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NSB NEW LONDON
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Revision 1
March 1997

Phase II
Remedial Investigation
for
Naval Submarine Base
New London
Groton, Connecticut

Volume VII - Appendices F.9 - F.16

Northern Division
Naval Facilities Engineering Command
Contract Number N62472-90-D-1298
Contract Task Order 0129

March 1997

Brown & Root Environmental

A Division of Halliburton NUS Corporation

APPENDIX F.9

SITE 4 - RUBBLE FILL AT BUNKER A86

SUMMARY OF COC SELECTION
SITE 4 RUBBLE FILL @ BUNKER A86 - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
1,1,2,2-Tetrachloroethane	1/14	0.003	4SS10	0.006 - 0.02	3.2	0.4	0.001	N	2
1,1,2-Trichloroethane	1/14	0.006	4SS10	0.006 - 0.02	11	0.8	0.01	N	2
1,1-Dichloroethene	2/14	0.002	4SS4/4SS7	0.006 - 0.02	1.1	0.04	0.03	N	2
1,2-Dichloroethene (total)	2/14	0.001 - 0.003	4SS10	0.006 - 0.02	70	1500/3600 (11)	0.2/0.3 (11)	N	2
2-Butanone	1/14	0.07	4SS9	0.011 - 0.02	4700	6900 (12)	-	N	2
4-Methyl-2-pentanone	1/14	0.012	4SS10	0.011 - 0.02	630	1000	-	N	2
Acetone	1/14	0.61	4SS8	0.011 - 0.061	780	62000	8	N	2
Benzene	3/14	0.002	4SS10/4SS7/4SS9	0.006 - 0.02	22	0.5	0.02	N	2
Bromodichloromethane	1/14	0.003	4SS10	0.006 - 0.02	10	1800	0.3	N	2
Bromomethane	1/14	0.003	4SS9	0.011 - 0.02	11	0.08	0.1	N	2
Chlorobenzene	1/14	0.003	4SS10	0.006 - 0.02	160	94	0.6	N	2
Chloroform	1/14	0.002	4SS10	0.006 - 0.02	100	0.2	0.3	N	2
Chloromethane	5/14	0.005 - 0.022	4SS9	0.012 - 0.015	49	0.3	0.0066	N	2
Cis-1,3-dichloropropene	1/14	0.003	4SS10	0.006 - 0.02	-	-	-	N	1
Ethylbenzene	1/14	0.002	4SS10	0.006 - 0.02	780	260	5	N	2
Methylene chloride	1/14	0.11	4MW4S	0.003 - 0.02	85	7	0.01	N	2
Styrene	1/14	0.002	4SS10	0.006 - 0.02	1600	1400	2	N	2
Tetrachloroethene	10/14	0.001 - 0.005	4SS5	0.006 - 0.015	12	11	0.04	N	2
Toluene	4/14	0.002 - 0.003	4SS10	0.006 - 0.015	1600	520	5	N	2
Trans-1,3-dichloropropene	1/14	0.004	4SS10	0.006 - 0.02	3.7 (7)	0.1 (7)	0.001 (7)	N	2
Trichloroethene	3/14	0.002	4SS10/4SS2S/4SS7	0.006 - 0.02	58	3	0.02	N	2
Vinyl acetate	1/14	0.008	4SS10	0.011 - 0.02	7800	370	84	N	2
Xylenes, total	1/14	0.005	4SS10	0.006 - 0.02	16000	320	74	N	2
2-Methylnaphthalene	1/11	0.045	4SS4	0.39 - 7.4	-	-	-	N	1
3,3'-Dichlorobenzidine	1/11	0.1	4SS10	0.39 - 7.4	1.4	-	0.01	N	2
Acenaphthene	5/11	0.028 - 0.41	4SS9	0.42 - 7.3	470	-	200	N	2
Acenaphthylene	8/11	0.04 - 1.6	4SS9	0.42	-	-	-	N	1
Anthracene	10/11	0.032 - 3.4	4SS9	0.42	2300	-	4300	N	2
Benzo(a)anthracene	10/11	0.15 - 14	4SS9	0.42	0.88	-	0.7	Y	3

SUMMARY OF COC SELECTION (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Benzo(a)pyrene	10/11	0.16 - 14	4SS9	0.42	0.088	-	4	Y	3
Benzo(b)fluoranthene	10/11	0.16 - 13	4SS5/4SS9	0.42	0.88	-	4	Y	3
Benzo(g,h,I)perylene	10/11	0.089 - 6.5	4SS5/4SS7	0.42	-	-	-	N	1
Benzo(k)fluoranthene	6/11	0.22 - 18	4SS7	0.4 - 1.9	8.8	-	4	Y	3
Benzoic acid	3/11	0.028 - 0.29	4MW4S	0.4 - 7.4	31000	-	280	N	2
Bis(2-ethylhexyl)phthalate	1/11	0.12	4SS4	0.39 - 7.4	46	210	11	N	2
Carbazole	8/11	0.023 - 1.5	4SS7	0.42 - 4.2	32	-	0.2	N	2
Chrysene	10/11	0.24 - 29	4SS7	0.42	88	-	1	N	2
Di-n-octyl phthalate	1/11	0.026	4MW3S	0.39 - 7.4	160	-	1000000	N	2
Dibenzo(a,h)anthracene	8/11	0.036 - 3.8	4SS5	0.4 - 0.42	0.088	-	11	Y	3
Dibenzofuran	1/11	0.07	4SS4	0.39 - 7.4	31	-	-	N	2
Fluoranthene	10/11	0.27 - 38	4SS7	0.42	310	-	980	N	2
Fluorene	9/11	0.023 - 1.5	4SS9	0.42	310	-	160	N	2
Indeno(1,2,3-cd)pyrene	10/11	0.097 - 6.6	4SS5	0.42	0.88	-	35	Y	3
Naphthalene	1/11	0.05	4SS4	0.39 - 7.4	310	-	30	N	2
Phenanthrene	10/11	0.2 - 21	4SS9	0.42	-	-	-	N	1
Pyrene	10/11	0.41 - 43	4SS9	0.42	230	-	1400	N	2
4,4'-DDE	10/11	0.013 - 0.095	4SS5	0.042	1.9	-	0.5	N	2
4,4'-DDT	10/11	0.033 - 0.38	4SS7	0.042	1.9	80	1.0	N	2
Alpha-chlordane	3/11	0.002 - 0.013	4SS6	0.0019 - 0.022	0.49 (8)	10 (8)	2 (8)	N	2
Dieldrin	2/11	0.0065 - 0.0085	4SS6	0.0022 - 0.042	0.04	2	0.001	N	2
Endosulfan sulfate	4/11	0.0039 - 0.019	4SS5	0.0039 - 0.042	-	-	-	N	1
Endrin aldehyde	1/11	0.0058	4SS6	0.0037 - 0.042	-	-	-	N	1
Endrin ketone	5/11	0.0064 - 0.043	4SS7	0.0039 - 0.042	-	-	-	N	1
Gamma-chlordane	3/11	0.0024 - 0.008	4SS6	0.0019 - 0.022	0.49 (8)	10 (8)	2 (8)	N	2
Heptachlor	2/11	0.001 - 0.0024	4MW4S	0.0019 - 0.022	0.14	0.3	0.06	N	2
Heptachlor epoxide	2/11	0.0024 - 0.0025	4SS6	0.0019 - 0.022	0.07	1	0.03	N	2
Aluminum	11/11	6440 - 22900	4TB2	-	7800	-	-	~~Y~~ N	~~3~~ 4
Antimony	3/11	4.1 - 5.9	4MW3S	4.8 - 28.2	3.1	-	-	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Arsenic	11/11	4.4 - 150	4SS4	-	0.43	380	15	Y	3
Barium	11/11	28.4 - 70.1	4SS5	-	550	350000	32	N	2
Beryllium	10/11	0.28 - 0.85	4TB2	0.24	0.15	690	180	Y	3
Boron	2/10	16 - 17.4	4SS8	11.1 - 12.9	700	-	-	N	2
Calcium	11/11	798 - 3830	4SS10	-	-	-	-	N	1
Chromium (total)	11/11	11.1 - 19.5	4SS5	-	39 (8)	140 (8)	19 (9)	N	2
Cobalt	9/11	2.3 - 6.8	4SS4	4.3 - 4.7	470	-	-	N	2
Copper	11/11	8 - 30.9	4SS5	-	290	-	-	N	2
Iron	11/11	6870 - 36800	4SS4	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	9/11	37.5 - 87.2	4SS5	9.4 - 29.8	400 (10)	-	-	N	2
Magnesium	11/11	1830 - 3310	4SS6	-	-	-	-	N	1
Manganese	11/11	126 - 336	4SS4	-	~~39~~ 190	-	-	Y	3
Mercury	1/11	0.17	4SS8	0.11 - 0.14	2.3	7	3	N	2
Nickel	11/11	7.9 - 15.6	4SS4	-	160	6900	21	N	2
Potassium	11/11	697 - 2300	4SS6	-	-	-	-	N	1
Selenium	2/11	0.75 - 0.93	4TB2	0.44 - 0.78	39	-	3	N	2
Sodium	7/11	58 - 134	4MW3S	51.3 - 63.3	-	-	-	N	1
Vanadium	11/11	15.3 - 89.6	4SS8	-	55	-	-	Y	3
Zinc	11/11	37.9 - 412	4SS7	-	2300	-	42000	N	2

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SUMMARY OF COC SELECTION (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in mg/kg unless otherwise noted. Surface soil designated as soil from depths of 0 to 2 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 1,3-Dichloropropene.
8 Total chlordane.
9 Hexavalent chromium.
10 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
11 Value for cis- and trans- isomer.
12 Calculated using SSL guidance (see Appendix F.3).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 4 RUBBLE FILL @ BUNKER A86 - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
1,1,2,2-Tetrachloroethane	3	5.5769
1,1,2-Trichloroethane	6	5.8077
1,1-Dichloroethene	2	5.1923
1,2-Dichloroethene (total)	3	5.2308
2-Butanone	70	11.4615
4-Methyl-2-pentanone	12	6.9615
Acetone	610	57.1923
Benzene	2	4.9615
Bromodichloromethane	3	5.5769
Bromomethane	3	6.3077
Chlorobenzene	3	5.5769
Chloroform	2	5.5
Chloromethane	22	8.2308
Cis-1,3-dichloropropene	3	5.5769
Ethylbenzene	2	5.5
Methylene chloride	110	13.0769
Styrene	2	5.5
Tetrachloroethene	5	3.8077
Toluene	3	4.4231
Trans-1,3-dichloropropene	4	5.6538
Trichloroethene	2	5.1538
Vinyl acetate	8	6.6538
Xylenes, total	5	5.7308
2-Methylnaphthalene	45	1152.5
3,3'-Dichlorobenzidine	100	1107
Acenaphthene	410	630.9
Acenaphthylene	1600	516
Anthracene	3400	880.1
Benzo(a)anthracene	14000	4252
Benzo(a)pyrene	14000	4528
Benzo(b)fluoranthene	13000	4683
Benzo(g,h,i)perylene	6500	2267.9
Benzo(k)fluoranthene	18000	5130
Benzoic acid	290	1342.8
Bis(2-ethylhexyl)phthalate	120	1160
Carbazole	1500	590.7
Chrysene	29000	7033
Di-n-octyl phthalate	26	1173.6
Dibenzo(a,h)anthracene	3800	1287.6
Dibenzofuran	70	1155
Fluoranthene	38000	11058
Fluorene	1500	404.9
Indeno(1,2,3-cd)pyrene	6600	2241.7

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg) (Continued)		
Naphthalene	50	1153
Phenanthrene	21000	5632
Pyrene	43000	12597
4,4'-DDE	95	37.9
4,4'-DDT	380	106.8
alpha-Chlordane	13	5.35
Dieldrin	8.5	8.295
Endosulfan sulfate	19	12.555
Endrin aldehyde	5.8	8.125
Endrin ketone	43	19.69
gamma-Chlordane	8	4.875
Heptachlor	2.4	3.185
Heptachlor epoxide	2.5	4.195
Inorganics (mg/kg)		
Aluminum	22900	13631
Antimony	5.9	5.36
Arsenic	150	42.54
Barium	70.1	42.26
Beryllium	0.85	0.52
Boron	17.4	8.3111
Calcium	3830	2073.8
Chromium (total)	19.5	15.31
Cobalt	6.8	3.77
Copper	30.9	18.1
Iron	36800	14861
Lead	87.2	50.16
Magnesium	3310	2373
Manganese	336	189
Mercury	0.17	0.072
Nickel	15.6	11.3
Potassium	2300	1129.5
Selenium	0.93	0.389
Sodium	134	74.255
Vanadium	89.6	37.08
Zinc	412	110.07

SUMMARY OF COC SELECTION
SITE 4 RUBBLE FILL @ BUNKER A86 - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
1,1,2,2-Tetrachloroethane	1/17	0.003	4SS10	0.003 - 0.02	3.2	0.4	0.001	N	2
1,1,2-Trichloroethane	1/17	0.006	4SS10	0.003 - 0.02	11	0.8	0.01	N	2
1,1-Dichloroethene	2/17	0.002	4SS4/4SS7	0.003 - 0.02	1.1	0.04	0.03	N	2
1,2-Dichloroethene (total)	2/17	0.001 - 0.003	4SS10	0.003 - 0.02	70	1500/3600 (11)	0.2/0.3 (11)	N	2
2-Butanone	2/17	0.018 - 0.07	4SS9	0.006 - 0.02	4700	6900 (12)	-	N	2
4-Methyl-2-pentanone	1/17	0.012	4SS10	0.006 - 0.02	630	1000	-	N	2
Acetone	1/17	0.61	4SS8	0.006 - 0.14	780	62000	8	N	2
Benzene	3/17	0.002	4SS10/4SS7/4SS9	0.003 - 0.02	22	0.5	0.02	N	2
Bromodichloromethane	1/17	0.003	4SS10	0.003 - 0.02	10	1800	0.3	N	2
Bromomethane	1/17	0.003	4SS9	0.0055 - 0.02	11	0.08	0.1	N	2
Chlorobenzene	1/17	0.003	4SS10	0.003 - 0.02	160	94	0.6	N	2
Chloroform	1/17	0.002	4SS10	0.003 - 0.02	100	0.2	0.3	N	2
Chloromethane	5/17	0.005 - 0.022	4SS9	0.0055 - 0.015	49	0.3	0.0066	N	2
Cis-1,3-dichloropropene	1/17	0.003	4SS10	0.003 - 0.02	-	-	-	N	1
Ethylbenzene	1/17	0.002	4SS10	0.003 - 0.02	780	260	5	N	2
Methylene chloride	1/17	0.11	4MW4S	0.003 - 0.044	85	7	0.01	N	2
Styrene	1/17	0.002	4SS10	0.003 - 0.02	1600	1400	2	N	2
Tetrachloroethene	10/17	0.001 - 0.005	4SS5	0.003 - 0.015	12	11	0.04	N	2
Toluene	4/17	0.002 - 0.003	4SS10	0.003 - 0.015	1600	520	5	N	2
Trans-1,3-dichloropropene	1/17	0.004	4SS10	0.003 - 0.02	3.7 (7)	0.1 (7)	0.001 (7)	N	2
Trichloroethene	3/17	0.002	4SS10/4SS2S/4SS7	0.003 - 0.02	58	3	0.02	N	2
Vinyl acetate	1/17	0.008	4SS10	0.006 - 0.02	7800	370	84	N	2
Xylenes, total	1/17	0.005	4SS10	0.003 - 0.02	16000	320	74	N	2
2-Methylnaphthalene	1/14	0.045	4SS4	0.37 - 7.4	-	-	-	N	1
3,3'-Dichlorobenzidine	1/14	0.1	4SS10	0.37 - 7.4	1.4	-	0.01	N	2
Acenaphthene	5/14	0.028 - 0.41	4SS9	0.37 - 7.3	470	-	200	N	2
Acenaphthylene	8/14	0.04 - 1.6	4SS9	0.37 - 1.8	-	-	-	N	1
Anthracene	12/14	0.023 - 3.4	4SS9	0.37 - 0.42	2300	-	4300	N	2
Benzo(a)anthracene	13/14	0.15 - 14	4SS9	0.42	0.88	-	0.7	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Benzo(a)pyrene	13/14	0.16 - 14	4SS9	0.42	0.088	-	4	Y	3
Benzo(b)fluoranthene	13/14	0.16 - 13	4SS5/4SS9	0.42	0.88	-	4	Y	3
Benzo(g,h,i)perylene	13/14	0.089 - 6.5	4SS5/4SS7	0.42	-	-	-	N	1
Benzo(k)fluoranthene	8/14	0.22 - 18	4SS7	0.38 - 1.9	8.8	-	4	Y	3
Benzoic acid	3/14	0.028 - 0.29	4MW4S	0.4 - 8.7	31000	-	280	N	2
Bis(2-ethylhexyl)phthalate	1/14	0.12	4SS4	0.38 - 7.4	46	210	11	N	2
Carbazole	9/14	0.023 - 1.5	4SS7	0.37 - 4.2	32	-	0.2	N	2
Chrysene	13/14	0.24 - 29	4SS7	0.42	88	-	1	N	2
Di-n-octyl phthalate	1/14	0.026	4MW3S	0.37 - 7.4	160	-	1000000	N	2
Dibenzo(a,h)anthracene	11/14	0.03 - 3.8	4SS5	0.4 - 0.42	0.088	-	11	Y	3
Dibenzofuran	1/14	0.07	4SS4	0.37 - 7.4	31	-	-	N	2
Fluoranthene	13/14	0.27 - 38	4SS7	0.42	310	-	980	N	2
Fluorene	10/14	0.023 - 1.5	4SS9	0.37 - 0.42	310	-	160	N	2
Indeno(1,2,3-cd)pyrene	13/14	0.097 - 6.6	4SS5	0.42	0.88	-	35	Y	3
Naphthalene	2/14	0.05	4MW1S/4SS4	0.37 - 7.4	310	-	30	N	2
Phenanthrene	13/14	0.089 - 21	4SS9	0.42	-	-	-	N	1
Pyrene	13/14	0.41 - 43	4SS9	0.42	230	-	1400	N	2
4,4'-DDE	11/14	0.01 - 0.095	4SS5	0.037 - 0.042	1.9	-	0.5	N	2
4,4'-DDT	11/14	0.024 - 0.38	4SS7	0.037 - 0.042	1.9	80	1.0	N	2
Alpha-chlordane	3/14	0.002 - 0.013	4SS6	0.0019 - 0.022	0.49 (8)	10 (8)	2 (8)	N	2
Dieldrin	2/14	0.0065 - 0.0085	4SS6	0.0022 - 0.042	0.04	2	0.001	N	2
Endosulfan II	1/14	0.007	4TB1	0.0037 - 0.042	47	-	3	N	2
Endosulfan sulfate	4/14	0.0039 - 0.019	4SS5	0.0039 - 0.042	-	-	-	N	1
Endrin aldehyde	1/14	0.0058	4SS6	0.0037 - 0.042	-	-	-	N	1
Endrin ketone	5/14	0.0064 - 0.043	4SS7	0.0039 - 0.042	-	-	-	N	1
Gamma-chlordane	3/14	0.0024 - 0.008	4SS6	0.0019 - 0.022	0.49 (8)	10 (8)	2 (8)	N	2
Heptachlor	2/14	0.001 - 0.0024	4MW4S	0.0019 - 0.022	0.14	0.3	0.06	N	2
Heptachlor epoxide	2/14	0.0024 - 0.0025	4SS6	0.0019 - 0.022	0.07	1	0.03	N	2
Aluminum	14/14	6440 - 22900	4TB2	-	7800	-	-	~~Y~~ N	~~3~~ 4

SUMMARY OF COC SELECTION (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Antimony	6/14	4.1 - 5.9	4MW3S	4.8 - 28.2	3.1	-	-	Y	3
Arsenic	13/14	2.8 - 150	4SS4	13.9	0.43	380	15	Y	3
Barium	14/14	28.4 - 70.1	4SS5	-	550	350000	32	N	2
Beryllium	13/14	0.28 - 0.85	4TB2	0.24	0.15	690	180	Y	3
Boron	2/13	16 - 17.4	4SS8	10.9 - 12.9	700	-	-	N	2
Calcium	14/14	798 - 31600	4TB1	-	-	-	-	N	1
Chromium (total)	14/14	10.3 - 19.5	4SS5	-	39 (9)	140 (9)	19 (9)	N	2
Cobalt	10/14	2.3 - 6.8	4SS4	4.1 - 4.7	470	-	-	N	2
Copper	14/14	8 - 77.4	4MW2S	-	290	-	-	N	2
Iron	14/14	6870 - 36800	4SS4	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	10/14	37.5 - 120	4TB1	3.3 - 29.8	400 (10)	-	-	N	2
Magnesium	14/14	1830 - 3310	4SS6	-	-	-	-	N	1
Manganese	14/14	126 - 336	4SS4	-	~~39~~ 190	-	-	Y	3
Mercury	1/14	0.17	4SS8	0.11 - 0.14	2.3	7	3	N	2
Nickel	14/14	7.5 - 15.6	4SS4	-	160	6900	21	N	2
Potassium	14/14	697 - 2300	4SS6	-	-	-	-	N	1
Selenium	2/14	0.75 - 0.93	4TB2	0.44 - 0.78	39	-	3	N	2
Sodium	10/14	58 - 254	4TB1	51.3 - 63.3	-	-	-	N	1
Vanadium	14/14	15.3 - 89.6	4SS8	-	55	-	-	Y	3
Zinc	14/14	31.3 - 412	4SS7	-	2300	-	42000	N	2

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SUMMARY OF COC SELECTION (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in mg/kg unless otherwise noted. All soil designated as soil from depths of 0 to 10 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 1,3-Dichloropropene.
8 Total chlordane.
9 Hexavalent chromium.
10 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
11 Value for cis- and trans- isomer.
12 Calculated using SSL guidance (see Appendix F.3).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 4 RUBBLE FILL @ BUNKER A86 - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
1,1,2,2-Tetrachloroethane	3	5.5625
1,1,2-Trichloroethane	6	5.75
1,1-Dichloroethene	2	5.25
1,2-Dichloroethene (total)	3	5.2813
2-Butanone	70	11.125
4-Methyl-2-pentanone	12	6.6875
Acetone	610	52.8438
Benzene	2	5.0625
Bromodichloromethane	3	5.5625
Bromomethane	3	6.1563
Chlorobenzene	3	5.5625
Chloroform	2	5.5
Chloromethane	22	7.7188
Cis-1,3-dichloropropene	3	5.5625
Ethylbenzene	2	5.5
Methylene chloride	110	13.5313
Styrene	2	5.5
Tetrachloroethene	5	4.125
Toluene	3	4.625
Trans-1,3-dichloropropene	4	5.625
Trichloroethene	2	5.2188
Vinyl acetate	8	6.4375
Xylenes, total	5	5.6875
2-Methylnaphthalene	45	984.6154
3,3'-Dichlorobenzidine	100	949.6154
Acenaphthene	410	583.3846
Acenaphthylene	1600	495
Anthracene	3400	730.6923
Benzo(a)anthracene	14000	3476.1538
Benzo(a)pyrene	14000	3666.1538
Benzo(b)fluoranthene	13000	3786.1538
Benzo(g,h,i)perylene	6500	1832.2308
Benzo(k)fluoranthene	18000	4175.3846
Benzoic acid	290	1509.8462
Bis(2-Ethylhexyl)phthalate	120	990.7692
Carbazole	1500	501.6923
Chrysene	29000	5656.9231
Di-N-octyl phthalate	26	1000.8462
Dibenzo(a,h)anthracene	3800	1009.8462
Dibenzofuran	70	986.5385
Fluoranthene	38000	8883.8462
Fluorene	1500	360.3077
Indeno(1,2,3-Cd)pyrene	6600	1807.4615

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg) (Continued)		
Naphthalene	50	974.2308
Phenanthrene	21000	4586.8462
Pyrene	43000	10175.3846
4,4'-DDE	95	32.8077
4,4'-DDT	380	86.8846
Alpha-Chlordane	13	6.3077
Dieldrin	8.5	10.65
Endosulfan ii	7	9.3808
Endosulfan sulfate	19	13.9269
Endrin aldehyde	5.8	10.5192
Endrin ketone	43	19.4154
Gamma-Chlordane	8	5.9423
Heptachlor	2.4	4.6423
Heptachlor epoxide	2.5	5.4192
Inorganics (mg/kg)		
Aluminum	22900	12642.3077
Antimony	5.9	5.1769
Arsenic	150	35.9192
Barium	70.1	43.4154
Beryllium	0.85	0.5085
Boron	17.4	7.6583
Calcium	31600	4191.7692
Chromium (total)	19.5	14.3846
Cobalt	6.8	3.6077
Copper	77.4	23.8769
Iron	36800	13592.3077
Lead	120	48.2308
Magnesium	3310	2443.8462
Manganese	336	183
Mercury	0.17	0.0685
Nickel	15.6	10.4692
Potassium	2300	1253.4615
Selenium	0.93	0.3781
Sodium	254	108.1962
Vanadium	89.6	32.8615
Zinc	412	95.5615

SUMMARY OF COC SELECTION
SITE 4 RUBBLE FILL @ BUNKER A86 - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Bromodichloromethane	2/10	1	4GW1S/4GW2S	10	100 (7)	100 (7)	0.17	Y	3
Carbon disulfide	1/10	2	4GW1S	10	-	-	100	N	2
Chloroform	5/10	3 - 11	4GW3S	10 - 11	100 (7)	100 (7)	0.15	Y	3
Methylene chloride	2/10	4 - 8	4GW1S	10	5	5	4.1	Y	3
Xylenes, total	1/10	2	4GW4S	10	10000	10000	1200	N	2
Benzoic acid	2/10	0.6 - 0.7	4GW1S	25 - 50	-	-	15000	N	2
Bis(2-Ethylhexyl)phthalate	2/10	2 - 11	4GW2S	10 - 12	6	6	4.8	Y	3
1,1,1-Trichloroethane	1/10	2	4GW2S	10	200	200	130	N	2
4-Methyl-2-pentanone	1/10	5	4GW1S	10	-	-	290	N	2
Heptachlor	1/8	0.53	4GW2S	0.05	0.4	0.4	0.0023	Y	3
Aluminum	4/10	55.6 - 3350	4GW1S	47.2 - 135	50 - 200 (8)	-	3700	N	2
Barium	10/10	28 - 91.7	4GW4S	-	2000	2000	260	N	2
Boron	2/10	26.6 - 34.4	4GW2S	23.6 - 50	-	-	330	N	2
Cadmium	2/10	1.1 - 20.2	4GW2S	2 - 3	5	5	1.8	Y	3
Calcium	10/10	14500 - 28600	4GW4D	-	-	-	-	N	1
Chromium (total)	1/10	12.6	4GW1S	1 - 4.9	100	100	18 (10)	N	2
Copper	4/10	4 - 28.1	4GW2S	2 - 6.5	1300 (9)	-	150	N	2
Iron	4/10	6.8 - 4430	4GW1S	17 - 50	300 (8)	-	1100	~~Y~~ N	~~3~~ 4
Lead	4/10	5.2 - 16.5	4GW2S	1 - 2	15 (9)	-	-	N	1
Magnesium	10/10	2260 - 4890	4GW2S	-	-	-	-	N	2
Manganese	10/10	3.1 - 80.1	4GW1S	-	50 (8)	-	~~18~~ 88	~~Y~~ N	~~3~~ 2
Potassium	7/10	2700 - 4330	4GW4D	2410 - 2990	-	-	-	N	1
Sodium	10/10	26900 - 62400	4GW3S	-	-	-	-	N	1
Thallium	2/6	5.6 - 5.8	4GW4D	1 - 2	2	2	0.26 (11)	Y	3
Vanadium	1/10	4.5	4GW1S	1 - 6.8	-	-	26	N	2
Zinc	7/10	10.4 - 58.5	4GW1S	10.9 - 22.3	5000 (8)	-	1100	N	2

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SUMMARY OF COC SELECTION (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample-specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Total trihalomethanes.
8 Secondary MCL (SMCL) based on aesthetic water qualities.
9 Action Level.
10 Hexavalent chromium.
11 Thallic oxide.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 4 RUBBLE FILL @ BUNKER A86 - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
1,1,1-Trichloroethane	3.5	4.7
4-Methyl-2-pentanone	5	5
Bromodichloromethane	3	4.2
Carbon disulfide	3.5	4.7
Chloroform	7	5.45
Chloroform	7	5.45
Methylene chloride	6.5	5.2
Xylenes, total	3.5	4.7
Benzoic acid	12.85	18.88
Bis(2-ethylhexyl)phthalate	8	5.4
Heptachlor	0.53	0.126
Inorganics (ug/L)		
Aluminum	1702.8	655.755
Barium	63.75	52.14
Boron	29.7	22.735
Cadmium	10.6	2.98
Calcium	24950	21090
Chromium (total)	7.3	2.555
Copper	16.05	7.085
Iron	2218.4	737.595
Lead	8.75	5.36
Magnesium	4185	3531
Manganese	46.55	24.12
Potassium	3545	2879
Sodium	60200	41020
Thallium	5.8	2.37
Vanadium	3.25	2.24
Zinc	36.5	20.545

SUMMARY OF COC SELECTION
SITE 4 RUBBLE FILL @ BUNKER A86 - FILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Aluminum	1/10	48.6	4GW1S	51 - 140	50 - 200 (7)	-	3700	N	1
Antimony	1/10	6.8	4GW3S	1 - 15	6	6	1.5	Y	2
Barium	10/10	24.8 - 91.6	4GW4S	-	2000	2000	260	N	1
Boron	4/10	16.7 - 49.1	4GW4S	50 - 50.3	-	-	330	N	1
Cadmium	1/10	5	4GW4D	1 - 3	5	5	1.8	N	1
Calcium	10/10	14500 - 27500	4GW4D	-	-	-	-	N	1
Copper	3/10	3.6 - 26.6	4GW2S	2 - 5	1300 (8)	-	150	N	1
Iron	2/10	5.9 - 33.3	4GW2S	10.5 - 43.7	300 (7)	-	1100	N	1
Lead	2/10	1.2 - 2.1	4GW1S	1 - 2	15 (8)	-	-	N	1
Magnesium	10/10	2160 - 4870	4GW2S	-	-	-	-	N	1
Manganese	10/10	3.2 - 16.1	4GW4D/4GW4S	-	50	-	~~18~~ 88	N	1
Potassium	10/10	2290 - 3710	4GW4D	-	-	-	-	N	1
Sodium	10/10	26700 - 66800	4GW3S	-	-	-	-	N	1
Thallium	2/6	5.7 - 6	4GW1S	1 - 5	2	2	0.26 (9)	N	1
Zinc	7/10	1.6 - 30.7	4GW4S	14.6 - 21	5000	-	1100	N	1

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample-specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL (SMCL) based on aesthetic water qualities.
8 Action Level.
9 Thallic oxide.

Rationale Designations:

1 Chemical detected in unfiltered samples; filtered results are not used in risk assessment.
2 Chemical not detected in unfiltered samples; maximum is less than or equal to the COC screening level.

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SUMMARY OF COC SELECTION
SITE 4 RUBBLE FILL @ BUNKER A86 - UNFILTERED SURFACE WATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	AWQC (4)	Risk-based COC Screening Level (5)	Selected as COC?	Rationale
Bis(2-Ethylhexyl)phthalate	1/3	1	4SW1	10	1.8	4.8	N	2
Aluminum	3/3	829 - 1710	4SW2	-	-	3700	N	2
Arsenic	1/3	2.4	4SW2	2	0.018	0.045	Y	3
Calcium	3/3	368 - 752	4SW2	-	-	-	N	1
Copper	3/3	4.6 - 23.4	4SW2	-	1300	150	N	2
Iron	3/3	600 - 1710	4SW2	-	-	1100	~~Y~~ N	~~3~~ 4
Lead	3/3	5 - 15.7	4SW2	-	50	15 (6)	Y	3
Magnesium	3/3	176 - 483	4SW2	-	-	-	N	1
Manganese	3/3	18.5 - 44.5	4SW2	-	-	~~18~~ 88	~~Y~~ N	~~3~~ 2
Potassium	2/3	710	4SW2	427	-	-	N	1
Vanadium	2/3	3.5 - 5.6	4SW2	3	-	26	N	2
Zinc	3/3	21.5 - 50.1	4SW2	-	-	1100	N	2

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as two samples. Non-validated and rejected results not used in risk assessment.
3 Sample quantitation limits.
4 Ambient water quality criteria for the consumption of water and organisms (USEPA, June 15, 1990).
5 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
6 Federal Action Level for drinking water.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 4 RUBBLE FILL @ BUNKER A86 - UNFILTERED SURFACE WATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
Bis(2-ethylhexyl)phthalate	1	3
Inorganics (ug/L)		
Aluminum	1555	1192
Arsenic	1.7	1.35
Calcium	690	529
Copper	16.25	10.425
Iron	1460	1030
Lead	15.5	10.25
Magnesium	434	305
Manganese	42.35	30.425
Potassium	710	461.75
Vanadium	4.55	3.025
Zinc	41.8	31.65

SUMMARY OF COC SELECTION
SITE 4 RUBBLE FILL @ BUNKER A86 - FILTERED SURFACE WATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	AWQC (4)	Risk-based COC Screening Level (5)	Selected as COC?	Rationale
Calcium	2/2	331 - 332	4SW2	-	-	-	N	1
Copper	1/2	8.7	4SW2	2	1300	150	N	1
Potassium	2/2	631 - 676	4SW2	-	-	-	N	1

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as two samples. Non-validated and rejected results not used in risk assessment.
3 Sample quantitation limits.
4 Ambient water quality criteria for the consumption of water and organisms (USEPA, June 15, 1990).
5 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).

