodiphenylamine	1.20E-03	7.67E-05	2.00E-02	3.84E-03	4.24E-05	2.00E-02	2.12E-03	NV	2.00E-02		5.95E-03
Pentachlorophenol	1.13E-02	7.21E-04	1.00E-03	7.21E-01	8.34E-03	1.00E-03	8.34E+00	NV	3.00E-02		**9.07E+00**
Phenanthrene	6.00E-03	3.84E-04	NA		1.00E-03	NA		NV	NA		
Pyrene	2.40E-03	1.53E-04	3.00E-02	5.11E-03	1.08E-03	3.00E-02	3.61E-02	7.73E-04	NA		4.12E-02
1,1,1-Trichloroethane	1.18E-01	7.54E-03	2.00E+00	3.77E-03	1.37E-03	2.00E+00	6.86E-04	3.80E-02	1.43E+00	2.66E-02	3.11E-02
1,1,2,2-Tetrachloroethane	1.29E-02	8.26E-04	4.00E-03	2.06E-01	9.95E-05	4.00E-03	2.49E-02	4.16E-03	6.00E-02	6.94E-02	**3.01E-01**
1,1,2-Trichloroethane	1.33E-02	8.52E-04	4.00E-03	2.13E-01	7.62E-05	4.00E-03	1.91E-02	4.29E-03	NA		**2.32E-01**
1,1-Dichloroethane	5.57E-01	3.56E-02	2.00E-01	1.78E-01	2.75E-03	2.00E-01	1.38E-02	1.79E-01	NA		**1.92E-01**
1,1-Dichloroethene	4.16E-02	2.66E-03	5.00E-02	5.32E-02	3.63E-04	5.00E-02	7.26E-03	1.34E-02	2.00E-02	6.70E-01	**7.30E-01**
1,2,3-Trichlorobenzene	2.72E-03	1.74E-04	NA		NA	NA		8.77E-04	NA		
1,2,4-Trichlorobenzene	1.51E-02	9.65E-04	1.00E-02	9.65E-02	1.21E-03	1.00E-02	1.21E-01	4.86E-03	5.71E-04	8.51E+00	**8.73E+00**
1,2,4-Trimethylbenzene	2.78E-01	1.77E-02	7.00E-03	2.54E+00	1.91E-02	7.00E-03	2.72E+00	8.94E-02	NA		**5.26E+00**
1,2-Dibromo-3-chloropropane	2.40E-03	1.53E-04	2.00E-04	7.67E-01	2.82E-05	2.00E-04	1.41E-01	7.73E-04	5.71E-05	1.35E+01	**1.44E+01**
1,2-Dichlorobenzene	7.34E-01	4.70E-02	9.00E-02	5.22E-01	2.94E-02	9.00E-02	3.26E-01	2.37E-01	5.71E-02	4.14E+00	**4.99E+00**
1,2-Dichloroethane	1.44E-02	9.18E-04	2.00E-02	4.59E-02	7.10E-05	2.00E-02	3.55E-03	4.63E-03	6.86E-01	6.75E-03	5.62E-02
1,2-Dichloropropane	5.10E-03	3.26E-04	9.00E-02	3.62E-03	3.12E-05	9.00E-02	3.46E-04	1.64E-03	1.14E-03	1.44E+00	**1.44E+00**
1,3,5-Trimethylbenzene	1.10E-01	7.05E-03	1.00E-02	7.05E-01	5.50E-03	1.00E-02	5.50E-01	3.55E-02	NA		**1.25E+00**
1,3-Dichlorobenzene	2.71E-02	1.73E-03	NA		1.53E-03	NA		8.73E-03	NA		
1,4-Dichlorobenzene	2.18E-01	1.39E-02	7.00E-02	1.99E-01	8.93E-03	7.00E-02	1.28E-01	7.02E-02	2.29E-01	3.07E-01	**6.33E-01**
2-Chlorotoluene	2.89E-03	1.84E-04	2.00E-02	9.22E-03	NA	2.00E-02		9.30E-04	NA		9.22E-03
2-Hexanone	2.35E-02	1.51E-03	5.00E-03	3.01E-01	6.21E-05	5.00E-03	1.24E-02	7.59E-03	8.57E-03	8.85E-01	**1.20E+00**
2,2-Dichloropropane	5.00E-04	3.20E-05	NA		NA	NA		1.61E-04	NA		
Acetone	4.85E-01	3.10E-02	9.00E-01	3.45E-02	1.54E-04	9.00E-01	1.71E-04	1.56E-01	8.86E+00	1.77E-02	5.23E-02
Benzene	4.00E-01	2.56E-02	4.00E-03	6.39E+00	3.94E-03	4.00E-03	9.85E-01	1.29E-01	8.57E-03	1.50E+01	**2.24E+01**
Carbon disulfide	3.10E-03	1.98E-04	1.00E-01	1.98E-03	3.49E-05	1.00E-01	3.49E-04	9.99E-04	2.00E-01	4.99E-03	7.32E-03
Carbon tetrachloride	3.00E-04	1.92E-05	4.00E-03	4.79E-03	4.89E-06	4.00E-03	1.22E-03	9.67E-05	1.14E-02	8.46E-03	1.45E-02
Chlorobenzene	6.74E-01	4.31E-02	2.00E-02	2.15E+00	1.48E-02	2.00E-02	7.38E-01	2.17E-01	1.43E-02	1.52E+01	**1.81E+01**
Chloroethane	9.74E-02	6.23E-03	NA		3.69E-04	NA		3.14E-02	2.86E+00	1.10E-02	1.10E-02
Chloroform	4.40E-03	2.81E-04	1.00E-02	2.81E-02	2.44E-05	1.00E-02	2.44E-03	1.42E-03	2.80E-02	5.06E-02	8.12E-02
Chloromethane	7.40E-03	4.73E-04	NA		1.44E-05	NA		2.38E-03	2.57E-02	9.27E-02	9.27E-02
cis-1,2-Dichloroethene	1.37E+01	8.77E-01	1.00E-02	8.77E+01	1.09E-01	1.00E-02	1.09E+01	4.42E+00	NA		**9.86E+01**
cis-1,3-Dichloropropene	4.20E-03	2.68E-04	3.00E-02	8.95E-03	1.40E-05	3.00E-02	4.66E-04	1.35E-03	5.71E-03	2.37E-01	**2.46E-01**
Cyclohexane	1.80E-02	1.15E-03	NA		1.19E-03	NA		5.80E-03	1.71E+00	3.38E-03	3.38E-03
Ethyl tert-butyl ether (ETBE)	1.20E-03	7.67E-05	NA		NA	NA		3.87E-04	NA		
Ethylbenzene	4.49E-01	2.87E-02	1.00E-01	2.87E-01	1.69E-02	1.00E-01	1.69E-01	1.45E-01	2.86E-01	5.06E-01	**9.62E-01**
Isopropyl ether	4.30E-01	2.75E-02	NA		NA	NA		1.39E-01	NA		
Isopropylbenzene (cumene)	2.71E-02	1.73E-03	1.00E-01	1.73E-02	1.95E-03	1.00E-01	1.95E-02	8.72E-03	1.14E-01	7.63E-02	**1.13E-01**
Methyl acetate	2.25E-02	1.44E-03	1.00E+00	1.44E-03	1.18E-05	1.00E+00	1.18E-05	7.26E-03	NA		1.45E-03
Methyl ethyl ketone	4.30E-01	2.75E-02	6.00E-01	4.58E-02	2.67E-04	6.00E-01	4.44E-04	1.39E-01	1.43E+00	9.70E-02	**1.43E-01**
Methyl isobutyl ketone	4.86E+00	3.11E-01	8.00E-02	3.88E+00	9.61E-03	8.00E-02	1.20E-01	1.57E+00	8.57E-01	1.83E+00	**5.83E+00**
Methyl tert-butyl ether	2.01E-02	1.29E-03	NA		2.98E-05	NA		6.49E-03	8.57E-01	7.57E-03	7.57E-03
Methylcyclohexane	2.45E-02	1.57E-03	NA		1.94E-03	NA		7.90E-03	8.60E-01	9.19E-03	9.19E-03
Methylene chloride	8.19E-03	5.23E-04	6.00E-02	8.72E-03	1.96E-05	6.00E-02	3.27E-04	2.64E-03	2.86E-01	9.23E-03	1.83E-02
n-Butylbenzene	6.12E-03	3.91E-04	4.00E-02	9.77E-03	NA	4.00E-02		1.97E-03	NA		9.77E-03
n-Propylbenzene	5.61E-02	3.59E-03	4.00E-02	8.97E-02	NA	4.00E-02		1.81E-02	NA		8.97E-02
p-Cymene (p-isopropyltoluene)	7.86E-02	5.02E-03	NA		NA	NA		2.53E-02	NA		
Phenol	4.80E-02	3.07E-03	3.00E-01	1.02E-02	1.48E-04	3.00E-01	4.95E-04	NV	5.71E-02		1.07E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
sec-Butylbenzene	5.64E-03	3.60E-04	4.00E-02	9.01E-03	NA	4.00E-02		1.82E-03	4.00E-02	4.54E-02	5.44E-02
Styrene	1.39E-02	8.90E-04	2.00E-01	4.45E-03	3.90E-04	2.00E-01	1.95E-03	4.49E-03	2.57E-01	1.74E-02	2.38E-02
tert-Butylbenzene	2.10E-03	1.34E-04	4.00E-02	3.36E-03	NA	4.00E-02		6.77E-04	NA		3.36E-03
tert-Butyl alcohol	1.17E-01	7.47E-03	1.00E-01	7.47E-02	NA	1.00E-01		3.77E-02	2.60E-03	1.45E+01	**1.46E+01**
Tetrachloroethene	1.20E-02	7.67E-04	1.00E-02	7.67E-02	4.36E-04	1.00E-02	4.36E-02	3.87E-03	1.00E-02	3.87E-01	**5.07E-01**
Toluene	6.11E+00	3.91E-01	8.00E-02	4.88E+00	1.33E-01	8.00E-02	1.66E+00	1.97E+00	8.57E-02	2.30E+01	**2.95E+01**
trans-1,2-Dichloroethene	4.01E-01	2.57E-02	2.00E-02	1.28E+00	2.25E-03	2.00E-02	1.13E-01	1.29E-01	1.71E-02	7.54E+00	**8.94E+00**
trans-1,3-Dichloropropene	4.10E-03	2.62E-04	3.00E-02	8.74E-03	1.36E-05	3.00E-02	4.55E-04	1.32E-03	5.71E-03	2.31E-01	**2.40E-01**
Trichloroethene	5.70E-02	3.64E-03	3.00E-04	1.21E+01	6.03E-04	3.00E-04	2.01E+00	1.84E-02	1.00E-02	1.84E+00	**1.60E+01**
Vinyl chloride	1.63E+00	1.04E-01	3.00E-03	3.47E+01	5.62E-03	3.00E-03	1.87E+00	5.24E-01	2.86E-02	1.83E+01	**5.49E+01**
m,p-Xylenes	9.44E-01	6.04E-02	2.00E-01	3.02E-01	NA	2.00E-01		3.04E-01	2.00E-01	1.52E+00	**1.82E+00**
o-Xylene	4.45E-01	2.84E-02	2.00E-01	1.42E-01	2.42E-02	2.00E-01	1.21E-01	1.43E-01	2.00E-01	7.16E-01	**9.79E-01**
Xylenes, total	1.60E+00	1.02E-01	2.00E-01	5.11E-01	6.52E-02	2.00E-01	3.26E-01	5.16E-01	2.86E-02	1.80E+01	**1.89E+01**
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	4.64E-07	2.97E-08	NA		1.10E-06	NA		NV	1.14E-08		
1,2,3,4,6,7,8-HpCDF	9.49E-08	6.07E-09	NA		2.03E-07	NA		NV	1.14E-08		
1,2,3,4,7,8,9-HpCDF	9.79E-09	6.26E-10	NA		2.10E-08	NA		NV	1.14E-08		
1,2,3,4,7,8-HxCDD	2.62E-09	1.68E-10	NA		4.99E-09	NA		NV	1.14E-08		
1,2,3,4,7,8-HxCDF	8.49E-09	5.43E-10	NA		1.46E-08	NA		NV	1.14E-08		
1,2,3,6,7,8-HxCDD	1.33E-08	8.50E-10	NA		2.53E-08	NA		NV	1.14E-08		
1,2,3,6,7,8-HxCDF	1.62E-09	1.03E-10	NA		2.78E-09	NA		NV	1.14E-08		
1,2,3,7,8,9-HxCDD	4.40E-09	2.81E-10	NA		8.38E-09	NA		NV	1.14E-08		
1,2,3,7,8,9-HxCDF	3.87E-09	2.47E-10	NA		6.64E-09	NA		NV	1.14E-08		
1,2,3,7,8-PeCDD	1.08E-09	6.90E-11	NA		1.64E-09	NA		NV	1.14E-08		
1,2,3,7,8-PeCDF	2.28E-09	1.46E-10	NA		3.13E-09	NA		NV	1.14E-08		
2,3,4,6,7,8-HxCDF	3.94E-09	2.52E-10	NA		6.77E-09	NA		NV	1.14E-08		
2,3,4,7,8-PeCDF	2.64E-09	1.69E-10	NA		3.62E-09	NA		NV	1.14E-08		
2,3,7,8-TCDF	1.68E-09	1.07E-10	NA		1.85E-09	NA		NV	1.14E-08		
OCDF	7.44E-07	4.75E-08	NA		1.99E-06	NA		NV	1.14E-08		
OCDD	2.18E-06	1.39E-07	NA		6.47E-06	NA		NV	1.14E-08		
		Total Hazard Index:		2.79E+02	**Total Hazard Index:**		1.49E+02	**Total Hazard Index:**		2.00E+02	**6.28E+02**

Total Estimated Hazard Index Across All Exposure Routes : 628

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constant.

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

NV = Chemical classified as Nonvolatile thus no CDI was calculated.

Table 2-10
Cancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**4.0E-03**	**2.1E-05**		**4.1E-03**	9%	**2.4E-03**	**1.6E-05**		2.4E-03	9%
Chromium (VI)	**1.6E-06**	1.7E-08		**1.7E-06**	0%	9.6E-07	1.3E-08		9.7E-07	0%
Subtotal Metals	**4.0E-03**	**2.1E-05**		**4.1E-03**	9%	**2.4E-03**	**1.6E-05**		2.4E-03	9%
Pesticides/PCBs										
4,4'-DDD	**1.1E-05**	**7.8E-05**		**9.0E-05**	0.2%	**6.6E-06**	**4.4E-05**		5.1E-05	0.2%
4,4'-DDE	**2.5E-06**	**1.5E-05**		**1.8E-05**	0.04%	**1.4E-06**	**8.5E-06**		1.0E-05	0.04%
4,4'-DDT	5.7E-07	**6.6E-06**		**7.2E-06**	0.015%	3.4E-07	**3.7E-06**		4.0E-06	0.015%
Aldrin	**6.5E-05**	**5.8E-06**		**7.0E-05**	0.2%	**3.8E-05**	**3.3E-06**		4.1E-05	0.2%
alpha-BHC	**1.8E-05**	**7.8E-06**		**2.6E-05**	0.06%	**1.0E-05**	**4.4E-06**		1.5E-05	0.05%
alpha-Chlordane	**4.1E-06**	**8.4E-06**		**1.2E-05**	0.03%	**2.4E-06**	**4.7E-06**		7.1E-06	0.03%
Atrazine	**4.3E-06**	5.5E-07		**4.9E-06**	0.010%	**2.5E-06**	3.1E-07		2.8E-06	0.010%
beta-BHC	**6.2E-06**	**2.7E-06**		**9.0E-06**	0.02%	**3.6E-06**	**1.5E-06**		5.2E-06	0.02%
Dieldrin	**1.4E-04**	**9.5E-05**		**2.3E-04**	0.5%	**8.1E-05**	**5.4E-05**		1.3E-04	0.5%
gamma-BHC	**3.4E-06**	**1.5E-06**		**4.9E-06**	0.011%	**2.0E-06**	8.4E-07		2.8E-06	0.010%
gamma-Chlordane	**2.8E-06**	**5.8E-06**		**8.6E-06**	0.02%	**1.6E-06**	**3.3E-06**		4.9E-06	0.02%
Heptachlor	**4.7E-06**	**2.2E-06**		**6.9E-06**	0.015%	**2.7E-06**	**1.2E-06**		4.0E-06	0.015%
Heptachlor epoxide	**1.0E-05**	**1.6E-05**		**2.6E-05**	0.06%	**6.0E-06**	**8.8E-06**		1.5E-05	0.05%
Aroclor-1260	**1.8E-05**	**6.4E-04**		**6.6E-04**	1.4%	**1.1E-05**	**3.6E-04**		3.7E-04	1.4%
Subtotal Pesticides/PCBs	**2.9E-04**	**8.9E-04**		**1.2E-03**	3%	**1.7E-04**	**5.0E-04**		6.7E-04	2%
SVOCs/VOCs										
1,4-Dioxane (p-dioxane)	**2.0E-04**	7.1E-07		**2.0E-04**	0.4%	**1.2E-04**	4.2E-07		1.2E-04	0.4%
2,4,6-Trichlorophenol	**4.7E-06**	**3.6E-06**		**8.3E-06**	0.02%	**2.7E-06**	**2.0E-06**		4.8E-06	0.02%
Benzo(a)anthracene	**1.0E-05**	**1.3E-04**		**1.4E-04**	0.3%	**5.9E-06**	**7.2E-05**		7.8E-05	0.3%
Benzo(a)pyrene	**5.6E-05**	**1.2E-03**		**1.3E-03**	3%	**3.3E-05**	**6.8E-04**		7.2E-04	3%
Benzo(b)fluoranthene	**8.6E-06**	**1.9E-04**		**2.0E-04**	0.4%	**5.0E-06**	**1.1E-04**		1.1E-04	0.4%
Benzo(k)fluoranthene	**5.2E-06**	**1.1E-04**		**1.1E-04**	0.2%	**3.0E-06**	**6.0E-05**		6.3E-05	0.2%
bis(2-Ethylhexyl)phthalate	**2.2E-06**	**4.2E-06**		**6.5E-06**	0.014%	**1.3E-06**	**2.4E-06**		3.7E-06	0.014%
Bromoform	**1.2E-06**	8.5E-08	**2.2E-06**	**3.5E-06**	0.008%	7.2E-07	4.8E-08	**1.3E-06**	2.0E-06	0.008%
Chrysene	**1.2E-06**	**1.6E-05**		**1.7E-05**	0.04%	7.2E-07	**8.8E-06**		9.5E-06	0.03%
Dibenz(a,h)anthracene	**3.1E-06**	**1.0E-04**		**1.1E-04**	0.2%	**1.8E-06**	**5.8E-05**		5.9E-05	0.2%
Indeno(1,2,3-c,d)pyrene	**2.3E-06**	**4.9E-05**		**5.2E-05**	0.11%	**1.3E-06**	**2.8E-05**		2.9E-05	0.11%

Table 2-10
Cancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Naphthalene	**1.5E-04**	**1.0E-04**	**7.6E-04**	**1.0E-03**	2%	**9.0E-05**	**5.7E-05**	**4.5E-04**	5.9E-04	2%
Nitrobenzene			**1.3E-05**	**1.3E-05**	0%			**7.7E-06**	7.7E-06	0%
N-Nitrosodi-n-propylamine	**1.3E-04**	**4.4E-06**		**1.4E-04**	0.3%	**7.7E-05**	**2.5E-06**		7.9E-05	0.3%
Pentachlorophenol	**1.3E-05**	**1.5E-04**		**1.7E-04**	0.4%	**7.4E-06**	**8.6E-05**		9.3E-05	0.3%
1,1,2,2-Tetrachloroethane	**2.4E-05**	**3.0E-06**	**1.2E-04**	**1.5E-04**	0.3%	**1.4E-05**	**1.7E-06**	**7.2E-05**	8.8E-05	0.3%
1,1,2-Trichloroethane	**9.0E-06**	8.4E-07	**3.6E-05**	**4.5E-05**	0.1%	**5.3E-06**	4.7E-07	**2.1E-05**	2.7E-05	0.10%
1,1-Dichloroethane	**3.0E-05**	**2.3E-06**	**1.5E-04**	**1.8E-04**	0.4%	**1.7E-05**	**1.3E-06**	**8.8E-05**	1.1E-04	0.4%
1,1-Dichloroethene			**1.8E-04**	**1.8E-04**	0.4%			**1.0E-04**	1.0E-04	0.4%
1,2,4-Trichlorobenzene	**4.1E-06**	**5.4E-06**		**9.5E-06**	0.020%	**2.4E-06**	**3.0E-06**		5.4E-06	0.020%
1,2-Dibromo-3-chloropropane	**1.6E-04**	**3.0E-05**	**7.9E-04**	**9.7E-04**	2%	**9.2E-05**	**1.7E-05**	**4.6E-04**	5.7E-04	2%
1,2-Dichloroethane	**1.2E-05**	9.6E-07	**6.1E-05**	**7.4E-05**	0.2%	**7.2E-06**	5.5E-07	**3.6E-05**	4.4E-05	0.16%
1,2-Dichloropropane	**1.7E-06**	1.7E-07	**8.4E-06**	**1.0E-05**	0.02%	**1.0E-06**	9.6E-08	**4.9E-06**	6.0E-06	0.02%
1,4-Dichlorobenzene	**1.1E-05**	**7.4E-06**	**3.9E-04**	**4.1E-04**	0.9%	**6.4E-06**	**4.1E-06**	**2.3E-04**	2.4E-04	0.9%
Benzene	**3.8E-04**	**5.7E-05**	**1.9E-03**	**2.3E-03**	5%	**2.2E-04**	**3.4E-05**	**1.1E-03**	1.4E-03	5%
Carbon tetrachloride	4.2E-07	1.1E-07	**2.1E-06**	**2.6E-06**	0.006%	2.5E-07	6.3E-08	**1.2E-06**	1.5E-06	0.006%
Chloroethane			**1.3E-05**	**1.3E-05**	0.03%			**7.8E-06**	7.8E-06	0.03%
Chloroform	**1.3E-06**	1.2E-07	**3.8E-06**	**5.2E-06**	0.01%	7.5E-07	6.5E-08	**2.3E-06**	3.1E-06	0.01%
cis-1,3-Dichloropropene	**3.9E-06**	2.1E-07	**1.1E-05**	**1.5E-05**	0.03%	**2.3E-06**	1.2E-07	**6.5E-06**	8.9E-06	0.03%
Ethylbenzene	**4.6E-05**	**2.8E-05**	**1.8E-04**	**2.6E-04**	1%	**2.7E-05**	**1.6E-05**	**1.1E-04**	1.5E-04	1%
Methyl tert-butyl ether	3.4E-07	7.8E-09	8.6E-07	**1.2E-06**	0.003%	2.0E-07	4.6E-09	5.1E-07	7.1E-07	0.003%
Methylene chloride	**1.1E-06**	4.0E-08	**1.3E-06**	**2.5E-06**	0.005%	6.3E-07	2.4E-08	7.9E-07	1.4E-06	0.005%
Tetrachloroethene	**6.1E-05**	**3.6E-05**	**1.2E-05**	**1.1E-04**	0.2%	**3.6E-05**	**2.0E-05**	**6.8E-06**	6.3E-05	0.2%
trans-1,3-Dichloropropene	**3.9E-06**	2.1E-07	**1.1E-05**	**1.5E-05**	0.03%	**2.2E-06**	1.2E-07	**6.3E-06**	8.7E-06	0.03%
Trichloroethene	**3.2E-06**	5.4E-07	**1.9E-05**	**2.2E-05**	0%	**1.8E-06**	3.0E-07	**1.1E-05**	1.3E-05	0%
Vinyl chloride	**1.1E-02**	**5.8E-04**	**2.1E-02**	**3.2E-02**	70%	**6.4E-03**	**3.5E-04**	**1.2E-02**	1.9E-02	70%
Subtotal SVOCs/VOCs	**1.2E-02**	**2.8E-03**	**2.5E-02**	**4.1E-02**	87%	**7.2E-03**	**1.6E-03**	**1.5E-02**	2.4E-02	88%
Dioxans/Furans										
1,2,3,4,6,7,8-HpCDD	**6.5E-06**	**2.5E-04**		**2.6E-04**	0.6%	**3.8E-06**	**1.4E-04**		1.5E-04	0.5%
1,2,3,4,6,7,8-HpCDF	**1.3E-06**	**4.7E-05**		**4.8E-05**	0.10%	7.8E-07	**2.6E-05**		2.7E-05	0.10%
1,2,3,4,7,8,9-HpCDF	1.4E-07	**4.8E-06**		**4.9E-06**	0.01%	8.0E-08	**2.7E-06**		2.8E-06	0.01%
1,2,3,4,7,8-HxCDD	3.7E-07	**1.1E-05**		**1.2E-05**	0.03%	2.2E-07	**6.4E-06**		6.6E-06	0.02%
1,2,3,4,7,8-HxCDF	**1.2E-06**	**3.3E-05**		**3.5E-05**	0.07%	7.0E-07	**1.9E-05**		1.9E-05	0.07%
1,2,3,6,7,8-HxCDD	**1.9E-06**	**5.8E-05**		**6.0E-05**	0.13%	**1.1E-06**	**3.3E-05**		3.4E-05	0.12%

Table 2-10
Cancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
1,2,3,6,7,8-HxCDF	2.3E-07	**6.4E-06**		**6.6E-06**	0.01%	1.3E-07	**3.6E-06**		3.7E-06	0.01%
1,2,3,7,8,9-HxCDD	6.2E-07	**1.9E-05**		**2.0E-05**	0.04%	3.6E-07	**1.1E-05**		1.1E-05	0.04%
1,2,3,7,8,9-HxCDF	5.4E-07	**1.5E-05**		**1.6E-05**	0.03%	3.2E-07	**8.5E-06**		8.9E-06	0.03%
1,2,3,7,8-PeCDD	**1.5E-06**	**3.8E-05**		**3.9E-05**	0.1%	8.9E-07	**2.1E-05**		2.2E-05	0.08%
1,2,3,7,8-PeCDF	1.6E-07	**3.6E-06**		**3.7E-06**	0.01%	9.4E-08	**2.0E-06**		2.1E-06	0.008%
2,3,4,6,7,8-HxCDF	5.6E-07	**1.5E-05**		**1.6E-05**	0.03%	3.2E-07	**8.7E-06**		9.0E-06	0.03%
2,3,4,7,8-PeCDF	**1.9E-06**	**4.1E-05**		**4.3E-05**	0.09%	**1.1E-06**	**2.3E-05**		2.4E-05	0.09%
2,3,7,8-TCDF	2.4E-07	**4.2E-06**		**4.5E-06**	0.010%	1.4E-07	**2.4E-06**		2.5E-06	0.009%
OCDF	1.0E-07	**4.6E-06**		**4.7E-06**	0.010%	6.1E-08	**2.6E-06**		2.6E-06	0.010%
OCDD	3.1E-07	**1.5E-05**		**1.5E-05**	0.03%	1.8E-07	**8.3E-06**		8.5E-06	0.03%
Subtotal Dioxans/Furans	**1.8E-05**	**5.7E-04**		**5.9E-04**	1.3%	**1.0E-05**	**3.2E-04**		3.3E-04	1.2%
Total:	**1.7E-02**	**4.3E-03**	**2.5E-02**	**4.64E-02**		**9.7E-03**	**2.4E-03**	**1.5E-02**	2.72E-02	

Total Estimated Cancer Risk Across All Exposure Routes: **5E-02** 3E-02

Sum of Adult and Child Excess Lifetime Cancer Risk (30 year exposure): **2.6E-02** **6.7E-03** **4.0E-02** 7.36E-02

Total Estimated Adult plus Child Cancer Risk Across All Exposure Routes: 7E-02

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 2-11
Noncancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Non-Carcinogenic Effects Risk Results - Hazard Quotients										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	**2.6E-01**	1.3E-03		**2.6E-01**	0.1%	**6.0E-01**	4.0E-03		6.0E-01	0.1%
Antimony	**1.0E-01**	5.4E-04		**1.0E-01**	0.04%	**2.4E-01**	1.6E-03		2.4E-01	0.04%
Arsenic	**2.6E+01**	**1.4E-01**		**2.6E+01**	10%	**6.1E+01**	**4.0E-01**		6.2E+01	10%
Boron	**5.9E-01**	3.1E-03		**5.9E-01**	0.2%	**1.4E+00**	9.1E-03		1.4E+00	0.2%
Cadmium	6.9E-02	3.6E-04		6.9E-02	0.03%	**7.3E+00**	4.8E-02		7.3E+00	1.17%
Cobalt	**8.1E-01**	1.7E-03		**8.1E-01**	0%	**1.9E+00**	5.0E-03		1.9E+00	0%
Iron	**2.1E+00**	1.1E-02		**2.1E+00**	1%	**4.9E+00**	3.2E-02		4.9E+00	1%
Manganese	**4.9E+00**	2.6E-02		**5.0E+00**	2%	**1.2E+01**	7.6E-02		1.2E+01	2%
Nickel	7.5E-02	7.8E-05		7.5E-02	0.03%	**3.2E-01**	4.2E-04		3.2E-01	0.05%
Selenium	**1.0E-01**	5.4E-04		**1.0E-01**	0.04%	**2.4E-01**	1.6E-03		2.4E-01	0.04%
Vanadium	**1.8E-01**	9.1E-04		**1.8E-01**	0.1%	**4.1E-01**	2.7E-03		4.1E-01	0.1%
Cyanide	8.6E-02	4.5E-04		8.7E-02	0.03%	**2.0E-01**	1.3E-03		2.0E-01	0.03%
Subtotal Metals	**3.6E+01**	**1.8E-01**		**3.6E+01**	14%	**9.0E+01**	**5.9E-01**		9.1E+01	15%
Pesticides/PCBs										
4,4'-DDT	9.9E-03	**1.1E-01**		**1.2E-01**	0.05%	2.3E-02	**2.5E-01**		2.8E-01	0.04%
Aldrin	**3.7E-01**	3.3E-02		**4.0E-01**	0.2%	**8.6E-01**	7.5E-02		9.4E-01	0.1%
alpha-Chlordane	1.8E-02	3.8E-02		5.6E-02	0.02%	**6.5E-01**	**1.3E+00**		1.9E+00	0.31%
Dieldrin	**5.1E-01**	**3.5E-01**		**8.5E-01**	0.3%	**1.2E+00**	**7.8E-01**		2.0E+00	0.3%
Endrin	5.9E-02	4.1E-02		1.0E-01	0.04%	**1.4E-01**	9.1E-02		2.3E-01	0.04%
gamma-Chlordane	1.4E-02	2.8E-02		4.2E-02	0%	**4.8E-01**	**9.6E-01**		1.4E+00	0%
Heptachlor	**1.0E-01**	4.7E-02		**1.5E-01**	0%	**2.4E-01**	**1.1E-01**		3.4E-01	0%
Heptachlor epoxide	**2.5E-01**	**3.9E-01**		**6.4E-01**	0.2%	**5.9E-01**	**8.7E-01**		1.5E+00	0.2%
Methoxychlor	**1.6E-01**	**3.9E-01**		**5.5E-01**	0%	**3.8E-01**	**8.7E-01**		1.3E+00	0%
Aroclor-1260	**1.3E+00**	**4.7E+01**		**4.8E+01**	18%	**3.1E+00**	**1.0E+02**		1.1E+02	17%
Subtotal Pesticides/PCBs	**2.9E+00**	**4.8E+01**		**5.1E+01**	19%	**7.8E+00**	**1.1E+02**		1.2E+02	19%
SVOCs/VOCs										
1,4-Dioxane (p-dioxane)	**2.1E-01**	7.6E-04		**2.1E-01**	0.1%	**5.0E-01**	1.8E-03		5.0E-01	0.1%
2,4,6-Trichlorophenol	**2.0E-01**	**1.5E-01**		**3.5E-01**	0.1%	**4.6E-01**	**3.4E-01**		7.9E-01	0.1%
2,4-Dimethylphenol	**1.1E-01**	1.6E-02		**1.2E-01**	0.05%	**2.5E-01**	3.6E-02		2.9E-01	0.05%
2-Methylnaphthalene	**1.5E+00**	**2.1E+00**		**3.7E+00**	1.4%	**3.6E+00**	**4.8E+00**		8.4E+00	1.3%
2-Methylphenol	6.7E-02	6.4E-03		7.4E-02	0.03%	**1.6E-01**	1.4E-02		1.7E-01	0.03%

Table 2-11
Noncancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Non-Carcinogenic Effects Risk Results - Hazard Quotients										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
3,4-methylphenol	**4.6E+00**	**4.4E-01**		**5.0E+00**	1.9%	**1.1E+01**	**9.8E-01**		1.2E+01	1.9%
4-Methylphenol	**1.1E+00**	**1.0E-01**		**1.2E+00**	0.4%	**2.5E+00**	**2.3E-01**		2.7E+00	0.4%
bis(2-Ethylhexyl)phthalate	2.3E-02	4.4E-02		6.7E-02	0.03%	5.4E-02	9.9E-02		1.5E-01	0.02%
Hexachloroethane	2.7E-02	2.3E-02		5.1E-02	0.02%	6.4E-02	5.2E-02		1.2E-01	0.02%
Naphthalene	**1.9E-01**	**1.2E-01**	**2.2E+01**	**2.2E+01**	8%	**4.4E-01**	**2.8E-01**	**5.1E+01**	5.2E+01	8%
Nitrobenzene	2.7E-02	2.0E-03	**1.1E-01**	**1.4E-01**	0.1%	6.4E-02	4.5E-03	**2.5E-01**	3.2E-01	0.1%
Pentachlorophenol	1.0E-02	**1.2E-01**		**1.3E-01**	0.05%	**7.2E-01**	**8.3E+00**		9.1E+00	1.44%
1,1,2,2-Tetrachloroethane	8.8E-02	1.1E-02	2.9E-02	**1.3E-01**	0.0%	**2.1E-01**	2.5E-02	6.9E-02	3.0E-01	0.0%
1,1,2-Trichloroethane	9.1E-02	8.5E-03		1.0E-01	0.0%	**2.1E-01**	1.9E-02		2.3E-01	0.0%
1,1-Dichloroethane	7.6E-02	5.9E-03		8.2E-02	0.0%	**1.8E-01**	1.4E-02		1.9E-01	0.0%
1,1-Dichloroethene	2.3E-02	3.1E-03	**2.8E-01**	**3.1E-01**	0.1%	5.3E-02	7.3E-03	**6.7E-01**	7.3E-01	0.1%
1,2,4-Trichlorobenzene	4.1E-02	5.4E-02	**3.6E+00**	**3.7E+00**	1.4%	9.6E-02	**1.2E-01**	**8.5E+00**	8.7E+00	1.4%
1,2,4-Trimethylbenzene	**1.1E+00**	**1.2E+00**		**2.3E+00**	1%	**2.5E+00**	**2.7E+00**		5.3E+00	1%
1,2-Dibromo-3-chloropropane	**3.3E-01**	6.3E-02	**5.7E+00**	**6.1E+00**	2%	**7.7E-01**	**1.4E-01**	**1.4E+01**	1.4E+01	2%
1,2-Dichlorobenzene	**2.2E-01**	**1.5E-01**	**1.8E+00**	**2.1E+00**	0.8%	**5.2E-01**	**3.3E-01**	**4.1E+00**	5.0E+00	0.8%
1,2-Dichloropropane	1.6E-03	1.5E-04	**6.1E-01**	**6.1E-01**	0.2%	3.6E-03	3.5E-04	**1.4E+00**	1.4E+00	0.2%
1,3,5-Trimethylbenzene	**3.0E-01**	**2.4E-01**		**5.5E-01**	0%	**7.0E-01**	**5.5E-01**		1.3E+00	0%
1,4-Dichlorobenzene	8.5E-02	5.7E-02	**1.3E-01**	**2.7E-01**	0.1%	**2.0E-01**	**1.3E-01**	**3.1E-01**	6.3E-01	0.1%
2-Hexanone	**1.3E-01**	5.4E-03	**3.7E-01**	**5.1E-01**	0%	**3.0E-01**	1.2E-02	**8.9E-01**	1.2E+00	0%
Benzene	**2.7E+00**	**4.2E-01**	**6.4E+00**	**9.5E+00**	4%	**6.4E+00**	**9.9E-01**	**1.5E+01**	2.2E+01	4%
Chlorobenzene	**9.2E-01**	**3.3E-01**	**6.4E+00**	**7.7E+00**	3%	**2.2E+00**	**7.4E-01**	**1.5E+01**	1.8E+01	3%
cis-1,2-Dichloroethene	**3.8E+01**	**4.7E+00**		**4.2E+01**	16%	**8.8E+01**	**1.1E+01**		9.9E+01	16%
cis-1,3-Dichloropropene	3.8E-03	2.1E-04	**1.0E-01**	**1.0E-01**	0.04%	8.9E-03	4.7E-04	**2.4E-01**	2.5E-01	0.04%
Ethylbenzene	**1.2E-01**	7.3E-02	**2.1E-01**	**4.1E-01**	0.2%	**2.9E-01**	**1.7E-01**	**5.1E-01**	9.6E-01	0.2%
Isopropylbenzene (cumene)	7.4E-03	8.7E-03	3.2E-02	4.8E-02	0.02%	1.7E-02	1.9E-02	7.6E-02	1.1E-01	0.02%
Methyl ethyl ketone	2.0E-02	1.8E-04	4.1E-02	6.1E-02	0.02%	4.6E-02	4.4E-04	9.7E-02	1.4E-01	0.02%
Methyl isobutyl ketone	**1.7E+00**	5.2E-02	**7.7E-01**	**2.5E+00**	1.0%	**3.9E+00**	**1.2E-01**	**1.8E+00**	5.8E+00	0.93%
tert-Butyl alcohol	3.2E-02		**6.1E+00**	**6.2E+00**	2%	7.5E-02		**1.4E+01**	1.5E+01	2%
Tetrachloroethene	3.3E-02	1.9E-02	**1.6E-01**	**2.2E-01**	0.08%	7.7E-02	4.4E-02	**3.9E-01**	5.1E-01	0.08%
Toluene	**2.1E+00**	**7.2E-01**	**9.7E+00**	**1.3E+01**	5%	**4.9E+00**	**1.7E+00**	**2.3E+01**	3.0E+01	5%
trans-1,2-Dichloroethene	**5.5E-01**	4.9E-02	**3.2E+00**	**3.8E+00**	1.4%	**1.3E+00**	**1.1E-01**	**7.5E+00**	8.9E+00	1.42%
trans-1,3-Dichloropropene	3.7E-03	2.0E-04	9.8E-02	**1.0E-01**	0.04%	8.7E-03	4.5E-04	**2.3E-01**	2.4E-01	0.04%
Trichloroethene	**5.2E+00**	**8.9E-01**	**7.8E-01**	**6.9E+00**	3%	**1.2E+01**	**2.0E+00**	**1.8E+00**	1.6E+01	3%
Vinyl chloride	**1.5E+01**	**7.9E-01**	**7.8E+00**	**2.3E+01**	9%	**3.5E+01**	**1.9E+00**	**1.8E+01**	5.5E+01	9%

Table 2-11
Noncancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Non-Carcinogenic Effects Risk Results - Hazard Quotients										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
m,p-Xylenes	**1.3E-01**		**6.4E-01**	**7.7E-01**	0%	**3.0E-01**		**1.5E+00**	1.8E+00	0%
o-Xylene	6.1E-02	5.2E-02	**3.0E-01**	**4.2E-01**	0.2%	**1.4E-01**	**1.2E-01**	**7.2E-01**	9.8E-01	0.2%
Xylenes, total	**2.2E-01**	**1.4E-01**	**7.6E+00**	**8.0E+00**	3%	**5.1E-01**	**3.3E-01**	**1.8E+01**	1.9E+01	3%
Subtotal SVOCs/VOCs	**7.7E+01**	**1.3E+01**	**8.5E+01**	**1.8E+02**	67%	**1.8E+02**	**3.8E+01**	**2.0E+02**	4.2E+02	67%
Total:	**1.2E+02**	**6.2E+01**	**8.5E+01**	**2.62E+02**		**2.8E+02**	**1.5E+02**	**2.0E+02**	6.28E+02	

Total Estimated Hazard Index Across All Exposure Routes: **262** 628

Notes:
Subtotals and Total: Cumulative Hazard Index of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard index for all chemicals evaluated.

Table 2-12
Risk Calculation Worksheet for Groundwater - Carcinogenic Effects - Construction Exposure Scenario - Trench Worker
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Trench Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	90	day/yr
Exposure Duration	ED	1	yr
Exposure Time	ET	8	hr/day
Inhalation Rate (VOCs in Water Inhalation)	InRw	2.5	m3/hr
Skin Surface Area (Water Contact)	SA_w	5700	cm2 [water]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (L/cm^3)	CF	1.00E-03	L/cm3
Conversion Factor (yr/day)	CF	2.74E-03	yr/day
Conversion Factor (mg/ug)	CF	1.00E-03	mg/ug
Constituent Specific Permeability Constant	Kp	Chemical Specific	cm/hr

Risk Calculations

		Exposure Route = Dermal			Exposure Route = Inhalation				
Chemical of Potential Concern	**RME Medium EPC Value, Cgw [mg/L]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Concentration in Air, Cair [ug/m3]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Metals									
Aluminum	9.40E+00	2.16E-05	NA		NA	NV	NA		
Antimony	1.51E-03	3.47E-09	NA		NA	NV	NA		
Arsenic	2.87E-01	6.58E-07	1.50E+00	9.87E-07	NA	NV	1.50E+00		9.87E-07
Barium	1.68E-01	3.85E-07	NA		NA	NV	NA		
Beryllium	7.64E-04	1.75E-09	NA		NA	NV	NA		
Boron	4.31E+00	9.88E-06	NA		NA	NV	NA		
Cadmium	1.26E-03	2.88E-09	NA		NA	NV	NA		
Chromium	3.57E-02	8.19E-08	NA		NA	NV	NA		
Chromium (VI)	3.50E-04	1.61E-09	5.00E-01	8.03E-10	NA	NV	5.00E-01		8.03E-10
Cobalt	8.89E-03	8.16E-09	NA		NA	NV	NA		
Copper	4.66E-02	1.07E-07	NA		NA	NV	NA		
Iron	5.35E+01	1.23E-04	NA		NA	NV	NA		
Lead	4.00E-02	9.18E-09	NA		NA	NV	NA		
Manganese	4.33E+00	9.94E-06	NA		NA	NV	NA		
Mercury	1.21E-04	2.78E-10	NA		NA	NV	NA		
Molybdenum	5.64E-03	1.29E-08	NA		NA	NV	NA		
Nickel	5.46E-02	2.51E-08	NA		NA	NV	NA		
Selenium	1.89E-02	4.34E-08	NA		NA	NV	NA		

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Silver	1.20E-04	1.65E-10	NA		NA	NV	NA		
Thallium	5.00E-05	1.15E-10	NA		NA	NV	NA		
Vanadium	3.19E-02	7.33E-08	NA		NA	NV	NA		
Zinc	3.03E-01	4.17E-07	NA		NA	NV	NA		
Cyanide	6.29E-02	1.44E-07	NA		NA	NV	NA		
Pesticides/PCBs									
4,4'-DDD	5.00E-03	4.12E-06	2.40E-01	9.88E-07	NA	NV	2.40E-01		9.88E-07
4,4'-DDE	7.76E-04	5.61E-07	3.40E-01	1.91E-07	NA	NV	3.40E-01		1.91E-07
4,4'-DDT	1.80E-04	2.44E-07	3.40E-01	8.30E-08	NA	NV	3.40E-01		8.30E-08
Aldrin	4.05E-04	4.33E-09	1.70E+01	7.37E-08	NA	NV	1.70E+01		7.37E-08
alpha-BHC	3.00E-04	1.56E-08	6.30E+00	9.86E-08	NA	NV	6.30E+00		9.86E-08
alpha-Chlordane	3.34E-04	8.12E-08	1.30E+00	1.06E-07	NA	NV	1.30E+00		1.06E-07
Atrazine	2.00E-03	3.35E-08	2.30E-01	7.71E-09	NA	NV	2.30E-01		7.71E-09
beta-BHC	3.69E-04	1.92E-08	1.80E+00	3.46E-08	NA	NV	1.80E+00		3.46E-08
delta-BHC	1.60E-04	8.35E-09	NA		NA	NV	NA		
Diazinon	2.60E-04	1.38E-08	NA		NA	NV	NA		
Dieldrin	9.24E-04	7.52E-08	1.60E+01	1.20E-06	NA	NV	1.60E+01		**1.20E-06**
Endosulfan I	3.31E-04	9.33E-09	NA		NA	NV	NA		
Endosulfan II	2.30E-04	4.05E-09	NA		NA	NV	NA		
Endosulfan sulfate	9.20E-05	NA	NA		NA	NV	NA		
Endrin	6.46E-04	5.26E-08	NA		NA	NV	NA		
Endrin aldehyde	1.40E-04	NA	NA		NA	NV	NA		
Endrin ketone	1.70E-04	NA	NA		NA	NV	NA		
gamma-BHC	3.28E-04	1.71E-08	1.10E+00	1.88E-08	NA	NV	1.10E+00		1.88E-08
gamma-Chlordane	2.50E-04	6.08E-08	1.20E+00	7.30E-08	NA	NV	1.20E+00		7.30E-08
Heptachlor	1.11E-04	6.15E-09	4.50E+00	2.77E-08	NA	NV	4.50E+00		2.77E-08
Heptachlor epoxide	1.20E-04	2.18E-08	9.10E+00	1.98E-07	NA	NV	9.10E+00		1.98E-07
Methoxychlor	1.20E-04	3.36E-08	NA		NA	NV	NA		
Aroclor-1260	9.63E-04	4.03E-06	2.00E+00	8.06E-06	NA	NV	2.00E+00		**8.06E-06**
SVOCs/VOCs									
1,4-Dioxane (p-dioxane)	7.80E-01	6.38E-07	2.70E-02	1.72E-08	NA	NV	2.70E-02		1.72E-08
2,4,6-Trichlorophenol	7.14E-03	7.10E-07	7.00E-02	4.97E-08	NA	NV	7.00E-02		4.97E-08
2,4-Dimethylphenol	7.87E-02	2.16E-06	NA		NA	NV	NA		
2-Chlorophenol	4.30E-03	8.75E-08	NA		2.86E-01	2.87E-07	NA		
2-Methylnaphthalene	2.26E-01	4.33E-05	NA		NA	NA	NA		
2-Methylphenol	1.23E-01	2.34E-06	NA		NA	NV	NA		
2-Nitroaniline	1.00E-02	1.16E-07	NA		NA	NV	NA		
3,4-methylphenol	8.40E-01	1.60E-05	NA		NA	NV	NA		
4-Chloro-3-methylphenol	2.38E-02	NA	NA		NA	NV	NA		
4-Methylphenol	1.94E-01	3.69E-06	NA		NA	NV	NA		

Risk Calculations

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Acenaphthene	4.50E-03	1.25E-06	NA		2.32E-01	2.33E-07	NA		
Acenaphthylene	9.54E-03	2.75E-06	NA		1.14E-01	1.14E-07	NA		
Anthracene	3.20E-03	1.56E-06	NA		1.14E-01	1.14E-07	NA		
Benzo(a)anthracene	9.00E-04	1.34E-06	1.20E+00	1.61E-06	NA	NV	1.20E+00		**1.61E-06**
Benzo(a)pyrene	5.00E-04	1.28E-06	1.20E+01	1.53E-05	NA	NV	1.20E+01		**1.53E-05**
Benzo(b)fluoranthene	7.60E-04	1.97E-06	1.20E+00	2.36E-06	NA	NV	1.20E+00		**2.36E-06**
Benzo(g,h,i)perylene	2.00E-04	9.22E-07	NA		NA	NV	NA		
Benzo(k)fluoranthene	4.60E-04	1.12E-06	1.20E+00	1.35E-06	NA	NV	1.20E+00		**1.35E-06**
Biphenyl (Diphenyl)	1.30E-03	2.64E-07	NA		NA	NV	NA		
bis(2-Chloroethoxy)methane	2.00E-04	6.99E-10	NA		NA	NA	NA		
bis(2-Ethylhexyl)phthalate	1.69E-02	3.82E-06	1.40E-02	5.35E-08	NA	NV	1.40E-02		5.35E-08
Bromoform	1.20E-02	1.02E-07	1.10E-02	1.12E-09	5.98E-01	6.02E-07	1.10E-02	6.62E-09	7.74E-09
Caprolactam	2.40E-03	6.14E-09	NA		NA	NV	NA		
Carbazole	1.25E-02	1.62E-06	NA		NA	NV	NA		
Chrysene	1.10E-03	1.64E-06	1.20E-01	1.97E-07	NA	NV	1.20E-01		1.97E-07
Dibenz(a,h)anthracene	4.50E-05	1.77E-07	7.30E+00	1.29E-06	NA	NV	7.30E+00		**1.29E-06**
Diethylphthalate	1.03E-02	1.34E-07	NA		NA	NV	NA		
Di-n-butyl phthalate	1.17E-02	1.10E-06	NA		NA	NV	NA		
Fluoranthene	2.40E-03	1.35E-06	NA		NA	NV	NA		
Fluorene	2.60E-03	9.34E-07	NA		1.02E-01	1.03E-07	NA		
Hexachloroethane	1.00E-03	1.03E-07	3.90E-02	4.03E-09	NA	NV	3.90E-02		4.03E-09
Indeno(1,2,3-c,d)pyrene	2.00E-04	5.18E-07	1.20E+00	6.22E-07	NA	NV	1.20E+00		6.22E-07
Naphthalene	1.36E-01	1.46E-05	1.20E-01	1.75E-06	9.34E+00	9.40E-06	1.20E-01	1.13E-06	**2.88E-06**
Nitrobenzene	2.00E-03	2.74E-08	NA		4.65E-02	4.68E-08	NA		
N-Nitrosodi-n-propylamine	2.00E-03	1.21E-08	7.00E+00	8.50E-08	NA	NV	7.00E+00		8.50E-08
N-Nitrosodiphenylamine	1.20E-03	9.04E-08	9.00E-03	8.13E-10	NA	NV	9.00E-03		8.13E-10
Pentachlorophenol	1.13E-02	1.60E-05	1.20E-01	1.93E-06	NA	NV	1.20E-01		**1.93E-06**
Phenanthrene	6.00E-03	1.92E-06	NA		NA	NV	NA		
Pyrene	2.40E-03	1.95E-06	NA		2.53E-02	2.55E-08	NA		
1,1-Dichloroethene	4.16E-02	1.20E-06	NA		3.65E+00	3.68E-06	NA		
1,1-Dichloroethane	5.57E-01	9.18E-06	5.70E-03	5.23E-08	4.80E+01	4.83E-05	5.70E-03	2.76E-07	3.28E-07
1,1,2-Trichloroethane	1.33E-02	2.20E-07	7.20E-02	1.58E-08	9.44E-01	9.50E-07	7.20E-02	6.84E-08	8.42E-08
1,1,2,2-Tetrachloroethane	1.29E-02	2.46E-07	2.00E-01	4.93E-08	7.47E-01	7.51E-07	2.00E-01	1.50E-07	2.00E-07
1,1,1-Trichloroethane	1.18E-01	3.87E-06	NA		8.85E+00	8.90E-06	NA		
1,1,2-Trichloroethane	1.33E-02	2.20E-07	7.20E-02	1.58E-08	9.44E-01	9.50E-07	7.20E-02	6.84E-08	8.42E-08
1,1,2,2-Tetrachloroethane	1.29E-02	2.46E-07	2.00E-01	4.93E-08	7.47E-01	7.51E-07	2.00E-01	1.50E-07	2.00E-07
1,2,3-Trichlorobenzene	2.72E-03	NA	NA		1.69E-01	1.70E-07	NA		
1,2,4-Trichlorobenzene	1.51E-02	2.53E-06	2.90E-02	7.33E-08	9.37E-01	9.43E-07	2.90E-02	2.74E-08	1.01E-07
1,2,4-Trimethylbenzene	2.78E-01	4.82E-05	NA		2.17E+01	2.19E-05	NA		
1,2-Dibromo-3-chloropropane	2.40E-03	5.73E-08	7.00E+00	4.01E-07	1.00E-01	1.01E-07	7.00E+00	7.06E-07	**1.11E-06**

Risk Calculations

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1,2-Dichlorobenzene	7.34E-01	7.23E-05	NA		5.10E+01	5.14E-05	NA		
1,2-Dichloroethane	1.44E-02	2.37E-07	9.10E-02	2.15E-08	1.18E+00	1.19E-06	9.10E-02	1.08E-07	1.30E-07
1,2-Dichloropropane	5.10E-03	9.91E-08	3.60E-02	3.57E-09	4.08E-01	4.10E-07	3.60E-02	1.48E-08	1.83E-08
1,3-Dichlorobenzene	2.71E-02	3.63E-06	NA		1.88E+00	1.90E-06	NA		
1,3,5-Trimethylbenzene	1.10E-01	1.46E-05	NA		8.65E+00	8.71E-06	NA		
1,4-Dichlorobenzene	2.18E-01	2.19E-05	5.40E-03	1.18E-07	1.52E+01	1.53E-05	5.40E-03	8.28E-08	2.01E-07
2-Chlorotoluene	2.89E-03	NA	NA		NA	NA	NA		
2-Hexanone	2.35E-02	2.08E-07	NA		NA	NA	NA		
2,2-Dichloropropane	5.00E-04	NA	NA		NA	NA	NA		
Acetone	4.85E-01	6.11E-07	NA		2.07E+01	2.08E-05	NA		
Benzene	4.00E-01	1.41E-05	1.00E-01	1.41E-06	3.88E+01	3.91E-05	1.00E-01	3.91E-06	**5.32E-06**
Carbon disulfide	3.10E-03	1.24E-07	NA		3.08E-01	3.10E-07	NA		
Carbon tetrachloride	3.00E-04	1.25E-08	1.50E-01	1.87E-09	2.09E-02	2.11E-08	1.50E-01	3.16E-09	5.03E-09
Chlorobenzene	6.74E-01	4.43E-05	NA		5.41E+01	5.45E-05	NA		
Chloroethane	9.74E-02	1.42E-06	NA		1.04E+01	1.05E-05	NA		
Chloroform	4.40E-03	7.54E-08	3.10E-02	2.34E-09	3.44E-01	3.47E-07	3.10E-02	1.07E-08	1.31E-08
Chloromethane	7.40E-03	5.84E-08	NA		8.96E-01	9.02E-07	NA		
cis-1,2-Dichloroethene	1.37E+01	3.62E-04	NA		1.19E+03	1.20E-03	NA		
cis-1,3-Dichloropropene	4.20E-03	4.54E-08	1.00E-01	4.54E-09	3.45E-01	3.47E-07	1.00E-01	3.47E-08	3.92E-08
Cyclohexane	1.80E-02	3.47E-06	NA		1.70E+00	1.71E-06	NA		
Ethyl tert-butyl ether (ETBE)	1.20E-03	NA	NA		NA	NA	NA		
Ethylbenzene	4.49E-01	4.85E-05	1.10E-02	5.33E-07	3.75E+01	3.77E-05	1.10E-02	4.15E-07	9.48E-07
Isopropyl ether	4.30E-01	NA	NA		NA	NA	NA		
Isopropylbenzene (cumene)	2.71E-02	4.88E-06	NA		NA	NA	NA		
Methyl acetate	2.25E-02	4.42E-08	NA		5.64E-01	5.68E-07	NA		
Methyl ethyl ketone	4.30E-01	1.01E-06	NA		1.34E+01	1.35E-05	NA		
Methyl isobutyl ketone	4.86E+00	3.22E-05	NA		2.96E+02	2.98E-04	NA		
Methyl tert-butyl ether	2.01E-02	1.05E-07	1.80E-03	1.90E-10	NA	NA	1.80E-03		1.90E-10
Methylcyclohexane	2.45E-02	5.08E-06	NA		2.15E+00	2.16E-06	NA		
Methylene chloride	8.19E-03	7.02E-08	1.40E-02	9.83E-10	7.49E-01	7.54E-07	1.40E-02	1.06E-08	1.15E-08
n-Butylbenzene	6.12E-03	NA	NA		4.56E-01	4.59E-07	NA		
n-Propylbenzene	5.61E-02	NA	NA		4.42E+00	4.45E-06	NA		
Phenol	4.80E-02	5.09E-07	NA		NA	NV	NA		
p-Cymene (p-isopropyltoluene)	7.86E-02	NA	NA		NA	NA	NA		
sec-Butylbenzene	5.64E-03	NA	NA		4.21E-01	4.23E-07	NA		
Styrene	1.39E-02	1.17E-06	NA		1.16E+00	1.17E-06	NA		
tert-Butylbenzene	2.10E-03	NA	NA		1.56E-01	1.58E-07	NA		
tert-Butyl alcohol	1.17E-01	NA	NA		NA	NA	NA		
Tetrachloroethene	1.20E-02	1.02E-06	5.40E-01	5.49E-07	8.06E-01	8.11E-07	5.40E-01	4.38E-07	9.87E-07
Toluene	6.11E+00	4.32E-04	NA		5.48E+02	5.51E-04	NA		

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trans-1,2-Dichloroethene	4.01E-01	7.56E-06	NA		3.51E+01	3.53E-05	NA		
trans-1,3-Dichloropropene	4.10E-03	4.43E-08	1.00E-01	4.43E-09	3.36E-01	3.39E-07	1.00E-01	3.39E-08	3.83E-08
Trichloroethene	5.70E-02	1.73E-06	5.90E-03	1.02E-08	4.29E+00	4.32E-06	5.90E-03	2.55E-08	3.57E-08
Vinyl chloride	1.63E+00	2.18E-05	7.20E-01	1.57E-05	1.77E+02	1.78E-04	7.20E-01	1.28E-04	**1.44E-04**
m,p-Xylenes	9.44E-01	NA	NA		7.88E+01	7.93E-05	NA		
o-Xylene	4.45E-01	6.56E-05	NA		3.70E+01	3.72E-05	NA		
Xylenes, total	1.60E+00	1.85E-04	NA		1.33E+02	1.34E-04	NA		
Dioxans/Furans									
1,2,3,4,6,7,8-HpCDD	4.64E-07	2.12E-09	1.50E+03	3.18E-06	NA	NV	1.50E+03		**3.18E-06**
1,2,3,4,6,7,8-HpCDF	9.49E-08	3.91E-10	1.50E+03	5.87E-07	NA	NV	1.50E+03		5.87E-07
1,2,3,4,7,8,9-HpCDF	9.79E-09	4.04E-11	1.50E+03	6.05E-08	NA	NV	1.50E+03		6.05E-08
1,2,3,4,7,8-HxCDD	2.62E-09	9.60E-12	1.50E+04	1.44E-07	NA	NV	1.50E+04		1.44E-07
1,2,3,4,7,8-HxCDF	8.49E-09	2.80E-11	1.50E+04	4.21E-07	NA	NV	1.50E+04		4.21E-07
1,2,3,6,7,8-HxCDD	1.33E-08	4.87E-11	1.50E+04	7.30E-07	NA	NV	1.50E+04		7.30E-07
1,2,3,6,7,8-HxCDF	1.62E-09	5.34E-12	1.50E+04	8.01E-08	NA	NV	1.50E+04		8.01E-08
1,2,3,7,8,9-HxCDD	4.40E-09	1.61E-11	1.50E+04	2.42E-07	NA	NV	1.50E+04		2.42E-07
1,2,3,7,8,9-HxCDF	3.87E-09	1.28E-11	1.50E+04	1.91E-07	NA	NV	1.50E+04		1.91E-07
1,2,3,7,8-PeCDD	1.08E-09	3.16E-12	1.50E+05	4.74E-07	NA	NV	1.50E+05		4.74E-07
1,2,3,7,8-PeCDF	2.28E-09	6.03E-12	7.50E+03	4.52E-08	NA	NV	7.50E+03		4.52E-08
2,3,4,6,7,8-HxCDF	3.94E-09	1.30E-11	1.50E+04	1.95E-07	NA	NV	1.50E+04		1.95E-07
2,3,4,7,8-PeCDF	2.64E-09	6.97E-12	7.50E+04	5.23E-07	NA	NV	7.50E+04		5.23E-07
2,3,7,8-TCDF	1.68E-09	3.56E-12	1.50E+04	5.34E-08	NA	NV	1.50E+04		5.34E-08
OCDD	2.18E-06	1.24E-08	1.50E+01	1.87E-07	NA	NV	1.50E+01		1.87E-07
OCDF	7.44E-07	3.83E-09	1.50E+01	5.74E-08	NA	NV	1.50E+01		5.74E-08
			Total Risk:	6.50E-05			**Total Risk:**	1.36E-04	2.01E-04

Total Estimated Carcinogenic Risk Across All Exposure Routes : **2.0E-04**

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constant.