Rationale Designations:

1 Chemical also detected in unfiltered samples; filtered samples are not used in risk assessment.

SUMMARY OF COC SELECTION
SITE 4 RUBBLE FILL @ BUNKER A86 - SEDIMENT (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
1,1,2,2-Tetrachloroethane	1/3	0.019	4SD2	0.011 - 0.012	3.2	N	2
1,1,2-Trichloroethane	1/3	0.016	4SD2	0.011 - 0.012	11	N	2
1,1-Dichloroethene	1/3	0.002	4SD2	0.011 - 0.012	1.1	N	2
1,2-Dichloroethane	1/3	0.012	4SD2	0.011 - 0.012	7	N	2
1,2-Dichloroethene (Total)	1/3	0.012	4SD2	0.011 - 0.012	70	N	2
1,2-Dichloropropane	1/3	0.01	4SD2	0.011 - 0.012	9.4	N	2
2-Butanone	2/3	0.016 - 0.045	4SD2	0.011	4700	N	2
4-Methyl-2-pentanone	1/3	0.036	4SD2	0.011 - 0.012	630	N	2
Benzene	1/3	0.007	4SD2	0.011 - 0.012	22	N	2
Bromodichloromethane	1/3	0.01	4SD2	0.011 - 0.012	10	N	2
Bromoform	1/3	0.009	4SD2	0.011 - 0.012	81	N	2
Chlorobenzene	1/3	0.008	4SD2	0.011 - 0.012	160	N	2
Chloroform	1/3	0.006	4SD2	0.011 - 0.012	100	N	2
Chloromethane	2/3	0.007 - 0.01	4SD2	0.011	49	N	2
cis-1,3-Dichloropropene	1/3	0.011	4SD2	0.011 - 0.012	3.7 (5)	N	2
Ethylbenzene	1/3	0.004	4SD2	0.011 - 0.012	780	N	2
Methylene chloride	1/3	0.014	4SD2	0.012 - 0.019	85	N	2
Styrene	1/3	0.008	4SD2	0.011 - 0.012	1600	N	2
Tetrachloroethene	2/3	0.002 - 0.005	4SD2	0.011	12	N	2
Toluene	2/3	0.001 - 0.007	4SD2	0.011	1600	N	2
trans-1,3-Dichloropropene	1/3	0.012	4SD2	0.011 - 0.012	3.7 (5)	N	2
Trichloroethene	2/3	0.002 - 0.005	4SD2	0.012	58	N	2
Vinyl acetate	1/3	0.016	4SD2	0.011 - 0.012	7800	N	2
Xylenes, total	1/3	0.015	4SD2	0.011 - 0.012	16000	N	2
2-Methylnaphthalene	2/3	0.048 - 54	4SD2	0.38	-	N	1
2-Methylphenol	1/3	0.11	4SD1	0.38 - 3.7	390	N	2
Acenaphthene	2/3	0.035 - 0.29	4SD1	3.7	470	N	2
Acenaphthylene	2/3	0.077 - 0.24	4SD1	3.7	-	N	1
Anthracene	2/3	0.18 - 0.95	4SD1	3.7	2300	N	2
Benzo(a)anthracene	2/3	0.76 - 2.7	4SD1	3.7	0.88	Y	3

SUMMARY OF COC SELECTION (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - SEDIMENT (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
Benzo(a)pyrene	2/3	0.79 - 2.6	4SD1	3.7	0.088	Y	3
Benzo(b)fluoranthene	2/3	1 - 3.1	4SD1	3.7	0.88	Y	3
Benzo(g,h,i)perylene	2/3	0.23 - 1.2	4SD1	3.7	-	N	1
Benzo(k)fluoranthene	2/3	0.76 - 2.2	4SD1	3.7	8.8	N	2
Bis(2-ethylhexyl)phthalate	3/3	0.97 - 610	4SD2	-	46	Y	3
Butyl benzyl phthalate	1/3	820	4SD2	0.38 - 0.8	1600	N	2
Carbazole	2/3	0.1 - 0.52	4SD1	3.7	32	N	2
Chrysene	2/3	1.1 - 2.9	4SD1	3.7	88	N	2
Di-n-butyl phthalate	1/3	42	4SD2	0.38 - 0.8	780	N	2
Di-n-octyl phthalate	2/3	0.031 - 6.5	4SD2	0.8	160	N	2
Dibenzo(a,h)anthracene	2/3	0.24 - 0.75	4SD1	3.7	0.088	Y	3
Dibenzofuran	2/3	0.024 - 0.24	4SD1	3.7	31	N	2
Dimethyl phthalate	1/3	59	4SD2	0.38 - 0.8	78000	N	2
Fluoranthene	3/3	0.25 - 5.2	4SD1	-	310	N	2
Fluorene	2/3	0.057 - 0.37	4SD1	3.7	310	N	2
Indeno(1,2,3-cd)pyrene	2/3	0.39 - 1.2	4SD1	3.7	0.88	Y	3
Naphthalene	2/3	0.077 - 380	4SD2	0.38	310	Y	3
Phenanthrene	2/3	0.7 - 3.9	4SD1	3.7	-	N	1
Pyrene	3/3	1 - 4.4	4SD1	-	230	N	2
4,4'-DDT	2/3	0.013 - 0.028	4SD1	0.02	1.9	N	2
Endosulfan sulfate	2/3	0.013 - 0.017	4SD2	0.037	-	N	1
Endrin	1/3	0.0072	4SD2	0.0038 - 0.004	2.3	N	2
Endrin aldehyde	1/3	0.016	4SD2	0.002 - 0.004	-	N	1
Endrin ketone	1/3	0.023	4SD1	0.0038 - 0.037	-	N	1
gamma-Chlordane	1/3	0.0024	4SD1	0.0024 - 0.019	0.49 (6)	N	2
Aluminum	3/3	3510 - 8460	4SD1	-	7800	~~Y~~ N	~~3~~ 4
Arsenic	3/3	1.9 - 8.9	4SD1	-	0.43	Y	3
Barium	3/3	16.1 - 29	4SD1	-	550	N	2
Beryllium	1/3	0.29	4SD1	0.24 - 0.64	0.15	Y	3
Calcium	3/3	902 - 1300	4SD1	-	-	N	1

00029

SUMMARY OF COC SELECTION (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - SEDIMENT (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
Chromium (total)	3/3	9.6 - 18.3	4SD1	-	39 (7)	N	2
Cobalt	3/3	3.8 - 5.9	4SD1	-	470	N	2
Copper	2/3	22.4 - 35.3	4SD1	8.9	290	N	2
Iron	3/3	7080 - 11300	4SD1	-	2300	~~Y~~ N	~~3~~ 4
Lead	3/3	13.9 - 66.6	4SD1	-	400 (8)	N	2
Magnesium	3/3	1870 - 2720	4SD2	-	-	N	1
Manganese	3/3	115 - 200	4SD1	-	~~39~~ 190	Y	3
Nickel	3/3	4.4 - 11.3	4SD1	-	160	N	2
Potassium	2/3	1200 - 1230	4SD1	877	-	N	1
Sodium	2/3	67 - 148	4SD1	27.1	-	N	1
Vanadium	3/3	10.6 - 37	4SD1	-	55	N	2
Zinc	3/3	26.9 - 73.2	4SD1	-	2300	N	2

Footnotes:

1 Results in mg/kg unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 1,2-Dichloropropene.
6 Total chlordane.
7 Hexavalent chromium.
8 OSWER soil screening level for residential land use (USEPA, July 14, 1994).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

Revisions
08/13/96
JAS

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 4 RUBBLE FILL @ BUNKER A86 - SEDIMENT
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
1,1,2,2-Tetrachloroethane	19	10.1667
1,1,2-Trichloroethane	16	9.1667
1,1-Dichloroethene	2	4.5
1,2-Dichloroethane	12	7.8333
1,2-Dichloroethene (total)	12	7.8333
1,2-Dichloropropane	10	7.1667
2-Butanone	45	22.1667
4-Methyl-2-pentanone	36	15.8333
Benzene	7	6.1667
Bromodichloromethane	10	7.1667
Bromoform	9	6.8333
Chlorobenzene	8	6.5
Chloroform	6	5.8333
Chloromethane	10	7.5
Cis-1,3-dichloropropene	11	7.5
Ethylbenzene	4	5.1667
Methylene chloride	14	9.8333
Styrene	8	6.5
Tetrachloroethene	5	4.1667
Toluene	7	4.5
Trans-1,3-dichloropropene	12	7.8333
Trichloroethene	5	4.3333
Vinyl acetate	16	9.1667
Xylenes, total	15	8.8333
2-Methylnaphthalene	54000	18079.3333
2-Methylphenol	110	716.6667
Acenaphthene	290	725
Acenaphthylene	240	722.3333
Anthracene	950	993.3333
Benzo(a)anthracene	2700	1770
Benzo(a)pyrene	2600	1746.6667
Benzo(b)fluoranthene	3100	1983.3333
Benzo(g,h,i)perylene	1200	1093.3333
Benzo(k)fluoranthene	2200	1603.3333
Bis(2-ethylhexyl)phthalate	610000	204156.6667
Butyl benzyl phthalate	820000	273530
Carbazole	520	823.3333
Chrysene	2900	1950
Di-n-butyl phthalate	42000	14196.6667
Di-n-octyl phthalate	6500	2310.3333
Dibenzo(a,h)anthracene	750	946.6667
Dibenzofuran	240	704.6667
Dimethyl phthalate	59000	19863.3333

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 4 RUBBLE FILL @ BUNKER A86 - SEDIMENT
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg) (Continued)		
Fluoranthene	5200	2283.3333
Fluorene	370	759
Indeno(1,2,3-cd)pyrene	1200	1146.6667
Naphthalene	380000	126755.6667
Phenanthrene	3900	2150
Pyrene	4400	2366.6667
4,4'-DDT	28	17
Endosulfan sulfate	17	16.1667
Endrin	7.2	3.7
Endrin aldehyde	16	6.3333
Endrin ketone	23	14.4667
gamma-Chlordane	2.4	4.3667
Inorganics (mg/kg)		
Aluminum	8460	5906.6667
Arsenic	8.9	4.5333
Barium	29	23.2333
Beryllium	0.29	0.2433
Calcium	1300	1134
Chromium (total)	18.3	13.4
Cobalt	5.9	4.5667
Copper	35.3	20.7167
Iron	11300	9220
Lead	66.6	36.8667
Magnesium	2720	2413.3333
Manganese	200	161
Nickel	11.3	8.3333
Potassium	1230	956.1667
Sodium	148	76.1833
Vanadium	37	23.9333
Zinc	73.2	47.4667

Soil Data (0-2') - Rubble Fill Area at Bunker A86

~~Table X~~

Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
ALUMINUM	10/10	6440.0000 22900.0000	Norm ✓	13631.0000	16,800(a)	na	na	na	na	na	
ARSENIC	10/10	5.6000 150.0000	Log ✓	42.5400	150(c)	na	na	na	na	na	
BARIUM	10/10	28.4000 70.1000	Log ✓	42.2600	51.3(b)	na	na	na	na	na	
BERYLLIUM	9/10	0.2800 0.8500	Norm ✓	0.5644	0.67(a)	na	na	na	na	na	
CALCIUM	10/10	798.0000 3830.0000	Log ✓	2073.8000	3280(b)	na	na	na	na	na	
CHROMIUM	10/10	11.1000 19.5000	Norm ✓	15.3100	16.9(a)	na	na	na	na	na	
COBALT	8/10	2.3000 6.8000	Log ✓	4.1500	5.0(b)	na	na	na	na	na	
COPPER	10/10	8.0000 30.9000	Log ✓	18.1000	24.3(b)	na	na	na	na	na	
IRON	10/10	6870.0000 36800.0000	Log ✓	14861.0000	20900(b)	na	na	na	na	na	
LEAD	8/10	37.5000 87.2000	Norm ✓	60.2500	65.3(a)	na	na	na	na	na	
MAGNESIUM	10/10	1830.0000 3310.0000	Log ✓	2373.0000	2700(b)	na	na	na	na	na	
MANGANESE	10/10	126.0000 336.0000	Log	189.0000	238(b)	na	na	na	na	na	

a - UCL Normal Distribution

b - UCL Lognormal Distribution

c - Max detection since UCL > max detection

d - Max detection - Undefined distribution

000031

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
NICKEL	10/10	7.9000 15.6000	Log ✓	11.3000	13.2(b)	na	na	na	na	na	
POTASSIUM	10/10	697.0000 2300.0000	Log ✓	1129.5000	1500(b)	na	na	na	na	na	
SODIUM	7/10	58.0000 134.0000	Norm	93.0000	95.0(a)	na	na	na	na	na	
VANADIUM	10/10	15.3000 89.6000	Log ✓	37.0800	53.5(b)	na	na	na	na	na	
ZINC	10/10	37.9000 412.0000	Und ✓	110.0700	412(d)	na	na	na	na	na	
TETRACHLOROETHENE	9/13	1.0000 5.0000	Log ✓	2.8889	5(c)	na	na	na	na	na	
ACENAPHTHYLENE	7/10	40.0000 1600.0000	Log ✓	647.1429	1600(c)	na	na	na	na	na	
ANTHRACENE	9/10	32.0000 3400.0000	Log	954.5556	3400(c)	na	na	na	na	na	
BENZO(A)ANTHRACENE	9/10	150.0000 14000.0000	Log	4701.1111	14,000(c)	na	na	na	na	na	
BENZO(A)PYRENE	9/10	160.0000 14000.0000	Log	5007.7778	14,000(c)	na	na	na	na	na	
BENZO(B)FLUORANTHENE	9/10	160.0000 13000.0000	Log	5180.0000	13,000(c)	na	na	na	na	na	
BENZO(G,H,I)PERYLENE	9/10	89.0000 6500.0000	Log	2496.5556	6500(c)	na	na	na	na	na	

000032

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
BENZO(K)FLUORANTHENE	6/10	220.0000 18000.0000	Und ✓	8286.6667	18,000(d)	na	na	na	na	na	
CARBAZOLE	7/10	23.0000 1500.0000	Log ✓	483.8571	1500(c)	na	na	na	na	na	
CHRYSENE	9/10	240.0000 29000.0000	Log ✓	7791.1111	29,000(c)	na	na	na	na	na	
DIBENZO(A,H)ANTHRACENE	8/10	36.0000 3800.0000	Log ✓	1557.0000	3800(c)	na	na	na	na	na	
FLUORANTHENE	9/10	270.0000 38000.0000	Log ✓	12263.3333	38,000(c)	na	na	na	na	na	
FLUORENE	8/10	23.0000 1500.0000	Log ✓	453.6250	1500(c)	na	na	na	na	na	
INDENO(1,2,3-CD)PYRENE	9/10	97.0000 6600.0000	Log ✓	2467.4444	6600(c)	na	na	na	na	na	
PHENANTHRENE	9/10	200.0000 21000.0000	Log ✓	6234.4444	21,000 (c)	na	na	na	na	na	
PYRENE	9/10	410.0000 43000.0000	Log ✓	13973.3333	43,000(c)	na	na	na	na	na	
4,4'-DDE	9/10	16.0000 95.0000	Log ✓	39.7778	43.5(b)	na	na	na	na	na	
4,4'-DDT	9/10	33.0000 380.0000	Log ✓	116.3333	254(b)	na	na	na	na	na	
ENDRIN KETONE	5/10	6.4000 43.0000	~~Und~~ Norm	25.8800	27.6(a)	na	na	na	na	na	

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : ALUMINUM (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	13631.0000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	6440.0000	
Positive Hits - Maximum	22900.0000	
Average Of Positive Hits	13631.0000	
Standard Deviation	5479.4007	
Upper Confidence Limit - Normal	16807.1099 UCL	
Upper Confidence Limit - Lognormal ...	18904.3183	
95th Percentile - Nonparametric.....	22900.0000	
95th Percentile - Normal.....	22644.6142	
95th Percentile - Lognormal	25834.0280	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9824	
Corr Coeff - Detected - Lognormal	0.9743	
Corr Coeff - Total - Normal	0.9824	
Corr Coeff - Total - Lognormal	0.9743	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.9505	NA
W-Test - Lognormal	0.9312	NA
Type of Distribution	NORMAL	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : ARSENIC (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	42.5400	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	5.6000	
Positive Hits - Maximum	150.0000 UCL	
Average Of Positive Hits	42.5400	
Standard Deviation	47.5228	
Upper Confidence Limit - Normal	70.0864	
Upper Confidence Limit - Lognormal ...	175.7498 > max hit	
95th Percentile - Nonparametric.....	150.0000	
95th Percentile - Normal.....	120.7150	
95th Percentile - Lognormal	160.1451	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8917	
Corr Coeff - Detected - Lognormal	0.9765	
Corr Coeff - Total - Normal	0.8917	
Corr Coeff - Total - Lognormal	0.9765	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7972	NA
W-Test - Lognormal	0.9318	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000036

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BARIUM (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	42.2600	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	28.4000	
Positive Hits - Maximum	70.1000	
Average Of Positive Hits	42.2600	
Standard Deviation	13.3852	
Upper Confidence Limit - Normal	~~50.0187~~	
Upper Confidence Limit - Lognormal	51.3313 ucl	
95th Percentile - Nonparametric	~~70.1000~~	
95th Percentile - Normal	64.2787	
95th Percentile - Lognormal	65.6732	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9426	
Corr Coeff - Detected - Lognormal	0.9751	
Corr Coeff - Total - Normal	0.9426	
Corr Coeff - Total - Lognormal	0.9751	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.8867	NA
W-Test - Lognormal	0.9422	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000037

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BERYLLIUM (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	0.5200	
Detection Limit - Minimum	0.1200	
Detection Limits - Maximum	0.1200	
Positive Hits - Minimum	0.2800	
Positive Hits - Maximum	0.8500	
Average Of Positive Hits	0.5644	
Standard Deviation	0.2579	
Upper Confidence Limit - Normal	0.6695	
Upper Confidence Limit - Lognormal ...	0.9007	
95th Percentile - Nonparametric.....	0.8500	
95th Percentile - Normal.....	0.9443	
95th Percentile - Lognormal	1.2540	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9417	
Corr Coeff - Detected - Lognormal	0.9333	
Corr Coeff - Total - Normal	0.9542	
Corr Coeff - Total - Lognormal	0.9315	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.8918	NA
W-Test - Lognormal	0.8673	NA
Type of Distribution	NORMAL ✓	

Test Results:

000038

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : CALCIUM (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	2073.8000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	798.0000	
Positive Hits - Maximum	3830.0000	
Average Of Positive Hits	2073.8000	
Standard Deviation	1074.8302	
Upper Confidence Limit - Normal	~~2696.8205~~	
Upper Confidence Limit - Lognormal	3279.5271 UCL	
95th Percentile - Nonparametric	~~3830.0000~~	
95th Percentile - Normal	3841.8957	
95th Percentile - Lognormal	4577.8198	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9703	
Corr Coeff - Detected - Lognormal	0.9742	
Corr Coeff - Total - Normal	0.9703	
Corr Coeff - Total - Lognormal	0.9742	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.9204	NA
W-Test - Lognormal	0.9258	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000039

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : CHROMIUM (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	15.3100	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	11.1000	
Positive Hits - Maximum	19.5000	
Average Of Positive Hits	15.3100	
Standard Deviation	2.8259	
Upper Confidence Limit - Normal	16.9480 UCL	
Upper Confidence Limit - Lognormal ...	17.3398	
95th Percentile - Nonparametric.....	19.5000	
95th Percentile - Normal.....	19.9585	
95th Percentile - Lognormal	20.7535	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9538	
Corr Coeff - Detected - Lognormal	0.9406	
Corr Coeff - Total - Normal	0.9538	
Corr Coeff - Total - Lognormal	0.9406	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.8996	NA
W-Test - Lognormal	0.8730	NA
Type of Distribution	NORMAL ✓	

Test Results:

000040

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : COBALT (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	8.0000	
Average	3.7700	
Detection Limit - Minimum	2.1500	
Detection Limits - Maximum	2.3500	
Positive Hits - Minimum	2.3000	
Positive Hits - Maximum	6.8000	
Average Of Positive Hits	4.1500	
Standard Deviation	1.5106	
Upper Confidence Limit - Normal	~~4.6456~~	
Upper Confidence Limit - Lognormal	4.9854 UCL	
95th Percentile - Nonparametric	~~6.8000~~	
95th Percentile - Normal	6.2549	
95th Percentile - Lognormal	6.7059	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8962	
Corr Coeff - Detected - Lognormal	0.9431	
Corr Coeff - Total - Normal	0.9602	
Corr Coeff - Total - Lognormal	0.9768	
Corr Coeff - Crit Val - Detected	0.9050	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.9143	NA
W-Test - Lognormal	0.9366	NA
Type of Distribution	LOGNORMAL	

Test Results:

00041

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : COPPER (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	18.1000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	8.0000	
Positive Hits - Maximum	30.9000	
Average Of Positive Hits	18.1000	
Standard Deviation	6.9903	
Upper Confidence Limit - Normal	22.1519	
Upper Confidence Limit - Lognormal ...	24.3177 UCL	
95th Percentile - Nonparametric.....	30.9000	
95th Percentile - Normal.....	29.5991	
95th Percentile - Lognormal	32.8799	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9867	
Corr Coeff - Detected - Lognormal	0.9896	
Corr Coeff - Total - Normal	0.9867	
Corr Coeff - Total - Lognormal	0.9896	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.9721	NA
W-Test - Lognormal	0.9798	NA
Type of Distribution	LOGNORMAL	

Test Results:

00042

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : IRON (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	14861.0000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	6870.0000	
Positive Hits - Maximum	36800.0000	
Average Of Positive Hits	14861.0000	
Standard Deviation	8456.5667	
Upper Confidence Limit - Normal	19762.8108	
Upper Confidence Limit - Lognormal	20901.0129 UCL	
95th Percentile - Nonparametric	36800.0000	
95th Percentile - Normal	28772.0523	
95th Percentile - Lognormal	28807.6062	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8526	
Corr Coeff - Detected - Lognormal	0.9541	
Corr Coeff - Total - Normal	0.8526	
Corr Coeff - Total - Lognormal	0.9541	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7564	NA
W-Test - Lognormal	0.9287	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00004 3

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : LEAD (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	8.0000	
Average	50.1600	
Detection Limit - Minimum	4.7000	
Detection Limits - Maximum	14.9000	
Positive Hits - Minimum	37.5000	
Positive Hits - Maximum	87.2000	
Average Of Positive Hits	60.2500	
Standard Deviation	26.1274	
Upper Confidence Limit - Normal	65.3046 UCL	
Upper Confidence Limit - Lognormal	~~140.6107~~	
95th Percentile - Nonparametric	87.2000	
95th Percentile - Normal	93.1396	
95th Percentile - Lognormal	172.8499	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9489	
Corr Coeff - Detected - Lognormal	0.9645	
Corr Coeff - Total - Normal	0.9826	
Corr Coeff - Total - Lognormal	0.8797	
Corr Coeff - Crit Val - Detected	0.9050	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.9588	NA
W-Test - Lognormal	0.7877	NA
Type of Distribution	NORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : MAGNESIUM (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	2373.0000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	1830.0000	
Positive Hits - Maximum	3310.0000	
Average Of Positive Hits	2373.0000	
Standard Deviation	496.0522	
Upper Confidence Limit - Normal	~~2660.5344~~	
Upper Confidence Limit - Lognormal	2695.4754 UCL	
95th Percentile - Nonparametric	~~3310.0000~~	
95th Percentile - Normal	3189.0059	
95th Percentile - Lognormal	3240.3894	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9597	
Corr Coeff - Detected - Lognormal	0.9750	
Corr Coeff - Total - Normal	0.9597	
Corr Coeff - Total - Lognormal	0.9750	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.9101	NA
W-Test - Lognormal	0.9356	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : MANGANESE (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	189.0000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	126.0000	
Positive Hits - Maximum	336.0000	
Average Of Positive Hits	189.0000	
Standard Deviation	73.3606	
Upper Confidence Limit - Normal	231.5231	
Upper Confidence Limit - Lognormal	238.3029 UCL	
95th Percentile - Nonparametric	336.0000	
95th Percentile - Normal	309.6782	
95th Percentile - Lognormal	313.1852	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8937	
Corr Coeff - Detected - Lognormal	0.9371	
Corr Coeff - Total - Normal	0.8937	
Corr Coeff - Total - Lognormal	0.9371	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7935	NA
W-Test - Lognormal	0.8659	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

9-0006

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : NICKEL (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	11.3000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	7.9000	
Positive Hits - Maximum	15.6000	
Average Of Positive Hits	11.3000	
Standard Deviation	2.7649	
Upper Confidence Limit - Normal	12.9026	
Upper Confidence Limit - Lognormal	13.2369 UCL	
95th Percentile - Nonparametric	15.6000	
95th Percentile - Normal	15.8482	
95th Percentile - Lognormal	16.3991	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9683	
Corr Coeff - Detected - Lognormal	0.9765	
Corr Coeff - Total - Normal	0.9683	
Corr Coeff - Total - Lognormal	0.9765	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.9149	NA
W-Test - Lognormal	0.9303	NA
Type of Distribution	LOGNORMAL	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : POTASSIUM (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	1129.5000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	697.0000	
Positive Hits - Maximum	2300.0000	
Average Of Positive Hits	1129.5000	
Standard Deviation	536.9646	
Upper Confidence Limit - Normal	~~1440.7491~~	
Upper Confidence Limit - Lognormal ...	1498.8045 UCL	
95th Percentile - Nonparametric.....	~~2300.0000~~	
95th Percentile - Normal.....	2012.8067	
95th Percentile - Lognormal	2025.8311	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8817	
Corr Coeff - Detected - Lognormal	0.9347	
Corr Coeff - Total - Normal	0.8817	
Corr Coeff - Total - Lognormal	0.9347	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7793	NA
W-Test - Lognormal	0.8655	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00048

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : SODIUM (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	7.0000	
Average	74.2550	
Detection Limit - Minimum	29.9000	
Detection Limits - Maximum	31.6500	
Positive Hits - Minimum	58.0000	
Positive Hits - Maximum	134.0000	
Average Of Positive Hits	93.0000	
Standard Deviation	35.8704	
Upper Confidence Limit - Normal	95.0471 UCL	
Upper Confidence Limit - Lognormal	118.6593	
95th Percentile - Nonparametric	134.0000	
95th Percentile - Normal	133.2619	
95th Percentile - Lognormal	165.6519	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7603	
Corr Coeff - Detected - Lognormal	0.7740	
Corr Coeff - Total - Normal	0.9668	
Corr Coeff - Total - Lognormal	0.9394	
Corr Coeff - Crit Val - Detected	0.8990	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.9178	NA
W-Test - Lognormal	0.8586	NA
Type of Distribution	NORMAL ✓	

Test Results:

000049

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : VANADIUM (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	37.0800	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	15.3000	
Positive Hits - Maximum	89.6000	
Average Of Positive Hits	37.0800	
Standard Deviation	20.9881	
Upper Confidence Limit - Normal	49.2456	
Upper Confidence Limit - Lognormal	53.4812 UCL	
95th Percentile - Nonparametric	89.6000	
95th Percentile - Normal	71.6054	
95th Percentile - Lognormal	74.0807	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8895	
Corr Coeff - Detected - Lognormal	0.9773	
Corr Coeff - Total - Normal	0.8895	
Corr Coeff - Total - Lognormal	0.9773	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.8161	NA
W-Test - Lognormal	0.9706	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000050

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : ZINC (MG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	10.0000	
Average	110.0700	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	37.9000	
Positive Hits - Maximum	412.0000 UCL	
Average Of Positive Hits	110.0700	
Standard Deviation	119.9677	
Upper Confidence Limit - Normal	179.6087	
Upper Confidence Limit - Lognormal	208.6828	
95th Percentile - Nonparametric	412.0000	
95th Percentile - Normal	307.4169	
95th Percentile - Lognormal	278.3146	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7796	
Corr Coeff - Detected - Lognormal	0.8938	
Corr Coeff - Total - Normal	0.7796	
Corr Coeff - Total - Lognormal	0.8938	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.6285	NA
W-Test - Lognormal	0.8044	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : TETRACHLOROETHENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	9.0000	
Average	3.8077	
Detection Limit - Minimum	3.0000	
Detection Limits - Maximum	7.5000	
Positive Hits - Minimum	~~1.0000~~	
Positive Hits - Maximum	5.0000 UCL	
Average Of Positive Hits	~~2.8889~~	
Standard Deviation	2.0263	
Upper Confidence Limit - Normal	4.8092	
Upper Confidence Limit - Lognormal	5.6609 > max hit	
95th Percentile - Nonparametric	7.5000	
95th Percentile - Normal	7.1409	
95th Percentile - Lognormal	8.5725	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9608	
Corr Coeff - Detected - Lognormal	0.9591	
Corr Coeff - Total - Normal	0.9659	
Corr Coeff - Total - Lognormal	0.9755	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.9223	NA
W-Test - Lognormal	0.9493	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00052

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : ACENAPHTHYLENE (UG/KG)

	Sample Results	Background Results
Count	10,0000	No samples
Number of Detects	7.0000	
Average	516.0000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	40.0000	
Positive Hits - Maximum	1600.0000 UCL	
Average Of Positive Hits	647.1429	
Standard Deviation	542.3037	
Upper Confidence Limit - Normal	830.3439	
Upper Confidence Limit - Lognormal	2024.7142 > max hit	
95th Percentile - Nonparametric	1600.0000	
95th Percentile - Normal	1408.0896	
95th Percentile - Lognormal	1939.2276	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6008	
Corr Coeff - Detected - Lognormal	0.7875	
Corr Coeff - Total - Normal	0.8811	
Corr Coeff - Total - Lognormal	0.9593	
Corr Coeff - Crit Val - Detected	0.8990	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7730	NA
W-Test - Lognormal	0.9237	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000053

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : ANTHRACENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	880.1000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	32.0000	
Positive Hits - Maximum	3400.0000 wrong	
Average Of Positive Hits	~~954.5556~~	
Standard Deviation	1204.5868	
Upper Confidence Limit - Normal	1578.3333	
Upper Confidence Limit - Lognormal ...	16944.0413 > max hit	
95th Percentile - Nonparametric.....	3400.0000	
95th Percentile - Normal.....	2861.6453	
95th Percentile - Lognormal	4914.6582	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8336	
Corr Coeff - Detected - Lognormal	0.9819	
Corr Coeff - Total - Normal	0.8555	
Corr Coeff - Total - Lognormal	0.9750	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7295	NA
W-Test - Lognormal	0.9269	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000034

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BENZO(A)ANTHRACENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	4252.0000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	150.0000	
Positive Hits - Maximum	14000.0000 UCL	
Average Of Positive Hits	4701.1111	
Standard Deviation	5501.4863	
Upper Confidence Limit - Normal	7440.9117	
Upper Confidence Limit - Lognormal	126815.6953 > max	
95th Percentile - Nonparametric	14000.0000 hit	
95th Percentile - Normal	13301.9449	
95th Percentile - Lognormal	26032.2944	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8675	
Corr Coeff - Detected - Lognormal	0.9798	
Corr Coeff - Total - Normal	0.8751	
Corr Coeff - Total - Lognormal	0.9633	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7479	NA
W-Test - Lognormal	0.8941	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000055

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BENZO(A)PYRENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	4528.0000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	~~160.0000~~	
Positive Hits - Maximum	14000.0000 UCL	
Average Of Positive Hits	~~5007.7778~~	
Standard Deviation	5711.8236	
Upper Confidence Limit - Normal	7838.8328	
Upper Confidence Limit - Lognormal ...	135708.3649 > max hit	
95th Percentile - Nonparametric.....	14000.0000	
95th Percentile - Normal.....	13923.9498	
95th Percentile - Lognormal	27847.7139	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8618	
Corr Coeff - Detected - Lognormal	0.9750	
Corr Coeff - Total - Normal	0.8693	
Corr Coeff - Total - Lognormal	0.9570	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7341	NA
W-Test - Lognormal	0.8811	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BENZO(B)FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	4683.0000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	160.0000	
Positive Hits - Maximum	13000.0000 UCL	
Average Of Positive Hits	~~5180.0000~~	
Standard Deviation	5340.8053	
Upper Confidence Limit - Normal	7778.7737	
Upper Confidence Limit - Lognormal	105094.3325 > max hit	
95th Percentile - Nonparametric	13000.0000	
95th Percentile - Normal	13468.6247	
95th Percentile - Lognormal	28910.5534	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9095	
Corr Coeff - Detected - Lognormal	0.9823	
Corr Coeff - Total - Normal	0.9046	
Corr Coeff - Total - Lognormal	0.9696	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7899	NA
W-Test - Lognormal	0.9079	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000037

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BENZO(G,H,I)PERYLENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	2267.9000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	~~89.0000~~	
Positive Hits - Maximum	6500.0000 UCL	
Average Of Positive Hits	~~2496.5556~~	
Standard Deviation	2787.9207	
Upper Confidence Limit - Normal	3883.9057	
Upper Confidence Limit - Lognormal	41052.2005 > max hit	
95th Percentile - Nonparametric	6500.0000	
95th Percentile - Normal	6854.0296	
95th Percentile - Lognormal	12604.0994	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8738	
Corr Coeff - Detected - Lognormal	0.9785	
Corr Coeff - Total - Normal	0.8700	
Corr Coeff - Total - Lognormal	0.9650	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7300	NA
W-Test - Lognormal	0.8995	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000058

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BENZO(K)FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	6.0000	
Average	5130.0000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	950.0000	
Positive Hits - Minimum	220.0000	
Positive Hits - Maximum	18000.0000 ucl	
Average Of Positive Hits	~~8280.6667~~	
Standard Deviation	7000.6682	
Upper Confidence Limit - Normal	9187.9058	
Upper Confidence Limit - Lognormal	196383.0423	
95th Percentile - Nonparametric	18000.0000	
95th Percentile - Normal	16646.0992	
95th Percentile - Lognormal	30790.0935	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.3941	
Corr Coeff - Detected - Lognormal	0.3421	
Corr Coeff - Total - Normal	0.8617	
Corr Coeff - Total - Lognormal	0.9358	
Corr Coeff - Crit Val - Detected	0.8900	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7276	NA
W-Test - Lognormal	0.8395	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000059

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : CARBAZOLE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	7.0000	
Average	590.7000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	2100.0000	
Positive Hits - Minimum	~~23.0000~~	
Positive Hits - Maximum	1500.0000 UCL	
Average Of Positive Hits	~~483.8571~~	
Standard Deviation	732.3296	
Upper Confidence Limit - Normal	1015.1916	
Upper Confidence Limit - Lognormal	4832.4846 > max hit	
95th Percentile - Nonparametric	2100.0000	
95th Percentile - Normal	1795.3822	
95th Percentile - Lognormal	2743.2819	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6971	
Corr Coeff - Detected - Lognormal	0.8674	
Corr Coeff - Total - Normal	0.8625	
Corr Coeff - Total - Lognormal	0.9625	
Corr Coeff - Crit Val - Detected	0.8990	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7417	NA
W-Test - Lognormal	0.9252	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000060

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : CHRYSENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	7033.0000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	~~240.0000~~	
Positive Hits - Maximum	29000.0000 acc	
Average Of Positive Hits	7791.1111	
Standard Deviation	9943.1999	
Upper Confidence Limit - Normal	12796.5310	
Upper Confidence Limit - Lognormal ...	269963.5136 > max	
95th Percentile - Nonparametric.....	29000.0000 hit	
95th Percentile - Normal.....	23389.5638	
95th Percentile - Lognormal	42952.5170	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8730	
Corr Coeff - Detected - Lognormal	0.9819	
Corr Coeff - Total - Normal	0.8612	
Corr Coeff - Total - Lognormal	0.9663	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7420	NA
W-Test - Lognormal	0.9040	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000091

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : DIBENZO(A,H)ANTHRACENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	8.0000	
Average	1287.6000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	~~36.0000~~	
Positive Hits - Maximum	3800.0000 4CL	
Average Of Positive Hits	~~1557.0000~~	
Standard Deviation	1552.6951	
Upper Confidence Limit - Normal	2187.6127	
Upper Confidence Limit - Lognormal ...	26806.9882 > max hit	
95th Percentile - Nonparametric.....	3800.0000	
95th Percentile - Normal.....	3841.7834	
95th Percentile - Lognormal	7695.2264	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8011	
Corr Coeff - Detected - Lognormal	0.9730	
Corr Coeff - Total - Normal	0.8749	
Corr Coeff - Total - Lognormal	0.9720	
Corr Coeff - Crit Val - Detected	0.9050	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7431	NA
W-Test - Lognormal	0.9211	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000092

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	11058.0000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	270.0000	
Positive Hits - Maximum	38000.0000 UCL	
Average Of Positive Hits	12263.3333	
Standard Deviation	14678.0432	
Upper Confidence Limit - Normal	19566.0616	
Upper Confidence Limit - Lognormal	790717.6031 >max hit	
95th Percentile - Nonparametric	38000.0000	
95th Percentile - Normal	35203.3810	
95th Percentile - Lognormal	78844.0148	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9102	
Corr Coeff - Detected - Lognormal	0.9780	
Corr Coeff - Total - Normal	0.8732	
Corr Coeff - Total - Lognormal	0.9652	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7472	NA
W-Test - Lognormal	0.9005	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000063

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : FLUORENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	8.0000	
Average	404.9000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	23.0000	
Positive Hits - Maximum	1500.0000 UCL	
Average Of Positive Hits	~~453.6250~~	
Standard Deviation	490.5966	
Upper Confidence Limit - Normal	689.2721	
Upper Confidence Limit - Lognormal	3228.3708 > max hit	
95th Percentile - Nonparametric	1500.0000	
95th Percentile - Normal	1211.9313	
95th Percentile - Lognormal	1913.1709	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7786	
Corr Coeff - Detected - Lognormal	0.9452	
Corr Coeff - Total - Normal	0.8767	
Corr Coeff - Total - Lognormal	0.9781	
Corr Coeff - Crit Val - Detected	0.9050	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7722	NA
W-Test - Lognormal	0.9434	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000004

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : INDENO(1,2,3-CD)PYRENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	2241.7000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	~~97.0000~~	
Positive Hits - Maximum	6600.0000 UCL	
Average Of Positive Hits	~~2467.4444~~	
Standard Deviation	2717.5606	
Upper Confidence Limit - Normal	3816.9218	
Upper Confidence Limit - Lognormal ...	39020.5104 > max	
95th Percentile - Nonparametric.....	6600.0000 hit	
95th Percentile - Normal.....	6712.0872	
95th Percentile - Lognormal	12509.5228	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8772	
Corr Coeff - Detected - Lognormal	0.9763	
Corr Coeff - Total - Normal	0.8783	
Corr Coeff - Total - Lognormal	0.9643	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7471	NA
W-Test - Lognormal	0.8973	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000035

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : PHENANTHRENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	5632.0000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	200.0000	
Positive Hits - Maximum	21000.0000 UCL	
Average Of Positive Hits	~~6234.4444~~	
Standard Deviation	7798.0479	
Upper Confidence Limit - Normal	10152.1033	
Upper Confidence Limit - Lognormal	186646.7167 > max hit	
95th Percentile - Nonparametric	21000.0000	
95th Percentile - Normal	18459.7888	
95th Percentile - Lognormal	33798.4013	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8487	
Corr Coeff - Detected - Lognormal	0.9642	
Corr Coeff - Total - Normal	0.8632	
Corr Coeff - Total - Lognormal	0.9600	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7358	NA
W-Test - Lognormal	0.8888	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000096

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : PYRENE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	12597.0000	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	~~410.0000~~	
Positive Hits - Maximum	43000.0000 UCL	
Average Of Positive Hits	~~13973.3333~~	
Standard Deviation	16752.4479	
Upper Confidence Limit - Normal	22307.4810	
Upper Confidence Limit - Lognormal ...	807412.5234 > max	
95th Percentile - Nonparametric.....	43000.0000 hit	
95th Percentile - Normal.....	40154.7769	
95th Percentile - Lognormal	88315.5496	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9117	
Corr Coeff - Detected - Lognormal	0.9795	
Corr Coeff - Total - Normal	0.8721	
Corr Coeff - Total - Lognormal	0.9705	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7447	NA
W-Test - Lognormal	0.9143	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : 4,4'-DDE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	37.9000	
Detection Limit - Minimum	21.0000	
Detection Limits - Maximum	21.0000	
Positive Hits - Minimum	16.0000	
Positive Hits - Maximum	95.0000	
Average Of Positive Hits	39.7778	
Standard Deviation	29.6027	
Upper Confidence Limit - Normal	~~55.0591~~	
Upper Confidence Limit - Lognormal	63.4983 UCL	
95th Percentile - Nonparametric	~~95.0000~~	
95th Percentile - Normal	86.5965	
95th Percentile - Lognormal	88.1830	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8307	
Corr Coeff - Detected - Lognormal	0.9243	
Corr Coeff - Total - Normal	0.8454	
Corr Coeff - Total - Lognormal	0.9270	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7087	NA
W-Test - Lognormal	0.8446	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000068

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : 4,4'-DDT (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	9.0000	
Average	106.8000	
Detection Limit - Minimum	21.0000	
Detection Limits - Maximum	21.0000	
Positive Hits - Minimum	33.0000	
Positive Hits - Maximum	380.0000	
Average Of Positive Hits	116.3333	
Standard Deviation	117.8792	
Upper Confidence Limit - Normal	175.1282	
Upper Confidence Limit - Lognormal	254.4778 UCL	
95th Percentile - Nonparametric	~~380.0000~~	
95th Percentile - Normal	300.7113	
95th Percentile - Lognormal	311.3787	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8233	
Corr Coeff - Detected - Lognormal	0.9441	
Corr Coeff - Total - Normal	0.8338	
Corr Coeff - Total - Lognormal	0.9628	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.7064	NA
W-Test - Lognormal	0.9263	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000069

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : ENDRIN KETONE (UG/KG)

	Sample Results	Background Results
Count	10.0000	No samples
Number of Detects	5.0000	
Average	19.6900	
Detection Limit - Minimum	2.0000	
Detection Limits - Maximum	21.0000	
Positive Hits - Minimum	6.4000	
Positive Hits - Maximum	43.0000	
Average Of Positive Hits	25.8800	
Standard Deviation	13.5984	
Upper Confidence Limit - Normal	27.5723 UCL	
Upper Confidence Limit - Lognormal ...	78.5294	
95th Percentile - Nonparametric.....	43.0000	
95th Percentile - Normal.....	42.0594	
95th Percentile - Lognormal	79.9149	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7672	
Corr Coeff - Detected - Lognormal	0.6820	
Corr Coeff - Total - Normal	0.9670	
Corr Coeff - Total - Lognormal	0.9205	
Corr Coeff - Crit Val - Detected	0.8790	
Corr Coeff - Crit Val - Total	0.9170	
W-Test - Table Value	0.8420	NA
W-Test - Normal	0.9249	NA
W-Test - Lognormal	0.8371	NA

Type of Distribution ..... Set ~~NORMAL~~ Undefined

Test Results:

000070

Soil Data (0-10') - Rubble Fill Area at Bunker A84

~~Table X~~

Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
ALUMINUM	13/13	6440.0000 22900.0000	Log ✓	12642.3077	14,100(b)	na	na	na	na	na	
ARSENIC	12/13	2.8000 150.0000	Log ✓	38.3333	121(b)	na	na	na	na	na	
BARIUM	13/13	28.4000 70.1000	Log ✓	43.4154	50.7(b)	na	na	na	na	na	
BERYLLIUM	12/13	0.2800 0.8500	Norm ✓	0.5408	0.62(a)	na	na	na	na	na	
CALCIUM	13/13	798.0000 31600.0000	Und ✓	4191.7692	31,600(d)	na	na	na	na	na	
CHROMIUM	13/13	10.3000 19.5000	Norm ✓	14.3846	15.9(a)	na	na	na	na	na	
COBALT	9/13	2.3000 6.8000	Log ✓	4.2556	4.6(b)	na	na	na	na	na	
COPPER	13/13	8.0000 77.4000	Log ✓	23.8769	34.5(b)	na	na	na	na	na	
IRON	13/13	6870.0000 36800.0000	Log ✓	13592.3077	17,400(b)	na	na	na	na	na	
LEAD	9/13	37.5000 120.0000	Norm ✓	66.8889	66.0(a)	na	na	na	na	na	
MAGNESIUM	13/13	1830.0000 3310.0000	Log ✓	2443.8462	2700(b)	na	na	na	na	na	
MANGANESE	13/13	126.0000 336.0000	Und ✓	183.0000	336(d)	na	na	na	na	na	

000071

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
NICKEL	13/13	7.5000 15.6000	Log ✓	10.4692	12.1(b)	na	na	na	na	na	
POTASSIUM	13/13	697.0000 2300.0000	Log ✓	1253.4615	1600 (b)	na	na	na	na	na	
SODIUM	10/13	58.0000 254.0000	Log ✓	131.5000	186 (b)	na	na	na	na	na	
VANADIUM	13/13	15.3000 89.6000	Log ✓	32.8615	44.2(b)	na	na	na	na	na	
ZINC	13/13	31.3000 412.0000	Und ✓	95.5615	412 (d)	na	na	na	na	na	
TETRACHLOROETHENE	9/16	1.0000 5.0000	Norm ✓	2.8889	5 (b)	na	na	na	na	na	
ACENAPHTHYLENE	7/13	40.0000 1600.0000	Log ✓	647.1429	1280(b)	na	na	na	na	na	
ANTHRACENE	11/13	23.0000 3400.0000	Log ✓	827.6364	3400(c)	na	na	na	na	na	
BENZO(A)ANTHRACENE	12/13	150.0000 14000.0000	Log ✓	3748.3333	14,000(c)	na	na	na	na	na	
BENZO(A)PYRENE	12/13	160.0000 14000.0000	Log ✓	3954.1667	14,000(c)	na	na	na	na	na	
BENZO(B)FLUORANTHENE	12/13	160.0000 13000.0000	Log ✓	4084.1667	13,000(c)	na	na	na	na	na	
BENZO(G,H,I)PERYLENE	12/13	89.0000 6500.0000	Log ✓	1967.4167	6500(c)	na	na	na	na	na	

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
BENZO(K)FLUORANTHENE	8/13	220.0000 18000.0000	Und ✓	6563.7500	18,000(d)	na	na	na	na	na	
CARBAZOLE	8/13	23.0000 1500.0000	Log ✓	453.3750	1500(c)	na	na	na	na	na	
CHRYSENE	12/13	240.0000 29000.0000	Log ✓	6110.8333	29,000(c)	na	na	na	na	na	
DIBENZO(A,H)ANTHRACENE	11/13	30.0000 3800.0000	Log ✓	1155.2727	3800(c)	na	na	na	na	na	
FLUORANTHENE	12/13	270.0000 38000.0000	Log ✓	9606.6667	38000(c)	na	na	na	na	na	
FLUORENE	9/13	23.0000 1500.0000	Log ✓	432.1111	1270(b)	na	na	na	na	na	
INDENO(1,2,3-CD)PYRENE	12/13	97.0000 6600.0000	Log	1940.5833	6600(c)	na	na	na	na	na	
PHENANTHRENE	12/13	89.0000 21000.0000	Log	4951.5833	21,000(c)	na	na	na	na	na	
PYRENE	12/13	410.0000 43000.0000	Log	11005.8333	43,000(c)	na	na	na	na	na	
4,4'-DDE	10/13	10.0000 95.0000	Log	36.8000	49.9(b)	na	na	na	na	na	
4,4'-DDT	10/13	24.0000 380.0000	Log	107.1000	180(b)	na	na	na	na	na	

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : ALUMINUM (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	12642.3077	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	6440.0000	
Positive Hits - Maximum	22900.0000	
Average Of Positive Hits	12642.3077	
Standard Deviation	5146.1849	
Upper Confidence Limit - Normal	~~15185.7472~~	
Upper Confidence Limit - Lognormal	16148.8459 UCL	
95th Percentile - Nonparametric	~~22900~~.0000	
95th Percentile - Normal	21107.7819	
95th Percentile - Lognormal	22935.4642	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9701	
Corr Coeff - Detected - Lognormal	0.9855	
Corr Coeff - Total - Normal	0.9701	
Corr Coeff - Total - Lognormal	0.9855	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.9296	NA
W-Test - Lognormal	0.9540	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000075

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : ARSENIC (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	12.0000	
Average	35.9192	
Detection Limit - Minimum	6.9500	
Detection Limits - Maximum	6.9500	
Positive Hits - Minimum	2.8000	
Positive Hits - Maximum	150.0000	
Average Of Positive Hits	38.3333	
Standard Deviation	43.5097	
Upper Confidence Limit - Normal	~~57.4234~~	
Upper Confidence Limit - Lognormal ...	120.7325 UCL	
95th Percentile - Nonparametric.....	~~150.0000~~	
95th Percentile - Normal.....	107.4928	
95th Percentile - Lognormal	137.2931	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8372	
Corr Coeff - Detected - Lognormal	0.9845	
Corr Coeff - Total - Normal	0.8666	
Corr Coeff - Total - Lognormal	0.9862	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.7598	NA
W-Test - Lognormal	0.9622	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00076

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BARIUM (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	43.4154	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	28.4000	
Positive Hits - Maximum	70.1000	
Average Of Positive Hits	43.4154	
Standard Deviation	12.9000	
Upper Confidence Limit - Normal	~~49.7910~~	
Upper Confidence Limit - Lognormal	60.6844 UCL	
95th Percentile - Nonparametric	~~70.1000~~	
95th Percentile - Normal	64.6359	
95th Percentile - Lognormal	66.2637	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9502	
Corr Coeff - Detected - Lognormal	0.9773	
Corr Coeff - Total - Normal	0.9502	
Corr Coeff - Total - Lognormal	0.9773	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.8963	NA
W-Test - Lognormal	0.9445	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00027

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BERYLLIUM (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	12.0000	
Average	0.5085	
Detection Limit - Minimum	0.1200	
Detection Limits - Maximum	0.1200	
Positive Hits - Minimum	0.2800	
Positive Hits - Maximum	0.8500	
Average Of Positive Hits	0.5408	
Standard Deviation	0.2274	
Upper Confidence Limit - Normal	0.6209 ucl	
Upper Confidence Limit - Lognormal	~~0.7405~~	
95th Percentile - Nonparametric	0.8500	
95th Percentile - Normal	0.8826	
95th Percentile - Lognormal	1.1122	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9720	
Corr Coeff - Detected - Lognormal	0.9699	
Corr Coeff - Total - Normal	0.9770	
Corr Coeff - Total - Lognormal	0.9446	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.9420	NA
W-Test - Lognormal	0.8978	NA
Type of Distribution	NORMAL ✓	

Test Results:

000078

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : CALCIUM (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	4191.7692	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	~~798.0000~~	
Positive Hits - Maximum	31600.0000 UCL	
Average Of Positive Hits	~~4191.7692~~	
Standard Deviation	8296.2002	
Upper Confidence Limit - Normal	8292.0656	
Upper Confidence Limit - Lognormal	7385.1689	
95th Percentile - Nonparametric	31600.0000	
95th Percentile - Normal	17839.0185	
95th Percentile - Lognormal	10339.6097	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6177	
Corr Coeff - Detected - Lognormal	0.8914	
Corr Coeff - Total - Normal	0.6177	
Corr Coeff - Total - Lognormal	0.8914	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.4176	NA
W-Test - Lognormal	0.8136	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : CHROMIUM (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	14.3846	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	10.3000	
Positive Hits - Maximum	19.5000	
Average Of Positive Hits	14.3846	
Standard Deviation	3.0876	
Upper Confidence Limit - Normal	15.9106 UCL	
Upper Confidence Limit - Lognormal	16.2122	
95th Percentile - Nonparametric	19.5000	
95th Percentile - Normal	19.4637	
95th Percentile - Lognormal	20.2093	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9666	
Corr Coeff - Detected - Lognormal	0.9629	
Corr Coeff - Total - Normal	0.9666	
Corr Coeff - Total - Lognormal	0.9629	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.9152	NA
W-Test - Lognormal	0.9057	NA
Type of Distribution	NORMAL ✓	

Test Results:

000080

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : COBALT (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	9.0000	
Average	3.6077	
Detection Limit - Minimum	2.0500	
Detection Limits - Maximum	2.3500	
Positive Hits - Minimum	2.3000	
Positive Hits - Maximum	6.8000	
Average Of Positive Hits	4.2556	
Standard Deviation	1.5242	
Upper Confidence Limit - Normal	~~4.3610~~	
Upper Confidence Limit - Lognormal	4.6252 UCL	
95th Percentile - Nonparametric	~~6.8000~~	
95th Percentile - Normal	6.1150	
95th Percentile - Lognormal	6.5919	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7206	
Corr Coeff - Detected - Lognormal	0.7447	
Corr Coeff - Total - Normal	0.9489	
Corr Coeff - Total - Lognormal	0.9615	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.8882	NA
W-Test - Lognormal	0.9019	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : COPPER (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	23.8769	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	8.0000	
Positive Hits - Maximum	77.4000	
Average Of Positive Hits	23.8769	
Standard Deviation	18.0980	
Upper Confidence Limit - Normal	~~32.8217~~	
Upper Confidence Limit - Lognormal ...	~~34.4759~~ UCL	
95th Percentile - Nonparametric.....	77.4000	
95th Percentile - Normal.....	53.6482	
95th Percentile - Lognormal	52.2796	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8365	
Corr Coeff - Detected - Lognormal	0.9717	
Corr Coeff - Total - Normal	0.8365	
Corr Coeff - Total - Lognormal	0.9717	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.7265	NA
W-Test - Lognormal	0.9578	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000082

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : IRON (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	13592.3077	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	6870.0000	
Positive Hits - Maximum	36800.0000	
Average Of Positive Hits	13592.3077	
Standard Deviation	7716.0905	
Upper Confidence Limit - Normal	~~17405.8919~~	
Upper Confidence Limit - Lognormal	17459.9448 UCL	
95th Percentile - Nonparametric	36800.0000	
95th Percentile - Normal	26285.2766	
95th Percentile - Lognormal	25142.8827	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8268	
Corr Coeff - Detected - Lognormal	0.9447	
Corr Coeff - Total - Normal	0.8268	
Corr Coeff - Total - Lognormal	0.9447	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.7124	NA
W-Test - Lognormal	0.9083	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000083

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : LEAD (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	9.0000	
Average	48.2308	
Detection Limit - Minimum	1.6500	
Detection Limits - Maximum	14.9000	
Positive Hits - Minimum	37.5000	
Positive Hits - Maximum	120.0000	
Average Of Positive Hits	66.8889	
Standard Deviation	35.9167	
Upper Confidence Limit - Normal	65.9822 UCL	
Upper Confidence Limit - Lognormal	294.5620	
95th Percentile - Nonparametric	120.0000	
95th Percentile - Normal	107.3137	
95th Percentile - Lognormal	268.6790	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6658	
Corr Coeff - Detected - Lognormal	0.6807	
Corr Coeff - Total - Normal	0.9775	
Corr Coeff - Total - Lognormal	0.9174	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.9465	NA
W-Test - Lognormal	0.8353	NA
Type of Distribution	NORMAL ✓	

Test Results:

000034

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : MAGNESIUM (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	2443.8462	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	1830.0000	
Positive Hits - Maximum	3310.0000	
Average Of Positive Hits	2443.8462	
Standard Deviation	451.2490	
Upper Confidence Limit - Normal	~~2666.8705~~	
Upper Confidence Limit - Lognormal	2696.7261 UCL	
95th Percentile - Nonparametric	~~3310.0000~~	
95th Percentile - Normal	3186.1507	
95th Percentile - Lognormal	3259.8082	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9849	
Corr Coeff - Detected - Lognormal	0.9876	
Corr Coeff - Total - Normal	0.9849	
Corr Coeff - Total - Lognormal	0.9876	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.9600	NA
W-Test - Lognormal	0.9623	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000035

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : MANGANESE (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	183.0000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	~~126.0000~~	
Positive Hits - Maximum	336.0000 UCL	
Average Of Positive Hits	~~183.0000~~	
Standard Deviation	64.7945	
Upper Confidence Limit - Normal	215.0239	
Upper Confidence Limit - Lognormal	215.8290	
95th Percentile - Nonparametric	336.0000	
95th Percentile - Normal	289.5870	
95th Percentile - Lognormal	286.5901	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8663	
Corr Coeff - Detected - Lognormal	0.9212	
Corr Coeff - Total - Normal	0.8663	
Corr Coeff - Total - Lognormal	0.9212	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.7558	NA
W-Test - Lognormal	0.8476	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000036

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : NICKEL (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	10.4692	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	7.5000	
Positive Hits - Maximum	15.6000	
Average Of Positive Hits	10.4692	
Standard Deviation	2.8689	
Upper Confidence Limit - Normal	~~11.8872~~	
Upper Confidence Limit - Lognormal	12.0922 UCL	
95th Percentile - Nonparametric	15.6000	
95th Percentile - Normal	15.1886	
95th Percentile - Lognormal	15.5970	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9439	
Corr Coeff - Detected - Lognormal	0.9579	
Corr Coeff - Total - Normal	0.9439	
Corr Coeff - Total - Lognormal	0.9579	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.8698	NA
W-Test - Lognormal	0.8928	NA
Type of Distribution	LOGNORMAL	

Test Results:

000087

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : POTASSIUM (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	1253.4615	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	697.0000	
Positive Hits - Maximum	2300.0000	
Average Of Positive Hits	1253.4615	
Standard Deviation	529.8054	
Upper Confidence Limit - Normal	~~1515.3114~~	
Upper Confidence Limit - Lognormal	1599.3297 ucl	
95th Percentile - Nonparametric	~~2300.0000~~	
95th Percentile - Normal	2124.9914	
95th Percentile - Lognormal	2273.0157	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9490	
Corr Coeff - Detected - Lognormal	0.9696	
Corr Coeff - Total - Normal	0.9490	
Corr Coeff - Total - Lognormal	0.9696	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.8854	NA
W-Test - Lognormal	0.9177	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000038

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : SODIUM (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	10.0000	
Average	108.1962	
Detection Limit - Minimum	29.9000	
Detection Limits - Maximum	31.6500	
Positive Hits - Minimum	58.0000	
Positive Hits - Maximum	254.0000	
Average Of Positive Hits	131.5000	
Standard Deviation	73.2296	
Upper Confidence Limit - Normal	~~144.3890~~	
Upper Confidence Limit - Lognormal	186.5732 UCL	
95th Percentile - Nonparametric	~~254.0000~~	
95th Percentile - Normal	228.6589	
95th Percentile - Lognormal	285.1375	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7288	
Corr Coeff - Detected - Lognormal	0.7985	
Corr Coeff - Total - Normal	0.9483	
Corr Coeff - Total - Lognormal	0.9740	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.8870	NA
W-Test - Lognormal	0.9280	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000039

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : VANADIUM (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	32.8615	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	15.3000	
Positive Hits - Maximum	89.6000	
Average Of Positive Hits	32.8615	
Standard Deviation	19.8705	
Upper Confidence Limit - Normal	42.6823	
Upper Confidence Limit - Lognormal ...	44.1709 UCL	
95th Percentile - Nonparametric.....	89.6000	
95th Percentile - Normal.....	65.5485	
95th Percentile - Lognormal	65.1905	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8671	
Corr Coeff - Detected - Lognormal	0.9660	
Corr Coeff - Total - Normal	0.8671	
Corr Coeff - Total - Lognormal	0.9660	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.7721	NA
W-Test - Lognormal	0.9364	NA
Type of Distribution	LOGNORMAL	

Test Results:

000090

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : ZINC (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	13.0000	
Average	95.5615	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	31.3000	
Positive Hits - Maximum	412.0000 ucl	
Average Of Positive Hits	95.5615	
Standard Deviation	107.8926	
Upper Confidence Limit - Normal	148.8862	
Upper Confidence Limit - Lognormal	151.0069	
95th Percentile - Nonparametric	412.0000	
95th Percentile - Normal	273.0449	
95th Percentile - Lognormal	230.5239	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7497	
Corr Coeff - Detected - Lognormal	0.9000	
Corr Coeff - Total - Normal	0.7497	
Corr Coeff - Total - Lognormal	0.9000	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.5871	NA
W-Test - Lognormal	0.8197	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000081

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : TETRACHLOROETHENE (UG/KG)

	Sample Results	Background Results
Count	16.0000	No samples
Number of Detects	9.0000	
Average	4.1250	
Detection Limit - Minimum	3.0000	
Detection Limits - Maximum	7.5000	
Positive Hits - Minimum	1.0000	
Positive Hits - Maximum	5.0000	
Average Of Positive Hits	2.8889	
Standard Deviation	1.9365	
Upper Confidence Limit - Normal	4.973 UCL	
Upper Confidence Limit - Lognormal	5.7613	
95th Percentile - Nonparametric	7.5000	
95th Percentile - Normal	7.3105	
95th Percentile - Lognormal	9.1012	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9608	
Corr Coeff - Detected - Lognormal	0.9591	
Corr Coeff - Total - Normal	0.9812	
Corr Coeff - Total - Lognormal	0.9619	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9400	
W-Test - Table Value	0.8870	NA
W-Test - Normal	0.9504	NA
W-Test - Lognormal	0.9230	NA
Type of Distribution	NORMAL	

Test Results:

000092

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : ACENAPHTHYLENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	7.0000	
Average	495.0000	
Detection Limit - Minimum	185.0000	
Detection Limits - Maximum	900.0000	
Positive Hits - Minimum	40.0000	
Positive Hits - Maximum	1600.0000	
Average Of Positive Hits	647.1429	
Standard Deviation	500.3665	
Upper Confidence Limit - Normal	742.3001	
Upper Confidence Limit - Lognormal	1277.2679 UCL	
95th Percentile - Nonparametric	1600.0000	
95th Percentile - Normal	1318.1029	
95th Percentile - Lognormal	1706.6100	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9460	
Corr Coeff - Detected - Lognormal	0.9723	
Corr Coeff - Total - Normal	0.8794	
Corr Coeff - Total - Lognormal	0.9526	
Corr Coeff - Crit Val - Detected	0.8990	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.7717	NA
W-Test - Lognormal	0.9114	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000093

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : ANTHRACENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	11.0000	
Average	730.6923	
Detection Limit - Minimum	185.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	23.0000	
Positive Hits - Maximum	3400.0000 UCL	
Average Of Positive Hits	827.6364	
Standard Deviation	1085.4735	
Upper Confidence Limit - Normal	1267.1744	
Upper Confidence Limit - Lognormal	6586.3144 > max hit	
95th Percentile - Nonparametric	3400.0000	
95th Percentile - Normal	2516.2962	
95th Percentile - Lognormal	3723.9227	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6970	
Corr Coeff - Detected - Lognormal	0.9547	
Corr Coeff - Total - Normal	0.8181	
Corr Coeff - Total - Lognormal	0.9796	
Corr Coeff - Crit Val - Detected	0.9220	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6756	NA
W-Test - Lognormal	0.9420	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000034

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BENZO(A)ANTHRACENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	12.0000	
Average	3476.1538	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	150.0000	
Positive Hits - Maximum	14000.0000 UCL	
Average Of Positive Hits	3748.3333	
Standard Deviation	5005.6444	
Upper Confidence Limit - Normal	5950.1329	
Upper Confidence Limit - Lognormal	32953.4917 >max	
95th Percentile - Nonparametric	14000.0000 nit	
95th Percentile - Normal	11710.4388	
95th Percentile - Lognormal	17281.3021	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8322	
Corr Coeff - Detected - Lognormal	0.9670	
Corr Coeff - Total - Normal	0.8352	
Corr Coeff - Total - Lognormal	0.9608	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6906	NA
W-Test - Lognormal	0.8953	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000085

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BENZO(A)PYRENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	12.0000	
Average	3666.1538	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	~~160.0000~~	
Positive Hits - Maximum	14000.0000 UCL	
Average Of Positive Hits	~~3954.1667~~	
Standard Deviation	5222.8002	
Upper Confidence Limit - Normal	6247.4595	
Upper Confidence Limit - Lognormal	34489.2993 > max	
95th Percentile - Nonparametric	14000.0000 hit	
95th Percentile - Normal	12257.6602	
95th Percentile - Lognormal	18056.7408	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8265	
Corr Coeff - Detected - Lognormal	0.9610	
Corr Coeff - Total - Normal	0.8296	
Corr Coeff - Total - Lognormal	0.9545	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6779	NA
W-Test - Lognormal	0.8826	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000096

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BENZO(B)FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	12.0000	
Average	3786.1538	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	~~160.0000~~	
Positive Hits - Maximum	13000.0000 UCL	
Average Of Positive Hits	~~4084.1667~~	
Standard Deviation	4937.7990	
Upper Confidence Limit - Normal	6226.6011	
Upper Confidence Limit - Lognormal	30514.8223 > max	
95th Percentile - Nonparametric	13000.0000 hit	
95th Percentile - Normal	11908.8332	
95th Percentile - Lognormal	18904.3488	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8743	
Corr Coeff - Detected - Lognormal	0.9809	
Corr Coeff - Total - Normal	0.8626	
Corr Coeff - Total - Lognormal	0.9733	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.7277	NA
W-Test - Lognormal	0.9192	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000037

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BENZO(G,H,I)PERYLENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	12.0000	
Average	1832.2308	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	89.0000	
Positive Hits - Maximum	6500.0000 UCL	
Average Of Positive Hits	1967.4167	
Standard Deviation	2557.8135	
Upper Confidence Limit - Normal	3096.3991	
Upper Confidence Limit - Lognormal	13336.0551 > max	
95th Percentile - Nonparametric	6500.0000 hit	
95th Percentile - Normal	6039.8339	
95th Percentile - Lognormal	8471.0433	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8399	
Corr Coeff - Detected - Lognormal	0.9699	
Corr Coeff - Total - Normal	0.8306	
Corr Coeff - Total - Lognormal	0.9563	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6750	NA
W-Test - Lognormal	0.8873	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000098

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : BENZO(K)FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	8.0000	
Average	4175.3846	
Detection Limit - Minimum	190.0000	
Detection Limits - Maximum	950.0000	
Positive Hits - Minimum	~~220.0000~~	
Positive Hits - Maximum	18000.0000 UCL	
Average Of Positive Hits	~~6563.7500~~	
Standard Deviation	6347.9756	
Upper Confidence Limit - Normal	7312.7946	
Upper Confidence Limit - Lognormal	47517.6684	
95th Percentile - Nonparametric	18000.0000	
95th Percentile - Normal	14617.8044	
95th Percentile - Lognormal	20489.2774	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5338	
Corr Coeff - Detected - Lognormal	0.4607	
Corr Coeff - Total - Normal	0.8216	
Corr Coeff - Total - Lognormal	0.9372	
Corr Coeff - Crit Val - Detected	0.9050	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6709	NA
W-Test - Lognormal	0.8494	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000039

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : CARBAZOLE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	8.0000	
Average	501.6923	
Detection Limit - Minimum	185.0000	
Detection Limits - Maximum	2100.0000	
Positive Hits - Minimum	~~23.0000~~	
Positive Hits - Maximum	1500.0000 UCL	
Average Of Positive Hits	~~453.3750~~	
Standard Deviation	656.5004	
Upper Confidence Limit - Normal	826.1597	
Upper Confidence Limit - Lognormal	1726.0376 > max hit	
95th Percentile - Nonparametric	2100.0000	
95th Percentile - Normal	1581.6354	
95th Percentile - Lognormal	1908.1619	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7973	
Corr Coeff - Detected - Lognormal	0.9515	
Corr Coeff - Total - Normal	0.8112	
Corr Coeff - Total - Lognormal	0.9369	
Corr Coeff - Crit Val - Detected	0.9050	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6666	NA
W-Test - Lognormal	0.8895	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

0
0
0
1
0
0

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : CHRYSENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	12.0000	
Average	5656.9231	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	~~240.0000~~	
Positive Hits - Maximum	~~29000.0000~~ UCL	
Average Of Positive Hits	6110.8333	
Standard Deviation	9013.5503	
Upper Confidence Limit - Normal	10111.7610	
Upper Confidence Limit - Lognormal	62573.6564 > max hit	
95th Percentile - Nonparametric	29000.0000	
95th Percentile - Normal	20484.2134	
95th Percentile - Lognormal	27463.4760	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8309	
Corr Coeff - Detected - Lognormal	0.9746	
Corr Coeff - Total - Normal	0.8125	
Corr Coeff - Total - Lognormal	0.9567	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6690	NA
W-Test - Lognormal	0.8917	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : DIBENZO(A,H)ANTHRACENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	11.0000	
Average	1009.8462	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	~~30.0000~~	
Positive Hits - Maximum	3800.0000 UCL	
Average Of Positive Hits	1155.2727	
Standard Deviation	1445.0392	
Upper Confidence Limit - Normal	1724.0393	
Upper Confidence Limit - Lognormal ...	13904.5960 > max	
95th Percentile - Nonparametric.....	3800.0000 hit	
95th Percentile - Normal.....	3386.9356	
95th Percentile - Lognormal	5561.8077	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8017	
Corr Coeff - Detected - Lognormal	0.9666	
Corr Coeff - Total - Normal	0.8311	
Corr Coeff - Total - Lognormal	0.9663	
Corr Coeff - Crit Val - Detected	0.9220	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6789	NA
W-Test - Lognormal	0.9049	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000102

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	12.0000	
Average	8883.8462	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	~~270.0000~~	
Positive Hits - Maximum	38000.0000 UCL	
Average Of Positive Hits	~~9608.6667~~	
Standard Deviation	13394.4681	
Upper Confidence Limit - Normal	15503.8996	
Upper Confidence Limit - Lognormal ...	164382.9926 > max hit	
95th Percentile - Nonparametric.....	38000.0000	
95th Percentile - Normal.....	30917.7462	
95th Percentile - Lognormal	49934.8969	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8665	
Corr Coeff - Detected - Lognormal	0.9724	
Corr Coeff - Total - Normal	0.8285	
Corr Coeff - Total - Lognormal	0.9572	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6818	NA
W-Test - Lognormal	0.8900	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000103

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : FLUORENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	9.0000	
Average	360.3077	
Detection Limit - Minimum	185.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	23.0000	
Positive Hits - Maximum	1500.0000	
Average Of Positive Hits	432.1111	
Standard Deviation	433.5751	
Upper Confidence Limit - Normal	~~574.5969~~	
Upper Confidence Limit - Lognormal ...	1270.6821 UCL	
95th Percentile - Nonparametric.....	1500.0000	
95th Percentile - Normal.....	1073.5388	
95th Percentile - Lognormal	1440.3487	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7279	
Corr Coeff - Detected - Lognormal	0.8906	
Corr Coeff - Total - Normal	0.8382	
Corr Coeff - Total - Lognormal	0.9653	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.7162	NA
W-Test - Lognormal	0.9323	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : INDENO(1,2,3-CD)PYRENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	12.0000	
Average	1807.4615	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	97.0000	
Positive Hits - Maximum	6600.0000 UCL	
Average Of Positive Hits	1940.5833	
Standard Deviation	2499.0179	
Upper Confidence Limit - Normal	3042.5708	
Upper Confidence Limit - Lognormal	13381.0766 > mdl	
95th Percentile - Nonparametric	6600.0000 hit	
95th Percentile - Normal	5918.3460	
95th Percentile - Lognormal	8478.6687	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8427	
Corr Coeff - Detected - Lognormal	0.9673	
Corr Coeff - Total - Normal	0.8371	
Corr Coeff - Total - Lognormal	0.9549	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6879	NA
W-Test - Lognormal	0.8830	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000105

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : PHENANTHRENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	12.0000	
Average	4586.8462	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	89.0000	
Positive Hits - Maximum	21000.0000 acc	
Average Of Positive Hits	4951.5833	
Standard Deviation	7074.6229	
Upper Confidence Limit - Normal	8083.3927	
Upper Confidence Limit - Lognormal ...	94611.9291 > max	
95th Percentile - Nonparametric.....	21000.0000 hit	
95th Percentile - Normal.....	16224.6008	
95th Percentile - Lognormal	26711.0654	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8149	
Corr Coeff - Detected - Lognormal	0.9780	
Corr Coeff - Total - Normal	0.8263	
Corr Coeff - Total - Lognormal	0.9702	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6830	NA
W-Test - Lognormal	0.9166	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00106

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : PYRENE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	12.0000	
Average	10175.3846	
Detection Limit - Minimum	210.0000	
Detection Limits - Maximum	210.0000	
Positive Hits - Minimum	410.0000	
Positive Hits - Maximum	43000.0000 UCL	
Average Of Positive Hits	11005.8333	
Standard Deviation	15259.6989	
Upper Confidence Limit - Normal	17717.3058	
Upper Confidence Limit - Lognormal	165795.2533 > max hit	
95th Percentile - Nonparametric	43000.0000	
95th Percentile - Normal	35277.5893	
95th Percentile - Lognormal	56192.9021	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8680	
Corr Coeff - Detected - Lognormal	0.9711	
Corr Coeff - Total - Normal	0.8286	
Corr Coeff - Total - Lognormal	0.9625	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6816	NA
W-Test - Lognormal	0.9040	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : 4,4'-DDE (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	10.0000	
Average	32.8077	
Detection Limit - Minimum	18.5000	
Detection Limits - Maximum	21.0000	
Positive Hits - Minimum	10.0000	
Positive Hits - Maximum	95.0000	
Average Of Positive Hits	36.8000	
Standard Deviation	27.4799	
Upper Confidence Limit - Normal	~~46.3893~~	
Upper Confidence Limit - Lognormal ...	49.8752 UCL	
95th Percentile - Nonparametric.....	~~95.0000~~	
95th Percentile - Normal.....	78.0122	
95th Percentile - Lognormal	76.2766	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6315	
Corr Coeff - Detected - Lognormal	0.7961	
Corr Coeff - Total - Normal	0.8235	
Corr Coeff - Total - Lognormal	0.9373	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6836	NA
W-Test - Lognormal	0.8820	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00108

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : RUBBLE FILL AREA AT BUNKER A86

Parameter : 4,4'-DDT (UG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	10.0000	
Average	86.8846	
Detection Limit - Minimum	18.5000	
Detection Limits - Maximum	21.0000	
Positive Hits - Minimum	24.0000	
Positive Hits - Maximum	380.0000	
Average Of Positive Hits	107.1000	
Standard Deviation	108.8826	
Upper Confidence Limit - Normal	140.6985	
Upper Confidence Limit - Lognormal ...	179.6418 UCL	
95th Percentile - Nonparametric.....	380.0000	
95th Percentile - Normal.....	265.9965	
95th Percentile - Lognormal	254.4340	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6531	
Corr Coeff - Detected - Lognormal	0.8017	
Corr Coeff - Total - Normal	0.7998	
Corr Coeff - Total - Lognormal	0.9557	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.6542	NA
W-Test - Lognormal	0.9036	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000109

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 4 – Rubblefill at Bunker A86
LOCATION: NSB–NLON, Groton, CT
DATE: 01/11/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	240	IR:	0
EF:	80	EF:	1
Fi:	0.5	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	3.76E–07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	5.37E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	14	1	0.00E+00	5.26E–06	7.51E–08		7.30E–01
Benzo(a)pyrene	14	1	0.00E+00	5.26E–06	7.51E–08		7.30E+00
Benzo(b)fluoranthene	13	1	0.00E+00	4.88E–06	6.98E–08		7.30E–01
Benzo(k)fluoranthene	4.2	1	0.00E+00	1.58E–06	2.25E–08		7.30E–02
Bis(2–ethylhexyl)phthalate	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E–02	1.40E–02
Dibenz(a,h)anthracene	3.8	1	0.00E+00	1.43E–06	2.04E–08		7.30E+00
Indeno(1,2,3–cd)pyrene	6.6	1	0.00E+00	2.48E–06	3.54E–08		7.30E–01
Naphthalene	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–02	
~~Aluminum~~	~~16100~~	~~1~~	~~0.00E+00~~	~~6.05E–03~~	~~8.64E–05~~	~~1.00E+00~~	
Antimony	5.2	1	0.00E+00	1.95E–06	2.79E–08	4.00E–04	
Arsenic	121	1	0.00E+00	4.55E–05	6.49E–07	3.00E–04	1.50E+00
Beryllium	0.62	1	0.00E+00	2.33E–07	3.33E–09	5.00E–03	
~~Iron~~	~~17400~~	~~1~~	~~0.00E+00~~	~~6.54E–03~~	~~9.34E–05~~	~~3.00E–01~~	
Manganese	183	1	0.00E+00	6.88E–05	9.82E–07	~~5.00E–03~~ 2.4E-2	
Vanadium	44.2	1	0.00E+00	1.66E–05	2.37E–07	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/13/96
TLS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	5.49E−08
Benzo(a)pyrene	0.00E+00	0.00E+00	5.49E−07
Benzo(b)fluoranthene	0.00E+00	0.00E+00	5.09E−08
Benzo(k)fluoranthene	0.00E+00	0.00E+00	1.65E−09
Bis(2−ethylhexyl)phthalate	0.00E+00	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	1.49E−07
Indeno(1,2,3−cd)pyrene	0.00E+00	0.00E+00	2.59E−08
Naphthalene	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~6.05E−03~~	~~0.00E+00~~
Antimony	0.00E+00	4.88E−03	0.00E+00
Arsenic	0.00E+00	1.52E−01	9.74E−07
Beryllium	0.00E+00	4.66E−05	0.00E+00
~~Iron~~	~~0.00E+00~~	~~2.18E−02~~	~~0.00E+00~~
Manganese	0.00E+00	~~1.38E−02~~ 2.88E-3	0.00E+00
Vanadium	0.00E+00	2.37E−03	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~**2.60E−01**~~ 1.61E-1	**1.80E−06**

Revisions
08/13/96
AWS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 4 – Rubblefill at Bunker A86
LOCATION: NSB–NLON, Groton, CT
DATE: 01/11/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: *Construction Worker, CTE*

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: *DAevent = Kp x C x tevent x CF*

FOR ORGANICS:
IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	80
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.19E+01

CONVERSION FACTOR (CARCIN) = 1.70E–01

RISK ASSESSMENT SPREADSHEET -- DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Construction Worker, CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Chloroform	0.005	O	1.10E+00	4.70E-01	8.90E-03	9.30E-03	3.95E-07
Bromodichloromethane	0.003	O	2.10E+00	8.70E-01	5.80E-03	1.20E-02	1.69E-07
Methylene chloride	0.005	O	6.90E-01	2.90E-01	4.50E-03	1.80E-03	1.93E-07
Bis(2-ethylhexyl)phthalate	0.005	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	5.91E-06
Heptachlor	0.00013	O	9.40E+01	1.70E+01	1.10E-02	1.90E+00	4.61E-08
Antimony	0.0058	I			1.00E-03		4.64E-08
Cadmium	0.003	I			1.00E-03		2.40E-08
~~Iron~~	~~0.738~~	~~I~~			~~1.00E-03~~		~~5.90E-06~~
~~Manganese~~	~~0.0241~~	~~I~~			~~1.00E-03~~		~~1.93E-07~~
Thallium	0.0024	I			1.00E-03		1.92E-08
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

000116

Revisions
08/13/96
JMS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Chloroform	4.70E-06	1.00E-02	4.70E-04
Bromodichloromethane	2.01E-06	2.00E-02	1.00E-04
Methylene chloride	2.29E-06	6.00E-02	3.82E-05
Bis(2-ethylhexyl)phthalate	7.03E-05	1.10E-02	6.39E-03
Heptachlor	5.46E-07	5.00E-04	1.10E-03
Antimony	5.52E-07	4.00E-04	1.38E-03
Cadmium	2.86E-07	~~1.50E-05~~ 2.5E-5	~~1.90E-03~~ 1.14E-2
~~Iron~~	~~7.03E-05~~	~~1.50E-02~~	~~4.68E-03~~
~~Manganese~~	~~2.29E-06~~	~~1.50E-04~~	~~1.50E-02~~
Thallium	2.28E-07	4.00E-06	5.71E-02
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~1.00E-01~~ 7.80E-2

Revisions
08/13/96
JTS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Chloroform	6.72E–08	6.10E–03	4.10E–10
Bromodichloromethane	2.86E–08	6.20E–02	1.78E–09
Methylene chloride	3.28E–08	7.50E–03	2.46E–10
Bis(2–ethylhexyl)phthalate	1.00E–06	2.50E–02	2.51E–08
Heptachlor	7.83E–09	4.50E+00	3.53E–08
Antimony	7.89E–09		0.00E+00
Cadmium	4.08E–09		0.00E+00
~~Iron~~	~~1.00E–06~~		~~0.00E+00~~
~~Manganese~~	~~3.28E–08~~		~~0.00E+00~~
Thallium	3.26E–09		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			6.28E–08

000118

Revisions
08/13/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 4 – Rubblefill at Bunker A86
LOCATION: NSB–NLON, Groton, CT
DATE: 01/11/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	480	IR:	0
EF:	120	EF:	1
Fi:	1	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	2.25E–06	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	3.22E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	14	1	0.00E+00	3.16E–05	4.51E–07		7.30E–01
Benzo(a)pyrene	14	1	0.00E+00	3.16E–05	4.51E–07		7.30E+00
Benzo(b)fluoranthene	13	1	0.00E+00	2.93E–05	4.19E–07		7.30E–01
Benzo(k)fluoranthene	18	1	0.00E+00	4.06E–05	5.80E–07		7.30E–02
Bis(2–ethylhexyl)phthalate	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E–02	1.40E–02
Dibenz(a,h)anthracene	3.8	1	0.00E+00	8.57E–06	1.22E–07		7.30E+00
Indeno(1,2,3–cd)pyrene	6.6	1	0.00E+00	1.49E–05	2.13E–07		7.30E–01
Naphthalene	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–02	
~~Aluminum~~	~~16100~~	~~1~~	~~0.00E+00~~	~~3.63E–02~~	~~5.19E–04~~	~~1.00E+00~~	
Antimony	5.9	1	0.00E+00	1.33E–05	1.90E–07	4.00E–04	
Arsenic	121	1	0.00E+00	2.73E–04	3.90E–06	3.00E–04	1.50E+00
Beryllium	0.62	1	0.00E+00	1.40E–06	2.00E–08	5.00E–03	
~~Iron~~	~~17400~~	~~1~~	~~0.00E+00~~	~~3.92E–02~~	~~5.60E–04~~	~~3.00E–01~~	
Manganese	336	1	0.00E+00	7.57E–04	1.08E–05	~~5.00E–03~~ 2.4E-2	
Vanadium	44.2	1	0.00E+00	9.96E–05	1.42E–06	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

000120

Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	3.29E-07
Benzo(a)pyrene	0.00E+00	0.00E+00	3.29E-06
Benzo(b)fluoranthene	0.00E+00	0.00E+00	3.06E-07
Benzo(k)fluoranthene	0.00E+00	0.00E+00	4.23E-08
Bis(2-ethylhexyl)phthalate	0.00E+00	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	8.93E-07
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	1.55E-07
Naphthalene	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~8.68E-02~~	~~0.00E+00~~
Antimony	0.00E+00	3.33E-02	0.00E+00
Arsenic	0.00E+00	9.09E-01	5.85E-06
Beryllium	0.00E+00	2.80E-04	0.00E+00
~~Iron~~	~~0.00E+00~~	~~1.31E-01~~	~~0.00E+00~~
Manganese	0.00E+00	~~1.51E-01~~ 3.15E-2	0.00E+00
Vanadium	0.00E+00	1.42E-02	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~**1.00E+00**~~ 9.88E-1	**1.09E-05**