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

Table 2-13
Risk Calculation Worksheet for Groundwater - Noncarcinogenic Effects - Construction Exposure Scenario - Trench Worker
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Trench Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	90	day/yr
Exposure Duration	ED	1	yr
Exposure Time	ET	8	hr/day
Inhalation Rate (VOCs in Water Inhalation)	InRw	2.5	m3/hr
Skin Surface Area (Water Contact)	SA_w	5.70E+03	cm2 [water]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (L/cm^3)	CF	1.00E-03	L/cm3
Conversion Factor (yr/day)	CF	2.74E-03	yr/day
Conversion Factor (mg/ug)	CF	1.00E-03	mg/ug

Risk Calculations

		Exposure Route = Dermal			Exposure Route = Inhalation				
Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals									
Aluminum	9.40E+00	1.51E-03	1.00E+00	1.51E-03	NA	NV	1.00E+00		1.51E-03
Antimony	1.51E-03	2.43E-07	4.00E-04	6.07E-04	NA	NV	4.00E-04		6.07E-04
Arsenic	2.87E-01	4.61E-05	3.00E-04	1.54E-01	NA	NV	3.00E-04		1.54E-01
Barium	1.68E-01	2.69E-05	2.00E-01	1.35E-04	NA	NV	2.00E-01		1.35E-04
Beryllium	7.64E-04	1.23E-07	2.00E-03	6.14E-05	NA	NV	2.00E-03		6.14E-05
Boron	4.31E+00	6.92E-04	2.00E-01	3.46E-03	NA	NV	2.00E-01		3.46E-03
Cadmium	1.26E-03	2.02E-07	5.00E-04	4.03E-04	NA	NV	5.00E-04		4.03E-04
Chromium	3.57E-02	5.73E-06	NA		NA	NV	NA		
Chromium (VI)	3.50E-04	1.12E-07	3.00E-03	3.75E-05	NA	NV	3.00E-03		3.75E-05
Cobalt	8.89E-03	5.71E-07	3.00E-04	1.90E-03	NA	NV	3.00E-04		1.90E-03
Copper	4.66E-02	7.48E-06	4.00E-02	1.87E-04	NA	NV	4.00E-02		1.87E-04
Iron	5.35E+01	8.59E-03	7.00E-01	1.23E-02	NA	NV	7.00E-01		1.23E-02

Risk Calculations

		Exposure Route = Dermal			Exposure Route = Inhalation				
Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Lead	4.00E-02	6.42E-07	NA		NA	NV	NA		
Manganese	4.33E+00	6.96E-04	2.40E-02	2.90E-02	NA	NV	2.40E-02		2.90E-02
Mercury	1.21E-04	1.94E-08	3.00E-04	6.48E-05	NA	NV	3.00E-04		6.48E-05
Molybdenum	5.64E-03	9.05E-07	5.00E-03	1.81E-04	NA	NV	5.00E-03		1.81E-04
Nickel	5.46E-02	1.75E-06	2.00E-02	8.77E-05	NA	NV	2.00E-02		8.77E-05
Selenium	1.89E-02	3.04E-06	5.00E-03	6.07E-04	NA	NV	5.00E-03		6.07E-04
Silver	1.20E-04	1.16E-08	5.00E-03	2.31E-06	NA	NV	5.00E-03		2.31E-06
Thallium	5.00E-05	8.03E-09	6.60E-05	1.22E-04	NA	NV	6.60E-05		1.22E-04
Vanadium	3.19E-02	5.13E-06	5.00E-03	1.03E-03	NA	NV	5.00E-03		1.03E-03
Zinc	3.03E-01	2.92E-05	3.00E-01	9.73E-05	NA	NV	3.00E-01		9.73E-05
Cyanide	6.29E-02	1.01E-05	2.00E-02	5.05E-04	NA	NV	2.00E-02		5.05E-04
Pesticides/PCBs									
4,4'-DDD	5.00E-03	2.88E-04	NA		NA	NV	NA		
4,4'-DDE	7.76E-04	3.93E-05	NA		NA	NV	NA		
4,4'-DDT	1.80E-04	1.71E-05	5.00E-04	3.42E-02	NA	NV	5.00E-04		3.42E-02
Aldrin	4.05E-04	3.03E-07	3.00E-05	1.01E-02	NA	NV	3.00E-05		1.01E-02
alpha-BHC	3.00E-04	1.10E-06	5.00E-04	2.19E-03	NA	NV	5.00E-04		2.19E-03
alpha-Chlordane	3.34E-04	5.69E-06	5.00E-04	1.14E-02	NA	NV	5.00E-04		1.14E-02
Atrazine	2.00E-03	2.35E-06	3.50E-02	6.70E-05	NA	NV	3.50E-02		6.70E-05
beta-BHC	3.69E-04	1.35E-06	NA		NA	NV	NA		
delta-BHC	1.60E-04	5.84E-07	NA		NA	NV	NA		
Diazinon	2.60E-04	9.63E-07	7.00E-04	1.38E-03	NA	NV	7.00E-04		1.38E-03
Dieldrin	9.24E-04	5.26E-06	5.00E-05	1.05E-01	NA	NV	5.00E-05		1.05E-01
Endosulfan I	3.31E-04	6.53E-07	6.00E-03	1.09E-04	NA	NV	6.00E-03		1.09E-04
Endosulfan II	2.30E-04	2.83E-07	6.00E-03	4.72E-05	NA	NA	6.00E-03		4.72E-05
Endosulfan sulfate	9.20E-05	NA	6.00E-03		NA	NV	6.00E-03		
Endrin	6.46E-04	3.68E-06	3.00E-04	1.23E-02	NA	NV	3.00E-04		1.23E-02
Endrin aldehyde	1.40E-04	NA	3.00E-04		NA	NV	3.00E-04		
Endrin ketone	1.70E-04	NA	3.00E-04		NA	NV	3.00E-04		
gamma-BHC	3.28E-04	1.20E-06	3.00E-04	3.99E-03	NA	NV	3.00E-04		3.99E-03
gamma-Chlordane	2.50E-04	4.26E-06	5.00E-04	8.52E-03	NA	NV	5.00E-04		8.52E-03
Heptachlor	1.11E-04	4.31E-07	3.00E-05	1.44E-02	NA	NV	3.00E-05		1.44E-02
Heptachlor epoxide	1.20E-04	1.52E-06	1.30E-05	1.17E-01	NA	NV	1.30E-05		1.17E-01
Methoxychlor	1.20E-04	2.35E-06	2.00E-05	1.17E-01	NA	NV	2.00E-05		1.17E-01
Aroclor-1260	9.63E-04	2.82E-04	2.00E-05	1.41E+01	NA	NV	2.00E-05		**1.41E+01**
SVOCs/VOCs									
1,4-Dioxane (p-dioxane)	7.80E-01	4.47E-05	1.00E-01	4.47E-04	NA	NV	1.00E-01		4.47E-04
2,4,6-Trichlorophenol	7.14E-03	4.97E-05	1.00E-03	4.97E-02	NA	NV	1.00E-03		4.97E-02
2,4-Dimethylphenol	7.87E-02	1.51E-04	2.00E-02	7.56E-03	NA	NV	2.00E-02		7.56E-03
2-Chlorophenol	4.30E-03	6.13E-06	5.00E-03	1.23E-03	2.86E-01	2.01E-05	5.00E-03	4.02E-03	5.25E-03
2-Methylnaphthalene	2.26E-01	3.03E-03	4.00E-03	7.57E-01	NA	NA	4.00E-03		7.57E-01

Risk Calculations

		Exposure Route = Dermal			Exposure Route = Inhalation				
Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
2-Methylphenol	1.23E-01	1.64E-04	5.00E-02	3.28E-03	NA	NV	5.00E-02		3.28E-03
2-Nitroaniline	1.00E-02	8.13E-06	1.00E-02	8.13E-04	NA	NV	1.00E-02		8.13E-04
3,4-methylphenol	8.40E-01	1.12E-03	5.00E-03	2.24E-01	NA	NV	5.00E-03		2.24E-01
4-Chloro-3-methylphenol	2.38E-02	NA	NA		NA	NV	NA		
4-Methylphenol	1.94E-01	2.58E-04	5.00E-03	5.17E-02	NA	NV	5.00E-03		5.17E-02
Acenaphthene	4.50E-03	8.72E-05	6.00E-02	1.45E-03	2.32E-01	1.63E-05	6.00E-02	2.72E-04	1.73E-03
Acenaphthylene	9.54E-03	1.93E-04	NA		1.14E-01	8.01E-06	NA		
Anthracene	3.20E-03	1.09E-04	3.00E-01	3.63E-04	1.14E-01	8.01E-06	3.00E-01	2.67E-05	3.90E-04
Benzo(a)anthracene	9.00E-04	9.38E-05	NA		NA	NV	NA		
Benzo(a)pyrene	5.00E-04	8.93E-05	NA		NA	NV	NA		
Benzo(b)fluoranthene	7.60E-04	1.38E-04	NA		NA	NV	NA		
Benzo(g,h,i)perylene	2.00E-04	6.45E-05	NA		NA	NV	NA		
Benzo(k)fluoranthene	4.60E-04	7.86E-05	NA		NA	NV	NA		
Biphenyl (Diphenyl)	1.30E-03	1.85E-05	5.00E-02	3.70E-04	NA	NV	5.00E-02		3.70E-04
bis(2-Chloroethoxy)methane	2.00E-04	4.89E-08	3.00E-03	1.63E-05	NA	NA	3.00E-03		1.63E-05
bis(2-Ethylhexyl)phthalate	1.69E-02	2.68E-04	2.00E-02	1.34E-02	NA	NV	2.00E-02		1.34E-02
Bromoform	1.20E-02	7.12E-06	2.00E-02	3.56E-04	5.98E-01	4.21E-05	2.00E-02	2.11E-03	2.46E-03
Caprolactam	2.40E-03	4.30E-07	5.00E-01	8.59E-07	NA	NV	5.00E-01		8.59E-07
Carbazole	1.25E-02	1.13E-04	NA		NA	NV	NA		
Chrysene	1.10E-03	1.15E-04	NA		NA	NV	NA		
Dibenz(a,h)anthracene	4.50E-05	1.24E-05	NA		NA	NV	NA		
Diethylphthalate	1.03E-02	9.35E-06	8.00E-01	1.17E-05	NA	NV	8.00E-01		1.17E-05
Di-n-butyl phthalate	1.17E-02	7.69E-05	1.00E-01	7.69E-04	NA	NV	1.00E-01		7.69E-04
Fluoranthene	2.40E-03	9.43E-05	4.00E-02	2.36E-03	NA	NV	4.00E-02		2.36E-03
Fluorene	2.60E-03	6.54E-05	4.00E-02	1.63E-03	1.02E-01	7.21E-06	4.00E-02	1.80E-04	1.81E-03
Hexachloroethane	1.00E-03	7.24E-06	1.00E-03	7.24E-03	NA	NV	1.00E-03		7.24E-03
Indeno(1,2,3-c,d)pyrene	2.00E-04	3.63E-05	NA		NA	NV	NA		
Naphthalene	1.36E-01	1.02E-03	2.00E-02	5.12E-02	9.34E+00	6.58E-04	2.00E-02	3.29E-02	8.40E-02
Nitrobenzene	2.00E-03	1.92E-06	2.00E-03	9.60E-04	4.65E-02	3.27E-06	2.00E-03	1.64E-03	2.60E-03
N-Nitrosodi-n-propylamine	2.00E-03	8.50E-07	NA		NA	NV	NA		
N-Nitrosodiphenylamine	1.20E-03	6.33E-06	2.00E-02	3.16E-04	NA	NV	2.00E-02		3.16E-04
Pentachlorophenol	1.13E-02	1.12E-03	3.00E-02	3.74E-02	NA	NV	3.00E-02		3.74E-02
Phenanthrene	6.00E-03	1.35E-04	NA		NA	NV	NA		
Pyrene	2.40E-03	1.36E-04	3.00E-02	4.54E-03	2.53E-02	1.78E-06	3.00E-02	5.95E-05	4.60E-03
1,1-Dichloroethane	5.57E-01	6.42E-04	2.00E-01	3.21E-03	4.80E+01	3.38E-03	2.00E-01	1.69E-02	2.01E-02
1,1-Dichloroethene	4.16E-02	8.43E-05	5.00E-02	1.69E-03	3.65E+00	2.57E-04	5.00E-02	5.15E-03	6.83E-03
1,1,1-Trichloroethane	1.18E-01	2.71E-04	2.00E+00	1.36E-04	8.85E+00	6.23E-04	2.00E+00	3.12E-04	4.47E-04
1,1,2-Trichloroethane	1.33E-02	1.54E-05	4.00E-03	3.85E-03	9.44E-01	6.65E-05	4.00E-03	1.66E-02	2.05E-02
1,1,2,2-Tetrachloroethane	1.29E-02	1.72E-05	4.00E-03	4.31E-03	7.47E-01	5.26E-05	4.00E-03	1.32E-02	1.75E-02
1,2,3-Trichlorobenzene	2.72E-03	NA	NA		1.69E-01	1.19E-05	NA		
1,2,4-Trichlorobenzene	1.51E-02	1.77E-04	1.00E-02	1.77E-02	9.37E-01	6.60E-05	1.00E-02	6.60E-03	2.43E-02

Risk Calculations

		Exposure Route = Dermal			Exposure Route = Inhalation				
Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
1,2,4-Trimethylbenzene	2.78E-01	3.37E-03	7.00E-03	4.82E-01	2.17E+01	1.53E-03	7.00E-03	2.19E-01	7.01E-01
1,2-Dibromo-3-chloropropane	2.40E-03	4.01E-06	2.00E-04	2.00E-02	1.00E-01	7.06E-06	2.00E-04	3.53E-02	5.54E-02
1,2-Dichlorobenzene	7.34E-01	5.06E-03	9.00E-02	5.63E-02	5.10E+01	3.60E-03	9.00E-02	4.00E-02	9.62E-02
1,2-Dichloroethane	1.44E-02	1.66E-05	2.00E-02	8.28E-04	1.18E+00	8.32E-05	2.00E-02	4.16E-03	4.99E-03
1,2-Dichloropropane	5.10E-03	6.94E-06	9.00E-02	7.71E-05	4.08E-01	2.87E-05	9.00E-02	3.19E-04	3.96E-04
1,3-Dichlorobenzene	2.71E-02	2.54E-04	NA		1.88E+00	1.33E-04	NA		
1,3,5-Trimethylbenzene	1.10E-01	1.02E-03	1.00E-02	1.02E-01	8.65E+00	6.10E-04	1.00E-02	6.10E-02	1.63E-01
1,4-Dichlorobenzene	2.18E-01	1.54E-03	7.00E-02	2.19E-02	1.52E+01	1.07E-03	7.00E-02	1.53E-02	3.73E-02
2-Chlorotoluene	2.89E-03	NA	2.00E-02		NA	NA	2.00E-02		
2-Hexanone	2.35E-02	1.45E-05	5.00E-03	2.91E-03	NA	NA	5.00E-03		2.91E-03
2,2-Dichloropropane	5.00E-04	NA	NA		NA	NA	NA		
Acetone	4.85E-01	4.28E-05	9.00E-01	4.75E-05	2.07E+01	1.46E-03	9.00E-01	1.62E-03	1.67E-03
Benzene	4.00E-01	9.90E-04	4.00E-03	2.47E-01	3.88E+01	2.74E-03	4.00E-03	6.84E-01	9.31E-01
Carbon disulfide	3.10E-03	8.66E-06	1.00E-01	8.66E-05	3.08E-01	2.17E-05	1.00E-01	2.17E-04	3.03E-04
Carbon tetrachloride	3.00E-04	8.75E-07	4.00E-03	2.19E-04	2.09E-02	1.47E-06	4.00E-03	3.69E-04	5.87E-04
Chlorobenzene	6.74E-01	3.10E-03	2.00E-02	1.55E-01	5.41E+01	3.81E-03	2.00E-02	1.91E-01	3.46E-01
Chloroethane	9.74E-02	9.95E-05	NA		1.04E+01	7.34E-04	NA		
Chloroform	4.40E-03	5.28E-06	1.00E-02	5.28E-04	3.44E-01	2.43E-05	1.00E-02	2.43E-03	2.95E-03
Chloromethane	7.40E-03	4.09E-06	NA		8.96E-01	6.31E-05	NA		
cis-1,2-Dichloroethene	1.37E+01	2.53E-02	1.00E-02	2.53E+00	1.19E+03	8.39E-02	1.00E-02	8.39E+00	**1.09E+01**
cis-1,3-Dichloropropene	4.20E-03	3.18E-06	3.00E-02	1.06E-04	3.45E-01	2.43E-05	3.00E-02	8.09E-04	9.15E-04
Cyclohexane	1.80E-02	2.43E-04	NA		1.70E+00	1.20E-04	NA		
Ethyl tert-butyl ether (ETBE)	1.20E-03	NA	NA		NA	NA	NA		
Ethylbenzene	4.49E-01	3.39E-03	1.00E-01	3.39E-02	3.75E+01	2.64E-03	1.00E-01	2.64E-02	6.03E-02
Isopropyl ether	4.30E-01	NA	NA		NA	NA	NA		
Isopropylbenzene (cumene)	2.71E-02	3.41E-04	1.00E-01	3.41E-03	NA	NA	1.00E-01		3.41E-03
Methyl acetate	2.25E-02	3.09E-06	1.00E+00	3.09E-06	5.64E-01	3.97E-05	1.00E+00	3.97E-05	4.28E-05
Methyl ethyl ketone	4.30E-01	7.05E-05	6.00E-01	1.18E-04	1.34E+01	9.43E-04	6.00E-01	1.57E-03	1.69E-03
Methyl isobutyl ketone	4.86E+00	2.26E-03	8.00E-02	2.82E-02	2.96E+02	2.08E-02	8.00E-02	2.60E-01	2.89E-01
Methyl tert-butyl ether	2.01E-02	7.38E-06	NA		NA	NA	NA		
Methylcyclohexane	2.45E-02	3.55E-04	NA		2.15E+00	1.51E-04	NA		
Methylene chloride	8.19E-03	4.91E-06	6.00E-02	8.19E-05	7.49E-01	5.28E-05	6.00E-02	8.80E-04	9.62E-04
n-Butylbenzene	6.12E-03	NA	4.00E-02		4.56E-01	3.21E-05	4.00E-02	8.03E-04	8.03E-04
n-Propylbenzene	5.61E-02	NA	4.00E-02		4.42E+00	3.12E-04	4.00E-02	7.79E-03	7.79E-03
Phenol	4.80E-02	3.56E-05	3.00E-01	1.19E-04	NA	NV	3.00E-01		1.19E-04
p-Cymene (p-isopropyltoluene)	7.86E-02	NA	NA		NA	NA	NA		
sec-Butylbenzene	5.64E-03	NA	4.00E-02		4.21E-01	2.96E-05	4.00E-02	7.41E-04	7.41E-04
Styrene	1.39E-02	8.18E-05	2.00E-01	4.09E-04	1.16E+00	8.16E-05	2.00E-01	4.08E-04	8.17E-04
tert-Butylbenzene	2.10E-03	NA	4.00E-02		1.56E-01	1.10E-05	4.00E-02	2.76E-04	2.76E-04
tert-Butyl alcohol	1.17E-01	NA	1.00E-01		NA	NA	1.00E-01		
Tetrachloroethene	1.20E-02	7.11E-05	1.00E-02	7.11E-03	8.06E-01	5.68E-05	1.00E-02	5.68E-03	1.28E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Concentration in Air, Cair [ug/m3]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Toluene	6.11E+00	3.02E-02	8.00E-02	3.78E-01	5.48E+02	3.86E-02	8.00E-02	4.82E-01	8.60E-01
trans-1,2-Dichloroethene	4.01E-01	5.29E-04	2.00E-02	2.65E-02	3.51E+01	2.47E-03	2.00E-02	1.24E-01	1.50E-01
trans-1,3-Dichloropropene	4.10E-03	3.10E-06	3.00E-02	1.03E-04	3.36E-01	2.37E-05	3.00E-02	7.90E-04	8.93E-04
Trichloroethene	5.70E-02	1.21E-04	3.00E-04	4.03E-01	4.29E+00	3.02E-04	3.00E-04	1.01E+00	**1.41E+00**
Vinyl chloride	1.63E+00	1.53E-03	3.00E-03	5.09E-01	1.77E+02	1.25E-02	3.00E-03	4.16E+00	**4.67E+00**
m,p-Xylenes	9.44E-01	NA	2.00E-01		7.88E+01	5.55E-03	2.00E-01	2.78E-02	2.78E-02
o-Xylene	4.45E-01	4.59E-03	2.00E-01	2.29E-02	3.70E+01	2.61E-03	2.00E-01	1.30E-02	3.60E-02
Xylenes, total	1.60E+00	1.30E-02	2.00E-01	6.48E-02	1.33E+02	9.38E-03	2.00E-01	4.69E-02	1.12E-01
Dioxans/Furans									
1,2,3,4,6,7,8-HpCDD	4.64E-07	1.49E-07	NA		NA	NV	NA		
1,2,3,4,6,7,8-HpCDF	9.49E-08	2.74E-08	NA		NA	NV	NA		
1,2,3,4,7,8,9-HpCDF	9.79E-09	2.83E-09	NA		NA	NV	NA		
1,2,3,4,7,8-HxCDD	2.62E-09	6.72E-10	NA		NA	NV	NA		
1,2,3,4,7,8-HxCDF	8.49E-09	1.96E-09	NA		NA	NV	NA		
1,2,3,6,7,8-HxCDD	1.33E-08	3.41E-09	NA		NA	NV	NA		
1,2,3,6,7,8-HxCDF	1.62E-09	3.74E-10	NA		NA	NV	NA		
1,2,3,7,8,9-HxCDD	4.40E-09	1.13E-09	NA		NA	NV	NA		
1,2,3,7,8,9-HxCDF	3.87E-09	8.93E-10	NA		NA	NV	NA		
1,2,3,7,8-PeCDD	1.08E-09	2.21E-10	NA		NA	NV	NA		
1,2,3,7,8-PeCDF	2.28E-09	4.22E-10	NA		NA	NV	NA		
2,3,4,6,7,8-HxCDF	3.94E-09	9.11E-10	NA		NA	NA	NA		
2,3,4,7,8-PeCDF	2.64E-09	4.88E-10	NA		NA	NA	NA		
2,3,7,8-TCDF	1.68E-09	2.49E-10	NA		NA	NA	NA		
OCDD	2.18E-06	8.71E-07	NA		NA	NA	NA		
OCDF	7.44E-07	2.68E-07	NA		NA	NA	NA		
			Total Hazard Index:	2.11E+01			**Total Hazard Index:**	1.59E+01	**3.70E+01**

Total Estimated Non-carcinogenic Hazard Index Across All Exposure Routes : **37**

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constant.

Table 2-14
Cancer Risk Results Detailed Summary - Trench Worker
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates				
Chemical of Potential Concern	Trench Worker			
	Reasonable Maximum Exposure			
	Dermal	Inhalation	Total	%Contribution
Metals				
Arsenic	9.9E-07		9.9E-07	0%
Subtotal Metals	9.9E-07		9.9E-07	0%
Pesticides/PCBs				
Dieldrin	**1.2E-06**		**1.2E-06**	0.6%
Aroclor-1260	**8.1E-06**		**8.1E-06**	4%
Subtotal Pesticides/PCBs	**1.1E-05**		**1.1E-05**	6%
SVOCs/VOCs				
Benzo(a)anthracene	**1.6E-06**		**1.6E-06**	1%
Benzo(a)pyrene	**1.5E-05**		**1.5E-05**	8%
Benzo(b)fluoranthene	**2.4E-06**		**2.4E-06**	1.2%
Benzo(k)fluoranthene	**1.3E-06**		**1.3E-06**	1%
Dibenz(a,h)anthracene	**1.3E-06**		**1.3E-06**	1%
Naphthalene	**1.8E-06**	**1.1E-06**	**2.9E-06**	1%
Pentachlorophenol	**1.9E-06**		**1.9E-06**	1%
1,2-Dibromo-3-chloropropane	4.0E-07	7.1E-07	**1.1E-06**	1%
1,4-Dichlorobenzene	1.2E-07	8.3E-08	2.0E-07	0%
Benzene	**1.4E-06**	**3.9E-06**	**5.3E-06**	3%
Trichloroethene	1.0E-08	2.5E-08	3.6E-08	0%
Vinyl chloride	**1.6E-05**	**1.3E-04**	**1.4E-04**	72%
Subtotal SVOCs/VOCs	**4.6E-05**	**1.4E-04**	**1.8E-04**	90%
Dioxans/Furans				
1,2,3,4,6,7,8-HpCDD	**3.2E-06**		**3.2E-06**	2%
Subtotal Dioxans/Furans	**7.2E-06**		**7.2E-06**	4%
Total:	**6.5E-05**	**1.4E-04**	**2.0E-04**	

Total Estimated Cancer Risk Across All Exposure Routes: **2E-04**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 2-15
Noncancer Risk Results Detailed Summary - Trench Worker
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Non-Carcinogenic Effects Risk Results - Hazard Quotients				
Chemical of Potential Concern	Trench Worker			
	Reasonable Maximum Exposure			
	Dermal	Inhalation	Total	%Contribution
Metals				
Arsenic	**1.5E-01**		**1.5E-01**	0.4%
Subtotal Metals	**2.1E-01**		**2.1E-01**	0.6%
Pesticides/PCBs				
Dieldrin	**1.1E-01**		**1.1E-01**	0.3%
Heptachlor epoxide	**1.2E-01**		**1.2E-01**	0.3%
Aroclor-1260	**1.4E+01**		**1.4E+01**	38%
Subtotal Pesticides/PCBs	**1.5E+01**		**1.5E+01**	39%
SVOCs/VOCs				
2-Methylnaphthalene	**7.6E-01**		**7.6E-01**	2%
Naphthalene	5.1E-02	3.3E-02	8.4E-02	0%
1,2,4-Trimethylbenzene	**4.8E-01**	**2.2E-01**	**7.0E-01**	2%
1,2-Dibromo-3-chloropropane	2.0E-02	3.5E-02	5.5E-02	0.1%
1,2-Dichlorobenzene	5.6E-02	4.0E-02	9.6E-02	0.3%
1,3,5-Trimethylbenzene	**1.0E-01**	6.1E-02	**1.6E-01**	0%
Benzene	**2.5E-01**	**6.8E-01**	**9.3E-01**	3%
Chlorobenzene	**1.5E-01**	**1.9E-01**	**3.5E-01**	1%
cis-1,2-Dichloroethene	**2.5E+00**	**8.4E+00**	**1.1E+01**	30%
Toluene	**3.8E-01**	**4.8E-01**	**8.6E-01**	2%
trans-1,2-Dichloroethene	2.6E-02	**1.2E-01**	**1.5E-01**	0.4%
Trichloroethene	**4.0E-01**	**1.0E+00**	**1.4E+00**	4%
Vinyl chloride	**5.1E-01**	**4.2E+00**	**4.7E+00**	13%
m,p-Xylenes		2.8E-02	2.8E-02	0.1%
o-Xylene	2.3E-02	1.3E-02	3.6E-02	0.1%
Xylenes, total	6.5E-02	4.7E-02	**1.1E-01**	0%
Subtotal SVOCs/VOCs	**6.3E+00**	**1.6E+01**	**2.2E+01**	60%
Total:	**21.1**	**15.9**	**37.0**	

Total Estimated Noncancer Hazard Across All Exposure Routes: **37**

Notes:
Subtotals and Total: Cumulative Hazard Index of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard index for all chemicals evaluated.