Revisions
08/13/96
KMS

000121

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 4 – Rubblefill at Bunker A86
LOCATION: NSB–NLON, Groton, CT
DATE: 01/11/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	120
A:	3600
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.78E+01

CONVERSION FACTOR (CARCIN) = 2.55E–01

000123

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Construction Worker, RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Chloroform	0.007	O	1.10E+00	4.70E-01	8.90E-03	9.30E-03	5.53E-07
Bromodichloromethane	0.003	O	2.10E+00	8.70E-01	5.80E-03	1.20E-02	1.69E-07
Methylene chloride	0.007	O	6.90E-01	2.90E-01	4.50E-03	1.80E-03	2.70E-07
Bis(2-ethylhexyl)phthalate	0.008	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	9.46E-06
Heptachlor	0.00053	O	9.40E+01	1.70E+01	1.10E-02	1.90E+00	1.88E-07
Antimony	0.0068	I			1.00E-03		5.44E-08
Cadmium	0.1016	I			1.00E-03		8.13E-07
~~Iron~~	~~2.22~~	~~I~~			~~1.00E-03~~		~~1.78E-05~~
~~Manganese~~	~~0.0466~~	~~I~~			~~1.00E-03~~		~~3.73E-07~~
Thallium	0.0058	I			1.00E-03		4.64E-08
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00

Revisions
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KS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: *Construction Worker, RME*
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Chloroform	9.88E-06	1.00E-02	9.88E-04
Bromodichloromethane	3.01E-06	2.00E-02	1.50E-04
Methylene chloride	4.82E-06	6.00E-02	8.03E-05
Bis(2-ethylhexyl)phthalate	1.69E-04	1.10E-02	1.53E-02
Heptachlor	3.35E-06	5.00E-04	6.71E-03
Antimony	9.71E-07	4.00E-04	2.43E-03
Cadmium	1.45E-05	~~1.50E-05~~ 2.5E-5	~~9.67E-01~~ 5.80E-1
~~Iron~~	~~3.17E-04~~	~~1.50E-02~~	~~2.11E-02~~
~~Manganese~~	~~6.65E-06~~	~~4.50E-01~~	~~1.11E-08~~
Thallium	8.28E-07	4.00E-06	2.07E-01
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~1.27E+00~~ 8.13E-1

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Revisions
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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Chloroform	1.41E-07	6.10E-03	8.61E-10
Bromodichloromethane	4.30E-08	6.20E-02	2.66E-09
Methylene chloride	6.88E-08	7.50E-03	5.16E-10
Bis(2-ethylhexyl)phthalate	2.41E-06	2.50E-02	6.03E-08
Heptachlor	4.79E-08	4.50E+00	2.16E-07
Antimony	1.39E-08		0.00E+00
Cadmium	2.07E-07		0.00E+00
~~Iron~~	~~4.53E-06~~		~~0.00E+00~~
~~Manganese~~	~~9.50E-08~~		~~0.00E+00~~
Thallium	1.18E-08		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			2.80E-07

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Revisions
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[initials]

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 4 – Rubblefill at Bunker A86
LOCATION: NSB–NLON, Groton, CT
DATE: 01/11/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil); CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	50
EF:	1	EF:	52
Fi:	1	Fi:	0.5
ED:	1	ED:	3
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	1095

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	8.28E–08	(AVG ANNUAL DOSE)	CF:	3.55E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil); CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	14	1	1.16E–06	0.00E+00	4.97E–08		7.30E–01
Benzo(a)pyrene	14	1	1.16E–06	0.00E+00	4.97E–08		7.30E+00
Benzo(b)fluoranthene	13	1	1.08E–06	0.00E+00	4.61E–08		7.30E–01
Benzo(k)fluoranthene	5.1	1	4.22E–07	0.00E+00	1.81E–08		7.30E–02
Bis(2–ethylhexyl)phthalate	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E–02	1.40E–02
Dibenz(a,h)anthracene	3.8	1	3.15E–07	0.00E+00	1.35E–08		7.30E+00
Indeno(1,2,3–cd)pyrene	6.6	1	5.47E–07	0.00E+00	2.34E–08		7.30E–01
Naphthalene	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–02	
~~Aluminum~~	~~16800~~	~~1~~	~~1.39E–03~~	~~0.00E+00~~	~~5.96E–05~~	~~1.00E+00~~	
Antimony	5.4	1	4.47E–07	0.00E+00	1.92E–08	4.00E–04	
Arsenic	150	1	1.24E–05	0.00E+00	5.32E–07	3.00E–04	1.50E+00
Beryllium	0.67	1	5.55E–08	0.00E+00	2.38E–09	5.00E–03	
~~Iron~~	~~20900~~	~~1~~	~~1.73E–03~~	~~0.00E+00~~	~~7.42E–05~~	~~8.00E–01~~	
Manganese	238	1	1.97E–05	0.00E+00	8.45E–07	~~5.00E–03~~ 2.4E-2	
Vanadium	53.5	1	4.43E–06	0.00E+00	1.90E–07	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
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RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil); CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	3.63E−08
Benzo(a)pyrene	0.00E+00	0.00E+00	3.63E−07
Benzo(b)fluoranthene	0.00E+00	0.00E+00	3.37E−08
Benzo(k)fluoranthene	0.00E+00	0.00E+00	1.32E−09
Bis(2−ethylhexyl)phthalate	0.00E+00	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	9.85E−08
Indeno(1,2,3−cd)pyrene	0.00E+00	0.00E+00	1.71E−08
Naphthalene	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~1.30E−03~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	1.12E−03	0.00E+00	0.00E+00
Arsenic	4.14E−02	0.00E+00	7.99E−07
Beryllium	1.11E−05	0.00E+00	0.00E+00
~~Iron~~	~~5.77E−03~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	~~3.94E−03~~ 8.21E-4	0.00E+00	0.00E+00
Vanadium	6.33E−04	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	~~5.43E−02~~ 4.41E-2	**0.00E+00**	**1.35E−06**

Revisions
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AMS

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES

SITE NAME: Site 4 – Rubblefill at Bunker A86
LOCATION: NSB–NLON, Groton, CT
DATE: 01/11/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
TWO EXPOSURE ROUTES ARE CONSIDERED: INCIDENTAL INGESTION AND DERMAL CONTACT.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser; CTE

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

INGESTION: IEX = (C x CR x ET x EF x ED)/(BW x AT)

WHERE:
C = SURFACE WATER CONCENTRATION (MG/L)
CR = CONTACT RATE (L/HR)
ET = EXPOSURE TIME (HRS/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1000 CM**3/L)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

INGESTION:

CR:	0.05	CONVERSION	
ET:	2	FACTOR (NONCAR) =	3.31E–04
EF:	52		
ED:	3	CONVERSION	
BW:	43	FACTOR (CARCIN) =	1.42E–05
AT(NOCN):	1095		
AT(CAR):	25550		

DERMAL CONTACT:

EV:	1	CONVERSION	
ED:	3	FACTOR (NONCAR) =	1.04E+01
EF:	52		
A:	3150	CONVERSION	
tevent:	2	FACTOR (CARCIN) =	4.47E–01
BW:	43		
AT(NON):	1095		
AT(CAR):	25550		

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE TWO)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser; CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Arsenic	0.0014	I			1.00E-03		2.80E-09
~~Iron~~	~~1.03~~	~~I~~			~~1.00E-03~~		~~2.06E-06~~
~~Manganese~~	~~0.0304~~	~~I~~			~~1.00E-03~~		~~6.08E-08~~
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00

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RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE THREE)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser; CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL INGESTION DOSE (MG/KG/DAY)	ANNUAL DERMAL DOSE (MG/KG/DAY)	INGESTION RfD (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX INGESTION	HAZARD INDEX DERMAL	TOTAL HAZARD INDEX
Arsenic	4.64E-07	2.92E-08	3.00E-04	2.60E-04	1.55E-03	1.04E-04	1.65E-03
~~Iron~~	~~3.41E-04~~	~~2.15E-05~~	~~3.00E-01~~	~~1.50E-02~~	~~1.14E-03~~	~~1.43E-03~~	~~2.57E-03~~
~~Manganese~~	~~1.01E-05~~	~~6.35E-07~~	~~5.00E-03~~ 2.4E-2	~~1.50E-04~~ 7.2E-4	~~2.01E-03~~ 4.19E-4	~~4.23E-03~~ 8.81E-4	~~6.24E-03~~ 1.30E-3
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					~~4.70E-03~~ 1.55E-3	~~5.77E-03~~ 1.04E-4	~~1.05E-02~~ 1.65E-3

000133

Revisions
08/13/96
KMS

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE FOUR)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser; CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE INGESTION DOSE (MG/KG/DAY)	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF INGESTION (KG/DAY/MG)	CSF DERMAL (KG/DAY/MG)	CANCER RISK INGESTION	CANCER RISK DERMAL CONTACT	TOTAL CANCER RISK
Arsenic	1.99E-08	1.25E-09			0.00E+00	0.00E+00	0.00E+00
~~Iron~~	~~1.46E-05~~	~~9.21E-07~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Manganese~~	~~4.32E-07~~	~~2.72E-08~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					0.00E+00	0.00E+00	0.00E+00

000134

Revisions
3/13/96
ATLS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SEDIMENT

SITE NAME: Site 4 – Rubblefill at Bunker A86
LOCATION: NSB–NLON, Groton, CT
DATE: 01/11/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser; CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SEDIMENT SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	50
EF:	1	EF:	52
Fi:	1	Fi:	0.5
ED:	1	ED:	3
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	1095

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	8.28E–08	(AVG ANNUAL DOSE)	CF:	3.55E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SEDIMENT (PAGE TWO)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser; CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	1.8	1	1.49E–07	0.00E+00	6.39E–09		7.30E–01
Benzo(a)pyrene	1.7	1	1.41E–07	0.00E+00	6.03E–09		7.30E+00
Benzo(b)fluoranthene	2	1	1.66E–07	0.00E+00	7.10E–09		7.30E–01
Benzo(k)fluoranthene	0	1	0.00E+00	0.00E+00	0.00E+00		7.30E–02
Bis(2–ethylhexyl)phthalate	200	1	1.66E–05	0.00E+00	7.10E–07	2.00E–02	1.40E–02
Dibenz(a,h)anthracene	0.75	1	6.21E–08	0.00E+00	2.66E–09		7.30E+00
Indeno(1,2,3–cd)pyrene	1.1	1	9.11E–08	0.00E+00	3.90E–09		7.30E–01
Naphthalene	130	1	1.08E–05	0.00E+00	4.61E–07	4.00E–02	
~~Aluminum~~	~~5910~~	~~1~~	~~4.90E–04~~	~~0.00E+00~~	~~2.10E–05~~	~~1.00E+00~~	
Antimony	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–04	
Arsenic	4.5	1	3.73E–07	0.00E+00	1.60E–08	3.00E–04	1.50E+00
Beryllium	0.24	1	1.99E–08	0.00E+00	8.52E–10	5.00E–03	
~~Iron~~	~~9220~~	~~1~~	~~7.64E–04~~	~~0.00E+00~~	~~3.27E–05~~	~~3.00E–01~~	
Manganese	161	1	1.33E–05	0.00E+00	5.72E–07	~~5.00E–03~~ 2.4E-2	
Vanadium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/13/96
KS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SEDIMENT (PAGE THREE)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser; CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	4.66E−09
Benzo(a)pyrene	0.00E+00	0.00E+00	4.41E−08
Benzo(b)fluoranthene	0.00E+00	0.00E+00	5.18E−09
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Bis(2−ethylhexyl)phthalate	8.28E−04	0.00E+00	9.94E−09
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	1.94E−08
Indeno(1,2,3−cd)pyrene	0.00E+00	0.00E+00	2.85E−09
Naphthalene	2.69E−04	0.00E+00	0.00E+00
~~Aluminum~~	~~4.00E−04~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	1.24E−03	0.00E+00	2.40E−08
Beryllium	3.98E−06	0.00E+00	0.00E+00
~~Iron~~	~~2.55E−03~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	~~2.67E−03~~ 5.56E-4	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	~~8.05E−03~~ 2.90E-3	**0.00E+00**	**1.10E−07**

000137

Revisions
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AJS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 4 – Rubblefill at Bunker A86
LOCATION: NSB–NLON, Groton, CT
DATE: 01/11/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil); RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	100
EF:	1	EF:	120
Fi:	1	Fi:	1
ED:	1	ED:	10
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	3650

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	7.65E–07	(AVG ANNUAL DOSE)	CF:	1.09E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil); RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	14	1	1.07E–05	0.00E+00	1.53E–06		7.30E–01
Benzo(a)pyrene	14	1	1.07E–05	0.00E+00	1.53E–06		7.30E+00
Benzo(b)fluoranthene	13	1	9.94E–06	0.00E+00	1.42E–06		7.30E–01
Benzo(k)fluoranthene	18	1	1.38E–05	0.00E+00	1.97E–06		7.30E–02
Bis(2–ethylhexyl)phthalate	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E–02	1.40E–02
Dibenz(a,h)anthracene	3.8	1	2.91E–06	0.00E+00	4.15E–07		7.30E+00
Indeno(1,2,3–cd)pyrene	6.6	1	5.05E–06	0.00E+00	7.21E–07		7.30E–01
Naphthalene	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–02	
~~Aluminum~~	~~16800~~	~~1~~	~~1.28E–02~~	~~0.00E+00~~	~~1.83E–03~~	~~1.00E+00~~	
Antimony	5.9	1	4.51E–06	0.00E+00	6.44E–07	4.00E–04	
Arsenic	150	1	1.15E–04	0.00E+00	1.64E–05	3.00E–04	1.50E+00
Beryllium	0.67	1	5.12E–07	0.00E+00	7.32E–08	5.00E–03	
~~Iron~~	~~20900~~	~~1~~	~~1.60E–02~~	~~0.00E+00~~	~~2.28E–03~~	~~9.00E–01~~	
Manganese	238	1	1.82E–04	0.00E+00	2.60E–05	~~5.00E–03~~ 2.4E-2	
Vanadium	53.5	1	4.09E–05	0.00E+00	5.84E–06	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

000140

Revisions
08/13/96
JS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil); RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	1.12E−06
Benzo(a)pyrene	0.00E+00	0.00E+00	1.12E−05
Benzo(b)fluoranthene	0.00E+00	0.00E+00	1.04E−06
Benzo(k)fluoranthene	0.00E+00	0.00E+00	1.44E−07
Bis(2−ethylhexyl)phthalate	0.00E+00	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	3.03E−06
Indeno(1,2,3−cd)pyrene	0.00E+00	0.00E+00	5.26E−07
Naphthalene	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~1.28E−02~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	1.13E−02	0.00E+00	0.00E+00
Arsenic	3.82E−01	0.00E+00	2.46E−05
Beryllium	1.02E−04	0.00E+00	0.00E+00
~~Iron~~	~~5.33E−02~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	~~3.64E−02~~ 7.58E-3	0.00E+00	0.00E+00
Vanadium	5.84E−03	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	~~5.02E−01~~ 4.07E-1	**0.00E+00**	**4.16E−05**

Revisions
08/13/96
KMS

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES

SITE NAME: Site 4 – Rubblefill at Bunker A86
LOCATION: NSB–NLON, Groton, CT
DATE: 01/11/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
TWO EXPOSURE ROUTES ARE CONSIDERED: INCIDENTAL INGESTION AND DERMAL CONTACT.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser; RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

INGESTION: IEX = (C x CR x ET x EF x ED)/(BW x AT)

WHERE:
C = SURFACE WATER CONCENTRATION (MG/L)
CR = CONTACT RATE (L/HR)
ET = EXPOSURE TIME (HRS/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1000 CM**3/L)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

INGESTION:

CR:	0.05	CONVERSION FACTOR (NONCAR) =	1.53E–03
ET:	4		
EF:	120		
ED:	10	CONVERSION FACTOR (CARCIN) =	2.18E–04
BW:	43		
AT(NOCN):	3650		
AT(CAR):	25550		

DERMAL CONTACT:

EV:	1	CONVERSION FACTOR (NONCAR) =	2.41E+01
ED:	10		
EF:	120		
A:	3150	CONVERSION FACTOR (CARCIN) =	3.44E+00
tevent:	4		
BW:	43		
AT(NON):	3650		
AT(CAR):	25550		

RISK ASSESSMENT SPREADSHEET -- SURFACE WATER EXPOSURES (PAGE TWO)
Site 4 -- Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser; RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Arsenic	0.0017	I			1.00E-03		6.80E-09
~~Iron~~	~~1.46~~	~~I~~			~~1.00E-03~~		~~5.84E-06~~
~~Manganese~~	~~0.0424~~	~~I~~			~~1.00E-03~~		~~1.70E-07~~
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
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							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

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Revisions
08/13/96
JS

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE THREE)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser; RME
CALCULATE DOSES:

CHEMICAL	ANNUAL INGESTION DOSE (MG/KG/DAY)	ANNUAL DERMAL DOSE (MG/KG/DAY)	INGESTION RfD (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX INGESTION	HAZARD INDEX DERMAL	TOTAL HAZARD INDEX
Arsenic	2.60E-06	1.64E-07	3.00E-04	2.80E-04	8.67E-03	5.85E-04	9.25E-03
~~Iron~~	~~2.23E-03~~	~~1.41E-04~~	~~3.00E-01~~	~~1.50E-02~~	~~7.44E-03~~	~~9.38E-03~~	~~1.68E-02~~
~~Manganese~~	~~8.48E-05~~	~~4.88E-06~~	~~5.00E-03~~ ~~2.4E-2~~	~~1.50E-04~~ ~~7.2E-4~~	~~4.68E-02~~ ~~2.7E-3~~	~~2.78E-02~~ ~~5.67E-3~~	~~4.62E-02~~ ~~8.38E-3~~
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					~~2.91E-02~~ 8.67E-3	~~8.78E-02~~ 5.85 E-4	~~8.83E-02~~ 9.52E-3

Revisions
08/13/96
SMS

RISK ASSESSMENT SPREADSHEET -- SURFACE WATER EXPOSURES (PAGE FOUR)
Site 4 -- Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser; RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE INGESTION DOSE (MG/KG/DAY)	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF INGESTION (KG/DAY/MG)	CSF DERMAL (KG/DAY/MG)	CANCER RISK INGESTION	CANCER RISK DERMAL CONTACT	TOTAL CANCER RISK
Arsenic	3.71E-07	2.34E-08			0.00E+00	0.00E+00	0.00E+00
~~Iron~~	~~3.19E-04~~	~~2.01E-05~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Manganese~~	~~9.26E-06~~	~~5.84E-07~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					0.00E+00	0.00E+00	0.00E+00

Revisions
08/13/96
JMS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SEDIMENT

SITE NAME: Site 4 – Rubblefill at Bunker A86
LOCATION: NSB–NLON, Groton, CT
DATE: 01/11/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser; RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SEDIMENT SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	100
EF:	1	EF:	120
Fi:	1	Fi:	1
ED:	1	ED:	10
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	3650

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	7.65E–07	(AVG ANNUAL DOSE)	CF:	1.09E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SEDIMENT (PAGE TWO)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser; RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG-DAY/MG)
Benzo(a)anthracene	2.7	1	2.06E-06	0.00E+00	2.95E-07		7.30E-01
Benzo(a)pyrene	2.6	1	1.99E-06	0.00E+00	2.84E-07		7.30E+00
Benzo(b)fluoranthene	3.1	1	2.37E-06	0.00E+00	3.39E-07		7.30E-01
Benzo(k)fluoranthene	0	1	0.00E+00	0.00E+00	0.00E+00		7.30E-02
Bis(2-ethylhexyl)phthalate	610	1	4.66E-04	0.00E+00	6.66E-05	2.00E-02	1.40E-02
Dibenz(a,h)anthracene	0.75	1	5.73E-07	0.00E+00	8.19E-08		7.30E+00
Indeno(1,2,3-cd)pyrene	1.2	1	9.17E-07	0.00E+00	1.31E-07		7.30E-01
Naphthalene	380	1	2.91E-04	0.00E+00	4.15E-05	4.00E-02	
~~Aluminum~~	~~8460~~	~~1~~	~~6.47E-03~~	~~0.00E+00~~	~~9.24E-04~~	~~1.00E+00~~	
Antimony	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E-04	
Arsenic	8.9	1	6.80E-06	0.00E+00	9.72E-07	3.00E-04	1.50E+00
Beryllium	0.29	1	2.22E-07	0.00E+00	3.17E-08	5.00E-03	
~~Iron~~	~~11300~~	~~1~~	~~8.64E-03~~	~~0.00E+00~~	~~1.23E-03~~	~~3.00E-01~~	
Manganese	200	1	1.53E-04	0.00E+00	2.18E-05	~~5.00E-03~~ 2.4E-2	
Vanadium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E-03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

00018

Revisions
1-13/96
MS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SEDIMENT (PAGE THREE)
Site 4 – Rubblefill at Bunker A86
EXPOSURE SCENARIO: Older Child Trespasser; RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	2.15E−07
Benzo(a)pyrene	0.00E+00	0.00E+00	2.07E−06
Benzo(b)fluoranthene	0.00E+00	0.00E+00	2.47E−07
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Bis(2−ethylhexyl)phthalate	2.33E−02	0.00E+00	9.33E−07
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	5.98E−07
Indeno(1,2,3−cd)pyrene	0.00E+00	0.00E+00	9.57E−08
Naphthalene	7.26E−03	0.00E+00	0.00E+00
~~Aluminum~~	~~6.47E−03~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	2.27E−02	0.00E+00	1.46E−06
Beryllium	4.43E−05	0.00E+00	0.00E+00
~~Iron~~	~~2.08E−02~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	~~3.06E−02~~ 6.38E-3	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	~~4.19E−01~~ 5.95 E-2	**0.00E+00**	**5.62E−06**

Revisions
08/13/96
JAS

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 1 OF 2)

SITE NAME: Site 4 - Rubblefill at Bunker A86
LOCATION: NSB-NLON, Groton, CT
DATE: 01/12/96

EXPOSURE SCENARIO: CTE

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 8.80 ug Pb/L
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	200.0	200.0
1-2	200.0	200.0
2-3	200.0	200.0
3-4	200.0	200.0
4-5	200.0	200.0
5-6	200.0	200.0
6-7	200.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

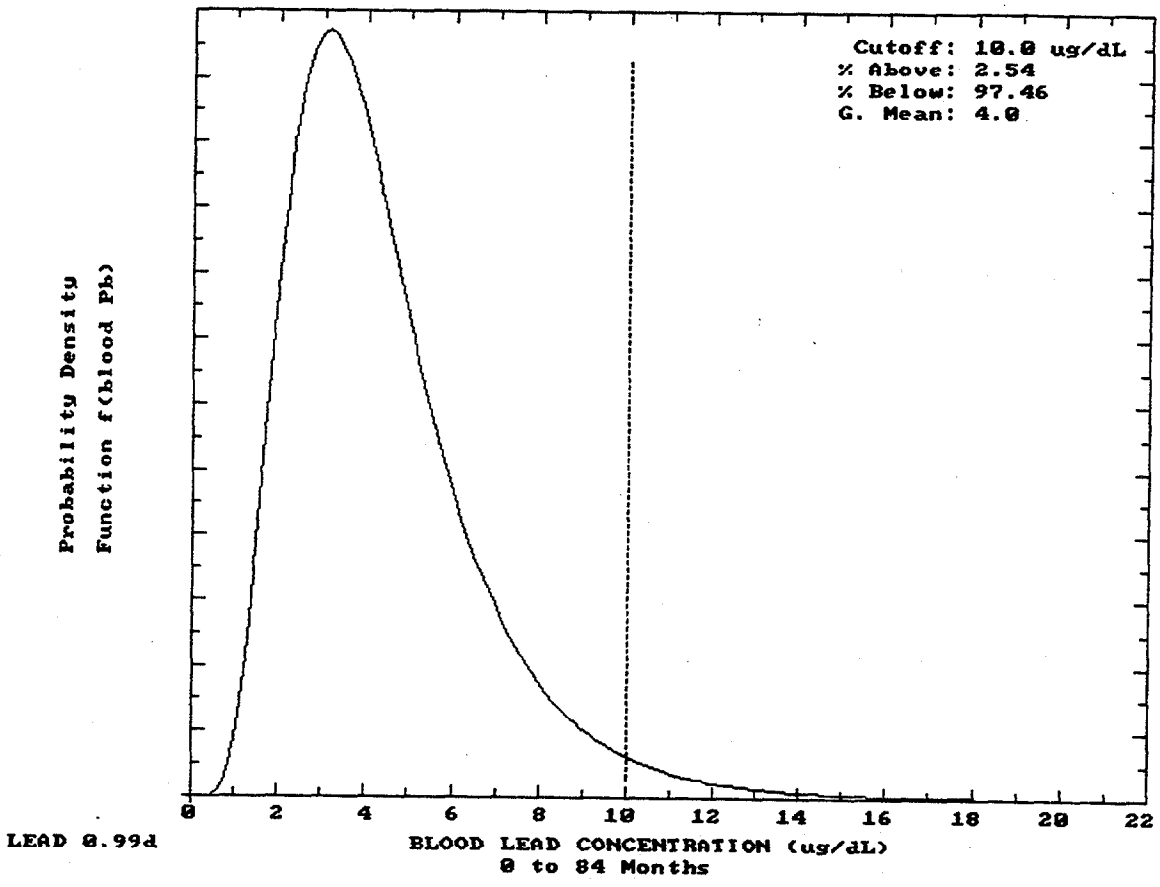
YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	4.3	8.00	4.65
1-2:	4.9	11.91	7.29
2-3:	4.6	12.48	7.38
3-4:	4.4	12.58	7.48
4-5:	3.8	10.84	5.66
5-6:	3.3	10.66	5.13
6-7:	3.1	10.77	4.86

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.52	0.80	0.00	0.02
1-2:	2.60	1.98	0.00	0.03
2-3:	2.96	2.08	0.00	0.06
3-4:	2.88	2.15	0.00	0.07
4-5:	2.83	2.28	0.00	0.07
5-6:	3.01	2.42	0.00	0.09
6-7:	3.34	2.48	0.00	0.09

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 2 OF 2)

SITE NAME: Site 4 - Rubblefill at Bunker A86
LOCATION: NSB-NLON, Groton, CT
DATE: 01/12/96

EXPOSURE SCENARIO: CTE



IEUBK MODEL - EXPOSURE TO LEAD (PAGE 1 OF 2)

SITE NAME: Site 4 - Rubblefill at Bunker A86
LOCATION: NSB-NLON, Groton, CT
DATE: 01/12/96

EXPOSURE SCENARIO: RME

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 5.40 ug Pb/L
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	200.0	200.0
1-2	200.0	200.0
2-3	200.0	200.0
3-4	200.0	200.0
4-5	200.0	200.0
5-6	200.0	200.0
6-7	200.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

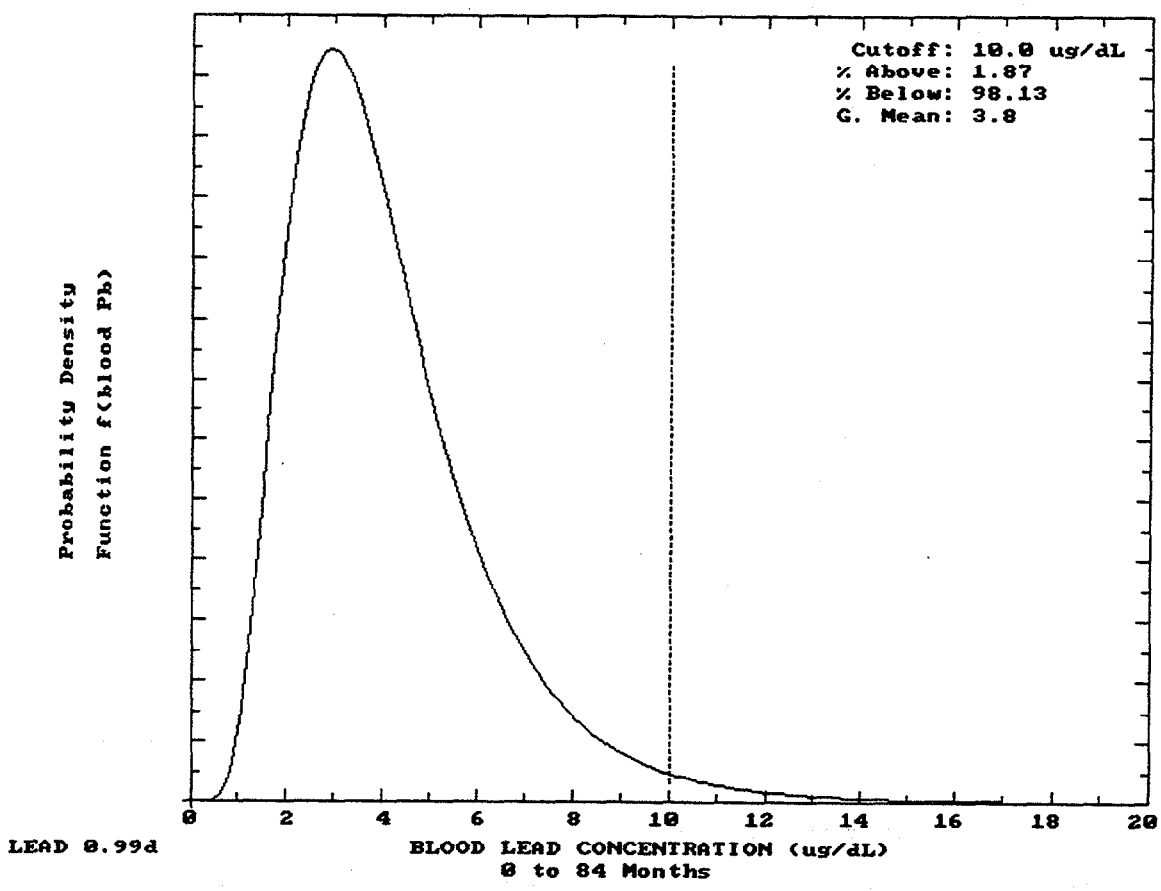
YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	4.2	7.72	4.67
1-2:	4.6	11.21	7.34
2-3:	4.4	11.74	7.42
3-4:	4.1	11.80	7.52
4-5:	3.5	10.00	5.68
5-6:	3.1	9.76	5.15
6-7:	2.8	9.85	4.88

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.53	0.49	0.00	0.02
1-2:	2.62	1.22	0.00	0.03
2-3:	2.97	1.29	0.00	0.06
3-4:	2.89	1.33	0.00	0.07
4-5:	2.85	1.41	0.00	0.07
5-6:	3.02	1.49	0.00	0.09
6-7:	3.35	1.53	0.00	0.09

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 2 OF 2)

SITE NAME: Site 4 - Rubblefill at Bunker A86
LOCATION: NSB-NLON, Groton, CT
DATE: 01/12/96

EXPOSURE SCENARIO: RME



SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 4 RUBBLE FILL AREA AT BUNKER A86 - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
1,1,2,2-Tetrachloroethane	0.003	0.003	3.1	29	0.01	0.1
1,1,2-Trichloroethane	0.006	0.006	11	100	0.1	1
1,1-Dichloroethene	0.002	0.002	1	9.5	0.14	1.4
1,2-Dichloroethene (total)	0.003	0.002	500 (3)	1000 (3)	1.4 (3)	14 (3)
2-Butanone	0.07	0.044	500	1000	8	80
4-Methyl-2-pentanone	0.012	0.012	500	1000	7	14
Acetone	0.61	0.61	500	1000	14	140
Benzene	0.002	0.002	21	200	0.02	0.2
Bromodichloromethane	0.003	0.003	-	-	-	-
Bromomethane	0.003	0.003	-	-	-	-
Chlorobenzene	0.003	0.003	500	1000	2	20
Chloroform	0.002	0.002	100	940	0.12	1.2
Chloromethane	0.022	0.011	-	-	-	-
Cis-1,3-dichloropropene	0.003	0.003	3.4 (4)	32 (4)	0.01 (4)	0.1 (4)
Ethylbenzene	0.002	0.002	500	1000	10.1	10.1
Methylene chloride	0.11	0.11	82	760	0.1 *	1.0
Styrene	0.002	0.002	500	1000	2	20
Tetrachloroethene	0.005	0.003	12	110	0.1	1
Toluene	0.003	0.002	500	1000	20	67
Trans-1,3-dichloropropene	0.004	0.004	3.4 (4)	32 (4)	0.01 (4)	0.1 (4)
Trichloroethene	0.002	0.002	56	520	0.1	1
Vinyl acetate	0.008	0.008	-	-	-	-
Xylenes (total)	0.005	0.005	500	1000	19.5	19.5
2-Methylnaphthalene	0.045	0.045	-	-	-	-
3,3'-Dichlorobenzidine	0.1	0.10	-	-	-	-
Acenaphthene	0.41	0.17	-	-	-	-
Acenaphthylene	1.6	0.6	1000	2500	8.4	84
Anthracene	3.4	0.8	1000	2500	40	400
Benzo(a)anthracene	14	4	1 *	7.8 *	1 *	1 *

000155

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 4 RUBBLE FILL AREA AT BUNKER A86 - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Benzo(a)pyrene	14	4	1 *	1 *	1 *	1 *
Benzo(b)fluoranthene	13	4	1 *	7.8 *	1 *	1 *
Benzo(g,h,i)perylene	6.5	1.9	-	-	-	-
Benzo(k)fluoranthene	18	7	8.4 *	78	1 *	1 *
Benzoic acid	0.29	0.16	-	-	-	-
Bis(2-Ethylhexyl)phthalate	0.12	0.12	44	410	1	11
Carbazole	1.5	0.4	-	-	-	-
Chrysene	29	6	-	-	-	-
Di-N-octyl phthalate	0.026	0.026	1000	2500	2	20
Dibenzo(a,h)anthracene	3.8	1.2	-	-	-	-
Dibenzofuran	0.07	0.070	-	-	-	-
Fluoranthene	38	9	1000	2500	5.6 *	56
Fluorene	1.5	0.4	1000	2500	5.6	56
Indeno(1,2,3-Cd)pyrene	6.6	1.8	-	-	-	-
Naphthalene	0.05	0.050	1000	2500	5.6	56
Phenanthrene	21	5	1000	2500	4 *	40
Pyrene	43	10	1000	2500	4 *	40 *
4,4'-DDE	0.095	0.035	-	-	-	-
4,4'-DDT	0.38	0.10	-	-	-	-
Alpha-Chlordane	0.013	0.008	0.49 (5)	2.2 (5)	0.066 (5)	0.066 (5)
Dieldrin	0.0085	0.0075	0.038	0.36	0.007 *	0.007 *
Endosulfan II	0.007	0.0070	-	-	-	-
Endosulfan sulfate	0.019	0.014	-	-	-	-
Endrin aldehyde	0.0058	0.0058	-	-	-	-
Endrin ketone	0.043	0.026	-	-	-	-
Gamma-Chlordane	0.008	0.0053	0.49 (5)	2.2 (5)	0.066 (5)	0.066 (5)
Heptachlor	0.0024	0.0017	0.14	1.3	0.013	0.013
Heptachlor epoxide	0.0025	0.0025	0.067	0.63	0.02	0.02
Aluminum	22900	12336	-	-	-	-

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 4 RUBBLE FILL AREA AT BUNKER A86 - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Antimony	5.9	4.7	27	8200	-	-
Arsenic	150	36	10 *	10 *	-	-
Barium	70.1	43.7	4700	1.4E+5	-	-
Beryllium	0.85	0.52	2	2	-	-
Boron	17.4	16.7	-	-	-	-
Calcium	31600	3982	-	-	-	-
Chromium (total)	19.5	14.3	100 (6)	100 (6)	-	-
Cobalt	6.8	4.2	-	-	-	-
Copper	77.4	23.1	2500	7.6E+4	-	-
Iron	36800	13281	-	-	-	-
Lead	120	65	500	1000	-	-
Magnesium	3310	2453	-	-	-	-
Manganese	336	181	-	-	-	-
Mercury	0.17	0.17	20	610	-	-
Nickel	15.6	10.3	1400	7500	-	-
Potassium	2300	1286	-	-	-	-
Selenium	0.93	0.84	340	1E+4	-	-
Sodium	254	132	-	-	-	-
Vanadium	89.6	31.8	470	1.4E+4	-	-
Zinc	412	92	2E+4	6.1E+5	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

000157

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 4 RUBBLE FILL AREA AT BUNKER A86 - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
1,1,1-Trichloroethane	2	2	200	200	62000
4-Methyl-2-pentanone	5	5	-	350	-
Bromodichloromethane	1	1	100	-	-
Carbon disulfide	2	2	-	-	-
Chloroform	11	6	100	6 *	14100
Methylene chloride	8	6	5 *	5 *	48000
Xylenes (total)	2	2	10000	530	-
Benzoic acid	0.7	0.65	-	-	-
Bis(2-Ethylhexyl)phthalate	11	7	6 *	2 *	59
Heptachlor	0.53	0.53	0.4 *	0.4 *	0.05 *
Aluminum	3350	1576	-	-	-
Barium	91.7	52.1	2000	1000	-
Boron	34.4	30.5	-	-	-
Cadmium	20.2	10.7	5 *	5 *	6 *
Calcium	28600	21090	-	-	-
Chromium (total)	12.6	12.6	100 (5)	50 (5)	110 (6)
Copper	28.1	15.2	-	1300	48
Iron	4430	1817	-	-	-
Lead	16.5	12.0	-	15 *	13 *
Magnesium	4890	3531	-	-	-
Manganese	80.1	24.1	5000 (7)	-	-
Potassium	4330	3529	-	-	-
Sodium	62400	41020	28000 (8) *	-	-
Thallium	5.8	5.7	2 *	5 *	63
Vanadium	4.5	4.5	-	50	-
Zinc	58.5	25.5	-	5000	123

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 4 RUBBLE FILL AREA AT BUNKER A86 - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 4 RUBBLE FILL AREA AT BUNKER A86 - FILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Aluminum	48.6	48.6	-	-	-
Antimony	6.8	6.8	6 *	6 *	86000
Barium	91.6	43.8	2000	1000	-
Boron	49.1	29.0	-	-	-
Cadmium	5	5	5	5	6
Calcium	27500	20580	-	-	-
Copper	26.6	11.4	-	1300	48
Iron	33.3	19.6	-	-	-
Lead	2.1	1.7	-	15	13
Magnesium	4870	3340	-	-	-
Manganese	16.1	10.7	5000 (7)	-	-
Potassium	3710	2942	-	-	-
Sodium	66800	41220	28000 (8) *	-	-
Thallium	6	6	2 *	5 *	63
Zinc	30.7	12.6	-	5000	123

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 4 RUBBLE FILL AREA AT BUNKER A86 - UNFILTERED SURFACE WATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Water Quality Standards (2)			
			Aquatic Life		Human Health	
			Freshwater	Saltwater	Organisms	Water and Organisms
Bis(2-Ethylhexyl)phthalate	1	1	-	-	5.9	1.8
Aluminum	1710	1313	-	-	-	-
Arsenic	2.4	2.4	190	36	0.14 *	0.018 *
Calcium	752	583	-	-	-	-
Copper	23.4	12.4	4.8 *	2.9 *	-	-
Iron	1710	1173	-	-	-	-
Lead	15.7	12.0	1.3 *	8.5 *	-	50
Magnesium	483	348	-	-	-	-
Manganese	44.5	34.4	-	-	-	-
Potassium	710	710	-	-	-	-
Vanadium	5.6	4.6	-	-	-	-
Zinc	50.1	35.0	12.3 *	86	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 Connecticut Water Quality Standards, 1992.
3 Chromium (hexavalent).

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 4 RUBBLE FILL AREA AT BUNKER A86 - FILTERED SURFACE WATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Water Quality Standards (2)			
			Aquatic Life		Human Health	
			Freshwater	Saltwater	Organisms	Water and Organisms
Calcium	332	332	-	-	-	-
Copper	8.7	8.7	4.8 *	2.9 *	-	-
Potassium	676	654	-	-	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 Connecticut Water Quality Standards, 1992.
3 Chromium (hexavalent).

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 4 RUBBLE FILL AREA AT BUNKER A86 - SEDIMENT (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
1,1,2,2-Tetrachloroethane	0.019	0.019	3.1	29	0.01 *	0.1
1,1,2-Trichloroethane	0.016	0.016	11	100	0.1	1
1,1-Dichloroethene	0.002	0.002	1	9.5	0.14	1.4
1,2-Dichloroethane	0.012	0.012	6.7	63	0.02	0.2
1,2-Dichloroethene (total)	0.012	0.012	500 (3)	1000 (3)	1.4 (3)	14 (3)
1,2-Dichloropropane	0.01	0.010	9	84	0.1	1.0
2-Butanone	0.045	0.031	500	1000	8	80
4-Methyl-2-pentanone	0.036	0.036	500	1000	7	14
Benzene	0.007	0.007	21	200	0.02	0.2
Bromodichloromethane	0.01	0.010	-	-	-	-
Bromoform	0.009	0.009	78	720	0.08	0.8
Chlorobenzene	0.008	0.008	500	1000	2	20
Chloroform	0.006	0.006	100	940	0.12	1.2
Chloromethane	0.01	0.009	-	-	-	-
Cis-1,3-dichloropropene	0.011	0.011	3.4 (4)	32 (4)	0.01 (4) *	0.1 (4)
Ethylbenzene	0.004	0.004	500	1000	10.1	10.1
Methylene chloride	0.014	0.014	82	760	0.1	1.0
Styrene	0.008	0.008	500	1000	2	20
Tetrachloroethene	0.005	0.004	12	110	0.1	1
Toluene	0.007	0.004	500	1000	20	67
Trans-1,3-dichloropropene	0.012	0.012	3.4 (4)	32 (4)	0.01 (4) *	0.1 (4)
Trichloroethene	0.005	0.004	56	520	0.1	1
Vinyl acetate	0.016	0.016	-	-	-	-
Xylenes (total)	0.015	0.015	500	1000	19.5	19.5
2-Methylnaphthalene	54	27	-	-	-	-
2-Methylphenol	0.11	0.11	-	-	-	-
Acenaphthene	0.29	0.16	-	-	-	-
Acenaphthylene	0.24	0.16	1000	2500	8.4	84

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SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 4 RUBBLE FILL AREA AT BUNKER A86 - SEDIMENT (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Anthracene	0.95	0.57	1000	2500	40	400
Benzo(a)anthracene	2.7	1.7	1 *	7.8	1 *	1 *
Benzo(a)pyrene	2.6	1.7	1 *	1 *	1 *	1 *
Benzo(b)fluoranthene	3.1	2.1	1 *	7.8	1 *	1 *
Benzo(g,h,i)perylene	1.2	0.7	-	-	-	-
Benzo(k)fluoranthene	2.2	1.5	8.4	78	1 *	1 *
Bis(2-Ethylhexyl)phthalate	610	204	44 *	410 *	1 *	11 *
Butyl benzyl phthalate	820	820	1000	2500	20 *	200 *
Carbazole	0.52	0.31	-	-	-	-
Chrysene	2.9	2.0	-	-	-	-
Di-N-butyl phthalate	42	42	1000	2500	14 *	140
Di-N-octyl phthalate	6.5	3.3	1000	2500	2 *	20
Dibenzo(a,h)anthracene	0.75	0.50	-	-	-	-
Dibenzofuran	0.24	0.13	-	-	-	-
Dimethyl phthalate	59	59	-	-	-	-
Fluoranthene	5.2	2.3	1000	2500	5.6	56
Fluorene	0.37	0.21	1000	2500	5.6	56
Indeno(1,2,3-Cd)pyrene	1.2	0.8	-	-	-	-
Naphthalene	380	190	1000	2500	5.6 *	56 *
Phenanthrene	3.9	2.3	1000	2500	4	40
Pyrene	4.4	2.4	1000	2500	4 *	40
4,4'-DDT	0.028	0.021	-	-	-	-
Endosulfan sulfate	0.017	0.015	-	-	-	-
Endrin	0.0072	0.0072	20	610	-	-
Endrin aldehyde	0.016	0.016	-	-	-	-
Endrin ketone	0.023	0.023	-	-	-	-
Gamma-Chlordane	0.0024	0.0024	0.49 (5)	2.2 (5)	0.066 (5)	0.066 (5)
Aluminum	8460	5907	-	-	-	-
Arsenic	8.9	4.5	10	10	-	-

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 4 RUBBLE FILL AREA AT BUNKER A86 - SEDIMENT (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Barium	29	23	4700	1.4E+5	-	-
Beryllium	0.29	0.29	2	2	-	-
Calcium	1300	1134	-	-	-	-
Chromium (total)	18.3	13.4	100 (6)	100 (6)	-	-
Cobalt	5.9	4.6	-	-	-	-
Copper	35.3	28.9	2500	7.6E+4	-	-
Iron	11300	9220	-	-	-	-
Lead	66.6	36.9	500	1000	-	-
Magnesium	2720	2413	-	-	-	-
Manganese	200	161	-	-	-	-
Nickel	11.3	8.3	1400	7500	-	-
Potassium	1230	1215	-	-	-	-
Sodium	148	108	-	-	-	-
Vanadium	37	24	470	1.4E+4	-	-
Zinc	73.2	47.5	2E+4	6.1E+5	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

APPENDIX F.10

SITE 6 - DRMO

SUMMARY OF COC SELECTION
SITE 6 DRMO - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Carbon disulfide	2/16	0.001 - 0.002	6MW4	0.005 - 0.013	780	11	14	N	2
Methylene chloride	2/16	0.002	6SS3	0.001 - 0.02	85	7	0.01	N	2
Tetrachloroethene	5/16	0.001 - 0.009	6MW2	0.004 - 0.013	12	11	0.04	N	2
Toluene	1/16	0.001	6TB1	0.005 - 0.013	1600	520	5	N	2
Trichloroethene	8/16	0.001 - 0.04	6TB12	0.005 - 0.013	58	3	0.02	N	2
Acenaphthylene	1/16	0.21	6MW4	0.33 - 23	-	-	-	N	1
Anthracene	2/16	0.039 - 0.43	6MW4	0.33 - 23	2300	-	4300	N	2
Benzo(a)anthracene	8/16	0.1 - 3.2	6MW4	0.35 - 23	0.88	-	0.7	Y	3
Benzo(a)pyrene	3/16	0.24 - 4	6MW4	0.33 - 23	0.088	-	4	Y	3
Benzo(b)fluoranthene	7/16	0.15 - 2.7	6MW4	0.35 - 23	0.88	-	4	Y	3
Benzo(g,h,i)perylene	1/16	3.6	6MW4	0.33 - 23	-	-	-	N	1
Benzo(k)fluoranthene	7/16	0.047 - 4	6MW4	0.35 - 23	8.8	-	4	N	2
Benzoic acid	2/11	9.3 - 12	6SS3	1.6 - 18	31000	-	280	N	2
Bis(2-ethylhexyl)phthalate	2/16	0.34 - 3.5	6TB3	0.35 - 23	46	210	11	N	2
Chrysene	8/16	0.093 - 3	6MW4	0.35 - 23	88	-	1	N	2
Fluoranthene	10/16	0.066 - 3.7	6MW4	0.35 - 23	310	-	980	N	2
Indeno(1,2,3-cd)pyrene	1/16	3.6	6MW4	0.33 - 23	0.88	-	35	Y	3
Phenanthrene	8/16	0.055 - 1.4	6MW4	0.35 - 23	-	-	-	N	1
Pyrene	11/16	0.14 - 4.3	6MW4	0.35 - 23	230	-	1400	N	2
4,4'-DDD	1/16	0.026	6TB23	0.0034 - 0.53	2.7	-	0.7	N	2
4,4'-DDT	2/16	0.0072 - 0.03	6TB23	0.0034 - 0.53	1.9	80	1.0	N	2
Aroclor-1254	3/16	0.075 - 0.09	6TB11	0.037 - 5.3	0.16	-	-	N	2
Aroclor-1260	7/16	0.12 - 11	6TB2	0.036 - 0.18	0.083	-	-	Y	3
Endrin aldehyde	1/5	0.0054	6TB12	0.0034 - 0.0042	-	-	-	N	1
Aluminum	16/16	4490 - 14600	6SS3	-	7800	-	-	~~Y~~ N	~~3~~ 4
Antimony	3/4	2 - 19.2	6MW4	3.4	3.1	-	-	Y	3
Arsenic	16/16	1.1 - 3.4	W1/6MW12/6TB	-	0.43	380	15	Y	3
Barium	16/16	29.5 - 174	6MW4	-	550	350000	32	N	2
Beryllium	16/16	0.2 - 0.9	6TB23	-	0.15	690	180	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 6 DRMO - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Boron	1/5	2.9	6TB11	1.8 - 4.4	700	-	-	N	2
Cadmium	14/16	0.62 - 6.7	6MW4	0.42 - 0.55	3.9	920	6	Y	3
Calcium	16/16	610 - 2760	6SS3/6TB1	-	-	-	-	N	1
Chromium (total)	16/16	8.9 - 55	6MW4	-	39 (7)	140 (7)	19 (7)	Y	3
Cobalt	14/16	3.8 - 13.9	6SS3	4.2 - 4.9	470	-	-	N	2
Copper	16/16	19.7 - 513	6MW4	-	290	-	-	~~Y~~ N	~~3~~ 4
Cyanide	1/16	0.1	6TB11	0.09 - 1.4	160	-	-	N	2
Iron	16/16	7700 - 23400	6SS3	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	16/16	2.9 - 459	6MW2	-	400 (8)	-	-	Y	3
Magnesium	16/16	1680 - 7190	6SS3	-	-	-	-	N	1
Manganese	16/16	110 - 440	6SS3	-	~~39~~ 190	-	-	Y	3
Mercury	14/16	0.05 - 1.9	6TB3	0.11	2.3	7	3	N	2
Nickel	16/16	7.5 - 33.1	6TB23	-	160	6900	21	N	2
Potassium	16/16	1070 - 6520	6SS3	-	-	-	-	N	1
Selenium	2/16	0.22 - 0.23	6SS3	0.21 - 0.51	39	-	3	N	2
Silver	1/15	6.2	6MW2	0.29 - 1.7	39	-	-	N	2
Sodium	13/16	80.5 - 459	6TB1	57.3 - 85.2	-	-	-	N	1
Thallium	2/16	0.44 - 0.64	6TB23	0.34 - 0.69	0.55 (9)	-	0.4	Y	3
Vanadium	16/16	11.5 - 53.2	6SS3	-	55	-	-	N	2
Zinc	16/16	25.3 - 28300	6TB2	-	2300	-	42000	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 6 DRMO - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in mg/kg unless otherwise noted. Surface soil designated as soil from depths of 0 to ~~10~~ 2 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Hexavalent chromium.
8 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
9 Thallic oxide.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 6 DRMO - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
Carbon disulfide	2	3.6786
Methylene chloride	2	4.3571
Tetrachloroethene	9	4.3571
Toluene	1	3.7143
Trichloroethene	40	7.0714
Acenaphthylene	210	1806.4286
Anthracene	430	1811.7143
Benzo(a)anthracene	3200	1820.7143
Benzo(a)pyrene	4000	2065
Benzo(b)fluoranthene	2700	1839.2857
Benzo(g,h,i)perylene	3600	2048.5714
Benzo(k)fluoranthene	4000	1878.9286
Benzoic acid	12000	5088.8889
Bis(2-ethylhexyl)phthalate	3500	2007.8571
Chrysene	3000	1817.3571
Fluoranthene	3700	1904
Indeno(1,2,3-cd)pyrene	3600	2048.5714
Phenanthrene	1400	1692.5
Pyrene	4300	1898.5714
4,4'-DDD	26	37.4607
4,4'-DDT	30	38.1321
Aroclor-1254	90	370.6071
Aroclor-1260	11000	1545.8214
Endrin aldehyde	5.4	2.59
Inorganics (mg/kg)		
Aluminum	14600	8142.8571
Antimony	19.2	7.7333
Arsenic	3.4	2.25
Barium	174	82.5857
Beryllium	0.9	0.445
Boron	2.9	1.66
Cadmium	6.7	3.0504
Calcium	2760	1669.7857
Chromium (total)	55	20.85
Cobalt	13.9	7.4607
Copper	513	136.3857
Cyanide	0.1	0.4286
Iron	23400	12480
Lead	459	156.3071
Magnesium	7190	3434.2857
Manganese	440	208.9286
Mercury	1.9	0.3968
Nickel	33.1	17.8214

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 6 DRMO - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (mg/kg) (Continued)		
Potassium	6520	2490.7143
Selenium	0.23	0.2096
Silver	6.2	0.9536
Sodium	459	155.0893
Thallium	0.64	0.3107
Vanadium	53.2	25.5643
Zinc	28300	2245.7143

SUMMARY OF COC SELECTION
SITE 6 DRMO - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
1,1,2,2-Tetrachloroethane	1/31	6.4	6TB4	0.005 - 0.03	3.2	0.4	0.001	Y	2
1,1,2-Trichloroethane	1/31	0.59	6TB4	0.005 - 0.03	11	0.8	0.01	N	3
1,1-Dichloroethene	1/31	0.013	6TB4	0.005 - 0.03	1.1	0.04	0.03	N	2
1,2-Dichloroethane	2/31	0.079 - 1.9	6TB4	0.005 - 0.013	7	0.3	0.01	N	2
1,2-Dichloroethene (total)	2/31	0.002 - 16	6TB4	0.005 - 0.03	70	1500/3600 (10)	0.2/0.3 (10)	N	2
Acetone	1/31	0.35	6TB4	0.01 - 0.11	780	62000	8	N	2
Benzene	1/31	0.007	6TB4	0.005 - 0.03	22	0.5	0.02	N	2
Carbon disulfide	5/31	0.001 - 0.048	6TB4	0.005 - 0.03	780	11	14	N	2
Chloroform	1/31	0.014	6TB4	0.005 - 0.03	100	0.2	0.3	N	2
Ethylbenzene	1/31	0.044	6TB4	0.005 - 0.03	780	260	5	N	2
Methylene chloride	3/31	0.002 - 0.017	6MW2D	0.001 - 0.037	85	7	0.01	N	2
Tetrachloroethene	9/31	0.001 - 0.21	6TB4	0.004 - 0.03	12	11	0.04	N	2
Toluene	3/31	0.001 - 0.043	6TB4	0.005 - 0.03	1600	520	5	N	2
Trichloroethene	14/31	0.001 - 7.1	6TB4	0.005 - 0.03	58	3	0.02	N	2
Vinyl chloride	1/31	1.3	6TB4	0.01 - 0.03	0.34	0.002	0.01	Y	3
Xylenes, total	1/31	0.34	6TB4	0.005 - 0.03	16000	320	74	N	2
2-Methylnaphthalene	3/30	0.042 - 1.7	6TB4	0.33 - 23	-	-	-	N	1
4-Methylphenol	1/30	0.79	6TB4	0.33 - 23	39	-	-	N	2
Acenaphthene	2/30	0.049 - 0.33	6TB4	0.33 - 23	470	-	200	N	2
Acenaphthylene	2/30	0.089 - 0.21	6MW4	0.14 - 23	-	-	-	N	1
Anthracene	6/30	0.037 - 0.43	6MW4	0.33 - 23	2300	-	4300	N	2
Benzo(a)anthracene	17/30	0.072 - 3.2	6MW4	0.35 - 23	0.88	-	0.7	Y	3
Benzo(a)pyrene	8/30	0.074 - 4	6MW4	0.33 - 23	0.088	-	4	Y	3
Benzo(b)fluoranthene	16/30	0.024 - 2.7	6MW4	0.35 - 23	0.88	-	4	Y	3
Benzo(g,h,i)perylene	4/29	0.37 - 3.6	6MW4	0.33 - 23	-	-	-	N	1
Benzo(k)fluoranthene	13/29	0.02 - 4	6MW4	0.35 - 23	8.8	-	4	N	2
Benzoic acid	4/22	0.032 - 12	6SS3	1.6 - 18	31000	-	280	N	2
Bis(2-ethylhexyl)phthalate	4/30	0.12 - 7.7	6MW4	0.35 - 23	46	210	11	N	2
Chrysene	18/30	0.093 - 3	6MW4	0.35 - 23	88	-	1	N	2

SUMMARY OF COC SELECTION (Continued)
SITE 6 DRMO - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL — Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Dibenzo(a,h)anthracene	1/29	0.13	6MW2	0.33 - 23	0.088	-	11	Y	3
Fluoranthene	21/30	0.036 - 3.7	6MW4	0.35 - 23	310	-	980	N	2
Fluorene	2/30	0.066 - 0.18	6MW4	0.33 - 23	310	-	160	N	2
Indeno(1,2,3-cd)pyrene	4/29	0.026 - 3.6	6MW4	0.33 - 23	0.88	-	35	Y	3
Naphthalene	1/30	6.5	6TB4	0.33 - 23	310	-	30	N	2
Phenanthrene	17/30	0.055 - 1.4	6MW4	0.35 - 23	-	-	-	N	1
Pyrene	22/30	0.047 - 4.3	6MW4	0.35 - 23	230	-	1400	N	2
4,4'-DDD	1/31	0.026	6TB23	0.0034 - 0.8	2.7	-	0.7	N	2
4,4'-DDE	1/31	0.0041	6TB9	0.0034 - 0.8	1.9	-	0.5	N	2
4,4'-DDT	2/31	0.0072 - 0.03	6TB23	0.0034 - 0.8	1.9	80	1.0	N	2
Aroclor-1254	6/31	0.072 - 0.44	6TB20	0.037 - 8	0.16	-	-	Y	3
Aroclor-1260	13/31	0.11 - 12	6TB2	0.036 - 0.94	0.083	-	-	Y	3
Endrin	1/31	0.0044	6MW2D	0.0034 - 0.8	2.3	-	0.4	N	2
Endrin aldehyde	3/11	0.0054 - 0.0058	6TB9	0.0034 - 0.038	-	-	-	N	1
Gamma-chlordane	1/31	0.0025	6TB20	0.0018 - 4	0.49 (7)	10 (7)	2 (7)	N	2
1,2,3,4,6,7,8-HPCDD	1/1	0.0007	6TB20	-	0.0004	-	-	Y	3
OCDD	1/1	0.0031	6TB20	-	0.004	-	-	N	2
Aluminum	31/31	4490 - 14600	6SS3	-	7800	-	-	~~Y~~ N	~~3~~ 4
Antimony	6/9	2 - 19.2	6MW4	3.4 - 6.9	3.1	-	-	Y	3
Arsenic	31/31	1.1 - 7.5	6MW1	-	0.43	380	15	Y	3
Barium	31/31	28 - 181	6TB20	-	550	350000	32	N	2
Beryllium	28/31	0.2 - 2.2	6TB20	0.2 - 0.7	0.15	690	180	Y	3
Boron	3/11	2.9 - 60.2	6TB20	1.8 - 11.6	700	-	-	N	2
Cadmium	26/31	0.45 - 6.7	6MW4	0.42 - 1.9	3.9	920	6	Y	3
Calcium	31/31	610 - 8320	6TB20	-	-	-	-	N	1
Chromium (total)	29/31	6.2 - 139	6MW4	7.9 - 10.7	39 (8)	140 (8)	19 (8)	Y	3
Cobalt	29/31	3.5 - 29	6TB20	4.2 - 4.9	470	-	-	N	2
Copper	31/31	10.6 - 513	6MW4	-	290	-	-	~~Y~~ N	~~3~~ 4
Cyanide	2/28	0.1 - 0.15	6TB20	0.09 - 2.3	160	-	-	N	2

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SUMMARY OF COC SELECTION (Continued)
SITE 6 DRMO - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Iron	31/31	6480 - 37300	6TB20	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	31/31	2.3 - 459	6MW2	-	400 (9)	-	-	Y	3
Magnesium	31/31	1680 - 7190	6SS3	-	-	-	-	N	1
Manganese	31/31	110 - 603	6MW7S	-	~~39~~ 190	-	-	Y	3
Mercury	22/31	0.05 - 1.9	6TB3	0.1 - 0.19	2.3	7	3	N	2
Nickel	31/31	6.5 - 104	6TB20	-	160	6900	21	N	2
Potassium	31/31	1050 - 6520	6SS3	-	-	-	-	N	1
Selenium	3/31	0.22 - 1	6TB4	0.21 - 0.96	39	-	3	N	2
Silver	1/30	6.2	6MW2	0.28 - 3.4	39	-	-	N	2
Sodium	27/31	80.5 - 5860	6TB4	57.3 - 85.2	-	-	-	N	1
Thallium	2/31	0.44 - 0.64	6TB23	0.33 - 2.3	0.55 (11)	-	0.4	Y	3
Vanadium	31/31	9 - 63.8	6MW4	-	55	-	-	Y	3
Zinc	31/31	25.3 - 28300	6TB2	-	2300	-	42000	Y	3

Footnotes:

1 Results in mg/kg unless otherwise noted. ~~Surface~~ All soil designated as soil from depths of 0 to 10 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Total chlordane.
8 Hexavalent chromium.
9 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
10 Value for cis- and trans- isomers presented.
11 Thallic oxide.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be a uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening lev
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 6 DRMO - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
1,1,2,2-Tetrachloroethane	6400	232.6786
1,1,2-Trichloroethane	590	25.1786
1,1-Dichloroethene	13	4.5714
1,2-Dichloroethane	1900	74.25
1,2-Dichloroethene (total)	16000	575.4107
Acetone	350	22.5179
Benzene	7	4.3571
Carbon disulfide	48	5.7321
Chloroform	14	4.6071
Ethylbenzene	44	5.6786
Methylene chloride	17	5.3929
Tetrachloroethene	210	12.3929
Toluene	43	5.5357
Trichloroethene	7100	260.3214
Vinyl chloride	1300	52.1429
Xylenes, total	340	16.25
2-Methylnaphthalene	1700	1383.2222
4-Methylphenol	790	1373.1481
Acenaphthene	330	1350.8889
Acenaphthylene	210	1366.8148
Anthracene	430	1343.2593
Benzo(a)anthracene	3200	1337.2963
Benzo(a)pyrene	4000	1568.1111
Benzo(b)fluoranthene	2700	1436.2593
Benzo(g,h,i)perylene	3600	1608.4615
Benzo(k)fluoranthene	4000	1463.0769
Benzoic acid	12000	3752.7368
Bis(2-ethylhexyl)phthalate	7700	1731.6667
Chrysene	3000	1357.7037
Dibenzo(a,h)anthracene	130	1447.3077
Fluoranthene	3700	1450.2593
Fluorene	180	1371.8889
Indeno(1,2,3-cd)pyrene	3600	1567.7308
Naphthalene	6500	1584.6296
Phenanthrene	1400	1278.8519
Pyrene	4300	1542.2963
4,4'-DDD	26	42.2375
4,4'-DDE	4.1	41.4589
4,4'-DDT	30	42.5732
Aroclor-1254	440	439.4821
Aroclor-1260	12000	1420.4107
Endrin	4.4	40.8732
Endrin aldehyde	5.8	7.85
gamma-Chlordane	2.5	195.1321

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 6 DRMO - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Dioxins (ug/kg)		
1,2,3,4,6,7,8-HPCDD	0.67	0.67
OCDD	3.07	3.07
Inorganics (mg/kg)		
Aluminum	14600	8205.7143
Antimony	19.2	5.4625
Arsenic	7.5	2.8464
Barium	181	82.4714
Beryllium	2.2	0.51
Boron	60.2	9.05
Cadmium	6.7	2.6511
Calcium	8320	1941
Chromium (total)	139	23.0571
Cobalt	29	8.1911
Copper	513	120.3714
Cyanide	0.15	0.4836
Iron	37300	13988.2143
Lead	459	114.0464
Magnesium	7190	3758.9286
Manganese	603	244.2143
Mercury	1.9	0.2877
Nickel	104	19.2536
Potassium	6520	2751.0714
Selenium	1	0.2534
Silver	6.2	0.8414
Sodium	5860	578.525
Thallium	0.64	0.3577
Vanadium	63.8	28.2
Zinc	28300	1261.7786

SUMMARY OF COC SELECTION
SITE 6 DRMO - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
1,1-Dichloroethane	2/27	2 - 3	6GW8S	5 - 10	-	-	81	N	2
1,2-Dichloroethene (total)	8/27	1 - 8	6GW8S	5 - 10	70/100 (7)	70/100 (7)	5.5	Y	3
Carbon disulfide	1/27	3	6GW2D	5 - 10	-	-	100	N	2
Trichloroethene	8/27	1 - 8	6GW4S	5 - 10	5	5	1.6	Y	3
Vinyl chloride	1/27	5	6GW8S	10	2	2	0.019	Y	3
1,4-Dichlorobenzene	1/25	0.5	6GW7S	10	75	75	0.44	Y	3
Benzo(g,h,i)perylene	1/25	1	6GW2D	10	-	-	-	N	1
Benzoic acid	2/25	1 - 21	6GW5D	50	-	-	15000	N	2
Bis(2-ethylhexyl)phthalate	5/25	0.6 - 10	6GW5D	10 - 18	6	6	4.8	Y	3
Di-n-butyl phthalate	1/25	1	6GW3S	10	-	-	370	N	2
Di-n-octyl phthalate	1/25	5	6GW3D	10	-	-	73	N	2
Diethyl phthalate	2/25	2 - 3	6GW7S	10	-	-	2900	N	2
Dimethyl phthalate	1/25	0.9	6GW7S	10	-	-	37000	N	2
Indeno(1,2,3-cd)pyrene	1/25	1	6GW2D	10	-	-	0.092	Y	3
Phenol	2/25	2 - 4	6GW6D	10	-	-	2200	N	2
Aluminum	9/25	21.5 - 19300	6GW2D	10 - 222	50 - 200 (8)	-	3700	~~Y~~ N	~~3~~ 5
Arsenic	12/25	2 - 21	6GW2D	1 - 10	50	50	0.045	Y	3
Barium	20/25	10.3 - 288	6GW3D	15 - 67.3	2000	2000	260	Y	3
Beryllium	1/25	1	6GW3D	1 - 1.1	4	4	0.016	Y	3
Boron	16/18	86.6 - 2370	6GW2D	42.8 - 50	-	-	330	Y	3
Cadmium	4/25	2.1 - 4	6GW4S	1 - 3	5	5	1.8	Y	3
Calcium	25/25	6970 - 274000	6GW3D	-	-	-	-	N	1
Chromium (total)	2/25	6.3 - 47.6	6GW2D	1 - 5	100	100	18 (10)	Y	3
Cobalt	4/25	4.6 - 14.3	6GW2D	1 - 5	-	-	220	N	2
Copper	15/24	4.1 - 355	6GW4S	1 - 5	1300 (9)	-	150	~~Y~~ N	~~3~~ 5
Iron	24/25	8.7 - 44800	6GW6D	20	300 (8)	-	1100	~~Y~~ N	~~3~~ 5
Lead	6/20	1.6 - 52.7	6GW2S	2 - 20	15 (9)	-	-	Y	4
Magnesium	25/25	1000 - 949000	6GW3D	-	-	-	-	N	1
Manganese	22/25	14.3 - 1440	6GW2D	2.5 - 6.9	50 (8)	-	~~18~~ 88	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 6 DRMO - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Mercury	2/25	0.21 - 0.3	6GW5D	0.2	2	2	1.1	N	2
Nickel	6/25	11.7 - 32.9	6GW2D	7 - 22.2	100	100	73	N	2
Potassium	25/25	3010 - 364000	6GW2D	-	-	-	-	N	1
Selenium	5/20	9.9 - 23.5	6GW4S	1 - 4	50	50	18	Y	3
Sodium	25/25	7470 - 7560000	6GW3D	-	-	-	-	N	1
Vanadium	6/22	5.2 - 64.2	6GW2D	1 - 20	-	-	26	Y	3
Zinc	14/25	4.2 - 356	6GW4S	2 - 60.3	5000 (8)	-	1100	N	2

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Values for cis- and trans- isomer presented.
8 Secondary MCL.
9 Action Level.
10 Hexavalent chromium.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 No COC screening level available; maximum is less than Federal Action Level.
5 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 6 DRMO - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
1,1-Dichloroethane	4	4.0417
1,2-Dichloroethene (total)	6.5	3.875
Carbon disulfide	4	4.0833
Trichloroethene	8	4.4028
Vinyl chloride	5	5
1,4-Dichlorobenzene	2.75	4.7955
Benzo(g,h,i)perylene	3	4.8182
Benzoic acid	21	23.9091
Bis(2-ethylhexyl)phthalate	10	5.3955
Di-n-butyl phthalate	3.6667	4.8788
Di-n-octyl phthalate	5	5
Diethyl phthalate	3.75	4.8864
Dimethyl phthalate	2.95	4.8136
Indeno(1,2,3-cd)pyrene	3	4.8182
Phenol	4	4.9091
Inorganics (ug/L)		
Aluminum	10053	1118.4159
Arsenic	18.6	6.1811
Barium	265	75.25
Beryllium	0.75	0.5242
Boron	2355	1228.8938
Cadmium	4	1.4576
Calcium	271000	111403.3333
Chromium (total)	24.55	4.0992
Cobalt	8.1	3.0682
Copper	355	42.1136
Iron	30675	6427.0318
Lead	50.9	13.0045
Magnesium	839000	304395.303
Manganese	1390	560.4091
Mercury	0.3	0.1215
Nickel	23.2	10.0773
Potassium	338500	116472.5758
Selenium	23.5	4.7636
Sodium	7025000	2631170
Vanadium	64.2	13.4765
Zinc	356	52.8311

SUMMARY OF COC SELECTION
SITE 6 DRMO - FILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Aluminum	1/18	327	6GW2S	10 - 32	50 - 200 (7)	-	3700	N	1
Antimony	1/15	5.7	6GW3S	5 - 17	6	6	1.5	Y	2
Arsenic	3/18	4.2 - 14	6GW2S	1 - 20	50	50	0.045	N	1
Barium	14/18	11.5 - 297	6GW3D	25.3 - 56.8	2000	2000	260	N	1
Boron	16/18	83.6 - 2420	6GW2D	50 - 57.4	-	-	330	N	1
Calcium	18/18	13400 - 326000	6GW3D	-	-	-	-	N	1
Chromium (total)	1/17	3.2	6GW2D	1 - 4	100	100	18 (9)	N	1
Cobalt	2/18	3 - 3.5	6GW3D	1 - 5	-	-	220	N	1
Copper	9/15	2.5 - 31.9	6GW7S	2 - 5	1300 (8)	-	150	N	1
Iron	13/18	5.7 - 14100	6GW3D	17 - 50	300 (7)	-	1100	N	1
Lead	1/16	2.4	6GW3D	1 - 20	15 (8)	-	-	N	1
Magnesium	18/18	4370 - 966000	6GW3D	-	-	-	-	N	1
Manganese	16/18	1.2 - 1460	6GW3D	2.4 - 5	50 (7)	-	~~18~~ 88	N	1
Mercury	1/18	0.2	6GW1S	0.2	2	2	1.1	N	1
Nickel	4/18	10.4 - 17.5	6GW3D	3 - 12.7	100	100	73	N	1
Potassium	18/18	3220 - 373000	6GW2D	-	-	-	-	N	1
Sodium	18/18	48200 - 7730000	6GW3D	-	-	-	-	N	1
Vanadium	5/14	3.1 - 19.5	6GW3S	1 - 5	-	-	26	N	1
Zinc	4/18	3.7 - 22.2	6GW3D	2 - 17.3	5000 (7)	-	1100	N	1

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL (SMCL).
8 Action Level.
9 Hexavalent chromium.

Rationale Designations:

1 Chemical detected in unfiltered samples; filtered results not used in risk assessment.
2 Chemical not detected in unfiltered samples; maximum is greater than or equal to the COC screening level.

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SUMMARY OF COC SELECTION
SITE 6 DRMO - UNFILTERED SURFACE WATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	AWQC (4)	Risk-based COC Screening Level (5)	Selected as COC?	Rationale
Aluminum	1/1	83.2	121090-6SW1	-	-	3700	N	2
Calcium	1/1	70800	121090-6SW1	-	-	-	N	1
Copper	1/1	13.7	121090-6SW1	-	1300	150	N	2
Iron	1/1	304	121090-6SW1	-	-	1100	N	2
Magnesium	1/1	204000	121090-6SW1	-	-	-	N	1
Manganese	1/1	30.8	121090-6SW1	-	-	~~18~~ 88	~~Y~~ N	~~3~~ 2
Potassium	1/1	63100	121090-6SW1	-	-	-	N	1
Selenium	1/1	4.8	121090-6SW1	-	100	18	N	2
Sodium	1/1	1820000	121090-6SW1	-	-	-	N	1
Zinc	1/1	16.5	121090-6SW1	-	-	1100	N	2

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as two samples. Non-validated and rejected results not used in risk assessment.
3 Sample-specific.
4 Ambient water quality criteria for the consumption of water and organisms (USEPA, June 15, 1990).
5 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
~~3 Maximum is greater than or equal to the COC screening level.~~

Soil Data (0-2') - DRMO

~~Table X~~

Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
ALUMINUM	14/14	4490.0000 14600.0000	Log✓	8142.8571	10,200(b)	na	na	na	na	na	
ARSENIC	14/14	1.1000 3.4000	Log✓	2.2500	2.8(b)	na	na	na	na	na	
BARIUM	14/14	29.5000 174.0000	Log✓	82.5857	119(b)	na	na	na	na	na	
BERYLLIUM	14/14	0.2000 0.9000	Log✓	0.4450	0.61(b)	na	na	na	na	na	
CADMIUM	12/14	0.6200 6.7000	Norm✓	3.5183	4.1(a)	na	na	na	na	na	
CALCIUM	14/14	610.0000 2760.0000	Log✓	1669.7857	2170(b)	na	na	na	na	na	
CHROMIUM	14/14	8.9000 55.0000	Log✓	20.8500	28.4(b)	na	na	na	na	na	
COBALT	12/14	3.8000 13.9000	Log✓	8.3250	11.2(b)	na	na	na	na	na	
COPPER	14/14	19.7000 513.0000	Log✓	136.3857	292(b)	na	na	na	na	na	
IRON	14/14	7700.0000 23400.0000	Log✓	12480.0000	14,800(b)	na	na	na	na	na	
LEAD	14/14	2.9000 459.0000	Log✓	156.3071	~~918(b)~~ → 469(c)	na	na	na	na	na	
MAGNESIUM	14/14	1680.0000 7190.0000	Und✓	3434.2857	7190(d)	na	na	na	na	na	

000021

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
MANGANESE	14/14	110.0000 440.0000	Log✓	208.9286	260(b)	na	na	na	na	na	
MERCURY	13/14	0.0500 1.9000	Log✓	0.4231	0.88(b)	na	na	na	na	na	
NICKEL	14/14	7.5000 33.1000	Log✓	17.8214	24.0(b)	na	na	na	na	na	
POTASSIUM	14/14	1170.0000 6520.0000	Und✓	2490.7143	6520(d)	na	na	na	na	na	
SODIUM	11/14	80.5000 459.0000	Log✓	187.7455	287(b)	na	na	na	na	na	
VANADIUM	14/14	11.5000 53.2000	Log✓	25.5643	33.9(b)	na	na	na	na	na	
ZINC	14/14	25.3000 28300.0000	Und✓	2245.7143	28,300(d)	na	na	na	na	na	
TRICHLOROETHENE	8/14	1.0000 40.0000	Log✓	8.8750	14.0(b)	na	na	na	na	na	
BENZO(A)ANTHRACENE	7/14	100.0000 3200.0000	~~Und~~ Log	700.0000	3200(c)	na	na	na	na	na	
BENZO(B)FLUORANTHENE	7/14	150.0000 2700.0000	~~Und~~ Log	701.4286	2700(c)	na	na	na	na	na	
BENZO(K)FLUORANTHENE	7/14	47.0000 4000.0000	~~Und~~ Log	780.7143	4,000(c)	na	na	na	na	na	
CHRYSENE	7/14	93.0000 3000.0000	Und	693.2857	3000(c)	na	na	na	na	na	

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
FLUORANTHENE	8/14	66.0000 3700.0000	Log ✓	877.0000	3700(c)	na	na	na	na	na	
PYRENE	9/14	140.0000 4300.0000	Und ✓	865.5556	4300(d)	na	na	na	na	na	

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : ALUMINUM (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	8142.8571	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	4490.0000	
Positive Hits - Maximum	14600.0000	
Average Of Positive Hits	8142.8571	
Standard Deviation	3499.2294	
Upper Confidence Limit - Normal	~~9799.1112~~	
Upper Confidence Limit - Lognormal ...	10151.7314 ucl	
95th Percentile - Nonparametric.....	~~14600.0000~~	
95th Percentile - Normal.....	13899.0896	
95th Percentile - Lognormal	14490.7859	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9265	
Corr Coeff - Detected - Lognormal	0.9638	
Corr Coeff - Total - Normal	0.9265	
Corr Coeff - Total - Lognormal	0.9638	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.8420	NA
W-Test - Lognormal	0.9093	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000025

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : ARSENIC (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	2.2500	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	1.1000	
Positive Hits - Maximum	3.4000	
Average Of Positive Hits	2.2500	
Standard Deviation	0.7901	
Upper Confidence Limit - Normal	~~2.6240~~	
Upper Confidence Limit - Lognormal	2.7759 UCL	
95th Percentile - Nonparametric	3.4000	
95th Percentile - Normal	3.5497	
95th Percentile - Lognormal	3.9006	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9712	
Corr Coeff - Detected - Lognormal	0.9743	
Corr Coeff - Total - Normal	0.9712	
Corr Coeff - Total - Lognormal	0.9743	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.9208	NA
W-Test - Lognormal	0.9307	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000026