Table 2-16
Model for Estimating Dermal Exposure from Contact with Chemicals in Water - Future Adult Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: EPA, 2004. RAGS Part E

ORGANICS

If $t_{event} \leq t^*$:

$$DA_{event_1} = 2 \times FA \times K_p \times C_v \sqrt{\frac{6 \times tau \times t_{event}}{\Pi}}$$

If $t_{event} > t^*$:

$$DA_{event_2} = FA \times K_p \times C_v \left[\frac{t_{event}}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$$

INORGANICS

$$DA_{event} = K_p \times C_v \times t_{event}$$

$$DAD = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT \times 365\, days/year}$$

$$\log K_p = -2.8 + 0.66 \log K_{ow} - 0.0056 MW$$

$$B = K_p \frac{\sqrt{MW}}{2.6}$$

$$If\ B \leq 0.6\ then\ t^* = 2.4\tau$$

$$If\ B > 0.6\ then\ t^* = 6\left(b - \sqrt{b^2 - c^2}\right)\tau$$

$$b = \frac{2}{\pi}(1+B)^2 - c \qquad c = \frac{1+3B+3B^2}{3(1+B)}$$

$$\log \frac{D_{sc}}{l_{sc}} = -2.80 - 0.0056 MW$$

$$\tau = \frac{l_{sc}^2}{6\, D_{sc}}$$

Dermally-absorbed dose	DAD	calculated	mg/kg-day
Concentration in water	Conc (Cv)	chem-specific	mg/cm3
permeability coefficient	Kp	calculated	cm/hr
Lag time per event (hours)	*tau* (τ)	calculated	hours
Time to reach steady-state (hours)	t*	calculated	hours
Dimensionless coefficient	B	calculated	
Pi	π	3.1416	
Exposure Time	t_event	0.58	hr/event
Number of exposure events	EV	1	event/day
Exposure Duration	ED	24	year
Exposure Frequency	EF	350	days/year
Exposed Skin Surface Area	SA	18000	cm2
Body Weight	BW	70	kg
Averaging time - noncarcinogenic	AT_N	24	years
Averaging time - carcinogenic	AT_C	70	years
Conversion Factor		0.001	mg/ug

Thickness of stratum corneum	*lsc* (cm)	0.001
Molecular Weight	g/mol	chem-specific
log octanol-water partition coefficient	Log Kow	chem-specific
log permeability coefficient	log Kp	calculated
Permeability coefficient (cm/hr)	Kp	calculated
Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	B	calculated
across the stratum corneum (cm2/hr)	Dsc	calculated
Lag time per event (hours)	τ	calculated
Time to reach steady-state (hours)	t*	calculated
methodology (see equations A7 and A8, USEPA, 2001)	b,c	calculated

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Metals																		
Aluminum	9.4E+00	9.4E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.45E-06	NA	NA	5.45E-06
Antimony	1.5E-03	1.5E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	8.77E-10	NA	NA	8.77E-10
Arsenic	2.9E-01	2.9E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.66E-07	NA	NA	1.66E-07
Barium	1.7E-01	1.7E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	9.72E-08	NA	NA	9.72E-08
Beryllium	7.6E-04	7.6E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.43E-10	NA	NA	4.43E-10
Boron	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.50E-06	NA	NA	2.50E-06

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/Isc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Cadmium	1.3E-03	1.3E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	7.28E-10	NA	NA	7.28E-10
Chromium	3.6E-02	3.6E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.07E-08	NA	NA	2.07E-08
Chromium (VI)	3.5E-04	3.5E-07	NA	1.0	NA	2.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.06E-10	NA	NA	4.06E-10
Cobalt	8.9E-03	8.9E-06	NA	1.0	NA	4.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	2.06E-09	NA	NA	2.06E-09
Copper	4.7E-02	4.7E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.70E-08	NA	NA	2.70E-08
Iron	5.4E+01	5.4E-02	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.10E-05	NA	NA	3.10E-05
Lead	4.0E-02	4.0E-05	NA	1.0	NA	1.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	2.32E-09	NA	NA	2.32E-09
Manganese	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.51E-06	NA	NA	2.51E-06
Mercury	1.2E-04	1.2E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	7.02E-11	NA	NA	7.02E-11
Molybdenum	5.6E-03	5.6E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.27E-09	NA	NA	3.27E-09
Nickel	5.5E-02	5.5E-05	NA	1.0	NA	2.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	6.33E-09	NA	NA	6.33E-09
Selenium	1.9E-02	1.9E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.10E-08	NA	NA	1.10E-08
Silver	1.2E-04	1.2E-07	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	4.18E-11	NA	NA	4.18E-11
Thallium	5.0E-05	5.0E-08	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.90E-11	NA	NA	2.90E-11
Vanadium	3.2E-02	3.2E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.85E-08	NA	NA	1.85E-08
Zinc	3.0E-01	3.0E-04	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	1.05E-07	NA	NA	1.05E-07
Cyanide	6.3E-02	6.3E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.65E-08	NA	NA	3.65E-08
Pesticides/PCBs																		
4,4'-DDD	5.0E-03	5.0E-06	3.2E+02	0.8	5.8E+00	1.80E-01	-7.64E-01	1.24E+00	2.56E-05	2.56E-08	6.51E+00	1.8	1.39	2.55E+01	NA	3.87E-06	1.76E-05	3.87E-06
4,4'-DDE	7.8E-04	7.8E-07	3.2E+02	0.8	5.7E+00	1.60E-01	-8.25E-01	1.10E+00	2.63E-05	2.63E-08	6.35E+00	1.5	1.26	2.46E+01	NA	5.27E-07	2.29E-06	5.27E-07
4,4'-DDT	1.8E-04	1.8E-07	3.6E+02	0.7	6.4E+00	2.70E-01	-5.90E-01	1.96E+00	1.63E-05	1.63E-08	1.02E+01	3.5	2.07	4.16E+01	NA	2.29E-07	1.47E-06	2.29E-07
Aldrin	4.0E-04	4.0E-07	3.7E+02	1.0	3.0E+00	1.40E-03	-2.86E+00	1.03E-02	1.43E-05	1.43E-08	1.16E+01	0.3	0.34	2.79E+01	NA	4.07E-09	1.36E-08	4.07E-09
alpha-BHC	3.0E-04	3.0E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	1.47E-08	3.34E-08	1.47E-08
alpha-Chlordane	3.3E-04	3.3E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	7.62E-08	4.18E-07	7.62E-08
Atrazine	2.0E-03	2.0E-06	2.2E+02	1.0	2.6E+00	5.18E-03	-2.29E+00	2.93E-02	9.82E-05	9.82E-08	1.70E+00	0.3	0.35	4.07E+00	NA	2.84E-08	4.21E-08	2.84E-08
beta-BHC	3.7E-04	3.7E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	1.81E-08	4.11E-08	1.81E-08
delta-BHC	1.6E-04	1.6E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	7.83E-09	1.78E-08	7.83E-09
Diazinon	2.6E-04	2.6E-07	3.0E+02	1.0	3.8E+00	1.02E-02	-1.99E+00	6.87E-02	3.13E-05	3.13E-08	5.32E+00	0.3	0.38	1.28E+01	NA	1.29E-08	3.17E-08	1.29E-08
Dieldrin	9.2E-04	9.2E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	7.06E-08	2.81E-07	7.06E-08
Endosulfan I	3.3E-04	3.3E-07	4.1E+02	1.0	3.8E+00	2.81E-03	-2.55E+00	2.18E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.35	4.80E+01	NA	8.76E-09	3.85E-08	8.76E-09
Endosulfan II	2.3E-04	2.3E-07	4.1E+02	1.0	3.5E+00	1.76E-03	-2.76E+00	1.36E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.34	4.80E+01	NA	3.80E-09	1.66E-08	3.80E-09
Endosulfan sulfate	9.2E-05	9.2E-08	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	6.5E-04	6.5E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	4.94E-08	1.97E-07	4.94E-08
Endrin aldehyde	1.4E-04	1.4E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	1.7E-04	1.7E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC	3.3E-04	3.3E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	1.60E-08	3.65E-08	1.60E-08
gamma-Chlordane	2.5E-04	2.5E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	5.71E-08	3.13E-07	5.71E-08
Heptachlor	1.1E-04	1.1E-07	3.7E+02	0.8	4.3E+00	8.60E-03	-2.07E+00	6.39E-02	1.28E-05	1.28E-08	1.30E+01	0.3	0.38	3.12E+01	NA	5.78E-09	2.15E-08	5.78E-09
Heptachlor epoxide	1.2E-04	1.2E-07	3.9E+02	1.0	5.0E+00	2.03E-02	-1.69E+00	1.54E-01	1.05E-05	1.05E-08	1.59E+01	0.4	0.44	3.82E+01	NA	2.04E-08	9.03E-08	2.04E-08
Methoxychlor	1.2E-04	1.2E-07	3.5E+02	1.0	5.1E+00	4.14E-02	-1.38E+00	2.96E-01	1.84E-05	1.84E-08	9.07E+00	0.5	0.55	2.18E+01	NA	3.15E-08	1.18E-07	3.15E-08
Aroclor-1260	9.6E-04	9.6E-07	4.0E+02	0.6	8.3E+00	7.50E-01	4.44E-01	5.74E+00	9.69E-06	9.69E-09	1.72E+01	23.1	5.78	7.60E+01	NA	3.78E-06	3.84E-05	3.78E-06
SVOCs/VOCs																		
1,4-Dioxane (p-dioxane)	7.8E-01	7.8E-04	8.8E+01	1.0	-2.7E-01	3.30E-04	-3.47E+00	1.19E-03	5.09E-04	5.09E-07	3.27E-01	0.3	0.33	7.86E-01	NA	3.10E-07	3.18E-07	3.10E-07
2,4,6-Trichlorophenol	7.1E-03	7.1E-06	2.0E+02	1.0	3.7E+00	3.50E-02	-1.47E+00	1.89E-01	1.24E-04	1.24E-07	1.34E+00	0.4	0.47	3.22E+00	NA	6.09E-07	9.15E-07	6.09E-07
2,4-Dimethylphenol	7.9E-02	7.9E-05	1.2E+02	1.0	2.3E+00	1.10E-02	-1.97E+00	4.68E-02	3.28E-04	3.28E-07	5.08E-01	0.3	0.37	1.22E+00	NA	1.30E-06	1.40E-06	1.30E-06
2-Chlorophenol	4.3E-03	4.3E-06	1.3E+02	1.0	2.2E+00	8.00E-03	-2.10E+00	3.49E-02	3.02E-04	3.02E-07	5.52E-01	0.3	0.36	1.33E+00	NA	5.38E-08	5.86E-08	5.38E-08
2-Methylnaphthalene	2.3E-01	2.3E-04	1.4E+02	1.0	3.9E+00	8.94E-02	-1.05E+00	4.10E-01	2.53E-04	2.53E-07	6.58E-01	0.6	0.65	1.58E+00	NA	3.44E-05	4.48E-05	3.44E-05
2-Methylphenol	1.2E-01	1.2E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	1.30E-06	1.36E-06	1.30E-06
2-Nitroaniline	1.0E-02	1.0E-05	1.4E+02	1.0	1.9E+00	4.44E-03	-2.35E+00	2.01E-02	2.67E-04	2.67E-07	6.24E-01	0.3	0.35	1.50E+00	NA	7.39E-08	8.18E-08	7.39E-08
3,4-methylphenol	8.4E-01	8.4E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	8.86E-06	9.29E-06	8.86E-06
4-Chloro-3-methylphenol	2.4E-02	2.4E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	1.9E-01	1.9E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	2.04E-06	2.14E-06	2.04E-06
Acenaphthene	4.5E-03	4.5E-06	1.5E+02	1.0	3.9E+00	1.33E-01	-1.08E+00	6.35E-01	2.17E-04	2.17E-07	7.68E-01	0.9	0.84	3.04E+00	NA	1.10E-06	1.63E-06	1.10E-06
Acenaphthylene	9.5E-03	9.5E-06	1.5E+02	1.0	3.9E+00	1.41E-01	-1.05E+00	6.69E-01	2.23E-04	2.23E-07	7.48E-01	0.9	0.87	2.93E+00	NA	2.45E-06	3.61E-06	2.45E-06
Anthracene	3.2E-03	3.2E-06	1.8E+02	1.0	4.5E+00	2.25E-01	-8.61E-01	1.16E+00	1.59E-04	1.59E-07	1.05E+00	1.6	1.31	4.07E+00	NA	1.55E-06	2.94E-06	1.55E-06
Benzo(a)anthracene	9.0E-04	9.0E-07	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	1.26E-06	3.90E-06	1.26E-06
Benzo(a)pyrene	5.0E-04	5.0E-07	2.5E+02	1.0	6.1E+00	7.00E-01	-1.74E-01	4.26E+00	6.31E-05	6.31E-08	2.64E+00	13.3	4.32	1.15E+01	NA	1.20E-06	4.60E-06	1.20E-06
Benzo(b)fluoranthene	7.6E-04	7.6E-07	2.5E+02	1.0	5.8E+00	6.99E-01	-3.98E-01	4.27E+00	6.12E-05	6.12E-08	2.72E+00	13.4	4.33	1.18E+01	NA	1.84E-06	7.19E-06	1.84E-06
Benzo(g,h,i)perylene	2.0E-04	2.0E-07	2.8E+02	1.0	6.6E+00	1.07E+00	2.83E-02	6.82E+00	4.49E-05	4.49E-08	3.71E+00	32.1	6.87	1.65E+01	NA	8.65E-07	4.19E-06	8.65E-07
Benzo(k)fluoranthene	4.6E-04	4.6E-07	2.5E+02	1.0	6.1E+00	6.60E-01	-1.80E-01	4.03E+00	6.12E-05	6.12E-08	2.72E+00	12.0	4.10	1.18E+01	NA	1.05E-06	4.07E-06	1.05E-06
Biphenyl (Diphenyl)	1.3E-03	1.3E-06	1.5E+02	1.0	4.0E+00	9.19E-02	-1.04E+00	4.39E-01	2.17E-04	2.17E-07	7.68E-01	0.6	0.67	1.84E+00	NA	2.20E-07	3.05E-07	2.20E-07
bis(2-Chloroethoxy)methane	2.0E-04	2.0E-07	1.7E+02	1.0	1.3E+00	1.23E-03	-2.91E+00	6.21E-03	1.70E-04	1.70E-07	9.79E-01	0.3	0.34	2.35E+00	NA	5.11E-10	6.25E-10	5.11E-10
bis(2-Ethylhexyl)phthalate	1.7E-02	1.7E-05	3.9E+02	1.0	5.1E+00	2.50E-02	-1.62E+00	1.90E-01	1.02E-05	1.02E-08	1.63E+01	0.4	0.47	3.91E+01	NA	3.59E-06	1.65E-05	3.59E-06
Bromoform	1.2E-02	1.2E-05	2.5E+02	1.0	2.4E+00	2.20E-03	-2.63E+00	1.35E-02	6.09E-05	6.09E-08	2.74E+00	0.3	0.34	6.56E+00	NA	9.19E-08	1.61E-07	9.19E-08

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Caprolactam	2.4E-03	2.4E-06	1.1E+02	1.0	6.6E-01	1.00E-03	-3.00E+00	4.11E-03	3.68E-04	3.68E-07	4.52E-01	0.3	0.34	1.09E+00	NA	3.41E-09	3.58E-09	3.41E-09
Carbazole	1.3E-02	1.3E-05	1.7E+02	1.0	3.7E+00	5.23E-02	-1.28E+00	2.60E-01	1.83E-04	1.83E-07	9.08E-01	0.5	0.52	2.18E+00	NA	1.32E-06	1.79E-06	1.32E-06
Chrysene	1.1E-03	1.1E-06	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	1.54E-06	4.76E-06	1.54E-06
Dibenz(a,h)anthracene	4.5E-05	4.5E-08	2.8E+02	0.6	6.5E+00	1.50E+00	-4.24E-02	9.63E+00	4.38E-05	4.38E-08	3.81E+00	62.2	9.66	1.72E+01	NA	1.66E-07	8.43E-07	1.66E-07
Diethylphthalate	1.0E-02	1.0E-05	2.2E+02	1.0	2.5E+00	3.90E-03	-2.41E+00	2.23E-02	9.05E-05	9.05E-08	1.84E+00	0.3	0.35	4.42E+00	NA	1.15E-07	1.74E-07	1.15E-07
Di-n-butyl phthalate	1.2E-02	1.2E-05	2.8E+02	0.9	4.1E+00	2.40E-02	-1.63E+00	1.54E-01	4.40E-05	4.40E-08	3.79E+00	0.4	0.44	9.10E+00	NA	1.03E-06	2.32E-06	1.03E-06
Fluoranthene	2.4E-03	2.4E-06	2.0E+02	1.0	5.0E+00	2.20E-01	-6.66E-01	1.20E+00	1.17E-04	1.17E-07	1.43E+00	1.7	1.35	5.57E+00	NA	1.33E-06	2.92E-06	1.33E-06
Fluorene	2.6E-03	2.6E-06	1.7E+02	1.0	4.2E+00	1.71E-01	-9.72E-01	8.48E-01	1.86E-04	1.86E-07	8.97E-01	1.1	1.03	3.45E+00	NA	8.86E-07	1.47E-06	8.86E-07
Hexachloroethane	1.0E-03	1.0E-06	2.4E+02	1.0	3.9E+00	3.00E-02	-1.53E+00	1.78E-01	7.49E-05	7.49E-08	2.23E+00	0.4	0.46	5.34E+00	NA	9.42E-08	1.71E-07	9.42E-08
Indeno(1,2,3-c,d)pyrene	2.0E-04	2.0E-07	2.8E+02	0.6	6.6E+00	1.00E+00	-4.48E-03	6.39E+00	4.49E-05	4.49E-08	3.71E+00	28.4	6.44	1.65E+01	NA	4.86E-07	2.33E-06	4.86E-07
Naphthalene	1.4E-01	1.4E-04	1.3E+02	1.0	3.3E+00	4.70E-02	-1.34E+00	2.05E-01	3.03E-04	3.03E-07	5.49E-01	0.4	0.48	1.32E+00	NA	9.99E-06	1.15E-05	9.99E-06
Nitrobenzene	2.0E-03	2.0E-06	1.2E+02	1.0	1.9E+00	5.39E-03	-2.27E+00	2.30E-02	3.24E-04	3.24E-07	5.14E-01	0.3	0.35	1.23E+00	NA	1.63E-08	1.75E-08	1.63E-08
N-Nitrosodi-n-propylamine	2.0E-03	2.0E-06	1.3E+02	1.0	1.4E+00	2.34E-03	-2.63E+00	1.03E-02	2.96E-04	2.96E-07	5.64E-01	0.3	0.34	1.35E+00	NA	7.38E-09	8.00E-09	7.38E-09
N-Nitrosodiphenylamine	1.2E-03	1.2E-06	2.0E+02	1.0	3.1E+00	2.60E-02	-1.84E+00	1.41E-01	1.23E-04	1.23E-07	1.35E+00	0.4	0.43	3.25E+00	NA	7.64E-08	1.12E-07	7.64E-08
Pentachlorophenol	1.1E-02	1.1E-05	2.7E+02	0.9	5.9E+00	3.90E-01	-4.24E-01	2.45E+00	5.11E-05	5.11E-08	3.26E+00	5.0	2.54	1.36E+01	NA	1.51E-05	5.79E-05	1.51E-05
Phenanthrene	6.0E-03	6.0E-06	1.8E+02	1.0	4.5E+00	1.40E-01	-8.54E-01	7.19E-01	1.59E-04	1.59E-07	1.05E+00	1.0	0.91	4.05E+00	NA	1.81E-06	3.08E-06	1.81E-06
Pyrene	2.4E-03	2.4E-06	2.0E+02	1.0	4.9E+00	3.24E-01	-7.12E-01	1.77E+00	1.17E-04	1.17E-07	1.43E+00	3.0	1.89	5.76E+00	NA	1.96E-06	4.71E-06	1.96E-06
1,1,1-Trichloroethane	1.2E-01	1.2E-04	1.3E+02	1.0	2.5E+00	1.30E-02	-1.90E+00	5.77E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.37	1.41E+00	NA	2.47E-06	2.75E-06	2.47E-06
1,1,2,2-Tetrachloroethane	1.3E-02	1.3E-05	1.7E+02	1.0	2.4E+00	6.90E-03	-2.16E+00	3.44E-02	1.82E-04	1.82E-07	9.16E-01	0.3	0.36	2.20E+00	NA	1.80E-07	2.19E-07	1.80E-07
1,1,2-Trichloroethane	1.3E-02	1.3E-05	1.3E+02	1.0	2.1E+00	6.40E-03	-2.19E+00	2.84E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.35	1.41E+00	NA	1.38E-07	1.51E-07	1.38E-07
1,1-Dichloroethane	5.6E-01	5.6E-04	9.9E+01	1.0	1.8E+00	6.70E-03	-2.17E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	4.82E-06	5.00E-06	4.82E-06
1,1-Dichloroethene	4.2E-02	4.2E-05	9.7E+01	1.0	2.1E+00	1.20E-02	-1.94E+00	4.54E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.80E-01	NA	6.36E-07	6.59E-07	6.36E-07
1,2,3-Trichlorobenzene	2.7E-03	2.7E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	1.5E-02	1.5E-05	1.8E+02	1.0	4.0E+00	6.60E-02	-1.19E+00	3.42E-01	1.53E-04	1.53E-07	1.09E+00	0.6	0.59	2.62E+00	NA	2.19E-06	3.30E-06	2.19E-06
1,2,4-Trimethylbenzene	2.8E-01	2.8E-04	1.2E+02	1.0	3.6E+00	8.37E-02	-1.08E+00	3.53E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.60	1.19E+00	NA	3.44E-05	4.06E-05	3.44E-05
1,2-Dibromo-3-chloropropane	2.4E-03	2.4E-06	2.4E+02	1.0	3.0E+00	6.76E-03	-2.17E+00	4.00E-02	7.53E-05	7.53E-08	2.21E+00	0.3	0.36	5.32E+00	NA	5.08E-08	8.38E-08	5.08E-08
1,2-Dichlorobenzene	7.3E-01	7.3E-04	1.5E+02	1.0	3.4E+00	4.10E-02	-1.39E+00	1.91E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	5.30E-05	6.47E-05	5.30E-05
1,2-Dichloroethane	1.4E-02	1.4E-05	9.9E+01	1.0	1.5E+00	6.70E-03	-2.38E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	1.24E-07	1.29E-07	1.24E-07
1,2-Dichloropropane	5.1E-03	5.1E-06	1.1E+02	1.0	2.0E+00	7.80E-03	-2.11E+00	3.19E-02	3.69E-04	3.69E-07	4.51E-01	0.3	0.35	1.08E+00	NA	5.63E-08	5.94E-08	5.63E-08
1,3,5-Trimethylbenzene	1.1E-01	1.1E-04	1.2E+02	1.0	3.4E+00	6.08E-02	-1.22E+00	2.56E-01	3.36E-04	3.36E-07	4.95E-01	0.5	0.52	1.19E+00	NA	9.93E-06	1.14E-05	9.93E-06
1,3-Dichlorobenzene	2.7E-02	2.7E-05	1.5E+02	1.0	3.6E+00	5.80E-02	-1.25E+00	2.70E-01	2.38E-04	2.38E-07	7.00E-01	0.5	0.53	1.68E+00	NA	2.77E-06	3.49E-06	2.77E-06
1,4-Dichlorobenzene	2.2E-01	2.2E-04	1.5E+02	1.0	3.4E+00	4.20E-02	-1.39E+00	1.96E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	1.61E-05	1.97E-05	1.61E-05
2-Chlorotoluene	2.9E-03	2.9E-06	1.3E+02	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	2.4E-02	2.4E-05	1.0E+02	1.0	1.4E+00	3.55E-03	-2.45E+00	1.37E-02	4.36E-04	4.36E-07	3.83E-01	0.3	0.34	9.18E-01	NA	1.09E-07	1.13E-07	1.09E-07
2,2-Dichloropropane	5.0E-04	5.0E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	4.9E-01	4.9E-04	5.8E+01	1.0	-2.4E-01	5.20E-04	-3.28E+00	1.53E-03	7.49E-04	7.49E-07	2.22E-01	0.3	0.33	5.34E-01	NA	2.51E-07	2.59E-07	2.59E-07
Benzene	4.0E-01	4.0E-04	7.8E+01	1.0	2.1E+00	1.50E-02	-1.83E+00	5.10E-02	5.79E-04	5.79E-07	2.88E-01	0.3	0.37	6.91E-01	NA	6.78E-06	6.94E-06	6.78E-06
Carbon disulfide	3.1E-03	3.1E-06	8.0E+01	1.0	2.2E+00	1.70E-02	-1.77E+00	5.85E-02	5.65E-04	5.65E-07	2.95E-01	0.3	0.37	7.08E-01	NA	6.03E-08	6.18E-08	6.03E-08
Carbon tetrachloride	3.0E-04	3.0E-07	1.5E+02	1.0	2.8E+00	1.60E-02	-1.79E+00	7.63E-02	2.18E-04	2.18E-07	7.64E-01	0.4	0.39	1.83E+00	NA	8.83E-09	1.05E-08	8.83E-09
Chlorobenzene	6.7E-01	6.7E-04	1.1E+02	1.0	2.8E+00	2.80E-02	-1.56E+00	1.14E-01	3.71E-04	3.71E-07	4.49E-01	0.4	0.41	1.08E+00	NA	2.66E-05	2.87E-05	2.66E-05
Chloroethane	9.7E-02	9.7E-05	6.5E+01	1.0	1.4E+00	6.10E-03	-2.22E+00	1.88E-02	6.90E-04	6.90E-07	2.42E-01	0.3	0.35	5.80E-01	NA	6.15E-07	6.31E-07	6.31E-07
Chloroform	4.4E-03	4.4E-06	1.2E+02	1.0	2.0E+00	6.80E-03	-2.17E+00	2.86E-02	3.40E-04	3.40E-07	4.90E-01	0.3	0.35	1.18E+00	NA	4.41E-08	4.71E-08	4.41E-08
Chloromethane	7.4E-03	7.4E-06	5.1E+01	1.0	9.1E-01	3.30E-03	-2.48E+00	9.02E-03	8.26E-04	8.26E-07	2.02E-01	0.3	0.34	4.84E-01	NA	2.31E-08	2.40E-08	2.40E-08
cis-1,2-Dichloroethene	1.4E+01	1.4E-02	9.7E+01	1.0	2.1E+00	1.09E-02	-1.96E+00	4.12E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.81E-01	NA	1.90E-04	1.97E-04	1.90E-04
cis-1,3-Dichloropropene	4.2E-03	4.2E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	2.52E-08	2.65E-08	2.52E-08
Cyclohexane	1.8E-02	1.8E-05	8.4E+01	1.0	3.4E+00	9.98E-02	-1.00E+00	3.52E-01	5.35E-04	5.35E-07	3.11E-01	0.6	0.60	7.47E-01	NA	2.11E-06	2.26E-06	2.11E-06
Ethyl tert-butyl ether (ETBE)	1.2E-03	1.2E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	4.5E-01	4.5E-04	1.1E+02	1.0	3.2E+00	4.90E-02	-1.32E+00	1.94E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.47	9.93E-01	NA	2.98E-05	3.23E-05	2.98E-05
Isopropyl ether	4.3E-01	4.3E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene (cumene)	2.7E-02	2.7E-05	1.2E+02	1.0	3.7E+00	8.76E-02	-1.06E+00	3.69E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.61	1.19E+00	NA	3.51E-06	4.16E-06	3.51E-06
Methyl acetate	2.3E-02	2.3E-05	7.4E+01	1.0	1.8E-01	8.02E-04	-3.10E+00	2.65E-03	6.10E-04	6.10E-07	2.73E-01	0.3	0.34	6.56E-01	NA	1.99E-08	2.03E-08	1.99E-08
Methyl ethyl ketone	4.3E-01	4.3E-04	7.2E+01	1.0	2.9E-01	9.60E-04	-3.01E+00	3.13E-03	6.26E-04	6.26E-07	2.66E-01	0.3	0.34	6.39E-01	NA	4.48E-07	4.59E-07	4.48E-07
Methyl isobutyl ketone	4.9E+00	4.9E-03	1.0E+02	1.0	1.2E+00	2.66E-03	-2.57E+00	1.02E-02	4.37E-04	4.37E-07	3.82E-01	0.3	0.34	9.16E-01	NA	1.68E-05	1.74E-05	1.68E-05
Methyl tert-butyl ether	2.0E-02	2.0E-05	8.8E+01	1.0	9.4E-01	2.12E-03	-2.67E+00	7.66E-03	5.09E-04	5.09E-07	3.28E-01	0.3	0.34	7.87E-01	NA	5.15E-08	5.28E-08	5.15E-08
Methylcyclohexane	2.5E-02	2.5E-05	9.8E+01	1.0	3.6E+00	1.08E-01	-9.67E-01	4.11E-01	4.47E-04	4.47E-07	3.73E-01	0.6	0.65	8.95E-01	NA	3.40E-06	3.80E-06	3.40E-06
Methylene chloride	8.2E-03	8.2E-06	8.5E+01	1.0	1.3E+00	3.50E-03	-2.45E+00	1.24E-02	5.30E-04	5.30E-07	3.14E-01	0.3	0.34	7.54E-01	NA	3.38E-08	3.47E-08	3.38E-08
n-Butylbenzene	6.1E-03	6.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	5.6E-02	5.6E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Cymene (p-isopropyltoluene)	7.9E-02	7.9E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	4.8E-02	4.8E-05	9.4E+01	1.0	1.5E+00	4.30E-03	-2.36E+00	1.60E-02	4.71E-04	4.71E-07	3.54E-01	0.3	0.34	8.49E-01	NA	2.59E-07	2.66E-07	2.59E-07
sec-Butylbenzene	5.6E-03	5.6E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	1.4E-02	1.4E-05	1.0E+02	1.0	3.0E+00	3.70E-02	-1.44E+00	1.45E-01	4.14E-04	4.14E-07	4.03E-01	0.4	0.44	9.66E-01	NA	6.88E-07	7.35E-07	6.88E-07
tert-Butylbenzene	2.1E-03	2.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert-Butyl alcohol	1.2E-01	1.2E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/Isc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Tetrachloroethene	1.2E-02	1.2E-05	1.7E+02	1.0	3.4E+00	3.30E-02	-1.48E+00	1.63E-01	1.87E-04	1.87E-07	8.92E-01	0.4	0.45	2.14E+00	NA	7.87E-07	1.02E-06	7.87E-07
Toluene	6.1E+00	6.1E-03	9.2E+01	1.0	2.7E+00	3.10E-02	-1.51E+00	1.14E-01	4.83E-04	4.83E-07	3.45E-01	0.4	0.41	8.28E-01	NA	2.34E-04	2.44E-04	2.34E-04
trans-1,2-Dichloroethene	4.0E-01	4.0E-04	9.7E+01	1.0	1.9E+00	7.70E-03	-2.12E+00	2.92E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.35	8.80E-01	NA	3.94E-06	4.08E-06	3.94E-06
trans-1,3-Dichloropropene	4.1E-03	4.1E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	2.46E-08	2.58E-08	2.46E-08
Trichloroethene	5.7E-02	5.7E-05	1.3E+02	1.0	2.4E+00	1.20E-02	-1.94E+00	5.29E-02	2.91E-04	2.91E-07	5.72E-01	0.3	0.37	1.37E+00	NA	1.09E-06	1.20E-06	1.09E-06
Vinyl chloride	1.6E+00	1.6E-03	6.3E+01	1.0	1.4E+00	5.60E-03	-2.25E+00	1.70E-02	7.08E-04	7.08E-07	2.35E-01	0.3	0.34	5.65E-01	NA	9.30E-06	9.56E-06	9.56E-06
m,p-Xylene	9.4E-01	9.4E-04	1.1E+02	1.0	NA	5.30E-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	4.4E-01	4.4E-04	1.1E+02	1.0	3.1E+00	7.04E-02	-1.34E+00	2.79E-01	4.03E-04	4.03E-07	4.13E-01	0.5	0.54	9.92E-01	NA	4.24E-05	4.70E-05	4.24E-05
Xylenes, total	1.6E+00	1.6E-03	1.1E+02	1.0	3.2E+00	5.30E-02	-1.28E+00	2.10E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.49	9.93E-01	NA	1.15E-04	1.25E-04	1.15E-04
Dioxans/Furans																		
1,2,3,4,6,7,8-HpCDD	4.6E-07	4.6E-10	4.3E+02	0.5	8.2E+00	8.10E-01	2.30E-01	6.42E+00	6.58E-06	6.58E-09	2.53E+01	28.6	6.47	1.13E+02	NA	1.99E-09	2.49E-08	1.99E-09
1,2,3,4,6,7,8-HpCDF	9.5E-08	9.5E-11	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	3.67E-10	4.13E-09	3.67E-10
1,2,3,4,7,8,9-HpCDF	9.8E-09	9.8E-12	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	3.79E-11	4.26E-10	3.79E-11
1,2,3,4,7,8-HxCDD	2.6E-09	2.6E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	9.01E-12	8.99E-11	9.01E-12
1,2,3,4,7,8-HxCDF	8.5E-09	8.5E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	2.63E-11	2.36E-10	2.63E-11
1,2,3,6,7,8-HxCDD	1.3E-08	1.3E-11	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	4.57E-11	4.55E-10	4.57E-11
1,2,3,6,7,8-HxCDF	1.6E-09	1.6E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	5.01E-12	4.49E-11	5.01E-12
1,2,3,7,8,9-HxCDD	4.4E-09	4.4E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	1.51E-11	1.51E-10	1.51E-11
1,2,3,7,8,9-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	1.20E-11	1.07E-10	1.20E-11
1,2,3,7,8-PeCDD	1.1E-09	1.1E-12	3.6E+02	0.5	6.3E+00	8.10E-01	-6.38E-01	5.88E+00	1.60E-05	1.60E-08	1.04E+01	24.2	5.93	4.61E+01	NA	2.97E-12	2.36E-11	2.97E-12
1,2,3,7,8-PeCDF	2.3E-09	2.3E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	5.66E-12	4.04E-11	5.66E-12
2,3,4,6,7,8-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	1.22E-11	1.10E-10	1.22E-11
2,3,4,7,8-PeCDF	2.6E-09	2.6E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	6.54E-12	4.67E-11	6.54E-12
2,3,7,8-TCDF	1.7E-09	1.7E-12	3.1E+02	0.5	6.5E+00	8.10E-01	-2.04E-01	5.45E+00	3.07E-05	3.07E-08	5.44E+00	21.0	5.50	2.39E+01	NA	3.34E-12	1.90E-11	3.34E-12
OCDF	7.4E-07	7.4E-10	4.4E+02	0.5	8.6E+00	8.10E-01	3.91E-01	6.56E+00	5.19E-06	5.19E-09	3.21E+01	29.8	6.61	1.43E+02	NA	3.59E-09	5.07E-08	3.59E-09
OCDD	2.2E-06	2.2E-09	4.6E+02	0.5	9.5E+00	8.10E-01	8.95E-01	6.68E+00	4.22E-06	4.22E-09	3.95E+01	30.8	6.72	1.76E+02	NA	1.17E-08	1.83E-07	1.17E-08