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : BARIUM (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	82.5857	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	29.5000	
Positive Hits - Maximum	174.0000	
Average Of Positive Hits	82.5857	
Standard Deviation	48.3919	
Upper Confidence Limit - Normal	105.4906	
Upper Confidence Limit - Lognormal ...	118.8919 ucl	
95th Percentile - Nonparametric.....	174.0000	
95th Percentile - Normal.....	162.1904	
95th Percentile - Lognormal	183.5258	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9454	
Corr Coeff - Detected - Lognormal	0.9828	
Corr Coeff - Total - Normal	0.9454	
Corr Coeff - Total - Lognormal	0.9828	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.8776	NA
W-Test - Lognormal	0.9467	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000027

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : BERYLLIUM (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	0.4450	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	0.2000	
Positive Hits - Maximum	0.9000	
Average Of Positive Hits	0.4450	
Standard Deviation	0.2490	
Upper Confidence Limit - Normal	0.5629	
Upper Confidence Limit - Lognormal ...	0.6103 UCL	
95th Percentile - Nonparametric.....	~~0.9000~~	
95th Percentile - Normal.....	0.8546	
95th Percentile - Lognormal	0.9267	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9259	
Corr Coeff - Detected - Lognormal	0.9647	
Corr Coeff - Total - Normal	0.9259	
Corr Coeff - Total - Lognormal	0.9647	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.8380	NA
W-Test - Lognormal	0.9065	NA
Type of Distribution	LOGNORMAL✓	

Test Results:

000028

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : CADMIUM (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	12.0000	
Average	3.0504	
Detection Limit - Minimum	0.2100	
Detection Limits - Maximum	0.2750	
Positive Hits - Minimum	0.6200	
Positive Hits - Maximum	6.7000	
Average Of Positive Hits	3.5183	
Standard Deviation	2.1778	
Upper Confidence Limit - Normal	4.0812 UCL	
Upper Confidence Limit - Lognormal ...	9.6440	
95th Percentile - Nonparametric.....	6.7000	
95th Percentile - Normal.....	6.6329	
95th Percentile - Lognormal	12.7993	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9422	
Corr Coeff - Detected - Lognormal	0.9234	
Corr Coeff - Total - Normal	0.9735	
Corr Coeff - Total - Lognormal	0.9353	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.9276	NA
W-Test - Lognormal	0.8647	NA
Type of Distribution	NORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : CALCIUM (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	1669.7857	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	610.0000	
Positive Hits - Maximum	2760.0000	
Average Of Positive Hits	1669.7857	
Standard Deviation	691.4026	
Upper Confidence Limit - Normal	1997.0402	
Upper Confidence Limit - Lognormal ...	2167.5899 ucc	
95th Percentile - Nonparametric.....	2760.0000	
95th Percentile - Normal.....	2807.1430	
95th Percentile - Lognormal	3170.0806	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9640	
Corr Coeff - Detected - Lognormal	0.9758	
Corr Coeff - Total - Normal	0.9640	
Corr Coeff - Total - Lognormal	0.9758	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.9150	NA
W-Test - Lognormal	0.9468	NA
Type of Distribution	LOGNORMAL✓	

Test Results:

000030

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : CHROMIUM (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	20.8500	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	8.9000	
Positive Hits - Maximum	55.0000	
Average Of Positive Hits	20.8500	
Standard Deviation	13.4753	
Upper Confidence Limit - Normal	27.2281	
Upper Confidence Limit - Lognormal	28.4534 UCL	
95th Percentile - Nonparametric	55.0000	
95th Percentile - Normal	43.0169	
95th Percentile - Lognormal	43.3316	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8758	
Corr Coeff - Detected - Lognormal	0.9544	
Corr Coeff - Total - Normal	0.8758	
Corr Coeff - Total - Lognormal	0.9544	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.7742	NA
W-Test - Lognormal	0.9079	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : COBALT (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	12.0000	
Average	7.4607	
Detection Limit - Minimum	2.1000	
Detection Limits - Maximum	2.4500	
Positive Hits - Minimum	3.8000	
Positive Hits - Maximum	13.9000	
Average Of Positive Hits	8.3250	
Standard Deviation	4.1911	
Upper Confidence Limit - Normal	~~9.4445~~	
Upper Confidence Limit - Lognormal	~~11.2357~~ UCL	
95th Percentile - Nonparametric	~~13.9000~~	
95th Percentile - Normal	14.3551	
95th Percentile - Lognormal	17.4910	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9490	
Corr Coeff - Detected - Lognormal	0.9609	
Corr Coeff - Total - Normal	0.9462	
Corr Coeff - Total - Lognormal	0.9649	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.8727	NA
W-Test - Lognormal	0.9144	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : COPPER (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	136.3857	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	19.7000	
Positive Hits - Maximum	513.0000	
Average Of Positive Hits	136.3857	
Standard Deviation	147.3164	
Upper Confidence Limit - Normal	206.1135	
Upper Confidence Limit - Lognormal	292.2283 UCL	
95th Percentile - Nonparametric	~~513.0000~~	
95th Percentile - Normal	378.7212	
95th Percentile - Lognormal	427.5786	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8670	
Corr Coeff - Detected - Lognormal	0.9737	
Corr Coeff - Total - Normal	0.8670	
Corr Coeff - Total - Lognormal	0.9737	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.7573	NA
W-Test - Lognormal	0.9395	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000033

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : IRON (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	12480.0000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	7700.0000	
Positive Hits - Maximum	23400.0000	
Average Of Positive Hits	12480.0000	
Standard Deviation	4446.7568	
Upper Confidence Limit - Normal	14584.7374	
Upper Confidence Limit - Lognormal	14832.2849 UCL	
95th Percentile - Nonparametric	23400.0000	
95th Percentile - Normal	19794.9150	
95th Percentile - Lognormal	20172.3992	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9321	
Corr Coeff - Detected - Lognormal	0.9717	
Corr Coeff - Total - Normal	0.9321	
Corr Coeff - Total - Lognormal	0.9717	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.8723	NA
W-Test - Lognormal	0.9394	NA
Type of Distribution	LOGNORMAL	

Test Results:

000034

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : LEAD (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	156.3071	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	2.9000	
Positive Hits - Maximum	459.0000	
Average Of Positive Hits	156.3071	
Standard Deviation	164.0004	
Upper Confidence Limit - Normal	233.9318	
Upper Confidence Limit - Lognormal ...	918.0141 UCL	
95th Percentile - Nonparametric.....	459.0000	
95th Percentile - Normal.....	426.0878	
95th Percentile - Lognormal	821.6516	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9110	
Corr Coeff - Detected - Lognormal	0.9703	
Corr Coeff - Total - Normal	0.9110	
Corr Coeff - Total - Lognormal	0.9703	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.8114	NA
W-Test - Lognormal	0.9388	NA
Type of Distribution	LOGNORMAL	

Test Results:

000035

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : MAGNESIUM (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	3434.2857	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	1680.0000	
Positive Hits - Maximum	7190.0000 UCL	
Average Of Positive Hits	3434.2857	
Standard Deviation	2039.0636	
Upper Confidence Limit - Normal	4399.4146	
Upper Confidence Limit - Lognormal ...	4570.6586	
95th Percentile - Nonparametric.....	7190.0000	
95th Percentile - Normal.....	6788.5453	
95th Percentile - Lognormal	6874.0266	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8481	
Corr Coeff - Detected - Lognormal	0.9036	
Corr Coeff - Total - Normal	0.8481	
Corr Coeff - Total - Lognormal	0.9036	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.7073	NA
W-Test - Lognormal	0.8032	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : MANGANESE (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	208.9286	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	110.0000	
Positive Hits - Maximum	440.0000	
Average Of Positive Hits	208.9286	
Standard Deviation	91.6485	
Upper Confidence Limit - Normal	252.3076	
Upper Confidence Limit - Lognormal ...	259.9619 UCL	
95th Percentile - Nonparametric.....	~~440.0000~~	
95th Percentile - Normal.....	359.6904	
95th Percentile - Lognormal	370.5637	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9255	
Corr Coeff - Detected - Lognormal	0.9794	
Corr Coeff - Total - Normal	0.9255	
Corr Coeff - Total - Lognormal	0.9794	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.8641	NA
W-Test - Lognormal	0.9570	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : MERCURY (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	13.0000	
Average	0.3968	
Detection Limit - Minimum	0.0550	
Detection Limits - Maximum	0.0550	
Positive Hits - Minimum	0.0500	
Positive Hits - Maximum	1.9000	
Average Of Positive Hits	0.4231	
Standard Deviation	0.4960	
Upper Confidence Limit - Normal	~~0.6315~~	
Upper Confidence Limit - Lognormal ...	0.878 MCL	
95th Percentile - Nonparametric.....	1.9000	
95th Percentile - Normal.....	1.2126	
95th Percentile - Lognormal	1.2574	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7669	
Corr Coeff - Detected - Lognormal	0.9641	
Corr Coeff - Total - Normal	0.8070	
Corr Coeff - Total - Lognormal	0.9767	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.6739	NA
W-Test - Lognormal	0.9545	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000038

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : NICKEL (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	17.8214	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	7.5000	
Positive Hits - Maximum	33.1000	
Average Of Positive Hits	17.8214	
Standard Deviation	8.7592	
Upper Confidence Limit - Normal	~~21.9673~~	
Upper Confidence Limit - Lognormal	23.9615 ucl	
95th Percentile - Nonparametric	~~33.1000~~	
95th Percentile - Normal	32.2303	
95th Percentile - Lognormal	35.9265	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9490	
Corr Coeff - Detected - Lognormal	0.9741	
Corr Coeff - Total - Normal	0.9490	
Corr Coeff - Total - Lognormal	0.9741	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.8815	NA
W-Test - Lognormal	0.9291	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000039

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : POTASSIUM (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	2490.7143	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	1170.0000	
Positive Hits - Maximum	6520.0000	
Average Of Positive Hits	2490.7143	
Standard Deviation	1635.3050	
Upper Confidence Limit - Normal	3264.7363	
Upper Confidence Limit - Lognormal	3380.7525	
95th Percentile - Nonparametric	6520.0000	
95th Percentile - Normal	5180.7911	
95th Percentile - Lognormal	5143.2589	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8605	
Corr Coeff - Detected - Lognormal	0.9335	
Corr Coeff - Total - Normal	0.8605	
Corr Coeff - Total - Lognormal	0.9335	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.7448	NA
W-Test - Lognormal	0.8653	NA
Type of Distribution	UNDEFINED	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : SODIUM (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	11.0000	
Average	155.0893	
Detection Limit - Minimum	28.6500	
Detection Limits - Maximum	42.6000	
Positive Hits - Minimum	80.5000	
Positive Hits - Maximum	459.0000	
Average Of Positive Hits	187.7455	
Standard Deviation	116.6642	
Upper Confidence Limit - Normal	~~210.3087~~	
Upper Confidence Limit - Lognormal	286.6657 UCL	
95th Percentile - Nonparametric	~~459.0000~~	
95th Percentile - Normal	347.0019	
95th Percentile - Lognormal	446.3288	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8139	
Corr Coeff - Detected - Lognormal	0.9095	
Corr Coeff - Total - Normal	0.9358	
Corr Coeff - Total - Lognormal	0.9861	
Corr Coeff - Crit Val - Detected	0.9220	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.8840	NA
W-Test - Lognormal	0.9658	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000541

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : VANADIUM (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	25.5643	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	11.5000	
Positive Hits - Maximum	53.2000	
Average Of Positive Hits	25.5643	
Standard Deviation	13.1369	
Upper Confidence Limit - Normal	31.7822	
Upper Confidence Limit - Lognormal	33.9368 UCL	
95th Percentile - Nonparametric	53.2000	
95th Percentile - Normal	47.1745	
95th Percentile - Lognormal	50.6583	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9390	
Corr Coeff - Detected - Lognormal	0.9728	
Corr Coeff - Total - Normal	0.9390	
Corr Coeff - Total - Lognormal	0.9728	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.8723	NA
W-Test - Lognormal	0.9314	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00042

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : ZINC (MG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	14.0000	
Average	2245.7143	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	25.3000	
Positive Hits - Maximum	28300.0000 UCL	
Average Of Positive Hits	~~2245.7143~~	
Standard Deviation	7503.2835	
Upper Confidence Limit - Normal	5797.1659	
Upper Confidence Limit - Lognormal	7533.4161	
95th Percentile - Nonparametric	28300.0000	
95th Percentile - Normal	14588.6157	
95th Percentile - Lognormal	3748.4855	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5362	
Corr Coeff - Detected - Lognormal	0.9161	
Corr Coeff - Total - Normal	0.5362	
Corr Coeff - Total - Lognormal	0.9161	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.3229	NA
W-Test - Lognormal	0.8602	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

00043

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : TRICHLOROETHENE (UG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	8.0000	
Average	7.0714	
Detection Limit - Minimum	2.5000	
Detection Limits - Maximum	6.5000	
Positive Hits - Minimum	1.0000	
Positive Hits - Maximum	40.0000	
Average Of Positive Hits	8.8750	
Standard Deviation	10.2654	
Upper Confidence Limit - Normal	11.9303	
Upper Confidence Limit - Lognormal	13.9703 UCL	
95th Percentile - Nonparametric	~~40.0000~~	
95th Percentile - Normal	23.9581	
95th Percentile - Lognormal	20.4751	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5291	
Corr Coeff - Detected - Lognormal	0.7428	
Corr Coeff - Total - Normal	0.7272	
Corr Coeff - Total - Lognormal	0.9420	
Corr Coeff - Crit Val - Detected	0.9050	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.5592	NA
W-Test - Lognormal	0.8999	NA
Type of Distribution	LOGNORMAL✓	

Test Results:

000044

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : BENZO(A)ANTHRACENE (UG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	7.0000	
Average	1820.7143	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	~~100.0000~~	
Positive Hits - Maximum	3200.0000 UCL	
Average Of Positive Hits	~~700.0000~~	
Standard Deviation	3291.3341	
Upper Confidence Limit - Normal	~~3378.5674~~	
Upper Confidence Limit - Lognormal	6976.8545 UCL > max hit	
95th Percentile - Nonparametric	~~11500.0000~~	
95th Percentile - Normal	7234.9589	
95th Percentile - Lognormal	6294.0516	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5011	
Corr Coeff - Detected - Lognormal	0.7315	
Corr Coeff - Total - Normal	0.7506	
Corr Coeff - Total - Lognormal	0.9463	
Corr Coeff - Crit Val - Detected	0.8990	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.5834	NA
W-Test - Lognormal	0.8896	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00045

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : BENZO(B)FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	7.0000	
Average	1839.2857	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	~~150.0000~~	
Positive Hits - Maximum	2700.0000 UCL	
Average Of Positive Hits	~~701.4286~~	
Standard Deviation	3257.9163	
Upper Confidence Limit - Normal	3381.3216	
Upper Confidence Limit - Lognormal	6445.7152	
95th Percentile - Nonparametric	11500.0000 > max hit	
95th Percentile - Normal	7198.5580	
95th Percentile - Lognormal	6330.4535	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6651	
Corr Coeff - Detected - Lognormal	0.8235	
Corr Coeff - Total - Normal	0.7500	
Corr Coeff - Total - Lognormal	0.9471	
Corr Coeff - Crit Val - Detected	0.8990	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.5832	NA
W-Test - Lognormal	0.8857	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : BENZO(K)FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	7.0000	
Average	1878.9286	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	47.0000	
Positive Hits - Maximum	4000.0000 UCL	
Average Of Positive Hits	780.7143	
Standard Deviation	3328.1456	
Upper Confidence Limit - Normal	3454.2053	
Upper Confidence Limit - Lognormal ...	11294.4148 > max	
95th Percentile - Nonparametric.....	11500.0000 hit	
95th Percentile - Normal.....	7353.7280	
95th Percentile - Lognormal	7600.0065	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.4988	
Corr Coeff - Detected - Lognormal	0.8244	
Corr Coeff - Total - Normal	0.7687	
Corr Coeff - Total - Lognormal	0.9743	
Corr Coeff - Crit Val - Detected	0.8990	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.6089	NA
W-Test - Lognormal	0.9441	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00047

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : CHRYSENE (UG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	7.0000	
Average	1817.3571	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	~~93.0000~~	
Positive Hits - Maximum	3000.0000 use	
Average Of Positive Hits	~~693.2857~~	
Standard Deviation	3281.2249	
Upper Confidence Limit - Normal	3370.4254	
Upper Confidence Limit - Lognormal	7052.5713 > max hit	
95th Percentile - Nonparametric	11500.0000	
95th Percentile - Normal	7214.9721	
95th Percentile - Lognormal	6358.1166	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5161	
Corr Coeff - Detected - Lognormal	0.7435	
Corr Coeff - Total - Normal	0.7496	
Corr Coeff - Total - Lognormal	0.9515	
Corr Coeff - Crit Val - Detected	0.8990	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.5823	NA
W-Test - Lognormal	0.9005	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00048

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	8.0000	
Average	1904.0000	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	66.0000	
Positive Hits - Maximum	3700.0000 UCL	
Average Of Positive Hits	877.0000	
Standard Deviation	3289.5123	
Upper Confidence Limit - Normal	3460.9908	
Upper Confidence Limit - Lognormal	7996.6204 > max hit	
95th Percentile - Nonparametric	11500.0000	
95th Percentile - Normal	7315.2477	
95th Percentile - Lognormal	7096.3715	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5960	
Corr Coeff - Detected - Lognormal	0.8815	
Corr Coeff - Total - Normal	0.7640	
Corr Coeff - Total - Lognormal	0.9700	
Corr Coeff - Crit Val - Detected	0.9050	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.6030	NA
W-Test - Lognormal	0.9412	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00049

Dataset: UTMP_RES
Media : SOIL DATA (0 - 2') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : PYRENE (UG/KG)

	Sample Results	Background Results
Count	14.0000	No samples
Number of Detects	9.0000	
Average	1898.5714	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	140.0000	
Positive Hits - Maximum	4300.0000 ucl	
Average Of Positive Hits	865.5556	
Standard Deviation	3339.9392	
Upper Confidence Limit - Normal	3479.4303	
Upper Confidence Limit - Lognormal	7314.2411	
95th Percentile - Nonparametric	11500.0000	
95th Percentile - Normal	7392.7714	
95th Percentile - Lognormal	6564.8202	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5364	
Corr Coeff - Detected - Lognormal	0.7789	
Corr Coeff - Total - Normal	0.7615	
Corr Coeff - Total - Lognormal	0.9258	
Corr Coeff - Crit Val - Detected	0.9120	
Corr Coeff - Crit Val - Total	0.9340	
W-Test - Table Value	0.8740	NA
W-Test - Normal	0.5973	NA
W-Test - Lognormal	0.8459	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000050

Soil Data (0-10') - DRMO

~~Table X~~

Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
ALUMINUM	28/28	4490.0000 14600.0000	Log ✓	8205.7143	9290(b)	na	na	na	na	na	
ARSENIC	28/28	1.1000 7.5000	Log ✓	2.8464	3.4(b)	na	na	na	na	na	
BARIUM	28/28	28.0000 181.0000	Log ✓	82.4714	105(b)	na	na	na	na	na	
BERYLLIUM	25/28	0.2000 2.2000	Log ✓	0.5480	0.66(b)	na	na	na	na	na	
CADMIUM	23/28	0.4500 6.7000	Und ✓	3.1439	6.7(d)	na	na	na	na	na	
CALCIUM	28/28	610.0000 8320.0000	Log ✓	1941.0000	2310(b)	na	na	na	na	na	
CHROMIUM	26/28	6.2000 139.0000	Log ✓	24.4731	30.0(b)	na	na	na	na	na	
COBALT	26/28	3.5000 29.0000	Log ✓	8.6462	10.2(b)	na	na	na	na	na	
COPPER	28/28	10.6000 513.0000	Log ✓	120.3714	201(b)	na	na	na	na	na	
IRON	28/28	6480.0000 37300.0000	Log ✓	13988.2143	16,200(b)	na	na	na	na	na	
LEAD	28/28	2.3000 459.0000	Log	114.0464	372(b)	na	na	na	na	na	
MAGNESIUM	28/28	1680.0000 7190.0000	~~Log~~ Und	3758.9286	7190(d)	na	na	na	na	na	

000051

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
MANGANESE	28/28	110.0000Log✓ 603.0000	244.2143	284(b)	na	na	na	na	na	
MERCURY	21/28	0.0500Log✓ 1.9000	0.3633	0.43(b)	na	na	na	na	na	
NICKEL	28/28	6.5000Und✓ 104.0000	19.2536	104(d)	na	na	na	na	na	
POTASSIUM	28/28	1050.0000Log✓ 6520.0000	2751.0714	3350(b)	na	na	na	na	na	
SODIUM	24/28	80.5000Log✓ 5860.0000	668.8417	1100(b)	na	na	na	na	na	
VANADIUM	28/28	9.0000Log✓ 63.8000	28.2000	34.6(b)	na	na	na	na	na	
ZINC	28/28	25.3000Und✓ 28300.0000	1261.7786	28,300(d)	na	na	na	na	na	
TRICHLOROETHENE	14/28	1.0000Und✓ 7100.0000	515.2857	7100(d)	na	na	na	na	na	
BENZO(A)ANTHRACENE	15/27	72.0000Und✓ 3200.0000	541.4667	3200(d)	na	na	na	na	na	
BENZO(B)FLUORANTHENE	16/27	24.0000Log✓ 2700.0000	582.1250	2700(c)	na	na	na	na	na	
BENZO(K)FLUORANTHENE	13/26	20.0000~~Und~~ 4000.0000LOS	568.4615	4000(b)	na	na	na	na	na	
CHRYSENE	16/27	93.0000Und 3000.0000	553.3125	3000(d)	na	na	na	na	na	

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
FLUORANTHENE	18/27	36.0000 3700.0000	Log ✓	694.0000	3190(b)	na	na	na	na	na	
PHENANTHRENE	14/27	55.0000 1400.0000	Und ✓	448.1429	1400(d)	na	na	na	na	na	
PYRENE	19/27	47.0000 4300.0000	Log ✓	833.0000	3140(b)	na	na	na	na	na	

000053

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : ALUMINUM (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	8205.7143	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	4490.0000	
Positive Hits - Maximum	14600.0000	
Average Of Positive Hits	8205.7143	
Standard Deviation	2919.0034	
Upper Confidence Limit - Normal	9145.1569	
Upper Confidence Limit - Lognormal ...	9291.9988 uc	
95th Percentile - Nonparametric.....	~~14600.0000~~	
95th Percentile - Normal.....	13007.4749	
95th Percentile - Lognormal	13702.7789	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9653	
Corr Coeff - Detected - Lognormal	0.9825	
Corr Coeff - Total - Normal	0.9653	
Corr Coeff - Total - Lognormal	0.9825	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.9171	NA
W-Test - Lognormal	0.9472	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000055

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : ARSENIC (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	2.8464	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	1.1000	
Positive Hits - Maximum	7.5000	
Average Of Positive Hits	2.8464	
Standard Deviation	1.6663	
Upper Confidence Limit - Normal	3.3827	
Upper Confidence Limit - Lognormal ...	3.4580 UCL	
95th Percentile - Nonparametric.....	7.5000	
95th Percentile - Normal.....	5.5875	
95th Percentile - Lognormal	5.8497	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9149	
Corr Coeff - Detected - Lognormal	0.9815	
Corr Coeff - Total - Normal	0.9149	
Corr Coeff - Total - Lognormal	0.9815	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.8353	NA
W-Test - Lognormal	0.9517 ✓	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000056

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : BARIUM (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	82.4714	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	28.0000	
Positive Hits - Maximum	181.0000	
Average Of Positive Hits	82.4714	
Standard Deviation	49.0634	
Upper Confidence Limit - Normal	~~98.2618~~	
Upper Confidence Limit - Lognormal	105.1284 uu	
95th Percentile - Nonparametric	~~181.0000~~	
95th Percentile - Normal	163.1807	
95th Percentile - Lognormal	186.1836	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9451	
Corr Coeff - Detected - Lognormal	0.9793	
Corr Coeff - Total - Normal	0.9451	
Corr Coeff - Total - Lognormal	0.9793	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.8736	NA
W-Test - Lognormal	0.9353	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : BERYLLIUM (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	25.0000	
Average	0.5100	
Detection Limit - Minimum	0.1000	
Detection Limits - Maximum	0.3500	
Positive Hits - Minimum	0.2000	
Positive Hits - Maximum	2.2000	
Average Of Positive Hits	0.5480	
Standard Deviation	0.4710	
Upper Confidence Limit - Normal	~~0.6616~~	
Upper Confidence Limit - Lognormal	0.6617 ucl	
95th Percentile - Nonparametric	~~2.2000~~	
95th Percentile - Normal	1.2849	
95th Percentile - Lognormal	1.2271	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7540	
Corr Coeff - Detected - Lognormal	0.9279	
Corr Coeff - Total - Normal	0.8130	
Corr Coeff - Total - Lognormal	0.9757	
Corr Coeff - Crit Val - Detected	0.9580	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.6787	NA
W-Test - Lognormal	0.9576	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000058

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : CADMIUM (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	23.0000	
Average	2.6511	
Detection Limit - Minimum	0.2100	
Detection Limits - Maximum	0.9500	
Positive Hits - Minimum	0.4500	
Positive Hits - Maximum	6.7000 ucl	
Average Of Positive Hits	3.1439	
Standard Deviation	2.0348	
Upper Confidence Limit - Normal	3.3059	
Upper Confidence Limit - Lognormal	5.3135	
95th Percentile - Nonparametric	6.7000	
95th Percentile - Normal	5.9983	
95th Percentile - Lognormal	10.2715	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8942	
Corr Coeff - Detected - Lognormal	0.9253	
Corr Coeff - Total - Normal	0.9652	
Corr Coeff - Total - Lognormal	0.9589	
Corr Coeff - Crit Val - Detected	0.9550	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.9112	NA
W-Test - Lognormal	0.9003	NA
Type of Distribution	UNDEFINED	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : CALCIUM (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	1941.0000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	610.0000	
Positive Hits - Maximum	8320.0000	
Average Of Positive Hits	1941.0000	
Standard Deviation	1421.4737	
Upper Confidence Limit - Normal	2398.4825	
Upper Confidence Limit - Lognormal	2314.7436 UCL	
95th Percentile - Nonparametric	8320.0000	
95th Percentile - Normal	4279.3242	
95th Percentile - Lognormal	3895.7528	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7744	
Corr Coeff - Detected - Lognormal	0.9624	
Corr Coeff - Total - Normal	0.7744	
Corr Coeff - Total - Lognormal	0.9624	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.6354	NA
W-Test - Lognormal	0.9456	NA
Type of Distribution	LOGNORMAL	

Test Results:

00060

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : CHROMIUM (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	26.0000	
Average	23.0571	
Detection Limit - Minimum	3.9500	
Detection Limits - Maximum	5.3500	
Positive Hits - Minimum	6.2000	
Positive Hits - Maximum	139.0000	
Average Of Positive Hits	24.4731	
Standard Deviation	25.5452	
Upper Confidence Limit - Normal	~~31.2785~~	
Upper Confidence Limit - Lognormal ...	29.9796 UCL	
95th Percentile - Nonparametric.....	~~139.0000~~	
95th Percentile - Normal.....	65.0790	
95th Percentile - Lognormal	56.2923	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7002	
Corr Coeff - Detected - Lognormal	0.9357	
Corr Coeff - Total - Normal	0.7355	
Corr Coeff - Total - Lognormal	0.9710	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.5757	NA
W-Test - Lognormal	0.9584	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000091

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : COBALT (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	26.0000	
Average	8.1911	
Detection Limit - Minimum	2.1000	
Detection Limits - Maximum	2.4500	
Positive Hits - Minimum	3.5000	
Positive Hits - Maximum	29.0000	
Average Of Positive Hits	8.6462	
Standard Deviation	5.3786	
Upper Confidence Limit - Normal	9.9221	
Upper Confidence Limit - Lognormal	10.2304 acc	
95th Percentile - Nonparametric	~~29.0000~~	
95th Percentile - Normal	17.0389	
95th Percentile - Lognormal	17.8580	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8519	
Corr Coeff - Detected - Lognormal	0.9696	
Corr Coeff - Total - Normal	0.8791	
Corr Coeff - Total - Lognormal	0.9872	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.7963	NA
W-Test - Lognormal	0.9817	NA

Type of Distribution ..... LOGNORMAL ✓

Test Results:

000092

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : COPPER (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	120.3714	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	10.6000	
Positive Hits - Maximum	513.0000	
Average Of Positive Hits	120.3714	
Standard Deviation	145.1189	
Upper Confidence Limit - Normal	167.0760	
Upper Confidence Limit - Lognormal ...	200.6100 ucl	
95th Percentile - Nonparametric.....	513.0000	
95th Percentile - Normal.....	359.0920	
95th Percentile - Lognormal	388.3786	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8445	
Corr Coeff - Detected - Lognormal	0.9667	
Corr Coeff - Total - Normal	0.8445	
Corr Coeff - Total - Lognormal	0.9667 >	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.7103 ≈	NA
W-Test - Lognormal	0.9229	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000083

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : IRON (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	13988.2143	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	6480.0000	
Positive Hits - Maximum	37300.0000	
Average Of Positive Hits	13988.2143	
Standard Deviation	6592.7637	
Upper Confidence Limit - Normal	~~16110.0079~~	
Upper Confidence Limit - Lognormal	16193.6902 UCL	
95th Percentile - Nonparametric	~~37300.0000~~	
95th Percentile - Normal	24833.3106	
95th Percentile - Lognormal	25244.2644	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9091	
Corr Coeff - Detected - Lognormal	0.9800	
Corr Coeff - Total - Normal	0.9091	
Corr Coeff - Total - Lognormal	0.9800	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.8415	NA
W-Test - Lognormal	0.9607	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000464

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : LEAD (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	114.0464	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	2.3000	
Positive Hits - Maximum	459.0000	
Average Of Positive Hits	114.0464	
Standard Deviation	141.3011	
Upper Confidence Limit - Normal	~~159.5223~~	
Upper Confidence Limit - Lognormal	372.439 but	
95th Percentile - Nonparametric	~~459.0000~~	
95th Percentile - Normal	346.4867	
95th Percentile - Lognormal	563.5759	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8749	
Corr Coeff - Detected - Lognormal	0.9881	
Corr Coeff - Total - Normal	0.8749	
Corr Coeff - Total - Lognormal	0.9881	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.7554	NA
W-Test - Lognormal	0.9597	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000065

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : MAGNESIUM (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	3758.9286	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	~~1680.0000~~	
Positive Hits - Maximum	7190.0000 UCL	
Average Of Positive Hits	~~3758.9286~~	
Standard Deviation	1834.4468	
Upper Confidence Limit - Normal	4349.3210	
Upper Confidence Limit - Lognormal	4477.1401	
95th Percentile - Nonparametric	7190.0000	
95th Percentile - Normal	6776.5936	
95th Percentile - Lognormal	7295.0638	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9344	
Corr Coeff - Detected - Lognormal	0.9640	
Corr Coeff - Total - Normal	0.9344	
Corr Coeff - Total - Lognormal	0.9640	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.8521	NA
W-Test - Lognormal	0.9068 < 0.924	NA
Type of Distribution	~~LOGNORMAL~~ Undefined	

Test Results:

000096

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : MANGANESE (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	244.2143	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	110.0000	
Positive Hits - Maximum	603.0000	
Average Of Positive Hits	244.2143	
Standard Deviation	110.6497	
Upper Confidence Limit - Normal	279.8254	
Upper Confidence Limit - Lognormal ...	284.1313 ucl	
95th Percentile - Nonparametric.....	~~603.0000~~	
95th Percentile - Normal.....	426.2331	
95th Percentile - Lognormal	444.6694	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9386	
Corr Coeff - Detected - Lognormal	0.9928	
Corr Coeff - Total - Normal	0.9386	
Corr Coeff - Total - Lognormal	0.9928	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.8897	NA
W-Test - Lognormal	0.9815	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : MERCURY (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	21.0000	
Average	0.2877	
Detection Limit - Minimum	0.0500	
Detection Limits - Maximum	0.0950	
Positive Hits - Minimum	0.0500	
Positive Hits - Maximum	1.9000	
Average Of Positive Hits	0.3633	
Standard Deviation	0.3854	
Upper Confidence Limit - Normal	0.4117	
Upper Confidence Limit - Lognormal	0.4267 UCL	
95th Percentile - Nonparametric	1.9000	
95th Percentile - Normal	0.9216	
95th Percentile - Lognormal	0.8353	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5999	
Corr Coeff - Detected - Lognormal	0.7777	
Corr Coeff - Total - Normal	0.7647	
Corr Coeff - Total - Lognormal	0.9697	
Corr Coeff - Crit Val - Detected	0.9520	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.6104	NA
W-Test - Lognormal	0.9322	NA
Type of Distribution	LOGNORMAL	

Test Results:

000068

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : NICKEL (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	19.2536	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	6.5000	
Positive Hits - Maximum	104.0000 ucl	
Average Of Positive Hits	19.2536	
Standard Deviation	18.5440	
Upper Confidence Limit - Normal	25.2217	
Upper Confidence Limit - Lognormal	23.5548	
95th Percentile - Nonparametric	104.0000	
95th Percentile - Normal	49.7585	
95th Percentile - Lognormal	42.0557	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7341	
Corr Coeff - Detected - Lognormal	0.9497	
Corr Coeff - Total - Normal	0.7341	
Corr Coeff - Total - Lognormal	0.9497	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.5729	NA
W-Test - Lognormal	0.9106	NA
Type of Distribution	UNDEFINED	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : POTASSIUM (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	2751.0714	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	1050.0000	
Positive Hits - Maximum	6520.0000	
Average Of Positive Hits	2751.0714	
Standard Deviation	1509.7396	
Upper Confidence Limit - Normal	~~3236.9611~~	
Upper Confidence Limit - Lognormal ...	3352.1979 ucl	
95th Percentile - Nonparametric.....	6520.0000	
95th Percentile - Normal.....	5234.5931	
95th Percentile - Lognormal	5654.9944	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9418	
Corr Coeff - Detected - Lognormal	0.9872	
Corr Coeff - Total - Normal	0.9418	
Corr Coeff - Total - Lognormal	0.9872	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.8782	NA
W-Test - Lognormal	0.9588	NA
Type of Distribution	LOGNORMAL✓	

Test Results:

00070

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : SODIUM (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	24.0000	
Average	578.5250	
Detection Limit - Minimum	28.6500	
Detection Limits - Maximum	42.6000	
Positive Hits - Minimum	80.5000	
Positive Hits - Maximum	5860.0000	
Average Of Positive Hits	668.8417	
Standard Deviation	1107.3474	
Upper Confidence Limit - Normal	~~934.9101~~	
Upper Confidence Limit - Lognormal	1102.9459 UCL	
95th Percentile - Nonparametric	~~5860.0000~~	
95th Percentile - Normal	2400.1115	
95th Percentile - Lognormal	2001.0955	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6154	
Corr Coeff - Detected - Lognormal	0.9454	
Corr Coeff - Total - Normal	0.6601	
Corr Coeff - Total - Lognormal	0.9894	
Corr Coeff - Crit Val - Detected	0.9570	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.4714	NA
W-Test - Lognormal	0.9777	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : VANADIUM (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	28.2000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	9.0000	
Positive Hits - Maximum	63.8000	
Average Of Positive Hits	28.2000	
Standard Deviation	14.2473	
Upper Confidence Limit - Normal	32.7853	
Upper Confidence Limit - Lognormal	34.5676 UCL	
95th Percentile - Nonparametric	63.8000	
95th Percentile - Normal	51.6368	
95th Percentile - Lognormal	58.2260	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9680	
Corr Coeff - Detected - Lognormal	0.9911	
Corr Coeff - Total - Normal	0.9680	
Corr Coeff - Total - Lognormal	0.9911	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.9301	NA
W-Test - Lognormal	0.9718	NA
Type of Distribution	LOGNORMAL	

Test Results:

000072

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : ZINC (MG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	28.0000	
Average	1261.7786	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	~~25.3000~~	
Positive Hits - Maximum	28300.0000 ucl	
Average Of Positive Hits	~~1261.7786~~	
Standard Deviation	5312.7456	
Upper Confidence Limit - Normal	2971.6153	
Upper Confidence Limit - Lognormal	1176.4791	
95th Percentile - Nonparametric	28300.0000	
95th Percentile - Normal	10001.2451	
95th Percentile - Lognormal	1836.0916	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.4489	
Corr Coeff - Detected - Lognormal	0.9117	
Corr Coeff - Total - Normal	0.4489	
Corr Coeff - Total - Lognormal	0.9117	
Corr Coeff - Crit Val - Detected	0.9620	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.2361	NA
W-Test - Lognormal	0.8472	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000073

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : TRICHLOROETHENE (UG/KG)

	Sample Results	Background Results
Count	28.0000	No samples
Number of Detects	14.0000	
Average	260.3214	
Detection Limit - Minimum	2.5000	
Detection Limits - Maximum	15.0000	
Positive Hits - Minimum	1.0000	
Positive Hits - Maximum	7100.0000 UCL	
Average Of Positive Hits	515.2857	
Standard Deviation	1340.4792	
Upper Confidence Limit - Normal	691.7369	
Upper Confidence Limit - Lognormal	66.2313	
95th Percentile - Nonparametric	7100.0000	
95th Percentile - Normal	2465.4096	
95th Percentile - Lognormal	87.5879	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.4388	
Corr Coeff - Detected - Lognormal	0.7438	
Corr Coeff - Total - Normal	0.4062	
Corr Coeff - Total - Lognormal	0.8052	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9620	
W-Test - Table Value	0.9240	NA
W-Test - Normal	0.1979	NA
W-Test - Lognormal	0.6825	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000074

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : BENZO(A)ANTHRACENE (UG/KG)

	Sample Results	Background Results
Count	27.0000	No samples
Number of Detects	15.0000	
Average	1337.2963	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	72.0000	
Positive Hits - Maximum	3200.0000 ucl	
Average Of Positive Hits	541.4667	
Standard Deviation	2614.7820	
Upper Confidence Limit - Normal	2195.7811	
Upper Confidence Limit - Lognormal	2320.6437	
95th Percentile - Nonparametric	11500.0000	
95th Percentile - Normal	5638.6126	
95th Percentile - Lognormal	4024.8388	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5775	
Corr Coeff - Detected - Lognormal	0.8589	
Corr Coeff - Total - Normal	0.7041	
Corr Coeff - Total - Lognormal	0.9492	
Corr Coeff - Crit Val - Detected	0.9370	
Corr Coeff - Crit Val - Total	0.9600	
W-Test - Table Value	0.9230	NA
W-Test - Normal	0.5176	NA
W-Test - Lognormal	0.8974	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000075

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : BENZO(B)FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	27.0000	No samples
Number of Detects	16.0000	
Average	1436.2593	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	~~24.0000~~	
Positive Hits - Maximum	2700.0000 ucl	
Average Of Positive Hits	~~582.1250~~	
Standard Deviation	2577.7722	
Upper Confidence Limit - Normal	2282.5931	
Upper Confidence Limit - Lognormal ...	3148.7283 >max	
95th Percentile - Nonparametric.....	11500.0000 hit	
95th Percentile - Normal.....	5676.6946	
95th Percentile - Lognormal	5221.4540	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6628	
Corr Coeff - Detected - Lognormal	0.9022	
Corr Coeff - Total - Normal	0.7291	
Corr Coeff - Total - Lognormal	0.9769	
Corr Coeff - Crit Val - Detected	0.9400	
Corr Coeff - Crit Val - Total	0.9600	
W-Test - Table Value	0.9230	NA
W-Test - Normal	0.5537	NA
W-Test - Lognormal	0.9608	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : BENZO(K)FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	13.0000	
Average	1463.0769	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	20.0000	
Positive Hits - Maximum	4000.0000 UCL	
Average Of Positive Hits	~~568.4~~615	
Standard Deviation	2682.7339	
Upper Confidence Limit - Normal	2361.7025	
Upper Confidence Limit - Lognormal	4446.7953 > max hit	
95th Percentile - Nonparametric	11500.0000	
95th Percentile - Normal	5876.1742	
95th Percentile - Lognormal	5933.4518	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5380	
Corr Coeff - Detected - Lognormal	0.8832	
Corr Coeff - Total - Normal	0.7456	
Corr Coeff - Total - Lognormal	0.9884	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5749	NA
W-Test - Lognormal	0.9725	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : CHRYSENE (UG/KG)

	Sample Results	Background Results
Count	27.0000	No samples
Number of Detects	16.0000	
Average	1357.7037	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	~~93.0000~~	
Positive Hits - Maximum	3000.0000 nCL	
Average Of Positive Hits	~~553.3125~~	
Standard Deviation	2604.0414	
Upper Confidence Limit - Normal	2212.6622	
Upper Confidence Limit - Lognormal	2288.4646	
95th Percentile - Nonparametric	11500.0000	
95th Percentile - Normal	5641.3518	
95th Percentile - Lognormal	4049.7351	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6055	
Corr Coeff - Detected - Lognormal	0.8518	
Corr Coeff - Total - Normal	0.7080	
Corr Coeff - Total - Lognormal	0.9441	
Corr Coeff - Crit Val - Detected	0.9400	
Corr Coeff - Crit Val - Total	0.9600	
W-Test - Table Value	0.9230	NA
W-Test - Normal	0.5231	NA
W-Test - Lognormal	0.8862	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

00078

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	27.0000	No samples
Number of Detects	18.0000	
Average	1450.2593	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	36.0000	
Positive Hits - Maximum	3700.0000	
Average Of Positive Hits	694.0000	
Standard Deviation	2607.9805	
Upper Confidence Limit - Normal	2306.5110	
Upper Confidence Limit - Lognormal	3187.0882 UCL	
95th Percentile - Nonparametric	11500.0000	
95th Percentile - Normal	5740.3873	
95th Percentile - Lognormal	5227.6096	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6683	
Corr Coeff - Detected - Lognormal	0.9533	
Corr Coeff - Total - Normal	0.7339	
Corr Coeff - Total - Lognormal	0.9859	
Corr Coeff - Crit Val - Detected	0.9450	
Corr Coeff - Crit Val - Total	0.9600	
W-Test - Table Value	0.9230	NA
W-Test - Normal	0.5597	NA
W-Test - Lognormal	0.9706	NA
Type of Distribution	LOGNORMAL	

Test Results:

000079

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : PHENANTHRENE (UG/KG)

	Sample Results	Background Results
Count	27.0000	No samples
Number of Detects	14.0000	
Average	1278.8519	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	55.0000	
Positive Hits - Maximum	1400.0000 UCL	
Average Of Positive Hits	448.1429	
Standard Deviation	2585.4115	
Upper Confidence Limit - Normal	2127.6938	
Upper Confidence Limit - Lognormal ...	2141.0928	
95th Percentile - Nonparametric.....	11500.0000	
95th Percentile - Normal.....	5531.8537	
95th Percentile - Lognormal	3778.6431	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6673	
Corr Coeff - Detected - Lognormal	0.8346	
Corr Coeff - Total - Normal	0.6807	
Corr Coeff - Total - Lognormal	0.9495	
Corr Coeff - Crit Val - Detected	0.9340	
Corr Coeff - Crit Val - Total	0.9600	
W-Test - Table Value	0.9230	NA
W-Test - Normal	0.4869	NA
W-Test - Lognormal	0.9043	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : DEFENSE REUTILIZATION AND MARKETING OFFICES

Parameter : PYRENE (UG/KG)

	Sample Results	Background Results
Count	27.0000	No samples
Number of Detects	19.0000	
Average	1542.2963	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	11500.0000	
Positive Hits - Minimum	47.0000	
Positive Hits - Maximum	4300.0000	
Average Of Positive Hits	833.0000	
Standard Deviation	2638.3115	
Upper Confidence Limit - Normal	~~2408.5064~~	
Upper Confidence Limit - Lognormal ...	3136.4885 ucl	
95th Percentile - Nonparametric.....	~~11500.0000~~	
95th Percentile - Normal.....	5882.3188	
95th Percentile - Lognormal	5344.6200	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6680	
Corr Coeff - Detected - Lognormal	0.8971	
Corr Coeff - Total - Normal	0.7531	
Corr Coeff - Total - Lognormal	0.9692	
Corr Coeff - Crit Val - Detected	0.9470	
Corr Coeff - Crit Val - Total	0.9600	
W-Test - Table Value	0.9230	NA
W-Test - Normal	0.5864	NA
W-Test - Lognormal	0.9386	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000081

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 6 – DRMO
LOCATION: NSB–NLON, Groton, CT
DATE: 01/13/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	50	IR:	0
EF:	150	EF:	1
Fi:	0.5	Fi:	1
ED:	6	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	2190	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	1.47E–07	(AVG ANNUAL DOSE)	CF:	2.74E–09	(AVG ANNUAL DOSE)	CF:	1.26E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 6 – DRMO
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
1,1,2,2–Tetrachloroethane	0	1	0.00E+00	0.00E+00	0.00E+00		2.00E–01
Vinyl chloride	0	1	0.00E+00	0.00E+00	0.00E+00		1.90E+00
Benzo(a)anthracene	3.2	1	0.00E+00	4.70E–07	4.04E–08		7.30E–01
Benzo(a)pyrene	2.1	1	0.00E+00	3.08E–07	2.65E–08		7.30E+00
Benzo(b)fluoranthene	2.7	1	0.00E+00	3.96E–07	3.41E–08		7.30E–01
Dibenz(a,h)anthracene	0	1	0.00E+00	0.00E+00	0.00E+00		7.30E+00
Indeno(1,2,3–cd)pyrene	2	1	0.00E+00	2.94E–07	2.52E–08		7.30E–01
Aroclors	1.5	1	0.00E+00	2.20E–07	1.89E–08	2.00E–05	~~7.70E+00~~ 1E+0*
1,2,3,4,6,7,8–HpCDD	0	1	0.00E+00	0.00E+00	0.00E+00		1.56E+03
~~Aluminum~~	~~10200~~	~~1~~	~~0.00E+00~~	~~1.56E–03~~	~~1.29E–04~~	~~1.00E+00~~	
Antimony	7.7	1	0.00E+00	1.13E–06	9.72E–08	4.00E–04	
Arsenic	2.8	1	0.00E+00	4.11E–07	3.53E–08	3.00E–04	1.50E+00
Beryllium	0.61	1	0.00E+00	8.95E–08	7.70E–09	5.00E–03	4.30E+00
Cadmium	4.1	1	0.00E+00	6.02E–07	5.17E–08	5.00E–04	
Chromium	28.4	1	0.00E+00	4.17E–06	3.58E–07	5.00E–03	
~~Copper~~	~~292~~	~~1~~	~~0.00E+00~~	~~4.29E–05~~	~~3.68E–06~~	~~4.00E–02~~	
~~Iron~~	~~14800~~	~~1~~	~~0.00E+00~~	~~2.17E–03~~	~~1.87E–04~~	~~3.00E–01~~	
Manganese	260	1	0.00E+00	3.82E–05	3.28E–06	~~5.00E–03~~ 2.4E-2	
Thallium	0.31	1	0.00E+00	4.55E–08	3.91E–09	8.00E–05	
Vanadium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–03	
Zinc	2250	1	0.00E+00	3.30E–04	2.84E–05	3.00E–01	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions
01/20/97

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 6 – DRMO
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
1,1,2,2–Tetrachloroethane	0.00E+00	0.00E+00	0.00E+00
Vinyl chloride	0.00E+00	0.00E+00	0.00E+00
Benzo(a)anthracene	0.00E+00	0.00E+00	2.95E–08
Benzo(a)pyrene	0.00E+00	0.00E+00	1.93E–07
Benzo(b)fluoranthene	0.00E+00	0.00E+00	2.49E–08
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3–cd)pyrene	0.00E+00	0.00E+00	1.84E–08
Aroclors	0.00E+00	1.10E–02	~~1.46E–07~~ 1.89E-8*
1,2,3,4,6,7,8–HpCDD	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~1.50E–03~~	~~0.00E+00~~
Antimony	0.00E+00	2.83E–03	0.00E+00
Arsenic	0.00E+00	1.37E–03	5.30E–08
Beryllium	0.00E+00	1.79E–05	3.31E–08
Cadmium	0.00E+00	1.20E–03	0.00E+00
Chromium	0.00E+00	8.34E–04	0.00E+00
~~Copper~~	~~0.00E+00~~	~~1.07E–03~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~7.24E–03~~	~~0.00E+00~~
Manganese	0.00E+00	~~7.63E–03~~ 1.59E-3	0.00E+00
Thallium	0.00E+00	5.69E–04	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	1.10E–03	0.00E+00
	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~3.64E–02~~ 2.05E-2	~~4.89E-07~~ 3.71 E-7 *

* Based on new PCB guidance (USEPA, September 1996).

Revisions 01/28/97 KJS

000085

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 6 – DRMO
LOCATION: NSB–NLON, Groton, CT
DATE: 01/15/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		3800
AF = ADHERENCE FACTOR (MG/SQ CM):		0.2
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		150
ED1 = YOUTH EXPOSURE DURATION (YEARS):		1
ED2 = ADULT EXPOSURE DURATION (YEARS):		6
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
BW1 = BODY WEIGHT ADOLESCENT (KG):		1
BW2 = BODY WEIGHT ADULT (KG):		70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		2190
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 0.00E+00 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 1.91E–07
DOSEadult = (CF2)*(C)*(ABS) CF2 = 2.23E–06

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 6 – DRMO
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	1.5	0.06	0.00E+00	2.01E–07	1.72E–08	2.00E–05	~~7.70E+00~~ 1E+0*
1,2,3,4,6,7,8–HpCDD	0	0.03	0.00E+00	0.00E+00	0.00E+00		~~1.56E+00~~ 1.73E+3
Cadmium	4.1	0.01	0.00E+00	9.15E–08	7.84E–09	~~1.50E–05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions
01/-9/97

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 6 – DRMO
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	0.00E+00	1.00E–02	~~1.33E–07~~ 1.72E-8 *
1,2,3,4,6,7,8–HpCDD	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	~~6.10E–03~~ 3.66E-3	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	~~1.61E–02~~ 1.37E-2	~~1.33E–07~~ 1.72E-8 *

* Based on new PCB guidance (USEPA, September 1996).

Revisions
01/20/97

000089

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 6 – DRMO
LOCATION: NSB–NLON, Groton, CT
DATE: 01/13/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	100	IR:	0
EF:	150	EF:	1
Fi:	1	Fi:	1
ED:	25	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	9125	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	5.87E–07	(AVG ANNUAL DOSE)	CF:	2.74E–09	(AVG ANNUAL DOSE)	CF:	2.10E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 6 – DRMO
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
1,1,2,2–Tetrachloroethane	0	1	0.00E+00	0.00E+00	0.00E+00		2.00E–01
Vinyl chloride	0	1	0.00E+00	0.00E+00	0.00E+00		1.90E+00
Benzo(a)anthracene	3.2	1	0.00E+00	1.88E–06	6.71E–07		7.30E–01
Benzo(a)pyrene	4	1	0.00E+00	2.35E–06	8.39E–07		7.30E+00
Benzo(b)fluoranthene	2.7	1	0.00E+00	1.59E–06	5.66E–07		7.30E–01
Dibenz(a,h)anthracene	0	1	0.00E+00	0.00E+00	0.00E+00		7.30E+00
Indeno(1,2,3–cd)pyrene	3.6	1	0.00E+00	2.11E–06	7.55E–07		7.30E–01
Aroclors	11	1	0.00E+00	6.46E–06	2.31E–06	2.00E–05	~~7.70E+00~~ 2E+0 *
1,2,3,4,6,7,8–HpCDD	0	1	0.00E+00	0.00E+00	0.00E+00		1.56E+03
~~Aluminum~~	~~10200~~	~~1~~	~~0.00E+00~~	~~5.99E–03~~	~~2.14E–03~~	~~1.00E+00~~	
Antimony	19.2	1	0.00E+00	1.13E–05	4.03E–06	4.00E–04	
Arsenic	2.8	1	0.00E+00	1.64E–06	5.87E–07	3.00E–04	1.50E+00
Beryllium	0.61	1	0.00E+00	3.58E–07	1.28E–07	5.00E–03	4.30E+00
Cadmium	4.1	1	0.00E+00	2.41E–06	8.60E–07	5.00E–04	
Chromium	28.4	1	0.00E+00	1.67E–05	5.96E–06	5.00E–03	
~~Copper~~	~~292~~	~~1~~	~~0.00E+00~~	~~1.71E–04~~	~~6.12E–05~~	~~4.00E–02~~	
~~Iron~~	~~14800~~	~~1~~	~~0.00E+00~~	~~8.69E–03~~	~~3.10E–03~~	~~3.00E–01~~	
Manganese	260	1	0.00E+00	1.53E–04	5.45E–05	~~5.00E–03~~ 2.4E-2	
Thallium	0.64	1	0.00E+00	3.76E–07	1.34E–07	8.00E–05	
Vanadium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–03	
Zinc	28300	1	0.00E+00	1.66E–02	5.93E–03	3.00E–01	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

000392

* Based on new PCB guidance (USEPA, September 1996).

Revisions 01/20/97

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 6 – DRMO
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
1,1,2,2–Tetrachloroethane	0.00E+00	0.00E+00	0.00E+00
Vinyl chloride	0.00E+00	0.00E+00	0.00E+00
Benzo(a)anthracene	0.00E+00	0.00E+00	4.90E–07
Benzo(a)pyrene	0.00E+00	0.00E+00	6.12E–06
Benzo(b)fluoranthene	0.00E+00	0.00E+00	4.13E–07
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3–cd)pyrene	0.00E+00	0.00E+00	5.51E–07
Aroclors	0.00E+00	3.23E–01	~~1.78E–05~~ 4.62E-6 *
1,2,3,4,6,7,8–HpCDD	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~5.99E–03~~	~~0.00E+00~~
Antimony	0.00E+00	2.82E–02	0.00E+00
Arsenic	0.00E+00	5.48E–03	8.81E–07
Beryllium	0.00E+00	7.16E–05	5.50E–07
Cadmium	0.00E+00	4.81E–03	0.00E+00
Chromium	0.00E+00	3.33E–03	0.00E+00
~~Copper~~	~~0.00E+00~~	~~4.29E–03~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~2.90E–02~~	~~0.00E+00~~
Manganese	0.00E+00	~~3.05E–03~~ 6.35E-3	0.00E+00
Thallium	0.00E+00	4.70E–03	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	5.54E–02	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~4.05E–01~~ 4.31E-1	~~2.68E–05~~ 1.36E-5 *

* Based on new PCB guidance (USEPA, September 1996).

Revisions 01/20/97 KLS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 6 – DRMO
LOCATION: NSB–NLON, Groton, CT
DATE: 01/15/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		3600
AF = ADHERENCE FACTOR (MG/SQ CM):		1
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		150
ED1 = YOUTH EXPOSURE DURATION (YEARS):		1
ED2 = ADULT EXPOSURE DURATION (YEARS):		25
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		1
BW1 = BODY WEIGHT ADOLESCENT (KG):		1
BW2 = BODY WEIGHT ADULT (KG):		70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		9125
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 0.00E+00 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 7.97E–06
DOSEadult = (CF2)*(C)*(ABS) CF2 = 2.23E–05

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 6 – DHMO
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	11	0.06	0.00E+00	1.47E–05	5.26E–06	2.00E–05	~~7.70E+00~~ 2E+0*
1,2,3,4,6,7,8–HpCDD	0	0.03	0.00E+00	0.00E+00	0.00E+00		~~1.50E+03~~ 1.73E+3
Cadmium	4.1	0.01	0.00E+00	9.15E–07	3.27E–07	~~1.50E–05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

000096

*Based on new PCB guidance (USEPA, September 1996).

Revisions 01/27

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 6 – DRMO
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	0.00E+00	7.36E–01	~~4.05E–05~~ 1.05E-5 *
1,2,3,4,6,7,8–HpCDD	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	~~6.10E–02~~ 3.66E-2	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	~~7.07E–01~~ 7.73E-1	~~4.05E–05~~ 1.05E-5 *

* Based on new PCB guidance (USEPA, September 1996). Revisions 01/20/97

000097

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 6 – DRMO
LOCATION: NSB–NLON, Groton, CT
DATE: 01/13/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	240	IR:	0
EF:	80	EF:	1
Fi:	0.5	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	3.76E–07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	5.37E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 6 – DRMO
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
1,1,2,2–Tetrachloroethane	0.23	1	0.00E+00	8.64E–08	1.23E–09		2.00E–01
Vinyl chloride	0.52	1	0.00E+00	1.95E–07	2.79E–09		1.90E+00
Benzo(a)anthracene	1.4	1	0.00E+00	5.26E–07	7.51E–09		7.30E–01
Benzo(a)pyrene	1.6	1	0.00E+00	6.01E–07	8.59E–09		7.30E+00
Benzo(b)fluoranthene	2.7	1	0.00E+00	1.01E–06	1.45E–08		7.30E–01
Dibenz(a,h)anthracene	0.13	1	0.00E+00	4.88E–08	6.98E–10		7.30E+00
Indeno(1,2,3–cd)pyrene	1.6	1	0.00E+00	6.01E–07	8.59E–09		7.30E–01
Aroclors	1.9	1	0.00E+00	7.14E–07	1.02E–08	2.00E–05	~~7.70E+00~~ 1E+0*
1,2,3,4,6,7,8–HpCDD	0.00067	1	0.00E+00	2.52E–10	3.60E–12		1.56E+03
~~Aluminum~~	~~9290~~	~~1~~	~~0.00E+00~~	~~3.49E–03~~	~~4.99E–05~~	~~1.00E+00~~	
Antimony	5.5	1	0.00E+00	2.07E–06	2.95E–08	4.00E–04	
Arsenic	3.4	1	0.00E+00	1.28E–06	1.82E–08	3.00E–04	1.50E+00
Beryllium	0.66	1	0.00E+00	2.48E–07	3.54E–09	5.00E–03	4.30E+00
Cadmium	2.7	1	0.00E+00	1.01E–06	1.45E–08	5.00E–04	
Chromium	30	1	0.00E+00	1.13E–05	1.61E–07	5.00E–03	
~~Copper~~	~~201~~	~~1~~	~~0.00E+00~~	~~7.55E–05~~	~~1.08E–06~~	~~4.00E–02~~	
~~Iron~~	~~16200~~	~~1~~	~~0.00E+00~~	~~6.09E–03~~	~~8.70E–05~~	~~3.00E–01~~	
Manganese	284	1	0.00E+00	1.07E–04	1.52E–06	~~5.00E–03~~ 2.4E-2	
Thallium	0.36	1	0.00E+00	1.35E–07	1.93E–09	8.00E–05	
Vanadium	34.6	1	0.00E+00	1.30E–05	1.86E–07	7.00E–03	
Zinc	1260	1	0.00E+00	4.73E–04	6.76E–06	3.00E–01	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, Sept 1996) Revisions 01/20/97 AS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 6 – DRMO
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
1,1,2,2-Tetrachloroethane	0.00E+00	~~4.32E-07~~ 0.00E+0	2.46E-10
Vinyl chloride	0.00E+00	0.00E+00	5.30E-09
Benzo(a)anthracene	0.00E+00	0.00E+00	5.49E-09
Benzo(a)pyrene	0.00E+00	0.00E+00	6.27E-08
Benzo(b)fluoranthene	0.00E+00	0.00E+00	1.06E-08
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	5.09E-09
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	6.27E-09
Aroclors	0.00E+00	3.57E-02	~~7.85E-08~~ 1.02E-8 *
1,2,3,4,6,7,8-HpCDD	0.00E+00	0.00E+00	5.61E-09
~~Aluminum~~	~~0.00E+00~~	~~3.49E-03~~	~~0.00E+00~~
Antimony	0.00E+00	5.17E-03	0.00E+00
Arsenic	0.00E+00	4.26E-03	2.74E-08
Beryllium	0.00E+00	4.96E-05	1.52E-08
Cadmium	0.00E+00	2.03E-03	0.00E+00
Chromium	0.00E+00	2.25E-03	0.00E+00
~~Copper~~	~~0.00E+00~~	~~1.69E-03~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~2.03E-02~~	~~0.00E+00~~
Manganese	0.00E+00	~~2.13E-02~~ 4.44E-3	0.00E+00
Thallium	0.00E+00	1.69E-03	0.00E+00
Vanadium	0.00E+00	1.86E-03	0.00E+00
Zinc	0.00E+00	1.58E-03	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~1.02E-01~~ 5.90E-2	~~2.22E-07~~ 1.54E-7 *

* Based on new PCB guidance (USEPA, Sept 1996)

Revisions
01/20/97
KMS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 6 – DRMO
LOCATION: NSB–NLON, Groton, CT
DATE: 01/15/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C	= CONCENTRATION IN SOIL (MG/KG)		
SA1	= YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2	= ADULT SKIN SURFACE AREA (SQ CM/DAY):		3800
AF	= ADHERENCE FACTOR (MG/SQ CM):		0.2
ABS	= ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
		Dioxins:	0.03
		PCBS:	0.06
EF1	= YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2	= ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		80
ED1	= YOUTH EXPOSURE DURATION (YEARS):		1
ED2	= ADULT EXPOSURE DURATION (YEARS):		1
Fd	= FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
BW1	= BODY WEIGHT ADOLESCENT (KG):		1
BW2	= BODY WEIGHT ADULT (KG):		70
AT1	= AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2	= AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		365
AT3	= AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 0.00E+00
DOSEadult = (CF2)*(C)*(ABS) CF2 = 1.19E–06
CANCER RISK = (CF3)*(C)*(ABS) CF3 = 1.70E–08

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 6 – DRMO
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	1.9	0.06	0.00E+00	1.36E–07	1.94E–09	2.00E–05	~~7.70E+00~~ 1E+0*
1,2,3,4,6,7,8–HpCDD	0.00067	0.03	0.00E+00	2.39E–11	3.42E–13		~~1.50E+03~~ 1.73E+3
Cadmium	2.7	0.01	0.00E+00	3.21E–08	4.59E–10	~~1.50E–05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, Sept 1996). Revisions 01/20/97 LS

APPENDIX F.11

SITE 7 - TORPEDO SHOPS

SUMMARY OF COC SELECTION
SITE 7 TORPEDO SHOPS - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
1,1-Dichloroethene	1/6	0.003	7MW4S	0.007 - 0.011	1.1	0.04	0.03	N	2
Acetone	2/6	0.011 - 0.027	7TB13	0.011 - 0.041	780	62000	8	N	2
Methylene chloride	3/6	0.005 - 0.011	7MW4S	0.007 - 0.011	85	7	0.01	N	2
Tetrachloroethene	1/6	0.011	7MW4S	0.007 - 0.011	12	11	0.04	N	2
Toluene	4/11	0.003 - 0.006	7TB10	0.0011 - 0.011	1600	520	5	N	2
Xylenes, total	4/11	0.0005 - 0.011	7MW4S	0.0011 - 0.011	16000	320	74	N	2
2-Methylnaphthalene	3/6	0.023 - 0.17	7MW4S	0.35 - 0.45	-	-	-	N	1
Acenaphthene	2/6	0.72 - 0.79	7MW4S	0.35 - 0.45	470	-	200	N	2
Acenaphthylene	2/6	0.028 - 0.055	7TB10	0.35 - 0.45	-	-	-	N	1
Anthracene	2/6	1.1 - 1.3	7TB10	0.35 - 0.45	2300	-	4300	N	2
Benzo(a)anthracene	4/6	0.036 - 2.7	7TB10	0.35 - 0.36	0.88	-	0.7	Y	3
Benzo(a)pyrene	4/6	0.061 - 1.9	7TB10	0.35 - 0.36	0.088	-	4	Y	3
Benzo(b)fluoranthene	4/6	0.048 - 3.2	7TB10	0.35 - 0.36	0.88	-	4	Y	3
Benzo(g,h,i)perylene	4/6	0.057 - 1.3	7MW4S	0.35 - 0.36	-	-	-	N	1
Benzo(k)fluoranthene	2/6	0.035 - 0.51	7MW1D	0.35 - 0.36	8.8	-	4	N	2
Benzoic acid	3/6	0.057 - 0.13	7MW4S	1.7 - 2.2	31000	-	280	N	2
Carbazole	2/5	0.64 - 0.66	7MW4S	0.35 - 0.38	32	-	0.2	N	2
Chrysene	4/6	0.038 - 2.4	7TB10	0.35 - 0.36	88	-	1	N	2
Di-n-butyl phthalate	2/6	0.02 - 0.022	7TB13	0.35 - 0.45	780	100	120	N	2
Dibenzo(a,h)anthracene	1/6	0.063	7MW1D	0.35 - 0.38	0.088	-	11	N	2
Dibenzofuran	2/6	0.34 - 0.35	7MW4S	0.35 - 0.45	31	-	-	N	2
Diethyl phthalate	1/6	14	7MW7S	0.35 - 0.45	6300	520	110	N	2
Fluoranthene	5/6	0.018 - 3.8	7TB10	0.36	310	-	980	N	2
Fluorene	2/6	0.66 - 0.71	7MW4S	0.35 - 0.45	310	-	160	N	2
Indeno(1,2,3-cd)pyrene	4/6	0.05 - 1.2	7TB10	0.35 - 0.36	0.88	-	35	Y	3
Naphthalene	2/6	0.26 - 0.31	7MW4S	0.35 - 0.45	310	-	30	N	2
Phenanthrene	4/6	0.063 - 4.3	7MW4S	0.35 - 0.36	-	-	-	N	1
Pyrene	5/6	0.023 - 4.2	7TB10	0.36	230	-	1400	N	2
4,4'-DDD	2/6	0.0061 - 0.025	7MW7S	0.021 - 0.036	2.7	-	0.7	N	2

SUMMARY OF COC SELECTION (Continued)
SITE 7 TORPEDO SHOPS - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
4,4'-DDE	1/6	0.01	7MW7S	0.021 - 0.037	1.9	-	0.5	N	2
4,4'-DDT	2/6	0.0054 - 0.0067	7MW4S	0.021 - 0.037	1.9	80	1.0	N	2
Endosulfan sulfate	2/6	0.013 - 0.035	7MW7S	0.021 - 0.037	-	-	-	N	1
Endrin ketone	1/6	0.0068	7MW4S	0.021 - 0.037	-	-	-	N	1
Heptachlor	1/6	0.0047	7MW4S	0.011 - 0.019	0.14	0.3	0.06	N	2
Methoxychlor	1/6	0.032	7MW4S	0.11 - 0.19	39	-	62	N	2
Aluminum	6/6	3730 - 13700	7MW1D	-	7800	-	-	~~Y~~ N	~~3~~ 4
Antimony	2/6	5.6 - 19.4	7MW1D	3 - 3.3	3.1	-	-	Y	3
Arsenic	6/6	1.1 - 3.5	7TB9	-	0.43	380	15	Y	3
Barium	6/6	23.2 - 159	7MW1D	-	550	350000	32	N	2
Beryllium	4/6	0.21 - 0.58	7MW1D	0.2 - 0.22	0.15	690	180	Y	3
Cadmium	2/6	0.48 - 4.6	7MW1D	0.4 - 0.46	3.9	920	6	Y	3
Calcium	6/6	849 - 5830	7MW1D	-	-	-	-	N	1
Chromium (total)	6/6	6.8 - 18.4	7MW1D	-	39 (7)	140 (7)	19 (7)	N	2
Cobalt	4/6	4.7 - 14.8	7MW1D	2.9 - 3.5	470	-	-	N	2
Copper	6/6	9.2 - 39.8	7MW1D	-	290	-	-	N	2
Iron	6/6	4580 - 21600	7MW1D	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	6/6	4 - 16.8	7TB13	-	400 (8)	-	-	N	2
Magnesium	6/6	1510 - 6440	7MW1D	-	-	-	-	N	1
Manganese	6/6	87.7 - 367	7MW4S	-	~~39~~ 190	-	-	Y	3
Mercury	1/6	0.11	7MW7S	0.1 - 0.12	2.3	7	3	N	2
Nickel	6/6	5.1 - 14.4	7MW1D	-	160	6900	21	N	2
Potassium	6/6	1020 - 5360	7MW1D	-	-	-	-	N	1
Silver	2/6	0.5 - 5.5	7MW1D	0.4 - 0.65	39	-	-	N	2
Sodium	6/6	60.9 - 708	7MW4S	-	-	-	-	N	1
Thallium	1/6	0.26	7MW4S	0.2 - 1	0.55 (9)	-	0.4	N	2
Vanadium	3/6	7.7 - 45.8	7MW1D	14.3 - 31.9	55	-	-	N	2
Zinc	6/6	13.8 - 133	7MW4S	-	2300	-	42000	N	2
TPH	6/6	28 - 367	B325-MW06	-	500 (10)	-	2500 (10)	N	2

Revisions
08/19/96
KMS

000002

SUMMARY OF COC SELECTION (Continued)
SITE 7 TORPEDO SHOPS - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in mg/kg unless otherwise noted. Surface soil designated as soil from depths of 0 to 3 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Hexavalent chromium.
8 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
9 Thallic oxide.
10 CTDEP guidance (CTDEP, October 3, 1995).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitation evaluation of this chemical.

000003

Revisions
08/19/96
TMS

000004

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 7 TORPEDO SHOPS - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
1,1-Dichloroethene	3	4.75
Acetone	27	12.5
Methylene chloride	11	6.4167
Tetrachloroethene	11	6.0833
Toluene	6	2.8185
Xylenes, total	11	3.9695
2-Methylnaphthalene	170	147.1667
Acenaphthene	790	380
Acenaphthylene	55	142.1667
Anthracene	1300	528.3333
Benzo(a)anthracene	2700	960.1667
Benzo(a)pyrene	1900	764.3333
Benzo(b)fluoranthene	3200	1168.8333
Benzo(g,h,i)perylene	1300	575.3333
Benzo(k)fluoranthene	510	209.1667
Benzoic acid	130	516.1667
Carbazole	660	369
Chrysene	2400	862.1667
Di-N-butyl phthalate	22	133.6667
Dibenzo(a,h)anthracene	63	160.5
Dibenzofuran	350	243.3333
Diethyl phthalate	14000	2491.6667
Fluoranthene	3800	1359.6667
Fluorene	710	356.6667
Indeno(1,2,3-Cd)pyrene	1200	540.8333
Naphthalene	310	223.3333
Phenanthrene	4300	1498
Pyrene	4200	1449.5
4,4'-DDD	25	15.85
4,4'-DDE	10	15.4167
4,4'-DDT	6.7	12.85
Endosulfan sulfate	35	18.75
Endrin ketone	6.8	14.8833
Heptachlor	4.7	7.7833
Methoxychlor	32	75.3333
Inorganics (mg/kg)		
Aluminum	13700	8106.6667
Antimony	19.4	5.2083
Arsenic	3.5	2.0667
Barium	159	81.0167
Beryllium	0.58	0.315
Cadmium	4.6	0.9883
Calcium	5830	2178.1667

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 7 TORPEDO SHOPS - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (mg/kg) (Continued)		
Chromium (total)	18.4	12
Cobalt	14.8	5.8
Copper	39.8	20.5667
Iron	21600	11938.3333
Lead	16.8	9.1
Magnesium	6440	3910
Manganese	367	218.1167
Mercury	0.11	0.0642
Nickel	14.4	8.3833
Potassium	5360	3151.6667
Silver	5.5	1.1592
Sodium	708	291.6833
Thallium	0.26	0.1975
Vanadium	45.8	18.525
Zinc	133	57.55

SUMMARY OF COC SELECTION
SITE 7 TORPEDO SHOPS - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
1,1-Dichloroethene	1/29	0.003	7MW4S	0.006 - 0.061	1.1	0.04	0.03	N	2
2-Butanone	1/29	0.032	7TB5	0.011 - 0.061	4700	6900 (11)	-	N	2
Acetone	4/29	0.011 - 0.17	7TB5	0.011 - 0.27	780	62000	8	N	2
Benzene	1/40	0.004	7TB5	0.0011 - 0.061	22	0.5	0.02	N	2
Carbon disulfide	2/29	0.003 - 0.005	7TB5	0.006 - 0.061	780	11	14	N	2
Methylene chloride	14/29	0.003 - 0.42	7MW8S	0.006 - 0.023	85	7	0.01	N	2
Tetrachloroethene	6/29	0.003 - 0.018	7MW8S	0.006 - 0.024	12	11	0.04	N	2
Toluene	6/40	0.003 - 0.008	7TB16	0.0011 - 0.061	1600	520	5	N	2
Xylenes, total	6/40	0.0005 - 0.011	7MW4S	0.0011 - 0.061	16000	320	74	N	2
2-Methylnaphthalene	3/29	0.023 - 0.17	7MW4S	0.35 - 0.5	-	-	-	N	1
4-Methylphenol	1/29	0.56	7MW2S	0.35 - 0.5	39	-	-	N	2
Acenaphthene	5/29	0.043 - 0.79	7MW4S	0.35 - 0.5	470	-	200	N	2
Acenaphthylene	3/29	0.02 - 0.055	7TB10	0.35 - 0.5	-	-	-	N	1
Anthracene	5/29	0.055 - 1.3	7TB10	0.35 - 0.5	2300	-	4300	N	2
Benzo(a)anthracene	8/29	0.036 - 2.7	7TB10	0.35 - 0.5	0.88	-	0.7	Y	3
Benzo(a)pyrene	11/29	0.033 - 1.9	7TB10	0.35 - 0.5	0.088	-	4	Y	3
Benzo(b)fluoranthene	10/29	0.021 - 3.2	7TB10	0.35 - 0.5	0.88	-	4	Y	3
Benzo(g,h,i)perylene	9/29	0.021 - 1.3	7MW4S	0.35 - 0.5	-	-	-	N	1
Benzo(k)fluoranthene	8/29	0.024 - 0.52	7TB12	0.35 - 0.5	8.8	-	4	N	2
Benzoic acid	10/29	0.023 - 0.13	7MW4S	1.7 - 2.4	31000	-	280	N	2
Bis(2-ethylhexyl)phthalate	5/29	0.13 - 0.74	7TB3	0.17 - 0.5	46	210	11	N	2
Butyl benzyl phthalate	1/29	0.026	7TB7	0.35 - 0.5	1600	530	68	N	2
Carbazole	4/19	0.027 - 0.66	7MW4S	0.35 - 0.47	32	-	0.2	N	2
Chrysene	10/29	0.025 - 2.4	7TB10	0.35 - 0.5	88	-	1	N	2
Di-n-butyl phthalate	11/29	0.02 - 0.17	7TB4	0.35 - 0.47	780	100	120	N	2
Dibenzo(a,h)anthracene	1/29	0.063	7MW1D	0.35 - 0.5	0.088	-	11	N	2
Dibenzofuran	3/29	0.027 - 0.35	7MW4S	0.35 - 0.5	31	-	-	N	2
Diethyl phthalate	2/29	0.094 - 14	7MW7S	0.35 - 0.48	6300	520	110	N	2
Fluoranthene	14/29	0.018 - 3.8	7TB10	0.36 - 0.5	310	-	980	N	2

SUMMARY OF COC SELECTION (Continued)
SITE 7 TORPEDO SHOPS - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Fluorene	5/29	0.043 - 0.71	7MW4S	0.35 - 0.5	310	-	160	N	2
Indeno(1,2,3-cd)pyrene	9/29	0.024 - 1.2	7TB10	0.35 - 0.5	0.88	-	35	Y	3
Naphthalene	2/29	0.26 - 0.31	7MW4S	0.35 - 0.5	310	-	30	N	2
Phenanthrene	9/29	0.025 - 4.3	7MW4S	0.35 - 0.5	-	-	-	N	1
Pyrene	14/29	0.021 - 4.2	7TB10	0.36 - 0.5	230	-	1400	N	2
4,4'-DDD	4/24	0.0044 - 0.025	7MW7S	0.02 - 0.047	2.7	-	0.7	N	2
4,4'-DDE	4/24	0.0054 - 0.21	7TB3	0.02 - 0.047	1.9	-	0.5	N	2
4,4'-DDT	4/24	0.0054 - 0.026	7TB16	0.02 - 0.047	1.9	80	1.0	N	2
Aroclor-1254	1/24	0.66	7MW2S	0.2 - 0.47	0.16	-	-	Y	3
Endosulfan sulfate	2/24	0.013 - 0.035	7MW7S	0.02 - 0.047	-	-	-	N	1
Endrin aldehyde	2/14	0.0055	7TB8/7TB7	0.035 - 0.047	-	-	-	N	1
Endrin ketone	1/24	0.0068	7MW4S	0.02 - 0.047	-	-	-	N	1
Heptachlor	1/24	0.0047	7MW4S	0.0098 - 0.024	0.14	0.3	0.06	N	2
Methoxychlor	1/24	0.032	7MW4S	0.098 - 0.24	39	-	62	N	2
Aluminum	29/29	3730 - 20000	7MW6S	-	7800	-	-	~~Y~~ N	~~3~~ 4
Antimony	11/27	5.1 - 19.4	7MW1D / 7TB2	3 - 18.2	3.1	-	-	Y	3
Arsenic	26/29	0.82 - 8.1	7MW9S	1.6 - 4.6	0.43	380	15	Y	3
Barium	29/29	17.4 - 506	7MW6S	-	550	350000	32	N	2
Beryllium	26/29	0.21 - 1	7TB1	0.2 - 0.23	0.15	690	180	Y	3
Cadmium	14/29	0.47 - 5.1	7TB1	0.4 - 1	3.9	920	6	Y	3
Calcium	29/29	600 - 5830	7MW1D	-	-	-	-	N	1
Chromium (total)	29/29	6.8 - 61.1	7MW6S	-	39 (7)	140 (7)	19 (7)	Y	3
Cobalt	24/29	4.7 - 19.2	7MW6S	1.8 - 3.9	470	-	-	N	2
Copper	29/29	7.6 - 45	7TB7	-	290	-	-	N	2
Iron	29/29	4580 - 32900	7MW6S	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	23/29	3.3 - 27.5	7TB12	2.5 - 9.1	400 (8)	-	-	N	2
Magnesium	29/29	1510 - 19500	7MW6S	-	-	-	-	N	1
Manganese	29/29	60.7 - 725	7MW6S	-	~~30~~ 190	-	-	Y	3
Mercury	5/29	0.11 - 1.2	7MW10S	0.1 - 0.14	2.3	7	3	N	2