Table 2-17
Model for Estimating Dermal Exposure from Contact with Chemicals in Water - Future Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: EPA, 2004. RAGS Part E

ORGANICS

If $t_{event} \leq t^*$:

$$DA_{event_1} = 2 \times FA \times K_p \times C_v \sqrt{\frac{6 \times tau \times t_{event}}{\Pi}}$$

If $t_{event} > t^*$:

$$DA_{event_2} = FA \times K_p \times C_v \left[\frac{t_{event}}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$$

INORGANICS

$$DA_{event} = K_p \times C_v \times t_{event}$$

$$DAD = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT \times 365\, days/year}$$

$$\log K_p = -2.8 + 0.66 \log K_{ow} - 0.0056 MW$$

$$B = K_p \frac{\sqrt{MW}}{2.6}$$

$$If\ B \leq 0.6\ then\ t^* = 2.4\tau$$

$$If\ B > 0.6\ then\ t^* = 6\left(b - \sqrt{b^2 - c^2}\right)\tau$$

$$b = \frac{2}{\pi}(1+B)^2 - c \qquad c = \frac{1+3B+3B^2}{3(1+B)}$$

$$\log \frac{D_{sc}}{l_{sc}} = -2.80 - 0.0056 MW$$

$$\tau = \frac{l_{sc}^2}{6\ D_{sc}}$$

Dermally-absorbed dose	DAD	calculated	mg/kg-day
Concentration in water	Conc (Cv)	chem-specific	mg/cm3
permeability coefficient	Kp	calculated	cm/hr
Lag time per event (hours)	*tau (τ)*	calculated	hours
Time to reach steady-state (hours)	t*	calculated	hours
Dimensionless coefficient	B	calculated	
Pi	π	3.141592654	
Exposure Time	t_event	1	hr/event
Number of exposure events	EV	1	event/day
Exposure Duration	ED	6	year
Exposure Frequency	EF	350	days/year
Exposed Skin Surface Area	SA	6600	cm2
Body Weight	BW	15	kg
Averaging time - noncarcinogenic	AT_N	6	years
Averaging time - carcinogenic	AT_C	70	years
Conversion Factor		0.001	mg/ug

Thickness of stratum corneum	*lsc* (cm)	0.001
Molecular Weight	g/mol	chem-specific
log octanol-water partition coefficient	Log Kow	chem-specific
log permeability coefficient	log Kp	calculated
Permeability coefficient (cm/hr)	Kp	calculated
Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	B	calculated
across the stratum corneum (cm2/hr)	Dsc	calculated
Lag time per event (hours)	τ	calculated
Time to reach steady-state (hours)	t*	calculated
methodology (see equations A7 and A8, USEPA, 2001)	b,c	calculated

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Metals																		
Aluminum	9.4E+00	9.4E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	9.40E-06	NA	NA	9.40E-06
Antimony	1.5E-03	1.5E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.51E-09	NA	NA	1.51E-09
Arsenic	2.9E-01	2.9E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.87E-07	NA	NA	2.87E-07
Barium	1.7E-01	1.7E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.68E-07	NA	NA	1.68E-07
Beryllium	7.6E-04	7.6E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	7.64E-10	NA	NA	7.64E-10

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/Isc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Boron	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.31E-06	NA	NA	4.31E-06
Cadmium	1.3E-03	1.3E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.26E-09	NA	NA	1.26E-09
Chromium	3.6E-02	3.6E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.57E-08	NA	NA	3.57E-08
Chromium (VI)	3.5E-04	3.5E-07	NA	1.0	NA	2.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	7.00E-10	NA	NA	7.00E-10
Cobalt	8.9E-03	8.9E-06	NA	1.0	NA	4.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	3.56E-09	NA	NA	3.56E-09
Copper	4.7E-02	4.7E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.66E-08	NA	NA	4.66E-08
Iron	5.4E+01	5.4E-02	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.35E-05	NA	NA	5.35E-05
Lead	4.0E-02	4.0E-05	NA	1.0	NA	1.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	4.00E-09	NA	NA	4.00E-09
Manganese	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.33E-06	NA	NA	4.33E-06
Mercury	1.2E-04	1.2E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.21E-10	NA	NA	1.21E-10
Molybdenum	5.6E-03	5.6E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.64E-09	NA	NA	5.64E-09
Nickel	5.5E-02	5.5E-05	NA	1.0	NA	2.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	1.09E-08	NA	NA	1.09E-08
Selenium	1.9E-02	1.9E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.89E-08	NA	NA	1.89E-08
Silver	1.2E-04	1.2E-07	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	7.20E-11	NA	NA	7.20E-11
Thallium	5.0E-05	5.0E-08	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.00E-11	NA	NA	5.00E-11
Vanadium	3.2E-02	3.2E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.19E-08	NA	NA	3.19E-08
Zinc	3.0E-01	3.0E-04	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	1.82E-07	NA	NA	1.82E-07
Cyanide	6.3E-02	6.3E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	6.29E-08	NA	NA	6.29E-08
Pesticides/PCBs																		
4,4'-DDD	5.0E-03	5.0E-06	3.2E+02	0.8	5.8E+00	1.80E-01	-7.64E-01	1.24E+00	2.56E-05	2.56E-08	6.51E+00	1.8	1.39	2.55E+01	NA	5.08E-06	1.77E-05	5.08E-06
4,4'-DDE	7.8E-04	7.8E-07	3.2E+02	0.8	5.7E+00	1.60E-01	-8.25E-01	1.10E+00	2.63E-05	2.63E-08	6.35E+00	1.5	1.26	2.46E+01	NA	6.92E-07	2.31E-06	6.92E-07
4,4'-DDT	1.8E-04	1.8E-07	3.6E+02	0.7	6.4E+00	2.70E-01	-5.90E-01	1.96E+00	1.63E-05	1.63E-08	1.02E+01	3.5	2.07	4.16E+01	NA	3.01E-07	1.47E-06	3.01E-07
Aldrin	4.0E-04	4.0E-07	3.7E+02	1.0	3.0E+00	1.40E-03	-2.86E+00	1.03E-02	1.43E-05	1.43E-08	1.16E+01	0.3	0.34	2.79E+01	NA	5.34E-09	1.39E-08	5.34E-09
alpha-BHC	3.0E-04	3.0E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	1.93E-08	3.47E-08	1.93E-08
alpha-Chlordane	3.3E-04	3.3E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	1.00E-07	4.20E-07	1.00E-07
Atrazine	2.0E-03	2.0E-06	2.2E+02	1.0	2.6E+00	5.18E-03	-2.29E+00	2.93E-02	9.82E-05	9.82E-08	1.70E+00	0.3	0.35	4.07E+00	NA	3.73E-08	4.63E-08	3.73E-08
beta-BHC	3.7E-04	3.7E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	2.37E-08	4.27E-08	2.37E-08
delta-BHC	1.6E-04	1.6E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	1.03E-08	1.85E-08	1.03E-08
Diazinon	2.6E-04	2.6E-07	3.0E+02	1.0	3.8E+00	1.02E-02	-1.99E+00	6.87E-02	3.13E-05	3.13E-08	5.32E+00	0.3	0.38	1.28E+01	NA	1.69E-08	3.27E-08	1.69E-08
Dieldrin	9.2E-04	9.2E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	9.27E-08	2.84E-07	9.27E-08
Endosulfan I	3.3E-04	3.3E-07	4.1E+02	1.0	3.8E+00	2.81E-03	-2.55E+00	2.18E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.35	4.80E+01	NA	1.15E-08	3.89E-08	1.15E-08
Endosulfan II	2.3E-04	2.3E-07	4.1E+02	1.0	3.5E+00	1.76E-03	-2.76E+00	1.36E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.34	4.80E+01	NA	4.99E-09	1.68E-08	4.99E-09
Endosulfan sulfate	9.2E-05	9.2E-08	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	6.5E-04	6.5E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	6.48E-08	1.99E-07	6.48E-08
Endrin aldehyde	1.4E-04	1.4E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	1.7E-04	1.7E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC	3.3E-04	3.3E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	2.11E-08	3.79E-08	2.11E-08
gamma-Chlordane	2.5E-04	2.5E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	7.50E-08	3.15E-07	7.50E-08
Heptachlor	1.1E-04	1.1E-07	3.7E+02	0.8	4.3E+00	8.60E-03	-2.07E+00	6.39E-02	1.28E-05	1.28E-08	1.30E+01	0.3	0.38	3.12E+01	NA	7.59E-09	2.18E-08	7.59E-09
Heptachlor epoxide	1.2E-04	1.2E-07	3.9E+02	1.0	5.0E+00	2.03E-02	-1.69E+00	1.54E-01	1.05E-05	1.05E-08	1.59E+01	0.4	0.44	3.82E+01	NA	2.68E-08	9.12E-08	2.68E-08
Methoxychlor	1.2E-04	1.2E-07	3.5E+02	1.0	5.1E+00	4.14E-02	-1.38E+00	2.96E-01	1.84E-05	1.84E-08	9.07E+00	0.5	0.55	2.18E+01	NA	4.14E-08	1.19E-07	4.14E-08
Aroclor-1260	9.6E-04	9.6E-07	4.0E+02	0.6	8.3E+00	7.50E-01	4.44E-01	5.74E+00	9.69E-06	9.69E-09	1.72E+01	23.1	5.78	7.60E+01	NA	4.97E-06	3.85E-05	4.97E-06
SVOCs/VOCs																		
1,4-Dioxane (p-dioxane)	7.8E-01	7.8E-04	8.8E+01	1.0	-2.7E-01	3.30E-04	-3.47E+00	1.19E-03	5.09E-04	5.09E-07	3.27E-01	0.3	0.33	7.86E-01	NA	4.07E-07	4.26E-07	4.26E-07
2,4,6-Trichlorophenol	7.1E-03	7.1E-06	2.0E+02	1.0	3.7E+00	3.50E-02	-1.47E+00	1.89E-01	1.24E-04	1.24E-07	1.34E+00	0.4	0.47	3.22E+00	NA	8.00E-07	1.00E-06	8.00E-07
2,4-Dimethylphenol	7.9E-02	7.9E-05	1.2E+02	1.0	2.3E+00	1.10E-02	-1.97E+00	4.68E-02	3.28E-04	3.28E-07	5.08E-01	0.3	0.37	1.22E+00	NA	1.71E-06	1.75E-06	1.71E-06
2-Chlorophenol	4.3E-03	4.3E-06	1.3E+02	1.0	2.2E+00	8.00E-03	-2.10E+00	3.49E-02	3.02E-04	3.02E-07	5.52E-01	0.3	0.36	1.33E+00	NA	7.06E-08	7.25E-08	7.06E-08
2-Methylnaphthalene	2.3E-01	2.3E-04	1.4E+02	1.0	3.9E+00	8.94E-02	-1.05E+00	4.10E-01	2.53E-04	2.53E-07	6.58E-01	0.6	0.65	1.58E+00	NA	4.52E-05	5.08E-05	4.52E-05
2-Methylphenol	1.2E-01	1.2E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	1.70E-06	1.74E-06	1.70E-06
2-Nitroaniline	1.0E-02	1.0E-05	1.4E+02	1.0	1.9E+00	4.44E-03	-2.35E+00	2.01E-02	2.67E-04	2.67E-07	6.24E-01	0.3	0.35	1.50E+00	NA	9.70E-08	1.00E-07	9.70E-08
3,4-methylphenol	8.4E-01	8.4E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	1.16E-05	1.19E-05	1.16E-05
4-Chloro-3-methylphenol	2.4E-02	2.4E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	1.9E-01	1.9E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	2.68E-06	2.75E-06	2.68E-06
Acenaphthene	4.5E-03	4.5E-06	1.5E+02	1.0	3.9E+00	1.33E-01	-1.08E+00	6.35E-01	2.17E-04	2.17E-07	7.68E-01	0.9	0.84	3.04E+00	NA	1.45E-06	1.78E-06	1.45E-06
Acenaphthylene	9.5E-03	9.5E-06	1.5E+02	1.0	3.9E+00	1.41E-01	-1.05E+00	6.69E-01	2.23E-04	2.23E-07	7.48E-01	0.9	0.87	2.93E+00	NA	3.22E-06	3.95E-06	3.22E-06
Anthracene	3.2E-03	3.2E-06	1.8E+02	1.0	4.5E+00	2.25E-01	-8.61E-01	1.16E+00	1.59E-04	1.59E-07	1.05E+00	1.6	1.31	4.07E+00	NA	2.04E-06	3.08E-06	2.04E-06
Benzo(a)anthracene	9.0E-04	9.0E-07	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	1.65E-06	3.94E-06	1.65E-06
Benzo(a)pyrene	5.0E-04	5.0E-07	2.5E+02	1.0	6.1E+00	7.00E-01	-1.74E-01	4.26E+00	6.31E-05	6.31E-08	2.64E+00	13.3	4.32	1.15E+01	NA	1.57E-06	4.63E-06	1.57E-06
Benzo(b)fluoranthene	7.6E-04	7.6E-07	2.5E+02	1.0	5.8E+00	6.99E-01	-3.98E-01	4.27E+00	6.12E-05	6.12E-08	2.72E+00	13.4	4.33	1.18E+01	NA	2.42E-06	7.23E-06	2.42E-06
Benzo(g,h,i)perylene	2.0E-04	2.0E-07	2.8E+02	1.0	6.6E+00	1.07E+00	2.83E-02	6.82E+00	4.49E-05	4.49E-08	3.71E+00	32.1	6.87	1.65E+01	NA	1.14E-06	4.20E-06	1.14E-06
Benzo(k)fluoranthene	4.6E-04	4.6E-07	2.5E+02	1.0	6.1E+00	6.60E-01	-1.80E-01	4.03E+00	6.12E-05	6.12E-08	2.72E+00	12.0	4.10	1.18E+01	NA	1.38E-06	4.10E-06	1.38E-06
Biphenyl (Diphenyl)	1.3E-03	1.3E-06	1.5E+02	1.0	4.0E+00	9.19E-02	-1.04E+00	4.39E-01	2.17E-04	2.17E-07	7.68E-01	0.6	0.67	1.84E+00	NA	2.89E-07	3.40E-07	2.89E-07
bis(2-Chloroethoxy)methane	2.0E-04	2.0E-07	1.7E+02	1.0	1.3E+00	1.23E-03	-2.91E+00	6.21E-03	1.70E-04	1.70E-07	9.79E-01	0.3	0.34	2.35E+00	NA	6.71E-10	7.28E-10	6.71E-10
bis(2-Ethylhexyl)phthalate	1.7E-02	1.7E-05	3.9E+02	1.0	5.1E+00	2.50E-02	-1.62E+00	1.90E-01	1.02E-05	1.02E-08	1.63E+01	0.4	0.47	3.91E+01	NA	4.71E-06	1.67E-05	4.71E-06

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/Isc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Bromoform	1.2E-02	1.2E-05	2.5E+02	1.0	2.4E+00	2.20E-03	-2.63E+00	1.35E-02	6.09E-05	6.09E-08	2.74E+00	0.3	0.34	6.56E+00	NA	1.21E-07	1.72E-07	1.21E-07
Caprolactam	2.4E-03	2.4E-06	1.1E+02	1.0	6.6E-01	1.00E-03	-3.00E+00	4.11E-03	3.68E-04	3.68E-07	4.52E-01	0.3	0.34	1.09E+00	NA	4.48E-09	4.59E-09	4.48E-09
Carbazole	1.3E-02	1.3E-05	1.7E+02	1.0	3.7E+00	5.23E-02	-1.28E+00	2.60E-01	1.83E-04	1.83E-07	9.08E-01	0.5	0.52	2.18E+00	NA	1.73E-06	2.01E-06	1.73E-06
Chrysene	1.1E-03	1.1E-06	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	2.02E-06	4.82E-06	2.02E-06
Dibenz(a,h)anthracene	4.5E-05	4.5E-08	2.8E+02	0.6	6.5E+00	1.50E+00	-4.24E-02	9.63E+00	4.38E-05	4.38E-08	3.81E+00	62.2	9.66	1.72E+01	NA	2.18E-07	8.45E-07	2.18E-07
Diethylphthalate	1.0E-02	1.0E-05	2.2E+02	1.0	2.5E+00	3.90E-03	-2.41E+00	2.23E-02	9.05E-05	9.05E-08	1.84E+00	0.3	0.35	4.42E+00	NA	1.51E-07	1.91E-07	1.51E-07
Di-n-butyl phthalate	1.2E-02	1.2E-05	2.8E+02	0.9	4.1E+00	2.40E-02	-1.63E+00	1.54E-01	4.40E-05	4.40E-08	3.79E+00	0.4	0.44	9.10E+00	NA	1.35E-06	2.41E-06	1.35E-06
Fluoranthene	2.4E-03	2.4E-06	2.0E+02	1.0	5.0E+00	2.20E-01	-6.66E-01	1.20E+00	1.17E-04	1.17E-07	1.43E+00	1.7	1.35	5.57E+00	NA	1.74E-06	3.02E-06	1.74E-06
Fluorene	2.6E-03	2.6E-06	1.7E+02	1.0	4.2E+00	1.71E-01	-9.72E-01	8.48E-01	1.86E-04	1.86E-07	8.97E-01	1.1	1.03	3.45E+00	NA	1.16E-06	1.57E-06	1.16E-06
Hexachloroethane	1.0E-03	1.0E-06	2.4E+02	1.0	3.9E+00	3.00E-02	-1.53E+00	1.78E-01	7.49E-05	7.49E-08	2.23E+00	0.4	0.46	5.34E+00	NA	1.24E-07	1.82E-07	1.24E-07
Indeno(1,2,3-c,d)pyrene	2.0E-04	2.0E-07	2.8E+02	0.6	6.6E+00	1.00E+00	-4.48E-03	6.39E+00	4.49E-05	4.49E-08	3.71E+00	28.4	6.44	1.65E+01	NA	6.39E-07	2.34E-06	6.39E-07
Naphthalene	1.4E-01	1.4E-04	1.3E+02	1.0	3.3E+00	4.70E-02	-1.34E+00	2.05E-01	3.03E-04	3.03E-07	5.49E-01	0.4	0.48	1.32E+00	NA	1.31E-05	1.37E-05	1.31E-05
Nitrobenzene	2.0E-03	2.0E-06	1.2E+02	1.0	1.9E+00	5.39E-03	-2.27E+00	2.30E-02	3.24E-04	3.24E-07	5.14E-01	0.3	0.35	1.23E+00	NA	2.14E-08	2.19E-08	2.14E-08
N-Nitrosodi-n-propylamine	2.0E-03	2.0E-06	1.3E+02	1.0	1.4E+00	2.34E-03	-2.63E+00	1.03E-02	2.96E-04	2.96E-07	5.64E-01	0.3	0.34	1.35E+00	NA	9.69E-09	9.94E-09	9.69E-09
N-Nitrosodiphenylamine	1.2E-03	1.2E-06	2.0E+02	1.0	3.1E+00	2.60E-02	-1.84E+00	1.41E-01	1.23E-04	1.23E-07	1.35E+00	0.4	0.43	3.25E+00	NA	1.00E-07	1.24E-07	1.00E-07
Pentachlorophenol	1.1E-02	1.1E-05	2.7E+02	0.9	5.9E+00	3.90E-01	-4.24E-01	2.45E+00	5.11E-05	5.11E-08	3.26E+00	5.0	2.54	1.36E+01	NA	1.98E-05	5.84E-05	1.98E-05
Phenanthrene	6.0E-03	6.0E-06	1.8E+02	1.0	4.5E+00	1.40E-01	-8.54E-01	7.19E-01	1.59E-04	1.59E-07	1.05E+00	1.0	0.91	4.05E+00	NA	2.38E-06	3.29E-06	2.38E-06
Pyrene	2.4E-03	2.4E-06	2.0E+02	1.0	4.9E+00	3.24E-01	-7.12E-01	1.77E+00	1.17E-04	1.17E-07	1.43E+00	3.0	1.89	5.76E+00	NA	2.57E-06	4.83E-06	2.57E-06
1,1,1-Trichloroethane	1.2E-01	1.2E-04	1.3E+02	1.0	2.5E+00	1.30E-02	-1.90E+00	5.77E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.37	1.41E+00	NA	3.25E-06	3.36E-06	3.25E-06
1,1,2,2-Tetrachloroethane	1.3E-02	1.3E-05	1.7E+02	1.0	2.4E+00	6.90E-03	-2.16E+00	3.44E-02	1.82E-04	1.82E-07	9.16E-01	0.3	0.36	2.20E+00	NA	2.36E-07	2.55E-07	2.36E-07
1,1,2-Trichloroethane	1.3E-02	1.3E-05	1.3E+02	1.0	2.1E+00	6.40E-03	-2.19E+00	2.84E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.35	1.41E+00	NA	1.81E-07	1.86E-07	1.81E-07
1,1-Dichloroethane	5.6E-01	5.6E-04	9.9E+01	1.0	1.8E+00	6.70E-03	-2.17E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	6.33E-06	6.52E-06	6.52E-06
1,1-Dichloroethene	4.2E-02	4.2E-05	9.7E+01	1.0	2.1E+00	1.20E-02	-1.94E+00	4.54E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.80E-01	NA	8.35E-07	8.60E-07	8.60E-07
1,2,3-Trichlorobenzene	2.7E-03	2.7E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	1.5E-02	1.5E-05	1.8E+02	1.0	4.0E+00	6.60E-02	-1.19E+00	3.42E-01	1.53E-04	1.53E-07	1.09E+00	0.6	0.59	2.62E+00	NA	2.88E-06	3.61E-06	2.88E-06
1,2,4-Trimethylbenzene	2.8E-01	2.8E-04	1.2E+02	1.0	3.6E+00	8.37E-02	-1.08E+00	3.53E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.60	1.19E+00	NA	4.52E-05	4.78E-05	4.52E-05
1,2-Dibromo-3-chloropropane	2.4E-03	2.4E-06	2.4E+02	1.0	3.0E+00	6.76E-03	-2.17E+00	4.00E-02	7.53E-05	7.53E-08	2.21E+00	0.3	0.36	5.32E+00	NA	6.68E-08	9.04E-08	6.68E-08
1,2-Dichlorobenzene	7.3E-01	7.3E-04	1.5E+02	1.0	3.4E+00	4.10E-02	-1.39E+00	1.91E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	6.96E-05	7.53E-05	6.96E-05
1,2-Dichloroethane	1.4E-02	1.4E-05	9.9E+01	1.0	1.5E+00	6.70E-03	-2.38E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	1.63E-07	1.68E-07	1.68E-07
1,2-Dichloropropane	5.1E-03	5.1E-06	1.1E+02	1.0	2.0E+00	7.80E-03	-2.11E+00	3.19E-02	3.69E-04	3.69E-07	4.51E-01	0.3	0.35	1.08E+00	NA	7.39E-08	7.56E-08	7.39E-08
1,3,5-Trimethylbenzene	1.1E-01	1.1E-04	1.2E+02	1.0	3.4E+00	6.08E-02	-1.22E+00	2.56E-01	3.36E-04	3.36E-07	4.95E-01	0.5	0.52	1.19E+00	NA	1.30E-05	1.36E-05	1.30E-05
1,3-Dichlorobenzene	2.7E-02	2.7E-05	1.5E+02	1.0	3.6E+00	5.80E-02	-1.25E+00	2.70E-01	2.38E-04	2.38E-07	7.00E-01	0.5	0.53	1.68E+00	NA	3.63E-06	4.01E-06	3.63E-06
1,4-Dichlorobenzene	2.2E-01	2.2E-04	1.5E+02	1.0	3.4E+00	4.20E-02	-1.39E+00	1.96E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	2.12E-05	2.29E-05	2.12E-05
2-Chlorotoluene	2.9E-03	2.9E-06	1.3E+02	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	2.4E-02	2.4E-05	1.0E+02	1.0	1.4E+00	3.55E-03	-2.45E+00	1.37E-02	4.36E-04	4.36E-07	3.83E-01	0.3	0.34	9.18E-01	NA	1.43E-07	1.47E-07	1.47E-07
2,2-Dichloropropane	5.0E-04	5.0E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	4.9E-01	4.9E-04	5.8E+01	1.0	-2.4E-01	5.20E-04	-3.28E+00	1.53E-03	7.49E-04	7.49E-07	2.22E-01	0.3	0.33	5.34E-01	NA	3.29E-07	3.65E-07	3.65E-07
Benzene	4.0E-01	4.0E-04	7.8E+01	1.0	2.1E+00	1.50E-02	-1.83E+00	5.10E-02	5.79E-04	5.79E-07	2.88E-01	0.3	0.37	6.91E-01	NA	8.90E-06	9.34E-06	9.34E-06
Carbon disulfide	3.1E-03	3.1E-06	8.0E+01	1.0	2.2E+00	1.70E-02	-1.77E+00	5.85E-02	5.65E-04	5.65E-07	2.95E-01	0.3	0.37	7.08E-01	NA	7.91E-08	8.27E-08	8.27E-08
Carbon tetrachloride	3.0E-04	3.0E-07	1.5E+02	1.0	2.8E+00	1.60E-02	-1.79E+00	7.63E-02	2.18E-04	2.18E-07	7.64E-01	0.4	0.39	1.83E+00	NA	1.16E-08	1.24E-08	1.16E-08
Chlorobenzene	6.7E-01	6.7E-04	1.1E+02	1.0	2.8E+00	2.80E-02	-1.56E+00	1.14E-01	3.71E-04	3.71E-07	4.49E-01	0.4	0.41	1.08E+00	NA	3.50E-05	3.58E-05	3.50E-05
Chloroethane	9.7E-02	9.7E-05	6.5E+01	1.0	1.4E+00	6.10E-03	-2.22E+00	1.88E-02	6.90E-04	6.90E-07	2.42E-01	0.3	0.35	5.80E-01	NA	8.07E-07	8.75E-07	8.75E-07
Chloroform	4.4E-03	4.4E-06	1.2E+02	1.0	2.0E+00	6.80E-03	-2.17E+00	2.86E-02	3.40E-04	3.40E-07	4.90E-01	0.3	0.35	1.18E+00	NA	5.79E-08	5.93E-08	5.79E-08
Chloromethane	7.4E-03	7.4E-06	5.1E+01	1.0	9.1E-01	3.30E-03	-2.48E+00	9.02E-03	8.26E-04	8.26E-07	2.02E-01	0.3	0.34	4.84E-01	NA	3.03E-08	3.41E-08	3.41E-08
cis-1,2-Dichloroethene	1.4E+01	1.4E-02	9.7E+01	1.0	2.1E+00	1.09E-02	-1.96E+00	4.12E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.81E-01	NA	2.50E-04	2.57E-04	2.57E-04
cis-1,3-Dichloropropene	4.2E-03	4.2E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	3.31E-08	3.39E-08	3.31E-08
Cyclohexane	1.8E-02	1.8E-05	8.4E+01	1.0	3.4E+00	9.98E-02	-1.00E+00	3.52E-01	5.35E-04	5.35E-07	3.11E-01	0.6	0.60	7.47E-01	NA	2.77E-06	2.81E-06	2.81E-06
Ethyl tert-butyl ether (ETBE)	1.2E-03	1.2E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	4.5E-01	4.5E-04	1.1E+02	1.0	3.2E+00	4.90E-02	-1.32E+00	1.94E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.47	9.93E-01	NA	3.91E-05	4.00E-05	4.00E-05
Isopropyl ether	4.3E-01	4.3E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene (cumene)	2.7E-02	2.7E-05	1.2E+02	1.0	3.7E+00	8.76E-02	-1.06E+00	3.69E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.61	1.19E+00	NA	4.61E-06	4.88E-06	4.61E-06
Methyl acetate	2.3E-02	2.3E-05	7.4E+01	1.0	1.8E-01	8.02E-04	-3.10E+00	2.65E-03	6.10E-04	6.10E-07	2.73E-01	0.3	0.34	6.56E-01	NA	2.61E-08	2.79E-08	2.79E-08
Methyl ethyl ketone	4.3E-01	4.3E-04	7.2E+01	1.0	2.9E-01	9.60E-04	-3.01E+00	3.13E-03	6.26E-04	6.26E-07	2.66E-01	0.3	0.34	6.39E-01	NA	5.89E-07	6.32E-07	6.32E-07
Methyl isobutyl ketone	4.9E+00	4.9E-03	1.0E+02	1.0	1.2E+00	2.66E-03	-2.57E+00	1.02E-02	4.37E-04	4.37E-07	3.82E-01	0.3	0.34	9.16E-01	NA	2.21E-05	2.28E-05	2.28E-05
Methyl tert-butyl ether	2.0E-02	2.0E-05	8.8E+01	1.0	9.4E-01	2.12E-03	-2.67E+00	7.66E-03	5.09E-04	5.09E-07	3.28E-01	0.3	0.34	7.87E-01	NA	6.76E-08	7.06E-08	7.06E-08
Methylcyclohexane	2.5E-02	2.5E-05	9.8E+01	1.0	3.6E+00	1.08E-01	-9.67E-01	4.11E-01	4.47E-04	4.47E-07	3.73E-01	0.6	0.65	8.95E-01	NA	4.46E-06	4.59E-06	4.59E-06
Methylene chloride	8.2E-03	8.2E-06	8.5E+01	1.0	1.3E+00	3.50E-03	-2.45E+00	1.24E-02	5.30E-04	5.30E-07	3.14E-01	0.3	0.34	7.54E-01	NA	4.44E-08	4.65E-08	4.65E-08
n-Butylbenzene	6.1E-03	6.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	5.6E-02	5.6E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Cymene (p-isopropyltoluene)	7.9E-02	7.9E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	4.8E-02	4.8E-05	9.4E+01	1.0	1.5E+00	4.30E-03	-2.36E+00	1.60E-02	4.71E-04	4.71E-07	3.54E-01	0.3	0.34	8.49E-01	NA	3.40E-07	3.52E-07	3.52E-07
sec-Butylbenzene	5.6E-03	5.6E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	1.4E-02	1.4E-05	1.0E+02	1.0	3.0E+00	3.70E-02	-1.44E+00	1.45E-01	4.14E-04	4.14E-07	4.03E-01	0.4	0.44	9.66E-01	NA	9.03E-07	9.24E-07	9.24E-07
tert-Butylbenzene	2.1E-03	2.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/Isc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
tert-Butyl alcohol	1.2E-01	1.2E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.2E-02	1.2E-05	1.7E+02	1.0	3.4E+00	3.30E-02	-1.48E+00	1.63E-01	1.87E-04	1.87E-07	8.92E-01	0.4	0.45	2.14E+00	NA	1.03E-06	1.16E-06	1.03E-06
Toluene	6.1E+00	6.1E-03	9.2E+01	1.0	2.7E+00	3.10E-02	-1.51E+00	1.14E-01	4.83E-04	4.83E-07	3.45E-01	0.4	0.41	8.28E-01	NA	3.08E-04	3.15E-04	3.15E-04
trans-1,2-Dichloroethene	4.0E-01	4.0E-04	9.7E+01	1.0	1.9E+00	7.70E-03	-2.12E+00	2.92E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.35	8.80E-01	NA	5.17E-06	5.34E-06	5.34E-06
trans-1,3-Dichloropropene	4.1E-03	4.1E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	3.23E-08	3.31E-08	3.23E-08
Trichloroethene	5.7E-02	5.7E-05	1.3E+02	1.0	2.4E+00	1.20E-02	-1.94E+00	5.29E-02	2.91E-04	2.91E-07	5.72E-01	0.3	0.37	1.37E+00	NA	1.43E-06	1.47E-06	1.43E-06
Vinyl chloride	1.6E+00	1.6E-03	6.3E+01	1.0	1.4E+00	5.60E-03	-2.25E+00	1.70E-02	7.08E-04	7.08E-07	2.35E-01	0.3	0.34	5.65E-01	NA	1.22E-05	1.33E-05	1.33E-05
m,p-Xylene	9.4E-01	9.4E-04	1.1E+02	1.0	NA	5.30E-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	4.4E-01	4.4E-04	1.1E+02	1.0	3.1E+00	7.04E-02	-1.34E+00	2.79E-01	4.03E-04	4.03E-07	4.13E-01	0.5	0.54	9.92E-01	NA	5.56E-05	5.72E-05	5.72E-05
Xylenes, total	1.6E+00	1.6E-03	1.1E+02	1.0	3.2E+00	5.30E-02	-1.28E+00	2.10E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.49	9.93E-01	NA	1.51E-04	1.55E-04	1.55E-04
Dioxans/Furans																		
1,2,3,4,6,7,8-HpCDD	4.6E-07	4.6E-10	4.3E+02	0.5	8.2E+00	8.10E-01	2.30E-01	6.42E+00	6.58E-06	6.58E-09	2.53E+01	28.6	6.47	1.13E+02	NA	2.62E-09	2.49E-08	2.62E-09
1,2,3,4,6,7,8-HpCDF	9.5E-08	9.5E-11	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	4.82E-10	4.14E-09	4.82E-10
1,2,3,4,7,8,9-HpCDF	9.8E-09	9.8E-12	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	4.97E-11	4.27E-10	4.97E-11
1,2,3,4,7,8-HxCDD	2.6E-09	2.6E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	1.18E-11	8.99E-11	1.18E-11
1,2,3,4,7,8-HxCDF	8.5E-09	8.5E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	3.46E-11	2.36E-10	3.46E-11
1,2,3,6,7,8-HxCDD	1.3E-08	1.3E-11	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	6.00E-11	4.56E-10	6.00E-11
1,2,3,6,7,8-HxCDF	1.6E-09	1.6E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	6.58E-12	4.50E-11	6.58E-12
1,2,3,7,8,9-HxCDD	4.4E-09	4.4E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	1.99E-11	1.51E-10	1.99E-11
1,2,3,7,8,9-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	1.57E-11	1.08E-10	1.57E-11
1,2,3,7,8-PeCDD	1.1E-09	1.1E-12	3.6E+02	0.5	6.3E+00	8.10E-01	-6.38E-01	5.88E+00	1.60E-05	1.60E-08	1.04E+01	24.2	5.93	4.61E+01	NA	3.90E-12	2.36E-11	3.90E-12
1,2,3,7,8-PeCDF	2.3E-09	2.3E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	7.43E-12	4.05E-11	7.43E-12
2,3,4,6,7,8-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	1.60E-11	1.10E-10	1.60E-11
2,3,4,7,8-PeCDF	2.6E-09	2.6E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	8.59E-12	4.68E-11	8.59E-12
2,3,7,8-TCDF	1.7E-09	1.7E-12	3.1E+02	0.5	6.5E+00	8.10E-01	-2.04E-01	5.45E+00	3.07E-05	3.07E-08	5.44E+00	21.0	5.50	2.39E+01	NA	4.38E-12	1.90E-11	4.38E-12
OCDF	7.4E-07	7.4E-10	4.4E+02	0.5	8.6E+00	8.10E-01	3.91E-01	6.56E+00	5.19E-06	5.19E-09	3.21E+01	29.8	6.61	1.43E+02	NA	4.72E-09	5.08E-08	4.72E-09
OCDD	2.2E-06	2.2E-09	4.6E+02	0.5	9.5E+00	8.10E-01	8.95E-01	6.68E+00	4.22E-06	4.22E-09	3.95E+01	30.8	6.72	1.76E+02	NA	1.53E-08	1.83E-07	1.53E-08

Table 2-18
Model for Estimating Dermal Exposure from Contact with Chemicals in Water - Adult Trench Worker
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: EPA, 2004. RAGS Part E
ORGANICS

If $t_{event} \leq t^*$:

$$DA_{event_1} = 2 \times FA \times K_p \times C_v \sqrt{\frac{6 \times tau \times t_{event}}{\Pi}}$$

If $t_{event} > t^*$:

$$DA_{event_2} = FA \times K_p \times C_v \left[\frac{t_{event}}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$$

INORGANICS

$$DA_{event} = K_p \times C_v \times t_{event}$$

$$DAD = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT \times 365\, days/year}$$

$$\log K_p = -2.8 + 0.66 \log K_{ow} - 0.0056 MW$$

$$B = K_p \frac{\sqrt{MW}}{2.6}$$

$$If\ B \leq 0.6\ then\ t^* = 2.4\tau$$

$$If\ B > 0.6\ then\ t^* = 6\left(b - \sqrt{b^2 - c^2}\right)\tau$$

$$b = \frac{2}{\pi}(1+B)^2 - c \qquad c = \frac{1+3B+3B^2}{3(1+B)}$$

$$\log \frac{D_{sc}}{l_{sc}} = -2.80 - 0.0056 MW$$

$$\tau = \frac{l_{sc}^2}{6\ D_{sc}}$$

Dermally-absorbed dose	DAD	calculated	mg/kg-day
Concentration in water	Conc (Cv)	chem-specific	mg/cm3
permeability coefficient	Kp	calculated	cm/hr
Lag time per event (hours)	tau (τ)	calculated	hours
Time to reach steady-state (hours)	t*	calculated	hours
Dimensionless coefficient	B	calculated	
Pi	π	3.1416	
Exposure Time	t_event	8	hr/event
Number of exposure events	EV	1	event/day
Exposure Duration	ED	1	year
Exposure Frequency	EF	90	days/year
Exposed Skin Surface Area	SA	5700	cm2
Body Weight	BW	70	kg
Averaging time - noncarcinogenic	AT_N	1	years
Averaging time - carcinogenic	AT_C	70	years
Conversion Factor		0.001	mg/ug

Thickness of stratum corneum	*lsc* (cm)	0.001
Molecular Weight	g/mol	chem-specific
log octanol-water partition coefficient	Log Kow	chem-specific
log permeability coefficient	log Kp	calculated
Permeability coefficient (cm/hr)	Kp	calculated
Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	B	calculated
across the stratum corneum (cm2/hr)	Dsc	calculated
Lag time per event (hours)	τ	calculated
Time to reach steady-state (hours)	t*	calculated
USEPA's methodology (see equations A7 and A8,	b,c	calculated

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Metals																		
Aluminum	9.4E+00	9.4E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	7.52E-05	NA	NA	7.52E-05
Antimony	1.5E-03	1.5E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.21E-08	NA	NA	1.21E-08
Arsenic	2.9E-01	2.9E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.29E-06	NA	NA	2.29E-06
Barium	1.7E-01	1.7E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.34E-06	NA	NA	1.34E-06
Beryllium	7.6E-04	7.6E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	6.11E-09	NA	NA	6.11E-09
Boron	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.45E-05	NA	NA	3.45E-05
Cadmium	1.3E-03	1.3E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.00E-08	NA	NA	1.00E-08
Chromium	3.6E-02	3.6E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.86E-07	NA	NA	2.86E-07
Chromium (VI)	3.5E-04	3.5E-07	NA	1.0	NA	2.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.60E-09	NA	NA	5.60E-09
Cobalt	8.9E-03	8.9E-06	NA	1.0	NA	4.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	2.85E-08	NA	NA	2.85E-08
Copper	4.7E-02	4.7E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.73E-07	NA	NA	3.73E-07

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/Isc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Iron	5.4E+01	5.4E-02	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.28E-04	NA	NA	4.28E-04
Lead	4.0E-02	4.0E-05	NA	1.0	NA	1.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	3.20E-08	NA	NA	3.20E-08
Manganese	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.46E-05	NA	NA	3.46E-05
Mercury	1.2E-04	1.2E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	9.68E-10	NA	NA	9.68E-10
Molybdenum	5.6E-03	5.6E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.51E-08	NA	NA	4.51E-08
Nickel	5.5E-02	5.5E-05	NA	1.0	NA	2.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	8.73E-08	NA	NA	8.73E-08
Selenium	1.9E-02	1.9E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.51E-07	NA	NA	1.51E-07
Silver	1.2E-04	1.2E-07	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	5.76E-10	NA	NA	5.76E-10
Thallium	5.0E-05	5.0E-08	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.00E-10	NA	NA	4.00E-10
Vanadium	3.2E-02	3.2E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.56E-07	NA	NA	2.56E-07
Zinc	3.0E-01	3.0E-04	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	1.45E-06	NA	NA	1.45E-06
Cyanide	6.3E-02	6.3E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.03E-07	NA	NA	5.03E-07
Pesticides/PCBs																		
4,4'-DDD	5.0E-03	5.0E-06	3.2E+02	0.8	5.8E+00	1.80E-01	-7.64E-01	1.24E+00	2.56E-05	2.56E-08	6.51E+00	1.8	1.39	2.55E+01	NA	1.44E-05	2.00E-05	1.44E-05
4,4'-DDE	7.8E-04	7.8E-07	3.2E+02	0.8	5.7E+00	1.60E-01	-8.25E-01	1.10E+00	2.63E-05	2.63E-08	6.35E+00	1.5	1.26	2.46E+01	NA	1.96E-06	2.65E-06	1.96E-06
4,4'-DDT	1.8E-04	1.8E-07	3.6E+02	0.7	6.4E+00	2.70E-01	-5.90E-01	1.96E+00	1.63E-05	1.63E-08	1.02E+01	3.5	2.07	4.16E+01	NA	8.51E-07	1.55E-06	8.51E-07
Aldrin	4.0E-04	4.0E-07	3.7E+02	1.0	3.0E+00	1.40E-03	-2.86E+00	1.03E-02	1.43E-05	1.43E-08	1.16E+01	0.3	0.34	2.79E+01	NA	1.51E-08	1.78E-08	1.51E-08
alpha-BHC	3.0E-04	3.0E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	5.46E-08	5.63E-08	5.46E-08
alpha-Chlordane	3.3E-04	3.3E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	2.83E-07	4.64E-07	2.83E-07
Atrazine	2.0E-03	2.0E-06	2.2E+02	1.0	2.6E+00	5.18E-03	-2.29E+00	2.93E-02	9.82E-05	9.82E-08	1.70E+00	0.3	0.35	4.07E+00	NA	1.06E-07	1.17E-07	1.17E-07
beta-BHC	3.7E-04	3.7E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	6.70E-08	6.91E-08	6.70E-08
delta-BHC	1.6E-04	1.6E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	2.91E-08	3.00E-08	2.91E-08
Diazinon	2.6E-04	2.6E-07	3.0E+02	1.0	3.8E+00	1.02E-02	-1.99E+00	6.87E-02	3.13E-05	3.13E-08	5.32E+00	0.3	0.38	1.28E+01	NA	4.79E-08	5.01E-08	4.79E-08
Dieldrin	9.2E-04	9.2E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	2.62E-07	3.41E-07	2.62E-07
Endosulfan I	3.3E-04	3.3E-07	4.1E+02	1.0	3.8E+00	2.81E-03	-2.55E+00	2.18E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.35	4.80E+01	NA	3.25E-08	4.53E-08	3.25E-08
Endosulfan II	2.3E-04	2.3E-07	4.1E+02	1.0	3.5E+00	1.76E-03	-2.76E+00	1.36E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.34	4.80E+01	NA	1.41E-08	1.95E-08	1.41E-08
Endosulfan sulfate	9.2E-05	9.2E-08	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	6.5E-04	6.5E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	1.83E-07	2.39E-07	1.83E-07
Endrin aldehyde	1.4E-04	1.4E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	1.7E-04	1.7E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC	3.3E-04	3.3E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	5.96E-08	6.14E-08	5.96E-08
gamma-Chlordane	2.5E-04	2.5E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	2.12E-07	3.48E-07	2.12E-07
Heptachlor	1.1E-04	1.1E-07	3.7E+02	0.8	4.3E+00	8.60E-03	-2.07E+00	6.39E-02	1.28E-05	1.28E-08	1.30E+01	0.3	0.38	3.12E+01	NA	2.15E-08	2.68E-08	2.15E-08
Heptachlor epoxide	1.2E-04	1.2E-07	3.9E+02	1.0	5.0E+00	2.03E-02	-1.69E+00	1.54E-01	1.05E-05	1.05E-08	1.59E+01	0.4	0.44	3.82E+01	NA	7.58E-08	1.06E-07	7.58E-08
Methoxychlor	1.2E-04	1.2E-07	3.5E+02	1.0	5.1E+00	4.14E-02	-1.38E+00	2.96E-01	1.84E-05	1.84E-08	9.07E+00	0.5	0.55	2.18E+01	NA	1.17E-07	1.46E-07	1.17E-07
Aroclor-1260	9.6E-04	9.6E-07	4.0E+02	0.6	8.3E+00	7.50E-01	4.44E-01	5.74E+00	9.69E-06	9.69E-09	1.72E+01	23.1	5.78	7.60E+01	NA	1.40E-05	3.89E-05	1.40E-05
SVOCs/VOCs																		
1,4-Dioxane (p-dioxane)	7.8E-01	7.8E-04	8.8E+01	1.0	-2.7E-01	3.30E-04	-3.47E+00	1.19E-03	5.09E-04	5.09E-07	3.27E-01	0.3	0.33	7.86E-01	NA	1.15E-06	2.23E-06	2.23E-06
2,4,6-Trichlorophenol	7.1E-03	7.1E-06	2.0E+02	1.0	3.7E+00	3.50E-02	-1.47E+00	1.89E-01	1.24E-04	1.24E-07	1.34E+00	0.4	0.47	3.22E+00	NA	2.26E-06	2.47E-06	2.47E-06
2,4-Dimethylphenol	7.9E-02	7.9E-05	1.2E+02	1.0	2.3E+00	1.10E-02	-1.97E+00	4.68E-02	3.28E-04	3.28E-07	5.08E-01	0.3	0.37	1.22E+00	NA	4.82E-06	7.54E-06	7.54E-06
2-Chlorophenol	4.3E-03	4.3E-06	1.3E+02	1.0	2.2E+00	8.00E-03	-2.10E+00	3.49E-02	3.02E-04	3.02E-07	5.52E-01	0.3	0.36	1.33E+00	NA	2.00E-07	3.05E-07	3.05E-07
2-Methylnaphthalene	2.3E-01	2.3E-04	1.4E+02	1.0	3.9E+00	8.94E-02	-1.05E+00	4.10E-01	2.53E-04	2.53E-07	6.58E-01	0.6	0.65	1.58E+00	NA	1.28E-04	1.51E-04	1.51E-04
2-Methylphenol	1.2E-01	1.2E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	4.82E-06	8.17E-06	8.17E-06
2-Nitroaniline	1.0E-02	1.0E-05	1.4E+02	1.0	1.9E+00	4.44E-03	-2.35E+00	2.01E-02	2.67E-04	2.67E-07	6.24E-01	0.3	0.35	1.50E+00	NA	2.74E-07	4.05E-07	4.05E-07
3,4-methylphenol	8.4E-01	8.4E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	3.29E-05	5.58E-05	5.58E-05
4-Chloro-3-methylphenol	2.4E-02	2.4E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	1.9E-01	1.9E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	7.59E-06	1.29E-05	1.29E-05
Acenaphthene	4.5E-03	4.5E-06	1.5E+02	1.0	3.9E+00	1.33E-01	-1.08E+00	6.35E-01	2.17E-04	2.17E-07	7.68E-01	0.9	0.84	3.04E+00	NA	4.10E-06	4.34E-06	4.34E-06
Acenaphthylene	9.5E-03	9.5E-06	1.5E+02	1.0	3.9E+00	1.41E-01	-1.05E+00	6.69E-01	2.23E-04	2.23E-07	7.48E-01	0.9	0.87	2.93E+00	NA	9.09E-06	9.59E-06	9.59E-06
Anthracene	3.2E-03	3.2E-06	1.8E+02	1.0	4.5E+00	2.25E-01	-8.61E-01	1.16E+00	1.59E-04	1.59E-07	1.05E+00	1.6	1.31	4.07E+00	NA	5.76E-06	5.42E-06	5.42E-06
Benzo(a)anthracene	9.0E-04	9.0E-07	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	4.67E-06	4.74E-06	4.67E-06
Benzo(a)pyrene	5.0E-04	5.0E-07	2.5E+02	1.0	6.1E+00	7.00E-01	-1.74E-01	4.26E+00	6.31E-05	6.31E-08	2.64E+00	13.3	4.32	1.15E+01	NA	4.45E-06	5.09E-06	4.45E-06
Benzo(b)fluoranthene	7.6E-04	7.6E-07	2.5E+02	1.0	5.8E+00	6.99E-01	-3.98E-01	4.27E+00	6.12E-05	6.12E-08	2.72E+00	13.4	4.33	1.18E+01	NA	6.85E-06	7.94E-06	6.85E-06
Benzo(g,h,i)perylene	2.0E-04	2.0E-07	2.8E+02	1.0	6.6E+00	1.07E+00	2.83E-02	6.82E+00	4.49E-05	4.49E-08	3.71E+00	32.1	6.87	1.65E+01	NA	3.21E-06	4.39E-06	3.21E-06
Benzo(k)fluoranthene	4.6E-04	4.6E-07	2.5E+02	1.0	6.1E+00	6.60E-01	-1.80E-01	4.03E+00	6.12E-05	6.12E-08	2.72E+00	12.0	4.10	1.18E+01	NA	3.92E-06	4.52E-06	3.92E-06
Biphenyl (Diphenyl)	1.3E-03	1.3E-06	1.5E+02	1.0	4.0E+00	9.19E-02	-1.04E+00	4.39E-01	2.17E-04	2.17E-07	7.68E-01	0.6	0.67	1.84E+00	NA	8.18E-07	9.21E-07	9.21E-07
bis(2-Chloroethoxy)methane	2.0E-04	2.0E-07	1.7E+02	1.0	1.3E+00	1.23E-03	-2.91E+00	6.21E-03	1.70E-04	1.70E-07	9.79E-01	0.3	0.34	2.35E+00	NA	1.90E-09	2.44E-09	2.44E-09
bis(2-Ethylhexyl)phthalate	1.7E-02	1.7E-05	3.9E+02	1.0	5.1E+00	2.50E-02	-1.62E+00	1.90E-01	1.02E-05	1.02E-08	1.63E+01	0.4	0.47	3.91E+01	NA	1.33E-05	1.91E-05	1.33E-05
Bromoform	1.2E-02	1.2E-05	2.5E+02	1.0	2.4E+00	2.20E-03	-2.63E+00	1.35E-02	6.09E-05	6.09E-08	2.74E+00	0.3	0.34	6.56E+00	NA	3.41E-07	3.55E-07	3.55E-07
Caprolactam	2.4E-03	2.4E-06	1.1E+02	1.0	6.6E-01	1.00E-03	-3.00E+00	4.11E-03	3.68E-04	3.68E-07	4.52E-01	0.3	0.34	1.09E+00	NA	1.27E-08	2.14E-08	2.14E-08
Carbazole	1.3E-02	1.3E-05	1.7E+02	1.0	3.7E+00	5.23E-02	-1.28E+00	2.60E-01	1.83E-04	1.83E-07	9.08E-01	0.5	0.52	2.18E+00	NA	4.89E-06	5.65E-06	5.65E-06
Chrysene	1.1E-03	1.1E-06	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	5.71E-06	5.79E-06	5.71E-06
Dibenz(a,h)anthracene	4.5E-05	4.5E-08	2.8E+02	0.6	6.5E+00	1.50E+00	-4.24E-02	9.63E+00	4.38E-05	4.38E-08	3.81E+00	62.2	9.66	1.72E+01	NA	6.18E-07	8.71E-07	6.18E-07
Diethylphthalate	1.0E-02	1.0E-05	2.2E+02	1.0	2.5E+00	3.90E-03	-2.41E+00	2.23E-02	9.05E-05	9.05E-08	1.84E+00	0.3	0.35	4.42E+00	NA	4.26E-07	4.66E-07	4.66E-07
Di-n-butyl phthalate	1.2E-02	1.2E-05	2.8E+02	0.9	4.1E+00	2.40E-02	-1.63E+00	1.54E-01	4.40E-05	4.40E-08	3.79E+00	0.4	0.44	9.10E+00	NA	3.83E-06	3.94E-06	3.83E-06

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Fluoranthene	2.4E-03	2.4E-06	2.0E+02	1.0	5.0E+00	2.20E-01	-6.66E-01	1.20E+00	1.17E-04	1.17E-07	1.43E+00	1.7	1.35	5.57E+00	NA	4.93E-06	4.70E-06	4.70E-06
Fluorene	2.6E-03	2.6E-06	1.7E+02	1.0	4.2E+00	1.71E-01	-9.72E-01	8.48E-01	1.86E-04	1.86E-07	8.97E-01	1.1	1.03	3.45E+00	NA	3.29E-06	3.26E-06	3.26E-06
Hexachloroethane	1.0E-03	1.0E-06	2.4E+02	1.0	3.9E+00	3.00E-02	-1.53E+00	1.78E-01	7.49E-05	7.49E-08	2.23E+00	0.4	0.46	5.34E+00	NA	3.50E-07	3.60E-07	3.60E-07
Indeno(1,2,3-c,d)pyrene	2.0E-04	2.0E-07	2.8E+02	0.6	6.6E+00	1.00E+00	-4.48E-03	6.39E+00	4.49E-05	4.49E-08	3.71E+00	28.4	6.44	1.65E+01	NA	1.81E-06	2.45E-06	1.81E-06
Naphthalene	1.4E-01	1.4E-04	1.3E+02	1.0	3.3E+00	4.70E-02	-1.34E+00	2.05E-01	3.03E-04	3.03E-07	5.49E-01	0.4	0.48	1.32E+00	NA	3.71E-05	5.10E-05	5.10E-05
Nitrobenzene	2.0E-03	2.0E-06	1.2E+02	1.0	1.9E+00	5.39E-03	-2.27E+00	2.30E-02	3.24E-04	3.24E-07	5.14E-01	0.3	0.35	1.23E+00	NA	6.04E-08	9.56E-08	9.56E-08
N-Nitrosodi-n-propylamine	2.0E-03	2.0E-06	1.3E+02	1.0	1.4E+00	2.34E-03	-2.63E+00	1.03E-02	2.96E-04	2.96E-07	5.64E-01	0.3	0.34	1.35E+00	NA	2.74E-08	4.23E-08	4.23E-08
N-Nitrosodiphenylamine	1.2E-03	1.2E-06	2.0E+02	1.0	3.1E+00	2.60E-02	-1.84E+00	1.41E-01	1.23E-04	1.23E-07	1.35E+00	0.4	0.43	3.25E+00	NA	2.84E-07	3.15E-07	3.15E-07
Pentachlorophenol	1.1E-02	1.1E-05	2.7E+02	0.9	5.9E+00	3.90E-01	-4.24E-01	2.45E+00	5.11E-05	5.11E-08	3.26E+00	5.0	2.54	1.36E+01	NA	5.59E-05	6.64E-05	5.59E-05
Phenanthrene	6.0E-03	6.0E-06	1.8E+02	1.0	4.5E+00	1.40E-01	-8.54E-01	7.19E-01	1.59E-04	1.59E-07	1.05E+00	1.0	0.91	4.05E+00	NA	6.72E-06	6.71E-06	6.71E-06
Pyrene	2.4E-03	2.4E-06	2.0E+02	1.0	4.9E+00	3.24E-01	-7.12E-01	1.77E+00	1.17E-04	1.17E-07	1.43E+00	3.0	1.89	5.76E+00	NA	7.26E-06	6.79E-06	6.79E-06
1,1-Dichloroethane	5.6E-01	5.6E-04	9.9E+01	1.0	1.8E+00	6.70E-03	-2.17E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	1.79E-05	3.20E-05	3.20E-05
1,1-Dichloroethene	4.2E-02	4.2E-05	9.7E+01	1.0	2.1E+00	1.20E-02	-1.94E+00	4.54E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.80E-01	NA	2.36E-06	4.20E-06	4.20E-06
1,1,1-Trichloroethane	1.2E-01	1.2E-04	1.3E+02	1.0	2.5E+00	1.30E-02	-1.90E+00	5.77E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.37	1.41E+00	NA	9.19E-06	1.35E-05	1.35E-05
1,1,2-Trichloroethane	1.3E-02	1.3E-05	1.3E+02	1.0	2.1E+00	6.40E-03	-2.19E+00	2.84E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.35	1.41E+00	NA	5.11E-07	7.66E-07	7.66E-07
1,1,2,2-Tetrachloroethane	1.3E-02	1.3E-05	1.7E+02	1.0	2.4E+00	6.90E-03	-2.16E+00	3.44E-02	1.82E-04	1.82E-07	9.16E-01	0.3	0.36	2.20E+00	NA	6.67E-07	8.59E-07	8.59E-07
1,2,3-Trichlorobenzene	2.7E-03	2.7E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	1.5E-02	1.5E-05	1.8E+02	1.0	4.0E+00	6.60E-02	-1.19E+00	3.42E-01	1.53E-04	1.53E-07	1.09E+00	0.6	0.59	2.62E+00	NA	8.14E-06	8.81E-06	8.81E-06
1,2,4-Trimethylbenzene	2.8E-01	2.8E-04	1.2E+02	1.0	3.6E+00	8.37E-02	-1.08E+00	3.53E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.60	1.19E+00	NA	1.28E-04	1.68E-04	1.68E-04
1,2-Dibromo-3-chloropropane	2.4E-03	2.4E-06	2.4E+02	1.0	3.0E+00	6.76E-03	-2.17E+00	4.00E-02	7.53E-05	7.53E-08	2.21E+00	0.3	0.36	5.32E+00	NA	1.89E-07	2.00E-07	2.00E-07
1,2-Dichlorobenzene	7.3E-01	7.3E-04	1.5E+02	1.0	3.4E+00	4.10E-02	-1.39E+00	1.91E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	1.97E-04	2.52E-04	2.52E-04
1,2-Dichloroethane	1.4E-02	1.4E-05	9.9E+01	1.0	1.5E+00	6.70E-03	-2.38E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	4.62E-07	8.25E-07	8.25E-07
1,2-Dichloropropane	5.1E-03	5.1E-06	1.1E+02	1.0	2.0E+00	7.80E-03	-2.11E+00	3.19E-02	3.69E-04	3.69E-07	4.51E-01	0.3	0.35	1.08E+00	NA	2.09E-07	3.45E-07	3.45E-07
1,3-Dichlorobenzene	2.7E-02	2.7E-05	1.5E+02	1.0	3.6E+00	5.80E-02	-1.25E+00	2.70E-01	2.38E-04	2.38E-07	7.00E-01	0.5	0.53	1.68E+00	NA	1.03E-05	1.27E-05	1.27E-05
1,3,5-Trimethylbenzene	1.1E-01	1.1E-04	1.2E+02	1.0	3.4E+00	6.08E-02	-1.22E+00	2.56E-01	3.36E-04	3.36E-07	4.95E-01	0.5	0.52	1.19E+00	NA	3.69E-05	5.10E-05	5.10E-05
1,4-Dichlorobenzene	2.2E-01	2.2E-04	1.5E+02	1.0	3.4E+00	4.20E-02	-1.39E+00	1.96E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	5.98E-05	7.65E-05	7.65E-05
2-Chlorotoluene	2.9E-03	2.9E-06	1.3E+02	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	2.4E-02	2.4E-05	1.0E+02	1.0	1.4E+00	3.55E-03	-2.45E+00	1.37E-02	4.36E-04	4.36E-07	3.83E-01	0.3	0.34	9.18E-01	NA	4.04E-07	7.24E-07	7.24E-07
2,2-Dichloropropane	5.0E-04	5.0E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	4.9E-01	4.9E-04	5.8E+01	1.0	-2.4E-01	5.20E-04	-3.28E+00	1.53E-03	7.49E-04	7.49E-07	2.22E-01	0.3	0.33	5.34E-01	NA	9.31E-07	2.13E-06	2.13E-06
Benzene	4.0E-01	4.0E-04	7.8E+01	1.0	2.1E+00	1.50E-02	-1.83E+00	5.10E-02	5.79E-04	5.79E-07	2.88E-01	0.3	0.37	6.91E-01	NA	2.52E-05	4.93E-05	4.93E-05
Carbon disulfide	3.1E-03	3.1E-06	8.0E+01	1.0	2.2E+00	1.70E-02	-1.77E+00	5.85E-02	5.65E-04	5.65E-07	2.95E-01	0.3	0.37	7.08E-01	NA	2.24E-07	4.31E-07	4.31E-07
Carbon tetrachloride	3.0E-04	3.0E-07	1.5E+02	1.0	2.8E+00	1.60E-02	-1.79E+00	7.63E-02	2.18E-04	2.18E-07	7.64E-01	0.4	0.39	1.83E+00	NA	3.28E-08	4.36E-08	4.36E-08
Chlorobenzene	6.7E-01	6.7E-04	1.1E+02	1.0	2.8E+00	2.80E-02	-1.56E+00	1.14E-01	3.71E-04	3.71E-07	4.49E-01	0.4	0.41	1.08E+00	NA	9.89E-05	1.54E-04	1.54E-04
Chloroethane	9.7E-02	9.7E-05	6.5E+01	1.0	1.4E+00	6.10E-03	-2.22E+00	1.88E-02	6.90E-04	6.90E-07	2.42E-01	0.3	0.35	5.80E-01	NA	2.28E-06	4.96E-06	4.96E-06
Chloroform	4.4E-03	4.4E-06	1.2E+02	1.0	2.0E+00	6.80E-03	-2.17E+00	2.86E-02	3.40E-04	3.40E-07	4.90E-01	0.3	0.35	1.18E+00	NA	1.64E-07	2.63E-07	2.63E-07
Chloromethane	7.4E-03	7.4E-06	5.1E+01	1.0	9.1E-01	3.30E-03	-2.48E+00	9.02E-03	8.26E-04	8.26E-07	2.02E-01	0.3	0.34	4.84E-01	NA	8.57E-08	2.04E-07	2.04E-07
cis-1,2-Dichloroethene	1.4E+01	1.4E-02	9.7E+01	1.0	2.1E+00	1.09E-02	-1.96E+00	4.12E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.81E-01	NA	7.07E-04	1.26E-03	1.26E-03
cis-1,3-Dichloropropene	4.2E-03	4.2E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	9.37E-08	1.58E-07	1.58E-07
Cyclohexane	1.8E-02	1.8E-05	8.4E+01	1.0	3.4E+00	9.98E-02	-1.00E+00	3.52E-01	5.35E-04	5.35E-07	3.11E-01	0.6	0.60	7.47E-01	NA	7.83E-06	1.21E-05	1.21E-05
Ethyl tert-butyl ether (ETBE)	1.2E-03	1.2E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	4.5E-01	4.5E-04	1.1E+02	1.0	3.2E+00	4.90E-02	-1.32E+00	1.94E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.47	9.93E-01	NA	1.11E-04	1.69E-04	1.69E-04
Isopropyl ether	4.3E-01	4.3E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene (cumene)	2.7E-02	2.7E-05	1.2E+02	1.0	3.7E+00	8.76E-02	-1.06E+00	3.69E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.61	1.19E+00	NA	1.30E-05	1.70E-05	1.70E-05
Methyl acetate	2.3E-02	2.3E-05	7.4E+01	1.0	1.8E-01	8.02E-04	-3.10E+00	2.65E-03	6.10E-04	6.10E-07	2.73E-01	0.3	0.34	6.56E-01	NA	7.38E-08	1.54E-07	1.54E-07
Methyl ethyl ketone	4.3E-01	4.3E-04	7.2E+01	1.0	2.9E-01	9.60E-04	-3.01E+00	3.13E-03	6.26E-04	6.26E-07	2.66E-01	0.3	0.34	6.39E-01	NA	1.66E-06	3.51E-06	3.51E-06
Methyl isobutyl ketone	4.9E+00	4.9E-03	1.0E+02	1.0	1.2E+00	2.66E-03	-2.57E+00	1.02E-02	4.37E-04	4.37E-07	3.82E-01	0.3	0.34	9.16E-01	NA	6.25E-05	1.12E-04	1.12E-04
Methyl tert-butyl ether	2.0E-02	2.0E-05	8.8E+01	1.0	9.4E-01	2.12E-03	-2.67E+00	7.66E-03	5.09E-04	5.09E-07	3.28E-01	0.3	0.34	7.87E-01	NA	1.91E-07	3.67E-07	3.67E-07
Methylcyclohexane	2.5E-02	2.5E-05	9.8E+01	1.0	3.6E+00	1.08E-01	-9.67E-01	4.11E-01	4.47E-04	4.47E-07	3.73E-01	0.6	0.65	8.95E-01	NA	1.26E-05	1.77E-05	1.77E-05
Methylene chloride	8.2E-03	8.2E-06	8.5E+01	1.0	1.3E+00	3.50E-03	-2.45E+00	1.24E-02	5.30E-04	5.30E-07	3.14E-01	0.3	0.34	7.54E-01	NA	1.26E-07	2.45E-07	2.45E-07
n-Butylbenzene	6.1E-03	6.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	5.6E-02	5.6E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	4.8E-02	4.8E-05	9.4E+01	1.0	1.5E+00	4.30E-03	-2.36E+00	1.60E-02	4.71E-04	4.71E-07	3.54E-01	0.3	0.34	8.49E-01	NA	9.61E-07	1.77E-06	1.77E-06
p-Cymene (p-isopropyltoluene)	7.9E-02	7.9E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	5.6E-03	5.6E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	1.4E-02	1.4E-05	1.0E+02	1.0	3.0E+00	3.70E-02	-1.44E+00	1.45E-01	4.14E-04	4.14E-07	4.03E-01	0.4	0.44	9.66E-01	NA	2.56E-06	4.07E-06	4.07E-06
tert-Butylbenzene	2.1E-03	2.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert-Butyl alcohol	1.2E-01	1.2E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.2E-02	1.2E-05	1.7E+02	1.0	3.4E+00	3.30E-02	-1.48E+00	1.63E-01	1.87E-04	1.87E-07	8.92E-01	0.4	0.45	2.14E+00	NA	2.92E-06	3.54E-06	3.54E-06
Toluene	6.1E+00	6.1E-03	9.2E+01	1.0	2.7E+00	3.10E-02	-1.51E+00	1.14E-01	4.83E-04	4.83E-07	3.45E-01	0.4	0.41	8.28E-01	NA	8.70E-04	1.51E-03	1.51E-03
trans-1,2-Dichloroethene	4.0E-01	4.0E-04	9.7E+01	1.0	1.9E+00	7.70E-03	-2.12E+00	2.92E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.35	8.80E-01	NA	1.46E-05	2.64E-05	2.64E-05
trans-1,3-Dichloropropene	4.1E-03	4.1E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	9.14E-08	1.54E-07	1.54E-07
Trichloroethene	5.7E-02	5.7E-05	1.3E+02	1.0	2.4E+00	1.20E-02	-1.94E+00	5.29E-02	2.91E-04	2.91E-07	5.72E-01	0.3	0.37	1.37E+00	NA	4.04E-06	6.02E-06	6.02E-06
Vinyl chloride	1.6E+00	1.6E-03	6.3E+01	1.0	1.4E+00	5.60E-03	-2.25E+00	1.70E-02	7.08E-04	7.08E-07	2.35E-01	0.3	0.34	5.65E-01	NA	3.46E-05	7.60E-05	7.60E-05
m,p-Xylene	9.4E-01	9.4E-04	1.1E+02	1.0	NA	5.30E-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/Isc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
o-Xylene	4.4E-01	4.4E-04	1.1E+02	1.0	3.1E+00	7.04E-02	-1.34E+00	2.79E-01	4.03E-04	4.03E-07	4.13E-01	0.5	0.54	9.92E-01	NA	1.57E-04	2.29E-04	2.29E-04
Xylenes, total	1.6E+00	1.6E-03	1.1E+02	1.0	3.2E+00	5.30E-02	-1.28E+00	2.10E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.49	9.93E-01	NA	4.26E-04	6.45E-04	6.45E-04
Dioxans/Furans																		
1,2,3,4,6,7,8-HpCDD	4.6E-07	4.6E-10	4.3E+02	0.5	8.2E+00	8.10E-01	2.30E-01	6.42E+00	6.58E-06	6.58E-09	2.53E+01	28.6	6.47	1.13E+02	NA	7.40E-09	2.51E-08	7.40E-09
1,2,3,4,6,7,8-HpCDF	9.5E-08	9.5E-11	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	1.36E-09	4.17E-09	1.36E-09
1,2,3,4,7,8,9-HpCDF	9.8E-09	9.8E-12	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	1.41E-10	4.30E-10	1.41E-10
1,2,3,4,7,8-HxCDD	2.6E-09	2.6E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	3.35E-11	9.10E-11	3.35E-11
1,2,3,4,7,8-HxCDF	8.5E-09	8.5E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	9.78E-11	2.40E-10	9.78E-11
1,2,3,6,7,8-HxCDD	1.3E-08	1.3E-11	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	1.70E-10	4.61E-10	1.70E-10
1,2,3,6,7,8-HxCDF	1.6E-09	1.6E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	1.86E-11	4.56E-11	1.86E-11
1,2,3,7,8,9-HxCDD	4.4E-09	4.4E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	5.62E-11	1.53E-10	5.62E-11
1,2,3,7,8,9-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	4.45E-11	1.09E-10	4.45E-11
1,2,3,7,8-PeCDD	1.1E-09	1.1E-12	3.6E+02	0.5	6.3E+00	8.10E-01	-6.38E-01	5.88E+00	1.60E-05	1.60E-08	1.04E+01	24.2	5.93	4.61E+01	NA	1.10E-11	2.40E-11	1.10E-11
1,2,3,7,8-PeCDF	2.3E-09	2.3E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	2.10E-11	4.14E-11	2.10E-11
2,3,4,6,7,8-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	4.54E-11	1.11E-10	4.54E-11
2,3,4,7,8-PeCDF	2.6E-09	2.6E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	2.43E-11	4.79E-11	2.43E-11
2,3,7,8-TCDF	1.7E-09	1.7E-12	3.1E+02	0.5	6.5E+00	8.10E-01	-2.04E-01	5.45E+00	3.07E-05	3.07E-08	5.44E+00	21.0	5.50	2.39E+01	NA	1.24E-11	1.98E-11	1.24E-11
OCDD	2.2E-06	2.2E-09	4.6E+02	0.5	9.5E+00	8.10E-01	8.95E-01	6.68E+00	4.22E-06	4.22E-09	3.95E+01	30.8	6.72	1.76E+02	NA	4.34E-08	1.84E-07	4.34E-08
OCDF	7.4E-07	7.4E-10	4.4E+02	0.5	8.6E+00	8.10E-01	3.91E-01	6.56E+00	5.19E-06	5.19E-09	3.21E+01	29.8	6.61	1.43E+02	NA	1.33E-08	5.10E-08	1.33E-08

Table 2-19
Emissions to Air from Standing Water
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: CalEPA, DTSC, 2004.
Emissions equation:

$$E_i = K_i \times A_w \times C_w$$

E_i	Emissions from liquid surface (mg/s)
K_i	Overall mass transfer coefficient (cm/s)
C_w	Concentration in liquid phase (mg/cm^3)
A_w	Bottom area of the trench covered with contaminated water (cm^2)

Overall Mass Transfer Coefficient:

$$\frac{1}{K_i} = \frac{1}{k_{iL}} + \frac{RT}{k_{iG} H_i}$$

K_i	overall mass transfer coefficient (cm/s)
k_{iL}	liquid-phase mass transfer coefficient (cm/s)
k_{iG}	gas-phase mass transfer coefficient (cm/s)
R	gas constant, 8.25x10^{-5} (atm-m^3/mol-K)
T	average temperature (K)
H_i	Henry's Law constant (atm-m^3/mol)

Chemical	Concentration in Water (mg/L)	Concentration in Water (mg/cm^3)	Henry's Law Constant (atm-m^3/mol)	k_{iL}	k_{iG}	$1/K_i$	K_i (cm/s)	E (mg/s)
Metals								
Aluminum	9.40E+00	9.40E-03	NA	NA	NA	NA	NA	NA
Antimony	1.51E-03	1.51E-06	NA	NA	NA	NA	NA	NA
Arsenic	2.87E-01	2.87E-04	NA	NA	NA	NA	NA	NA
Barium	1.68E-01	1.68E-04	NA	NA	NA	NA	NA	NA
Beryllium	7.64E-04	7.64E-07	NA	NA	NA	NA	NA	NA
Boron	4.31E+00	4.31E-03	NA	NA	NA	NA	NA	NA
Cadmium	1.26E-03	1.26E-06	NA	NA	NA	NA	NA	NA
Chromium	3.57E-02	3.57E-05	NA	NA	NA	NA	NA	NA
Chromium (VI)	3.50E-04	3.50E-07	NA	NA	NA	NA	NA	NA
Cobalt	8.89E-03	8.89E-06	NA	NA	NA	NA	NA	NA
Copper	4.66E-02	4.66E-05	NA	NA	NA	NA	NA	NA
Iron	5.35E+01	5.35E-02	NA	NA	NA	NA	NA	NA
Lead	4.00E-02	4.00E-05	NA	NA	NA	NA	NA	NA
Manganese	4.33E+00	4.33E-03	NA	NA	NA	NA	NA	NA
Mercury	1.21E-04	1.21E-07	NA	NA	NA	NA	NA	NA
Molybdenum	5.64E-03	5.64E-06	NA	NA	NA	NA	NA	NA
Nickel	5.46E-02	5.46E-05	NA	NA	NA	NA	NA	NA
Selenium	1.89E-02	1.89E-05	NA	NA	NA	NA	NA	NA
Silver	1.20E-04	1.20E-07	NA	NA	NA	NA	NA	NA
Thallium	5.00E-05	5.00E-08	NA	NA	NA	NA	NA	NA
Vanadium	3.19E-02	3.19E-05	NA	NA	NA	NA	NA	NA
Zinc	3.03E-01	3.03E-04	NA	NA	NA	NA	NA	NA
Cyanide	6.29E-02	6.29E-05	NA	NA	NA	NA	NA	NA
Pesticides/PCBs								
4,4'-DDD	5.00E-03	5.00E-06	NA	NA	NA	NA	NA	NA
4,4'-DDE	7.76E-04	7.76E-07	NA	NA	NA	NA	NA	NA
4,4'-DDT	1.80E-04	1.80E-07	NA	NA	NA	NA	NA	NA
Aldrin	4.05E-04	4.05E-07	NA	NA	NA	NA	NA	NA
alpha-BHC	3.00E-04	3.00E-07	NA	NA	NA	NA	NA	NA
alpha-Chlordane	3.34E-04	3.34E-07	NA	NA	NA	NA	NA	NA
Atrazine	2.00E-03	2.00E-06	NA	NA	NA	NA	NA	NA
beta-BHC	3.69E-04	3.69E-07	NA	NA	NA	NA	NA	NA
delta-BHC	1.60E-04	1.60E-07	NA	NA	NA	NA	NA	NA
Diazinon	2.60E-04	2.60E-07	NA	NA	NA	NA	NA	NA
Dieldrin	9.24E-04	9.24E-07	NA	NA	NA	NA	NA	NA
Endosulfan I	3.31E-04	3.31E-07	NA	NA	NA	NA	NA	NA
Endosulfan II	2.30E-04	2.30E-07	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	9.20E-05	9.20E-08	NA	NA	NA	NA	NA	NA
Endrin	6.46E-04	6.46E-07	NA	NA	NA	NA	NA	NA
Endrin aldehyde	1.40E-04	1.40E-07	NA	NA	NA	NA	NA	NA
Endrin ketone	1.70E-04	1.70E-07	NA	NA	NA	NA	NA	NA
gamma-BHC	3.28E-04	3.28E-07	NA	NA	NA	NA	NA	NA
gamma-Chlordane	2.50E-04	2.50E-07	NA	NA	NA	NA	NA	NA
Heptachlor	1.11E-04	1.11E-07	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	1.20E-04	1.20E-07	NA	NA	NA	NA	NA	NA
Methoxychlor	1.20E-04	1.20E-07	NA	NA	NA	NA	NA	NA
Aroclor-1260	9.63E-04	9.63E-07	NA	NA	NA	NA	NA	NA
SVOCs/VOCs								
1,4-Dioxane (p-dioxane)	7.80E-01	7.80E-04	NA	NA	NA	NA	NA	NA

Chemical	Concentration in Water (mg/L)	Concentration in Water (mg/cm^3)	Henry's Law Constant (atm-m^3/mol)	k_{iL}	k_{iG}	$1/K_i$	K_i (cm/s)	E (mg/s)
2,4,6-Trichlorophenol	7.14E-03	7.14E-06	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	7.87E-02	7.87E-05	NA	NA	NA	NA	NA	NA
2-Chlorophenol	4.30E-03	4.30E-06	3.91E-04	9.92E-04	4.30E-01	1.15E+03	0.00086642	2.42E-04
2-Methylnaphthalene	2.26E-01	2.26E-04	NA	9.49E-04	4.17E-01	NA	NA	NA
2-Methylphenol	1.23E-01	1.23E-04	NA	NA	NA	NA	NA	NA
2-Nitroaniline	1.00E-02	1.00E-05	NA	NA	NA	NA	NA	NA
3,4-methylphenol	8.40E-01	8.40E-04	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	2.38E-02	2.38E-05	NA	NA	NA	NA	NA	NA
4-Methylphenol	1.94E-01	1.94E-04	NA	NA	NA	NA	NA	NA
Acenaphthene	4.50E-03	4.50E-06	1.55E-04	9.11E-04	4.06E-01	1.49E+03	0.00067176	1.97E-04
Acenaphthylene	9.54E-03	9.54E-06	1.13E-05	9.17E-04	4.07E-01	6.43E+03	0.00015551	9.64E-05
Anthracene	3.20E-03	3.20E-06	6.50E-05	8.48E-04	3.87E-01	2.16E+03	0.00046348	9.65E-05
Benzo(a)anthracene	9.00E-04	9.00E-07	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	5.00E-04	5.00E-07	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	7.60E-04	7.60E-07	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	2.00E-04	2.00E-07	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	4.60E-04	4.60E-07	NA	NA	NA	NA	NA	NA
Biphenyl (Diphenyl)	1.30E-03	1.30E-06	3.00E-04	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	2.00E-04	2.00E-07	NA	8.60E-04	3.90E-01	NA	NA	NA
bis(2-Ethylhexyl)phthalate	1.69E-02	1.69E-05	NA	NA	NA	NA	NA	NA
Bromoform	1.20E-02	1.20E-05	5.35E-04	7.12E-04	3.44E-01	1.54E+03	0.00064985	5.07E-04
Caprolactam	2.40E-03	2.40E-06	NA	NA	NA	NA	NA	NA
Carbazole	1.25E-02	1.25E-05	NA	NA	NA	NA	NA	NA
Chrysene	1.10E-03	1.10E-06	9.46E-05	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	4.50E-05	4.50E-08	NA	NA	NA	NA	NA	NA
Diethylphthalate	1.03E-02	1.03E-05	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	1.17E-02	1.17E-05	NA	NA	NA	NA	NA	NA
Fluoranthene	2.40E-03	2.40E-06	NA	NA	NA	NA	NA	NA
Fluorene	2.60E-03	2.60E-06	7.70E-05	8.78E-04	3.96E-01	1.95E+03	0.0005137	8.69E-05
Hexachloroethane	1.00E-03	1.00E-06	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	2.00E-04	2.00E-07	NA	NA	NA	NA	NA	NA
Naphthalene	1.36E-01	1.36E-04	4.83E-04	9.99E-04	4.32E-01	1.12E+03	0.000894	7.92E-03
Nitrobenzene	2.00E-03	2.00E-06	2.39E-05	1.03E-03	4.41E-01	3.30E+03	0.00030305	3.94E-05
N-Nitrosodi-n-propylamine	2.00E-03	2.00E-06	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	1.20E-03	1.20E-06	NA	NA	NA	NA	NA	NA
Pentachlorophenol	1.13E-02	1.13E-05	NA	NA	NA	NA	NA	NA
Phenanthrene	6.00E-03	6.00E-06	NA	NA	NA	NA	NA	NA
Pyrene	2.40E-03	2.40E-06	1.10E-05	8.00E-04	3.72E-01	7.26E+03	0.00013772	2.15E-05
1,1-Dichloroethane	5.57E-01	5.57E-04	5.62E-03	1.14E-03	4.71E-01	8.89E+02	0.00112518	4.08E-02
1,1-Dichloroethene	4.16E-02	4.16E-05	2.61E-02	1.15E-03	4.74E-01	8.73E+02	0.00114612	3.10E-03
1,1,1-Trichloroethane	1.18E-01	1.18E-04	1.72E-02	9.81E-04	4.26E-01	1.02E+03	0.00097781	7.50E-03
1,1,2-Trichloroethane	1.33E-02	1.33E-05	9.13E-04	9.81E-04	4.26E-01	1.08E+03	0.00092377	8.01E-04
1,1,2,2-Tetrachloroethane	1.29E-02	1.29E-05	3.45E-04	8.73E-04	3.94E-01	1.33E+03	0.0007539	6.33E-04
1,2,3-Trichlorobenzene	2.72E-03	2.72E-06	1.42E-03	8.40E-04	3.84E-01	1.24E+03	0.00080926	1.43E-04
1,2,4-Trichlorobenzene	1.51E-02	1.51E-05	1.42E-03	8.41E-04	3.84E-01	1.23E+03	0.00081026	7.95E-04
1,2,4-Trimethylbenzene	2.78E-01	2.78E-04	5.70E-03	1.03E-03	4.41E-01	9.79E+02	0.00102167	1.84E-02
1,2-Dibromo-3-chloropropane	2.40E-03	2.40E-06	1.47E-04	7.36E-04	3.52E-01	1.83E+03	0.00054508	8.51E-05
1,2-Dichlorobenzene	7.34E-01	7.34E-04	1.90E-03	9.33E-04	4.12E-01	1.10E+03	0.00090658	4.33E-02
1,2-Dichloroethane	1.44E-02	1.44E-05	9.79E-04	1.14E-03	4.71E-01	9.33E+02	0.00107202	1.00E-03
1,2-Dichloropropane	5.10E-03	5.10E-06	2.80E-03	1.06E-03	4.50E-01	9.59E+02	0.00104266	3.46E-04
1,3-Dichlorobenzene	2.71E-02	2.71E-05	1.90E-03	9.33E-04	4.12E-01	1.10E+03	0.00090658	1.60E-03
1,3,5-Trimethylbenzene	1.10E-01	1.10E-04	7.71E-03	1.03E-03	4.41E-01	9.76E+02	0.00102433	7.34E-03
1,4-Dichlorobenzene	2.18E-01	2.18E-04	2.43E-03	9.33E-04	4.12E-01	1.10E+03	0.00091225	1.29E-02
2-Chlorotoluene	2.89E-03	2.89E-06	NA	1.01E-03	4.33E-01	NA	NA	NA
2-Hexanone	2.35E-02	2.35E-05	NA	1.13E-03	4.69E-01	NA	NA	NA
2,2-Dichloropropane	5.00E-04	5.00E-07	NA	1.06E-03	4.50E-01	NA	NA	NA
Acetone	4.85E-01	4.85E-04	3.88E-05	1.49E-03	5.63E-01	1.80E+03	0.00055591	1.75E-02
Benzene	4.00E-01	4.00E-04	5.55E-03	1.28E-03	5.09E-01	7.90E+02	0.00126611	3.29E-02
Carbon disulfide	3.10E-03	3.10E-06	3.03E-02	1.30E-03	5.14E-01	7.72E+02	0.00129512	2.61E-04
Carbon tetrachloride	3.00E-04	3.00E-07	3.04E-02	9.12E-04	4.06E-01	1.10E+03	0.00091003	1.78E-05
Chlorobenzene	6.74E-01	6.74E-04	3.70E-03	1.06E-03	4.50E-01	9.54E+02	0.00104784	4.59E-02
Chloroethane	9.74E-02	9.74E-05	1.10E-02	1.40E-03	5.42E-01	7.17E+02	0.00139522	8.84E-03
Chloroform	4.40E-03	4.40E-06	3.67E-03	1.04E-03	4.42E-01	9.79E+02	0.00102109	2.92E-04
Chloromethane	7.40E-03	7.40E-06	2.40E-02	1.58E-03	5.88E-01	6.33E+02	0.00157987	7.60E-04
cis-1,2-Dichloroethene	1.37E+01	1.37E-02	4.08E-03	1.15E-03	4.74E-01	8.83E+02	0.00113219	1.01E+00
cis-1,3-Dichloropropene	4.20E-03	4.20E-06	1.77E-02	1.07E-03	4.53E-01	9.34E+02	0.00107032	2.92E-04
Cyclohexane	1.80E-02	1.80E-05	2.00E-01	1.23E-03	4.97E-01	8.10E+02	0.00123405	1.44E-03
Ethyl tert-butyl ether (ETBE)	1.20E-03	1.20E-06	NA	1.12E-03	4.66E-01	NA	NA	NA
Ethylbenzene	4.49E-01	4.49E-04	7.88E-03	1.10E-03	4.60E-01	9.18E+02	0.00108973	3.18E-02
Isopropyl ether	4.30E-01	4.30E-04	NA	1.12E-03	4.66E-01	NA	NA	NA
Isopropylbenzene (cumene)	2.71E-02	2.71E-05	NA	1.03E-03	4.41E-01	NA	NA	NA
Methyl acetate	2.25E-02	2.25E-05	2.06E-05	1.31E-03	5.19E-01	3.06E+03	0.00032657	4.79E-04

Chemical	Concentration in Water (mg/L)	Concentration in Water (mg/cm^3)	Henry's Law Constant (atm-m^3/mol)	k_{iL}	k_{iG}	$1/K_i$	K_i (cm/s)	E (mg/s)
Methyl ethyl ketone	4.30E-01	4.30E-04	2.74E-05	1.33E-03	5.24E-01	2.46E+03	0.00040587	1.14E-02
Methyl isobutyl ketone	4.86E+00	4.86E-03	1.40E-04	1.13E-03	4.69E-01	1.26E+03	0.00079414	2.51E-01
Methyl tert-butyl ether	2.01E-02	2.01E-05	NA	1.21E-03	4.89E-01	NA	NA	NA
Methylcyclohexane	2.45E-02	2.45E-05	4.30E-01	1.14E-03	4.72E-01	8.76E+02	0.00114159	1.82E-03
Methylene chloride	8.19E-03	8.19E-06	2.19E-03	1.23E-03	4.95E-01	8.38E+02	0.00119393	6.36E-04
n-Butylbenzene	6.12E-03	6.12E-06	1.31E-02	9.77E-04	4.25E-01	1.03E+03	0.00097236	3.87E-04
n-Propylbenzene	5.61E-02	5.61E-05	1.31E-02	1.03E-03	4.41E-01	9.73E+02	0.00102747	3.75E-03
Phenol	4.80E-02	4.80E-05	NA	NA	NA	NA	NA	NA
p-Cymene (p-isopropyltoluene)	7.86E-02	7.86E-05	NA	9.77E-04	4.25E-01	NA	NA	NA
sec-Butylbenzene	5.64E-03	5.64E-06	1.87E-02	9.77E-04	4.25E-01	1.03E+03	0.00097361	3.57E-04
Styrene	1.39E-02	1.39E-05	2.75E-03	1.11E-03	4.63E-01	9.22E+02	0.00108509	9.83E-04
tert-Butylbenzene	2.10E-03	2.10E-06	1.26E-02	9.77E-04	4.25E-01	1.03E+03	0.0009722	1.33E-04
tert-Butyl alcohol	1.17E-01	1.17E-04	NA	1.31E-03	5.18E-01	NA	NA	NA
Tetrachloroethene	1.20E-02	1.20E-05	1.84E-02	8.79E-04	3.96E-01	1.14E+03	0.00087597	6.84E-04
Toluene	6.11E+00	6.11E-03	6.64E-03	1.18E-03	4.82E-01	8.55E+02	0.00116895	4.65E-01
trans-1,2-Dichloroethene	4.01E-01	4.01E-04	9.38E-03	1.15E-03	4.74E-01	8.76E+02	0.00114148	2.98E-02
trans-1,3-Dichloropropene	4.10E-03	4.10E-06	1.77E-02	1.07E-03	4.53E-01	9.34E+02	0.00107032	2.85E-04
Trichloroethene	5.70E-02	5.70E-05	1.03E-02	9.88E-04	4.28E-01	1.02E+03	0.00098307	3.64E-03
Vinyl chloride	1.63E+00	1.63E-03	2.70E-02	1.43E-03	5.47E-01	7.03E+02	0.00142202	1.50E-01
m,p-Xylene	9.44E-01	9.44E-04	7.34E-03	1.10E-03	4.60E-01	9.18E+02	0.00108914	6.69E-02
o-Xylene	4.45E-01	4.45E-04	5.19E-03	1.10E-03	4.60E-01	9.21E+02	0.00108557	3.14E-02
Xylenes, total	1.60E+00	1.60E-03	5.19E-03	1.10E-03	4.60E-01	9.21E+02	0.00108557	1.13E-01
Dioxans/Furans								
1,2,3,4,6,7,8-HpCDD	4.64E-07	4.64E-10	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDF	9.49E-08	9.49E-11	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-HpCDF	9.79E-09	9.79E-12	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HxCDD	2.62E-09	2.62E-12	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HxCDF	8.49E-09	8.49E-12	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDD	1.33E-08	1.33E-11	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDF	1.62E-09	1.62E-12	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDD	4.40E-09	4.40E-12	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDF	3.87E-09	3.87E-12	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDD	1.08E-09	1.08E-12	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDF	2.28E-09	2.28E-12	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HxCDF	3.94E-09	3.94E-12	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PeCDF	2.64E-09	2.64E-12	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	1.68E-09	1.68E-12	NA	NA	NA	NA	NA	NA
OCDD	2.18E-06	2.18E-09	NA	NA	NA	NA	NA	NA
OCDF	7.44E-07	7.44E-10	NA	NA	NA	NA	NA	NA

Notes:

[a] Trench dimensions are assumed to be 10 ft x 10 ft with 70% water coverage in the bottom of the trenc

- The Henry's Law Constant value for 1,2,4-trichlorobenzene was used for 1,2,3-trichlorobenzene.
- The Henry's Law Constant value for m-xylene was used for m,p-xylenes.
- The Henry's Law Constant value for 1,3-dichloropropene was used for cis-1,3-dichloropropene and trans-1,3-dichloropropene.

Table 2-20
Mass Transfer Coefficient Calculations - Water to Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: CalEPA, DTSC, 2004.

Liquid-phase mass transfer coefficient

$$k_{iL} = \sqrt{\frac{MW_{O_2}}{MW_i}} \times \frac{T}{298} \times k_{L,O_2}$$

MW_{O2}	Molecular Weight of Oxygen, g/mol	3.20E+01
MW_i	Chemical specific molecular weight, g/mol	chemical specific
T[a]	Average Temperature, K	298
$k_{L,O2}$	Liqiud-phase mass transfer coefficient for oxygen at 25°C, cm/s	0.002

[a] The average temperture is assumed to be 25°C.

Gas-phase mass transfer coefficient

$$k_{iG} = \left(\frac{MW_{H_2O}}{MW_i}\right)^{0.335} \times \left(\frac{T}{298}\right)^{1.005} \times k_{G,H_2O}$$

MW_{H2O}	Molecular weight of water, g/mol	18
MW_i	Chemical specific molecular weight, g/mol	chem specific
T[a]	Average Temperature, K	298
$k_{G,H2O}$	Gas phase mass transfer coefficient for water vapor at 25°C, cm/s	8.33E-01

[a] The average temperture is assumed to be 25°C.

Chemical	Molecular Weight (g/mol)	k_{iL} (cm/s)	k_{iG} (cm/s)	V or NV
Metals				
Aluminum		NA	NA	NV
Antimony		NA	NA	NV
Arsenic		NA	NA	NV
Barium		NA	NA	NV
Beryllium		NA	NA	NV
Boron		NA	NA	NV
Cadmium		NA	NA	NV
Chromium		NA	NA	NV
Chromium (VI)		NA	NA	NV
Cobalt		NA	NA	NV
Copper		NA	NA	NV
Iron		NA	NA	NV
Lead		NA	NA	NV
Manganese		NA	NA	NV
Mercury		NA	NA	NV
Molybdenum		NA	NA	NV
Nickel		NA	NA	NV
Selenium		NA	NA	NV
Silver		NA	NA	NV
Thallium		NA	NA	NV
Vanadium		NA	NA	NV
Zinc		NA	NA	NV
Cyanide		NA	NA	NV
Pesticides/PCBs				
4,4'-DDD		NA	NA	NV

Chemical	Molecular Weight (g/mol)	k_{iL} (cm/s)	k_{iG} (cm/s)	V or NV
4,4'-DDE		NA	NA	NV
4,4'-DDT		NA	NA	NV
Aldrin		NA	NA	NV
alpha-BHC		NA	NA	NV
alpha-Chlordane		NA	NA	NV
Atrazine		NA	NA	NV
beta-BHC		NA	NA	NV
delta-BHC		NA	NA	NV
Diazinon		NA	NA	NV
Dieldrin		NA	NA	NV
Endosulfan I		NA	NA	NV
Endosulfan II		NA	NA	NV
Endosulfan sulfate		NA	NA	NV
Endrin		NA	NA	NV
Endrin aldehyde		NA	NA	NV
Endrin ketone		NA	NA	NV
gamma-BHC		NA	NA	NV
gamma-Chlordane		NA	NA	NV
Heptachlor		NA	NA	NV
Heptachlor epoxide		NA	NA	NV
Methoxychlor		NA	NA	NV
Aroclor-1260		NA	NA	NV
SVOCs/VOCs				
1,4-Dioxane (p-dioxane)		NA	NA	NV
2,4,6-Trichlorophenol		NA	NA	NV
2,4-Dimethylphenol		NA	NA	NV
2-Chlorophenol	130	9.92E-04	4.30E-01	V
2-Methylnaphthalene	142.2	9.49E-04	4.17E-01	V
2-Methylphenol		NA	NA	NV
2-Nitroaniline		NA	NA	NV
3,4-methylphenol		NA	NA	NV
4-Chloro-3-methylphenol		NA	NA	NV
4-Methylphenol		NA	NA	NV
Acenaphthene	154.21	9.11E-04	4.06E-01	V
Acenaphthylene	152.195	9.17E-04	4.07E-01	V
Anthracene	178	8.48E-04	3.87E-01	V
Benzo(a)anthracene		NA	NA	NV
Benzo(a)pyrene		NA	NA	NV
Benzo(b)fluoranthene		NA	NA	NV
Benzo(g,h,i)perylene		NA	NA	NV
Benzo(k)fluoranthene		NA	NA	NV
Biphenyl (Diphenyl)	150	NA	NA	NV
bis(2-Chloroethoxy)methane	173.0388	8.60E-04	3.90E-01	V
bis(2-Ethylhexyl)phthalate		NA	NA	NV
Bromoform	252.7309	7.12E-04	3.44E-01	V
Caprolactam		NA	NA	NV
Carbazole		NA	NA	NV
Chrysene	228.28	NA	NA	NV
Dibenz(a,h)anthracene		NA	NA	NV
Diethylphthalate		NA	NA	NV
Di-n-butyl phthalate		NA	NA	NV
Fluoranthene		NA	NA	NV
Fluorene	166.21	8.78E-04	3.96E-01	V
Hexachloroethane		NA	NA	NV
Indeno(1,2,3-c,d)pyrene		NA	NA	NV
Naphthalene	128.16	9.99E-04	4.32E-01	V
Nitrobenzene	120	1.03E-03	4.41E-01	V

Chemical	Molecular Weight (g/mol)	k_{iL} (cm/s)	k_{iG} (cm/s)	V or NV
N-Nitrosodi-n-propylamine		NA	NA	NV
N-Nitrosodiphenylamine		NA	NA	NV
Pentachlorophenol		NA	NA	NV
Phenanthrene		NA	NA	NV
Pyrene	200	8.00E-04	3.72E-01	0.00
1,1-Dichloroethane	99	1.14E-03	4.71E-01	V
1,1-Dichloroethene	97	1.15E-03	4.74E-01	V
1,1,1-Trichloroethane	133	9.81E-04	4.26E-01	V
1,1,2-Trichloroethane	133	9.81E-04	4.26E-01	V
1,1,2,2-Tetrachloroethane	168	8.73E-04	3.94E-01	V
1,2,3-Trichlorobenzene	181.45	8.40E-04	3.84E-01	V
1,2,4-Trichlorobenzene	181	8.41E-04	3.84E-01	V
1,2,4-Trimethylbenzene	120.19	1.03E-03	4.41E-01	V
1,2-Dibromo-3-chloropropane	236.36	7.36E-04	3.52E-01	V
1,2-Dichlorobenzene	147	9.33E-04	4.12E-01	V
1,2-Dichloroethane	99	1.14E-03	4.71E-01	V
1,2-Dichloropropane	113	1.06E-03	4.50E-01	V
1,3-Dichlorobenzene	147	9.33E-04	4.12E-01	V
1,3,5-Trimethylbenzene	120.19	1.03E-03	4.41E-01	V
1,4-Dichlorobenzene	147	9.33E-04	4.12E-01	V
2-Chlorotoluene	126.59	1.01E-03	4.33E-01	V
2-Hexanone	100.2	1.13E-03	4.69E-01	V
2,2-Dichloropropane	113	1.06E-03	4.50E-01	V
Acetone	58	1.49E-03	5.63E-01	V
Benzene	78.1	1.28E-03	5.09E-01	V
Carbon disulfide	76	1.30E-03	5.14E-01	V
Carbon tetrachloride	154	9.12E-04	4.06E-01	V
Chlorobenzene	113	1.06E-03	4.50E-01	V
Chloroethane	65	1.40E-03	5.42E-01	V
Chloroform	119	1.04E-03	4.42E-01	V
Chloromethane	51	1.58E-03	5.88E-01	V
cis-1,2-Dichloroethene	97	1.15E-03	4.74E-01	V
cis-1,3-Dichloropropene	111	1.07E-03	4.53E-01	V
Cyclohexane	84	1.23E-03	4.97E-01	V
Ethyl tert-butyl ether (ETBE)	102.18	1.12E-03	4.66E-01	V
Ethylbenzene	106.2	1.10E-03	4.60E-01	V
Isopropyl ether	102.18	1.12E-03	4.66E-01	V
Isopropylbenzene (cumene)	120.2	1.03E-03	4.41E-01	V
Methyl acetate	74.0792	1.31E-03	5.19E-01	V
Methyl ethyl ketone	72	1.33E-03	5.24E-01	V
Methyl isobutyl ketone	100.16	1.13E-03	4.69E-01	V
Methyl tert-butyl ether	88.15	1.21E-03	4.89E-01	V
Methylcyclohexane	98.19	1.14E-03	4.72E-01	V
Methylene chloride	85	1.23E-03	4.95E-01	V
n-Butylbenzene	134.22	9.77E-04	4.25E-01	V
n-Propylbenzene	120.19	1.03E-03	4.41E-01	V
Phenol		NA	NA	NV
p-Cymene (p-isopropyltoluene)	134.22	9.77E-04	4.25E-01	V
sec-Butylbenzene	134.22	9.77E-04	4.25E-01	V
Styrene	104.2	1.11E-03	4.63E-01	V
tert-Butylbenzene	134.22	9.77E-04	4.25E-01	V
tert-Butyl alcohol	74.12	1.31E-03	5.18E-01	V
Tetrachloroethene	165.83	8.79E-04	3.96E-01	V
Toluene	92	1.18E-03	4.82E-01	V
trans-1,2-Dichloroethene	97	1.15E-03	4.74E-01	V
trans-1,3-Dichloropropene	111	1.07E-03	4.53E-01	V
Trichloroethene	131	9.88E-04	4.28E-01	V

Chemical	Molecular Weight (g/mol)	k_{iL} (cm/s)	k_{iG} (cm/s)	V or NV
Vinyl chloride	63	1.43E-03	5.47E-01	V
m,p-Xylene	106.2	1.10E-03	4.60E-01	V
o-Xylene	106.2	1.10E-03	4.60E-01	V
Xylenes, total	106.2	1.10E-03	4.60E-01	V
Dioxans/Furans				
1,2,3,4,6,7,8-HpCDD		NA	NA	NV
1,2,3,4,6,7,8-HpCDF		NA	NA	NV
1,2,3,4,7,8,9-HpCDF		NA	NA	NV
1,2,3,4,7,8-HxCDD		NA	NA	NV
1,2,3,4,7,8-HxCDF		NA	NA	NV
1,2,3,6,7,8-HxCDD		NA	NA	NV
1,2,3,6,7,8-HxCDF		NA	NA	NV
1,2,3,7,8,9-HxCDD		NA	NA	NV
1,2,3,7,8,9-HxCDF		NA	NA	NV
1,2,3,7,8-PeCDD		NA	NA	NV
1,2,3,7,8-PeCDF		NA	NA	NV
2,3,4,6,7,8-HxCDF		NA	NA	NV
2,3,4,7,8-PeCDF		NA	NA	NV
2,3,7,8-TCDF		NA	NA	NV
OCDD		NA	NA	NV
OCDF		NA	NA	NV

Table 2-21
Calculation of Concentration in Air from Emissions from Water
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: CalEPA, DTSC, 2004.

Description	Symbol	Value	Units	Comments
Mixing Height (adult breating zone)	H	1.83	m	DTSC, 2006
Assumed velocity of air in the trench	u	0.152	m/s	DTSC, 2006
Width of trench perpendicular to wind direction	W	3.05	m	DTSC, 2006
Conversion factor	CF	1000	ug/mg	

$$C_{air} = \frac{E_i \times CF}{u \times H \times W}$$

Chemical	Total emission rate, Ei (mg/s)	Concentration of VOCs in breathing zone, C_{air} (ug/m^3)
Metals		
Aluminum	NA	NA
Antimony	NA	NA
Arsenic	NA	NA
Barium	NA	NA
Beryllium	NA	NA
Boron	NA	NA
Cadmium	NA	NA
Chromium	NA	NA
Chromium (VI)	NA	NA
Cobalt	NA	NA
Copper	NA	NA
Iron	NA	NA
Lead	NA	NA
Manganese	NA	NA
Mercury	NA	NA
Molybdenum	NA	NA
Nickel	NA	NA
Selenium	NA	NA
Silver	NA	NA
Thallium	NA	NA
Vanadium	NA	NA
Zinc	NA	NA
Cyanide	NA	NA
Pesticides/PCBs		
4,4'-DDD	NA	NA
4,4'-DDE	NA	NA
4,4'-DDT	NA	NA
Aldrin	NA	NA
alpha-BHC	NA	NA
alpha-Chlordane	NA	NA
Atrazine	NA	NA
beta-BHC	NA	NA
delta-BHC	NA	NA
Diazinon	NA	NA
Dieldrin	NA	NA

Chemical	Total emission rate, Ei (mg/s)	Concentration of VOCs in breathing zone, C_{air} (ug/m^3)
Endosulfan I	NA	NA
Endosulfan II	NA	NA
Endosulfan sulfate	NA	NA
Endrin	NA	NA
Endrin aldehyde	NA	NA
Endrin ketone	NA	NA
gamma-BHC	NA	NA
gamma-Chlordane	NA	NA
Heptachlor	NA	NA
Heptachlor epoxide	NA	NA
Methoxychlor	NA	NA
Aroclor-1260	NA	NA
SVOCs/VOCs		
1,4-Dioxane (p-dioxane)	NA	NA
2,4,6-Trichlorophenol	NA	NA
2,4-Dimethylphenol	NA	NA
2-Chlorophenol	2.42E-04	2.86E-01
2-Methylnaphthalene	NA	NA
2-Methylphenol	NA	NA
2-Nitroaniline	NA	NA
3,4-methylphenol	NA	NA
4-Chloro-3-methylphenol	NA	NA
4-Methylphenol	NA	NA
Acenaphthene	1.97E-04	2.32E-01
Acenaphthylene	9.64E-05	1.14E-01
Anthracene	9.65E-05	1.14E-01
Benzo(a)anthracene	NA	NA
Benzo(a)pyrene	NA	NA
Benzo(b)fluoranthene	NA	NA
Benzo(g,h,i)perylene	NA	NA
Benzo(k)fluoranthene	NA	NA
Biphenyl (Diphenyl)	NA	NA
bis(2-Chloroethoxy)methane	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA
Bromoform	5.07E-04	5.98E-01
Caprolactam	NA	NA
Carbazole	NA	NA
Chrysene	NA	NA
Dibenz(a,h)anthracene	NA	NA
Diethylphthalate	NA	NA
Di-n-butyl phthalate	NA	NA
Fluoranthene	NA	NA
Fluorene	8.69E-05	1.02E-01
Hexachloroethane	NA	NA
Indeno(1,2,3-c,d)pyrene	NA	NA
Naphthalene	7.92E-03	9.34E+00
Nitrobenzene	3.94E-05	4.65E-02
N-Nitrosodi-n-propylamine	NA	NA
N-Nitrosodiphenylamine	NA	NA
Pentachlorophenol	NA	NA
Phenanthrene	NA	NA
Pyrene	2.15E-05	2.53E-02
1,1-Dichloroethane	4.08E-02	4.80E+01
1,1-Dichloroethene	3.10E-03	3.65E+00
1,1,1-Trichloroethane	7.50E-03	8.85E+00
1,1,2-Trichloroethane	8.01E-04	9.44E-01

Chemical	Total emission rate, Ei (mg/s)	Concentration of VOCs in breathing zone, C_{air} (ug/m^3)
1,1,2,2-Tetrachloroethane	6.33E-04	7.47E-01
1,2,3-Trichlorobenzene	1.43E-04	1.69E-01
1,2,4-Trichlorobenzene	7.95E-04	9.37E-01
1,2,4-Trimethylbenzene	1.84E-02	2.17E+01
1,2-Dibromo-3-chloropropane	8.51E-05	1.00E-01
1,2-Dichlorobenzene	4.33E-02	5.10E+01
1,2-Dichloroethane	1.00E-03	1.18E+00
1,2-Dichloropropane	3.46E-04	4.08E-01
1,3-Dichlorobenzene	1.60E-03	1.88E+00
1,3,5-Trimethylbenzene	7.34E-03	8.65E+00
1,4-Dichlorobenzene	1.29E-02	1.52E+01
2-Chlorotoluene	NA	NA
2-Hexanone	NA	NA
2,2-Dichloropropane	NA	NA
Acetone	1.75E-02	2.07E+01
Benzene	3.29E-02	3.88E+01
Carbon disulfide	2.61E-04	3.08E-01
Carbon tetrachloride	1.78E-05	2.09E-02
Chlorobenzene	4.59E-02	5.41E+01
Chloroethane	8.84E-03	1.04E+01
Chloroform	2.92E-04	3.44E-01
Chloromethane	7.60E-04	8.96E-01
cis-1,2-Dichloroethene	1.01E+00	1.19E+03
cis-1,3-Dichloropropene	2.92E-04	3.45E-01
Cyclohexane	1.44E-03	1.70E+00
Ethyl tert-butyl ether (ETBE)	NA	NA
Ethylbenzene	3.18E-02	3.75E+01
Isopropyl ether	NA	NA
Isopropylbenzene (cumene)	NA	NA
Methyl acetate	4.79E-04	5.64E-01
Methyl ethyl ketone	1.14E-02	1.34E+01
Methyl isobutyl ketone	2.51E-01	2.96E+02
Methyl tert-butyl ether	NA	NA
Methylcyclohexane	1.82E-03	2.15E+00
Methylene chloride	6.36E-04	7.49E-01
n-Butylbenzene	3.87E-04	4.56E-01
n-Propylbenzene	3.75E-03	4.42E+00
Phenol	NA	NA
p-Cymene (p-isopropyltoluene)	NA	NA
sec-Butylbenzene	3.57E-04	4.21E-01
Styrene	9.83E-04	1.16E+00
tert-Butylbenzene	1.33E-04	1.56E-01
tert-Butyl alcohol	NA	NA
Tetrachloroethene	6.84E-04	8.06E-01
Toluene	4.65E-01	5.48E+02
trans-1,2-Dichloroethene	2.98E-02	3.51E+01
trans-1,3-Dichloropropene	2.85E-04	3.36E-01
Trichloroethene	3.64E-03	4.29E+00
Vinyl chloride	1.50E-01	1.77E+02
m,p-Xylene	6.69E-02	7.88E+01
o-Xylene	3.14E-02	3.70E+01
Xylenes, total	1.13E-01	1.33E+02
Dioxans/Furans		
1,2,3,4,6,7,8-HpCDD	NA	NA
1,2,3,4,6,7,8-HpCDF	NA	NA
1,2,3,4,7,8,9-HpCDF	NA	NA

Chemical	Total emission rate, Ei (mg/s)	Concentration of VOCs in breathing zone, C_{air} (ug/m^3)
1,2,3,4,7,8-HxCDD	NA	NA
1,2,3,4,7,8-HxCDF	NA	NA
1,2,3,6,7,8-HxCDD	NA	NA
1,2,3,6,7,8-HxCDF	NA	NA
1,2,3,7,8,9-HxCDD	NA	NA
1,2,3,7,8,9-HxCDF	NA	NA
1,2,3,7,8-PeCDD	NA	NA
1,2,3,7,8-PeCDF	NA	NA
2,3,4,6,7,8-HxCDF	NA	NA
2,3,4,7,8-PeCDF	NA	NA
2,3,7,8-TCDF	NA	NA
OCDD	NA	NA
OCDF	NA	NA

Table 2-22
Summary of Cancer Risks and Noncancer Hazards - Groundwater
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario/ Receptor	Cancer	Noncancer
Trench Worker	1E-04	34
Hypothetical Resident		
Future Adult Resident (24 years)	5E-02	262
Future Child Resident (6 years)	3E-02	628
Sum of Adult plus Child (30 years)	7E-02	

Table 2-23
Summary of Cancer Risks - Resident Receptors - Soil plus Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario/ Receptor	Cancer Risk			
	Former AMCO Chemical Facility	Parking Lot	Large Vacant Lot	Small Vacant Lot
Hypothetical Resident				
Shallow Soil plus Groundwater				
Adult (Soil)	1E-04	5E-05	6E-05	5E-05
Child (Soil)	2E-04	1E-04	1E-04	1E-04
Groundwater (Adult plus Child)	7E-02	7E-02	7E-02	7E-02
Combined Cancer Risk	7E-02	7E-02	7E-02	7E-02
Deep Soil plus Groundwater				
Adult (Soil)	1E-04	1E-04	4E-05	
Child (Soil)	2E-04	2E-04	9E-05	
Groundwater (Adult plus Child)	7E-02	7E-02	7E-02	7E-02
Combined Cancer Risk	7E-02	7E-02	7E-02	7E-02

Groundwater

Exposure Scenario/ Receptor	Cancer Risk
Hypothetical Resident	
Future Adult Resident (24 years)	5E-02
Future Child Resident (6 years)	3E-02
Sum of Adult plus Child (30 years)	7E-02

Table 2-24
Summary of Target Organ / Endpoint for Health Hazards
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Target Organ / Endpoint	Source
1,2,4-Trimethylbenzene	Decreased body weight	PPRTV
1,3,5-Trimethylbenzene	Decreased body weight	PPRTV
2-Methylnaphthalene	Lungs	IRIS
Aroclor-1260*	Eyes	IRIS
Arsenic	Skin, Circulatory System	IRIS
Benzene	Immune system (decreased lymphocyte count)	IRIS
cis-1,2-Dichloroethene	Decreased hematocrit and hemoglobin (Blood)	PPRTV
Naphthalene	Decreased body weight	IRIS
Toluene	Kidney	IRIS
Trichloroethene	Nervous system	NCEA
Vinyl chloride	Liver	IRIS
Xylenes, total	Decreased body weight, increased mortality	IRIS

Notes
*Aroclor 1254 used as surrogate
PPRTV = Provisional Peer Reviewed Toxicity Value
IRIS = Integrated Risk Information System
NCEA = National Center for Environmental Assessment

Table 2-25

Noncancer Health Hazard - Target Organs/Endpoints for Future Adult Residents - Groundwater

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Aroclor-1260	48	18%	Eyes
cis-1,2-Dichloroethene	42	16%	Decreased hematocrit and hemoglobin (Blood)
Arsenic	26	10%	Skin, Circulatory System
Vinyl chloride	23	9%	Liver
Naphthalene	22	8%	Decreased body weight
Toluene	13	5%	Kidney
Benzene	10	4%	Immune system (decreased lymphocyte count)
Xylenes, total	8	3%	Decreased body weight, increased mortality
Chlorobenzene	8	3%	Liver
Trichloroethene	7	3%	Nervous system
Total Hazard Index1	**262**		

Notes

NA = Target organ data not available

1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors are presented.

2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 2-26
Noncancer Health Hazard - Target Organs/Endpoints for Future Child Residents - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Aroclor-1260	108	17%	Eyes
cis-1,2-Dichloroethene	99	16%	Decreased hematocrit and hemoglobin (Blood)
Arsenic	62	10%	Skin, Circulatory System
Vinyl chloride	55	9%	Liver
Naphthalene	52	8%	Decreased body weight
Toluene	30	5%	Kidney
Benzene	22	4%	Immune system (decreased lymphocyte count)
Xylenes, total	19	3%	Decreased body weight, increased mortality
Chlorobenzene	18	3%	Liver
Trichloroethene	16	3%	Nervous system
Total Hazard Index1	**628**		

Notes
NA = Target organ data not available
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 2-27
Noncancer Health Hazard - Target Organs/Endpoints for Trenchworkers - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Aroclor-1260	14	38%	Eyes
cis-1,2-Dichloroethene	11	30%	Decreased hematocrit and hemoglobin (Blood)
Vinyl chloride	5	13%	Liver
Trichloroethene	1	4%	Nervous system
Benzene	0.9	3%	Immune system (decreased lymphocyte count)
Toluene	0.9	2%	Kidney
2-Methylnaphthalene	0.8	2%	Lungs
1,2,4-Trimethylbenzene	0.7	2%	Decreased body weight
Chlorobenzene	0.3	1%	Liver
1,3,5-Trimethylbenzene	0.2	0.4%	Decreased body weight
Total Hazard Index1	**37**		

Notes
NA = Target organ data not available
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.