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SUMMARY OF COC SELECTION (Continued)
SITE 7 TORPEDO SHOPS - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Nickel	29/29	5.1 - 42.1	7MW6S	-	160	6900	21	N	2
Potassium	29/29	575 - 18400	7MW6S	-	-	-	-	N	1
Selenium	1/29	0.77	7TB5	0.44 - 0.85	39	-	3	N	2
Silver	10/29	0.5 - 5.5	7MW1D	0.4 - 2.4	39	-	-	N	2
Sodium	28/29	54.8 - 708	7MW4S	103	-	-	-	N	1
Thallium	4/29	0.26 - 1	7MW6S	0.2 - 1.2	0.55 (9)	-	0.4	Y	3
Vanadium	24/29	7.7 - 86.7	7MW6S	14.3 - 38.4	55	-	-	Y	3
Zinc	29/29	13.8 - 133	7MW4S	-	2300	-	42000	N	2
TPH	13/22	28 - 898	7MW8S	11.1 - 14.2	500 (10)	-	2500 (10)	Y	3

Footnotes:

1 Results in mg/kg unless otherwise noted. All soil designated as soil from depths of 0 to 10 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Hexavalent chromium.
8 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
9 Thallic oxide.
10 CTDEP guidance (CTDEP, October 3, 1995).
11 Calculated using SSL guidance (See Appendix F.3).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 7 TORPEDO SHOPS - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
1,1-Dichloroethene	3	6
2-Butanone	32	8.1346
Acetone	170	23.9231
Benzene	4	4.5606
Carbon disulfide	5	6.1154
Methylene chloride	420	27.8846
Tetrachloroethene	18	5.6346
Toluene	8	4.4494
Xylenes, total	11	4.6819
2-Methylnaphthalene	170	191.8462
4-Methylphenol	560	215
Acenaphthene	790	234.8077
Acenaphthylene	55	184.1538
Anthracene	1300	274.6154
Benzo(a)anthracene	2700	388.4615
Benzo(a)pyrene	1900	338.6154
Benzo(b)fluoranthene	3200	440.8462
Benzo(g,h,i)perylene	1300	288.9615
Benzo(k)fluoranthene	520	201.7692
Benzoic acid	130	676
Bis(2-Ethylhexyl)phthalate	740	212.5
Butyl benzyl phthalate	26	194.8462
Carbazole	660	235.5294
Chrysene	2400	360.6154
Di-N-butyl phthalate	170	148.7308
Dibenzo(a,h)anthracene	63	194.9231
Dibenzofuran	350	207.7692
Diethyl phthalate	14000	726.8846
Fluoranthene	3800	492.3462
Fluorene	710	244.7692
Indeno(1,2,3-Cd)pyrene	1200	279.5
Naphthalene	310	209.4231
Phenanthrene	4300	583
Pyrene	4200	506.5385
4,4'-DDD	25	14.6364
4,4'-DDE	210	23.2864
4,4'-DDT	26	14.9818
Aroclor-1254	660	183.8636
Endosulfan sulfate	35	16.4091
Endrin aldehyde	5.5	17.1538
Endrin ketone	6.8	15.3545
Heptachlor	4.7	7.8636
Methoxychlor	32	77.9545

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 7 TORPEDO SHOPS - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (mg/kg)		
Aluminum	20000	11882.3077
Antimony	19.4	7.488
Arsenic	8.1	2.6085
Barium	506	83.9308
Beryllium	1	0.4821
Cadmium	5.1	1.4627
Calcium	5830	1609.7692
Chromium (total)	61.1	18.2577
Cobalt	19.2	6.6538
Copper	45	19.5885
Iron	32900	13925.3846
Lead	27.5	8.6442
Magnesium	19500	4438.0769
Manganese	725	239.2462
Mercury	1.2	0.1192
Nickel	42.1	12.2462
Potassium	18400	3017.1538
Selenium	0.77	0.3275
Silver	5.5	1.4948
Sodium	708	197.7769
Thallium	1	0.3083
Vanadium	86.7	27.6038
Zinc	133	47.2385

SUMMARY OF COC SELECTION
SITE 7 TORPEDO SHOPS - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
1,1,1-Trichloroethane	8/34	2 - 42	7GW3S	5 - 10	200	200	130	N	2
1,1-Dichloroethane	6/34	2 - 30	7GW3S/7GW3D	5 - 10	-	-	81	N	2
2-Butanone	1/34	10	7GW8S	10	-	-	190	N	2
4-Methyl-2-pentanone	1/34	21	7GW4S	10	-	-	290	N	2
Carbon disulfide	2/34	2	7GW3S/7GW9S	5 - 10	-	-	100	N	2
Chlorobenzene	1/34	3	7GW3D	5 - 10	100	100	3.9	N	2
Chloroform	1/34	4	7GW3S	5 - 10	100 (7)	100 (7)	0.15	Y	3
Methylene chloride	3/34	1 - 4	7GW8S	5 - 14	5	5	4.1	N	2
Trichloroethene	1/34	1	7GW3S	5 - 10	5	5	1.6	N	2
1,4-Dichlorobenzene	1/34	2	7GW3S	10	75	75	0.44	Y	3
2-Methylnaphthalene	1/34	9	7GW8S	10	-	-	-	N	1
Acenaphthene	2/34	2 - 4	7GW8S	10	-	-	220	N	2
Acenaphthylene	1/34	0.5	7GW8S	10	-	-	-	N	1
Anthracene	1/34	0.8	7GW8S	10	-	-	1100	N	2
Benzoic acid	7/34	0.5 - 2	7GW3D/7GW10S	25 - 50	-	-	15000	N	2
Bis(2-ethylhexyl)phthalate	1/34	380	7GW5S	10 - 68	6	6	4.8	Y	3
Di-n-butyl phthalate	4/34	0.5 - 2	7GW8S	10	-	-	370	N	2
Dibenzofuran	2/34	1 - 3	7GW8S	10	-	-	15	N	2
Diethyl phthalate	1/34	1	7GW3D	10	-	-	2900	N	2
Fluorene	2/34	2 - 5	7GW8S	10	-	-	150	N	2
Phenanthrene	1/34	6	7GW8S	10	-	-	-	N	1
Phenol	2/34	0.8 - 2	7GW3D	10	-	-	2200	N	2
Aluminum	16/34	32.2 - 56200	7GW5D	20.3 - 344	50 - 200 (8)	-	3700	~~Y~~ N	~~3~~ 5
Antimony	2/29	13 - 108	7GW3S	12 - 25	6	6	1.5	Y	3
Arsenic	8/34	2.1 - 112	7GW4S	2 - 10.7	50	50	0.045	Y	3
Barium	28/34	10.8 - 585	7GW5D	10.4 - 24.5	2000	2000	260	Y	3
Beryllium	3/34	1.5 - 3.3	7GW5D	1	4	4	0.016	Y	3
Boron	14/30	12.5 - 185	7GW3D	11.1 - 220	-	-	330	N	2
Cadmium	5/34	2.6 - 4	7GW3S	2 - 3	5	5	1.8	Y	3
Calcium	34/34	6020 - 79600	7GW5D	-	-	-	-	N	1
Chromium (total)	6/34	6.4 - 104	7GW5D	3 - 11.3	100	100	18 (9)	Y	3
Cobalt	7/34	4.4 - 41.7	7GW5D	3 - 10.3	-	-	220	N	2

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SUMMARY OF COC SELECTION (Continued)
SITE 7 TORPEDO SHOPS - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Copper	17/34	2.3 - 797	7GW5D	2 - 6.9	1300 (10)	-	150	~~Y~~ N	~~3~~ 5
Iron	27/34	140 - 81800	7GW1D	22.3 - 96.7	300 (8)	-	1100	~~Y~~ N	~~3~~ 5
Lead	14/34	2.3 - 84.1	7GW5D	2 - 12.4	15 (10)	-	-	Y	4
Magnesium	34/34	821 - 29300	7GW5D	-	-	-	-	N	1
Manganese	34/34	8.3 - 7830	7GW5D	-	50 (8)	-	~~18~~ 88	Y	3
Mercury	2/34	0.99 - 3	7GW5D	0.2	2	2	1.1	Y	3
Nickel	2/34	24.3 - 94	7GW5D	7 - 24.6	100	100	73	Y	3
Potassium	31/34	970 - 29100	7GW5D	2300 - 3090	-	-	-	N	1
Selenium	3/34	1.2 - 18.8	7GW4S	1 - 5	50	50	18	Y	3
Silver	2/34	5 - 38.9	7GW3S	2 - 7	100 (8)	50	18	Y	3
Sodium	34/34	3250 - 194000	7GW10S	-	-	-	-	N	1
Thallium	4/34	2.8 - 11	7GW11S	1 - 10	2	2	0.26 (11)	Y	3
Vanadium	7/34	7.5 - 114	7GW5D	3 - 20	-	-	26	Y	3
Zinc	23/34	6.4 - 412	7GW5D	2 - 23.8	5000 (8)	-	1100	N	2
TPH	2/7	700 - 1200	7GW8S	500	-	500 (12)	500 (12)	Y	3

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Total trihalomethanes.
8 Secondary MCL.
9 Hexavalent chromium.
10 Action Level.
11 Thallic oxide.
12 CTDEP guidance (CTDEP, October 3, 1995).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 No COC screening level available; maximum is greater than or equal to Action Level for drinking water.
5 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 7 TORPEDO SHOPS - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
1,1,1-Trichloroethane	17.5	5.7024
1,1-Dichloroethane	13.8333	5.4286
1,1-Dichloroethene	3.5	4.5357
2-Butanone	7.5	5.1786
4-Methyl-2-pentanone	13	5.5714
Carbon disulfide	3.5	4.6429
Chlorobenzene	4	4.75
Chloroform	3.8333	4.7976
Methylene chloride	4.5	4.7143
Trichloroethene	2.8333	4.7262
1,4-Dichlorobenzene	4	4.9286
2-Methylnaphthalene	7	5.1429
Acenaphthene	3	4.8571
Acenaphthylene	2.75	4.8393
Anthracene	2.9	4.85
Benzoic acid	13.5	15.7369
Bis(2-ethylhexyl)phthalate	192.5	20.5
Di-n-butyl phthalate	3.5	4.4179
Dibenzofuran	2	4.7857
Diethyl phthalate	3	4.8571
Fluorene	3.5	4.8929
Phenanthrene	5.5	5.0357
Phenol	3.5	4.7429
Inorganics (ug/L)		
Aluminum	36350	4182.8512
Antimony	40.1667	9.6994
Arsenic	56.75	6.7792
Barium	416	84.6851
Beryllium	1.9	0.6929
Boron	184.5	66.5161
Cadmium	2.2	1.4345
Calcium	78650	31739.1667
Chromium (total)	63.3	8.3113
Cobalt	25.4	5.4732
Copper	480.5	42.1476
Iron	50750	9829.3036
Lead	51.85	6.8173
Magnesium	20900	7526.5
Manganese	5000	890.9655
Mercury	1.995	0.2354
Nickel	53.15	8.8197
Potassium	20300	6303.0357
Selenium	10.15	2.1652

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 7 TORPEDO SHOPS - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (ug/L) (Continued)		
Silver	13.6333	2.1821
Sodium	173500	66507.8571
Thallium	6	2.7024
Vanadium	75.25	11.5869
Zinc	264.5	51.9482
Miscellaneous (ug/L)		
TPH	950	483.3333

SUMMARY OF COC SELECTION
SITE 7 TORPEDO SHOPS - FILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Antimony	3/25	15.7 - 17.1	7GW1D	12 - 27.4	6	6	1.5	~~Y~~ N	~~3~~ 1
Arsenic	2/30	2.6 - 4.5	7GW2S	2 - 7	50	50	0.045	Y	3
Barium	24/30	9.3 - 153	7GW10S	6 - 24.2	2000	2000	260	Y	3
Boron	16/30	9.6 - 204	7GW4S	10.5 - 50	-	-	330	N	2
Cadmium	1/30	3.1	7GW1D	1 - 3	5	5	1.8	Y	3
Calcium	30/30	5850 - 81500	7GW5D	-	-	-	-	N	1
Cobalt	1/30	13.6	7GW2S	3 - 11.4	-	-	220	N	2
Copper	3/30	9.2 - 11.7	7GW7S	2 - 7.1	1300 (7)	-	150	Y	~~3~~
Iron	18/30	55.9 - 14200	7GW2S	5.3 - 76.8	300 (8)	-	1100	Y	~~3~~
Lead	12/30	2.1 - 8.3	7GW11S	2 - 2.2	15 (7)	-	-	Y	4
Magnesium	30/30	778 - 11700	7GW4S	-	-	-	-	N	1
Manganese	30/30	1.8 - 3530	7GW5D	-	50 (8)	-	~~10~~ 80	Y	3
Nickel	3/30	20.2 - 24.9	7GW8S	7 - 11	100	100	73	Y	3
Potassium	26/30	1180 - 8720	7GW10S	1900 - 2760	-	-	-	N	1
Sodium	30/30	3060 - 212000	7GW10S	-	-	-	-	N	1
Thallium	2/30	4.4 - 6.4	7GW3S	1 - 10	2	2	0.26 (9)	Y	3
Zinc	10/30	5.1 - 77.2	7GW1D	2 - 20.9	5000 (8)	-	1100	N ✓	2 ✓

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Action Level.
8 Secondary MCL (SMCL) based on aesthetic water qualities.
9 Thallic oxide.

Rationale Designations:

1 Chemical detected in unfiltered samples; filtered results not used in risk assessment.

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SUMMARY OF COC SELECTION
SITE 7 TORPEDO SHOPS - UNFILTERED SURFACE WATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	AWQC (4)	Risk-based COC Screening Level (5)	Selected as COC?	Rationale
Di-n-butyl phthalate	1/2	0.6	7SW1	10	2700	370	N	2
Aluminum	1/2	356	7SW1	28	-	3700	N	2
Barium	2/2	18.7 - 30.5	7SW1	-	-	260	N	2
Calcium	2/2	30800 - 32700	7SW1	-	-	-	N	1
Copper	2/2	4.4 - 16.2	7SW1	-	1300	150	N	2
Iron	2/2	56.5 - 558	7SW1	-	-	1100	N	2
Lead	1/2	4.4	7SW1	1	50	15 (6)	N	2
Magnesium	2/2	2440 - 2650	7SW1	-	-	-	N	1
Manganese	2/2	10.5 - 32.1	7SW1	-	-	~~18~~ 88	~~Y~~ N	~~3~~ 2
Potassium	2/2	3000 - 4270	7SW1	-	-	-	N	1
Selenium	1/2	1.2	7SW1	2	100	18	N	2
Sodium	2/2	9150 - 17000	7SW1	-	-	-	N	1
Zinc	2/2	34.5 - 54.1	7SW1	-	-	1100	N	2

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as two samples. Non-validated and rejected results not used in risk assessment.
3 Sample-specific.
4 Ambient water quality criteria for the consumption of water and organisms (USEPA, June 15, 1990).
5 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
6 Federal action level for drinking water.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
~~3 Maximum is greater than or equal to the COC screening level~~

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 7 TORPEDO SHOPS - UNFILTERED SURFACE WATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
Di--n-butyl phthalate	0.6	2.8
Inorganics (ug/L)		
Aluminum	356	185
Barium	30.5	24.6
Calcium	32700	31750
Copper	16.2	10.3
Iron	558	307.25
Lead	4.4	2.45
Magnesium	2650	2545
Manganese	32.1	21.3
Potassium	4270	3635
Selenium	1.2	1.1
Sodium	17000	13075
Zinc	54.1	44.3

SUMMARY OF COC SELECTION
SITE 7 TORPEDO SHOPS - SEDIMENT (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
Methylene chloride	1/3	0.018	7SD2	0.0035 - 0.014	85	N	2
Benzo(a)anthracene	3/3	0.072 - 0.14	7SD2	-	0.88	N	2
Benzo(a)pyrene	2/3	0.052 - 0.1	7SD2	0.45	0.088	Y	3
Benzo(b)fluoranthene	1/3	0.13	7SD3	0.45 - 0.46	0.88	N	2
Benzo(k)fluoranthene	1/3	0.13	7SD2	0.45 - 0.47	8.8	N	2
Benzoic acid	2/3	0.056 - 0.074	7SD2	2.2	31000	N	2
Chrysene	3/3	0.09 - 0.18	7SD2	-	88	N	2
Fluoranthene	3/3	0.088 - 0.21	120790-7SD1	-	310	N	2
Indeno(1,2,3-cd)pyrene	2/3	0.031 - 0.071	7SD2	0.45	0.88	N	2
Phenanthrene	3/3	0.068 - 0.14	120790-7SD1	-	-	N	1
Pyrene	3/3	0.081 - 0.24	7SD2	-	230	N	2
4,4'-DDD	1/3	0.093	7SD2	0.011 - 0.047	2.7	N	2
4,4'-DDE	1/3	0.012	7SD2	0.011 - 0.047	1.9	N	2
Aluminum	3/3	6190 - 11900	120790-7SD1	-	7800	~~Y~~ N	~~3~~ 4
Antimony	1/3	5	7SD2	3.45 - 4	3.1	Y	3
Arsenic	2/3	5.6 - 13.6	7SD3	1.8	0.43	Y	3
Barium	3/3	37.4 - 45.6	120790-7SD1	-	550	N	2
Beryllium	3/3	0.35 - 0.49	120790-7SD1	-	0.15	Y	3
Cadmium	3/3	0.52 - 2.4	120790-7SD1	-	3.9	N	2
Calcium	3/3	1570 - 2300	120790-7SD1	-	-	N	1
Chromium (total)	3/3	11.7 - 15	120790-7SD1	-	39 (5)	N	2
Cobalt	3/3	3.7 - 5.3	120790-7SD1	-	470	N	2
Copper	3/3	16 - 30.3	7SD2	-	290	N	2
Iron	3/3	10000 - 11600	120790-7SD1	-	2300	~~Y~~ N	~~3~~ 4
Lead	3/3	13.5 - 119	7SD3	-	400 (6)	N	2
Magnesium	3/3	2700 - 3120	7SD2	-	-	N	1
Manganese	3/3	147 - 173	7SD2	-	~~39~~ 190	~~Y~~ N	~~3~~ 2
Mercury	1/3	0.24	7SD2	0.06 - 0.13	2.3	N	2
Nickel	3/3	7 - 9.5	120790-7SD1	-	160	N	2

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7_COC.XLS

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SUMMARY OF COC SELECTION (Continued)
SITE 7 TORPEDO SHOPS - SEDIMENT (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
Potassium	3/3	767 - 1560	7SD2	-	-	N	1
Selenium	1/3	0.28	120790-7SD1	0.51 - 0.53	39	N	2
Sodium	3/3	76 - 248	7SD2	-	-	N	1
Vanadium	3/3	24.3 - 27.3	7SD2	-	55	N	2
Zinc	3/3	54.5 - 101	7SD2	-	2300	N	2

Footnotes:

1 Results presented in mg/kg unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Hexavalent chromium.
6 OSWER soil screening level for residential land use (USEPA, July 14, 1994).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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TMS

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 7 TORPEDO SHOPS - SEDIMENT
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
Methylene chloride	18	9.5
Benzo(a)anthracene	140	98.6667
Benzo(a)pyrene	100	125.6667
Benzo(b)fluoranthene	130	195
Benzo(k)fluoranthene	130	196.6667
Benzoic acid	74	410
Chrysene	180	126.6667
Fluoranthene	210	169.3333
Fluoranthene	210	169.3333
Indeno(1,2,3-cd)pyrene	71	109
Phenanthrene	140	102
Pyrene	240	173.6667
4,4'-DDD	93	42.5
4,4'-DDE	12	15.5
Inorganics (mg/kg)		
Aluminum	11900	8833.3333
Antimony	5	3.4833
Arsenic	13.6	6.7
Barium	45.6	41.1667
Beryllium	0.49	0.4067
Cadmium	2.4	1.1833
Calcium	2300	1933.3333
Chromium (total)	15	13.6
Cobalt	5.3	4.4
Copper	30.3	20.9
Iron	11600	10966.6667
Lead	119	52.6333
Magnesium	3120	2933.3333
Manganese	173	158.6667
Mercury	0.24	0.1217
Nickel	9.5	8.1333
Potassium	1560	1219
Selenium	0.28	0.2667
Sodium	248	184.3333
Vanadium	27.3	25.5
Zinc	101	70.6667

Soil Data (0-10') - Torpedo Shops

~~Table X~~

Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
ALUMINUM	26/26	3730.0000 20000.0000	Norm	11882.3077	13,500(a)	na	na	na	na	na	
ARSENIC	24/26	0.8200 8.1000	Log	2.6967	3.2(b)	na	na	na	na	na	
BARIUM	26/26	17.4000 506.0000	Log	83.9308	112(b)	na	na	na	na	na	
BERYLLIUM	23/26	0.2100 1.0000	Norm	0.5309	0.56(a)	na	na	na	na	na	
CADMIUM	13/26	0.4700 5.1000	Und	2.6200	5.1(d)	na	na	na	na	na	
CALCIUM	26/26	666.0000 5830.0000	Log	1609.7692	1890(b)	na	na	na	na	na	
CHROMIUM	26/26	6.8000 61.1000	Log	18.2577	21.9(b)	na	na	na	na	na	
COBALT	21/26	4.7000 19.2000	Und	7.8667	19.2(d)	na	na	na	na	na	
COPPER	26/26	7.6000 45.0000	Log	19.5885	24.0(b)	na	na	na	na	na	
IRON	26/26	4580.0000 32900.0000	Log	13925.3846	16,600(b)	na	na	na	na	na	
LEAD	21/26	3.3000 27.5000	Log	10.1000	12.8(b)	na	na	na	na	na	
MAGNESIUM	26/26	1510.0000 19500.0000	Log	4438.0769	5390(b)	na	na	na	na	na	

000027

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
MANGANESE	26/26	60.7000Log ✓ 725.0000	239.2462	301(b)	na	na	na	na	na	
NICKEL	26/26	5.1000Log ✓ 42.1000	12.2462	14.5(b)	na	na	na	na	na	
POTASSIUM	26/26	575.0000Log ✓ 18400.0000	3017.1538	4290(b)	na	na	na	na	na	
SODIUM	25/26	60.9000Log ✓ 708.0000	203.6280	253(b)	na	na	na	na	na	
VANADIUM	21/26	7.7000Log ✓ 86.7000	31.1000	35.6(b)	na	na	na	na	na	
ZINC	26/26	13.8000Log ✓ 133.0000	47.2385	57.6(b)	na	na	na	na	na	
METHYLENE CHLORIDE	13/26	3.0000Und ✓ 420.0000	50.5385	420(d)	na	na	na	na	na	
FLUORANTHENE	13/26	18.0000Und ✓ 3800.0000	778.1538	3800(d)	na	na	na	na	na	
PYRENE	13/26	21.0000Und ✓ 4200.0000	806.5385	4200(d)	na	na	na	na	na	
TPH	12/20	28.0000Und 898.0000	234.1833	898(d)	na	na	na	na	na	

000028

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : ALUMINUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	11882.3077	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	3730.0000	
Positive Hits - Maximum	20000.0000	
Average Of Positive Hits	11882.3077	
Standard Deviation	~~4774.7170~~	
Upper Confidence Limit - Normal	13481.6773 UCL	
Upper Confidence Limit - Lognormal	~~14338.8818~~	
95th Percentile - Nonparametric	20000.0000	
95th Percentile - Normal	19736.7172	
95th Percentile - Lognormal	22919.5203	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9838	
Corr Coeff - Detected - Lognormal	0.9741	
Corr Coeff - Total - Normal	0.9838	
Corr Coeff - Total - Lognormal	0.9741	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.9514	NA
W-Test - Lognormal	0.9399	NA
Type of Distribution	NORMAL ✓	

Test Results:

000029

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : ARSENIC (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	24.0000	
Average	2.6085	
Detection Limit - Minimum	0.8000	
Detection Limits - Maximum	2.3000	
Positive Hits - Minimum	0.8200	
Positive Hits - Maximum	8.1000	
Average Of Positive Hits	2.6967	
Standard Deviation	1.5058	
Upper Confidence Limit - Normal	~~3.1129~~	
Upper Confidence Limit - Lognormal	3.2576 UCL	
95th Percentile - Nonparametric	~~8.1000~~	
95th Percentile - Normal	5.0855	
95th Percentile - Lognormal	5.5190	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8784	
Corr Coeff - Detected - Lognormal	0.9667	
Corr Coeff - Total - Normal	0.9071	
Corr Coeff - Total - Lognormal	0.9868	
Corr Coeff - Crit Val - Detected	0.9570	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.8429	NA
W-Test - Lognormal	0.9761	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00030

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : BARIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	83.9308	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	17.4000	
Positive Hits - Maximum	506.0000	
Average Of Positive Hits	83.9308	
Standard Deviation	95.3587	
Upper Confidence Limit - Normal	~~115.8727~~	
Upper Confidence Limit - Lognormal	112.2883 UCL	
95th Percentile - Nonparametric	~~506.0000~~	
95th Percentile - Normal	240.7958	
95th Percentile - Lognormal	209.3941	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7369	
Corr Coeff - Detected - Lognormal	0.9772	
Corr Coeff - Total - Normal	0.7369	
Corr Coeff - Total - Lognormal	0.9772	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5760	NA
W-Test - Lognormal	0.9622	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000031

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : BERYLLIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	23.0000	
Average	0.4821	
Detection Limit - Minimum	0.1000	
Detection Limits - Maximum	0.1150	
Positive Hits - Minimum	0.2100	
Positive Hits - Maximum	1.0000	
Average Of Positive Hits	0.5309	
Standard Deviation	0.2250	
Upper Confidence Limit - Normal	0.5575 UCL	
Upper Confidence Limit - Lognormal	0.6446	
95th Percentile - Nonparametric	1.0000	
95th Percentile - Normal	0.8523	
95th Percentile - Lognormal	1.1335	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9430	
Corr Coeff - Detected - Lognormal	0.9499	
Corr Coeff - Total - Normal	0.9886	
Corr Coeff - Total - Lognormal	0.9381	
Corr Coeff - Crit Val - Detected	0.9550	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.9735	NA
W-Test - Lognormal	0.8769	NA

Type of Distribution ..... NORMAL ✓

Test Results:

000032

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : CADMIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	13.0000	
Average	1.4627	
Detection Limit - Minimum	0.2000	
Detection Limits - Maximum	0.5000	
Positive Hits - Minimum	0.4700	
Positive Hits - Maximum	5.1000 wcl	
Average Of Positive Hits	2.6200	
Standard Deviation	1.6758	
Upper Confidence Limit - Normal	2.0240	
Upper Confidence Limit - Lognormal	2.8050	
95th Percentile - Nonparametric	5.1000	
95th Percentile - Normal	4.2194	
95th Percentile - Lognormal	5.1345	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6227	
Corr Coeff - Detected - Lognormal	0.4987	
Corr Coeff - Total - Normal	0.8653	
Corr Coeff - Total - Lognormal	0.9314	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.7346	NA
W-Test - Lognormal	0.8431	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000033

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : CALCIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	1609.7692	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	666.0000	
Positive Hits - Maximum	5830.0000	
Average Of Positive Hits	1609.7692	
Standard Deviation	1017.0228	
Upper Confidence Limit - Normal	1950.4377	
Upper Confidence Limit - Lognormal ...	1891.7529 UCL	
95th Percentile - Nonparametric.....	5830.0000	
95th Percentile - Normal.....	3282.7717	
95th Percentile - Lognormal	3032.1080	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8035	
Corr Coeff - Detected - Lognormal	0.9586	
Corr Coeff - Total - Normal	0.8035	
Corr Coeff - Total - Lognormal	0.9586	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6755	NA
W-Test - Lognormal	0.9333	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00034

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : CHROMIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	18.2577	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	6.8000	
Positive Hits - Maximum	61.1000	
Average Of Positive Hits	18.2577	
Standard Deviation	10.4565	
Upper Confidence Limit - Normal	~~21.7603~~	
Upper Confidence Limit - Lognormal ...	21.9253 ucl	
95th Percentile - Nonparametric.....	~~61.1000~~	
95th Percentile - Normal.....	35.4586	
95th Percentile - Lognormal	35.6466	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8395	
Corr Coeff - Detected - Lognormal	0.9672	
Corr Coeff - Total - Normal	0.8395	
Corr Coeff - Total - Lognormal	0.9672	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.7352	NA
W-Test - Lognormal	0.9462	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000035

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : COBALT (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	21.0000	
Average	6.6538	
Detection Limit - Minimum	0.9000	
Detection Limits - Maximum	1.9500	
Positive Hits - Minimum	4.7000	
Positive Hits - Maximum	19.2000 UCL	
Average Of Positive Hits	7.8667	
Standard Deviation	3.9360	
Upper Confidence Limit - Normal	7.9723	
Upper Confidence Limit - Lognormal	9.5854	
95th Percentile - Nonparametric	19.2000	
95th Percentile - Normal	13.1286	
95th Percentile - Lognormal	17.6605	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7078	
Corr Coeff - Detected - Lognormal	0.8014	
Corr Coeff - Total - Normal	0.9172	
Corr Coeff - Total - Lognormal	0.9229	
Corr Coeff - Crit Val - Detected	0.9520	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.8573	NA
W-Test - Lognormal	0.8600	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000036

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : COPPER (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	19.5885	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	7.6000	
Positive Hits - Maximum	45.0000	
Average Of Positive Hits	19.5885	
Standard Deviation	10.7264	
Upper Confidence Limit - Normal	23.1814	
Upper Confidence Limit - Lognormal	23.9545 UCL	
95th Percentile - Nonparametric	~~45.0000~~	
95th Percentile - Normal	37.2334	
95th Percentile - Lognormal	39.8236	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9337	
Corr Coeff - Detected - Lognormal	0.9849	
Corr Coeff - Total - Normal	0.9337	
Corr Coeff - Total - Lognormal	0.9849	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.8623	NA
W-Test - Lognormal	0.9551	NA
Type of Distribution	LOGNORMAL✓	

Test Results:

000037

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : IRON (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	13925.3846	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	4580.0000	
Positive Hits - Maximum	32900.0000	
Average Of Positive Hits	13925.3846	
Standard Deviation	6069.2235	
Upper Confidence Limit - Normal	~~15958.3703~~	
Upper Confidence Limit - Lognormal ...	16578.8178 UCL	
95th Percentile - Nonparametric.....	~~32900.0000~~	
95th Percentile - Normal.....	23909.2573	
95th Percentile - Lognormal	26201.1237	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9568	
Corr Coeff - Detected - Lognormal	0.9880	
Corr Coeff - Total - Normal	0.9568	
Corr Coeff - Total - Lognormal	0.9880	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.9282	NA
W-Test - Lognormal	0.9827	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000038

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : LEAD (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	21.0000	
Average	8.6442	
Detection Limit - Minimum	1.2500	
Detection Limits - Maximum	4.5500	
Positive Hits - Minimum	3.3000	
Positive Hits - Maximum	27.5000	
Average Of Positive Hits	10.1000	
Standard Deviation	6.5381	
Upper Confidence Limit - Normal	~~10.8343~~	
Upper Confidence Limit - Lognormal	12.7583 UCL	
95th Percentile - Nonparametric	~~27.5000~~	
95th Percentile - Normal	19.3994	
95th Percentile - Lognormal	24.0407	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8513	
Corr Coeff - Detected - Lognormal	0.9339	
Corr Coeff - Total - Normal	0.9333	
Corr Coeff - Total - Lognormal	0.9865	
Corr Coeff - Crit Val - Detected	0.9520	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.8722	NA
W-Test - Lognormal	0.9668	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000039

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : MAGNESIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	4438.0769	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	1510.0000	
Positive Hits - Maximum	19500.0000	
Average Of Positive Hits	4438.0769	
Standard Deviation	3456.5787	
Upper Confidence Limit - Normal	5595.9145	
Upper Confidence Limit - Lognormal	5386.6216 UCL	
95th Percentile - Nonparametric	19500.0000	
95th Percentile - Normal	10124.1488	
95th Percentile - Lognormal	9118.6271	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7685	
Corr Coeff - Detected - Lognormal	0.9637	
Corr Coeff - Total - Normal	0.7685	
Corr Coeff - Total - Lognormal	0.9637	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6240	NA
W-Test - Lognormal	0.9429	NA
Type of Distribution	LOGNORMAL	

Test Results:

000040

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : MANGANESE (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	239.2462	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	60.7000	
Positive Hits - Maximum	725.0000	
Average Of Positive Hits	239.2462	
Standard Deviation	139.6935	
Upper Confidence Limit - Normal	~~286.0388~~	
Upper Confidence Limit - Lognormal	301.4511 UCL	
95th Percentile - Nonparametric	725.0000	
95th Percentile - Normal	469.0420	
95th Percentile - Lognormal	515.4899	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9225	
Corr Coeff - Detected - Lognormal	0.9938	
Corr Coeff - Total - Normal	0.9225	
Corr Coeff - Total - Lognormal	0.9938	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.8680	NA
W-Test - Lognormal	0.9929	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00041

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : NICKEL (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	12.2462	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	5.1000	
Positive Hits - Maximum	42.1000	
Average Of Positive Hits	12.2462	
Standard Deviation	7.1114	
Upper Confidence Limit - Normal	~~14.6282~~	
Upper Confidence Limit - Lognormal	14.5149 ucl	
95th Percentile - Nonparametric	~~42.1000~~	
95th Percentile - Normal	23.9444	
95th Percentile - Lognormal	23.2711	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8181	
Corr Coeff - Detected - Lognormal	0.9622	
Corr Coeff - Total - Normal	0.8181	
Corr Coeff - Total - Lognormal	0.9622	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.7008	NA
W-Test - Lognormal	0.9370	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000042

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : POTASSIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	3017.1538	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	575.0000	
Positive Hits - Maximum	18400.0000	
Average Of Positive Hits	3017.1538	
Standard Deviation	3564.1581	
Upper Confidence Limit - Normal	~~4211.0269~~	
Upper Confidence Limit - Lognormal	4293.3663 UCL	
95th Percentile - Nonparametric	~~18400.0000~~	
95th Percentile - Normal	8880.1940	
95th Percentile - Lognormal	8163.4853	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7603	
Corr Coeff - Detected - Lognormal	0.9743	
Corr Coeff - Total - Normal	0.7603	
Corr Coeff - Total - Lognormal	0.9743	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6080	NA
W-Test - Lognormal	0.9486	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000043

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : SODIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	25.0000	
Average	197.7769	
Detection Limit - Minimum	51.5000	
Detection Limits - Maximum	51.5000	
Positive Hits - Minimum	60.9000	
Positive Hits - Maximum	708.0000	
Average Of Positive Hits	203.6280	
Standard Deviation	131.8562	
Upper Confidence Limit - Normal	~~241.9443~~	
Upper Confidence Limit - Lognormal	252.6751 UCL	
95th Percentile - Nonparametric	708.0000	
95th Percentile - Normal	414.6804	
95th Percentile - Lognormal	440.5635	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8526	
Corr Coeff - Detected - Lognormal	0.9644	
Corr Coeff - Total - Normal	0.8680	
Corr Coeff - Total - Lognormal	0.9801	
Corr Coeff - Crit Val - Detected	0.9580	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.7786	NA
W-Test - Lognormal	0.9669	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000044

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : VANADIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	21.0000	
Average	27.6038	
Detection Limit - Minimum	7.1500	
Detection Limits - Maximum	19.2000	
Positive Hits - Minimum	7.7000	
Positive Hits - Maximum	86.7000	
Average Of Positive Hits	31.1000	
Standard Deviation	16.6444	
Upper Confidence Limit - Normal	~~33.1792~~	
Upper Confidence Limit - Lognormal	35.559 UCL	
95th Percentile - Nonparametric	~~86.7000~~	
95th Percentile - Normal	54.9838	
95th Percentile - Lognormal	61.8954	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7831	
Corr Coeff - Detected - Lognormal	0.9145	
Corr Coeff - Total - Normal	0.9085	
Corr Coeff - Total - Lognormal	0.9776	
Corr Coeff - Crit Val - Detected	0.9520	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.8444	NA
W-Test - Lognormal	0.9586	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000045

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : ZINC (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	47.2385	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	13.8000	
Positive Hits - Maximum	133.0000	
Average Of Positive Hits	47.2385	
Standard Deviation	25.8600	
Upper Confidence Limit - Normal	~~55.9007~~	
Upper Confidence Limit - Lognormal	57.6309 UCL	
95th Percentile - Nonparametric	133.0000	
95th Percentile - Normal	89.7782	
95th Percentile - Lognormal	95.2676	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9172	
Corr Coeff - Detected - Lognormal	0.9883	
Corr Coeff - Total - Normal	0.9172	
Corr Coeff - Total - Lognormal	0.9883	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.8561	NA
W-Test - Lognormal	0.9840	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000046

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : METHYLENE CHLORIDE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	13.0000	
Average	27.8846	
Detection Limit - Minimum	3.0000	
Detection Limits - Maximum	11.5000	
Positive Hits - Minimum	~~3.0000~~	
Positive Hits - Maximum	420.0000 UCL	
Average Of Positive Hits	~~50.5385~~	
Standard Deviation	81.9911	
Upper Confidence Limit - Normal	55.3489	
Upper Confidence Limit - Lognormal	32.8464	
95th Percentile - Nonparametric	420.0000	
95th Percentile - Normal	162.7600	
95th Percentile - Lognormal	58.9241	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7244	
Corr Coeff - Detected - Lognormal	0.8775	
Corr Coeff - Total - Normal	0.5376	
Corr Coeff - Total - Lognormal	0.8622	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.3232	NA
W-Test - Lognormal	0.7515	NA
Type of Distribution	UNDEFINED	

Test Results:

00047

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	13.0000	
Average	492.3462	
Detection Limit - Minimum	180.0000	
Detection Limits - Maximum	250.0000	
Positive Hits - Minimum	~~18.0000~~	
Positive Hits - Maximum	3800.0000 ucl	
Average Of Positive Hits	~~778.1538~~	
Standard Deviation	977.8231	
Upper Confidence Limit - Normal	819.8840	
Upper Confidence Limit - Lognormal	887.9208	
95th Percentile - Nonparametric	3800.0000	
95th Percentile - Normal	2100.8652	
95th Percentile - Lognormal	1560.9177	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7715	
Corr Coeff - Detected - Lognormal	0.9750	
Corr Coeff - Total - Normal	0.6499	
Corr Coeff - Total - Lognormal	0.9362	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.4394 <	NA
W-Test - Lognormal	0.8837	NA
Type of Distribution	~~LOGNORMAL~~ Undefined	

Test Results:

000048

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : PYRENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	13.0000	
Average	506.5385	
Detection Limit - Minimum	180.0000	
Detection Limits - Maximum	250.0000	
Positive Hits - Minimum	21.0000	
Positive Hits - Maximum	4200.0000 UCL	
Average Of Positive Hits	806.5385	
Standard Deviation	1058.0355	
Upper Confidence Limit - Normal	860.9448	
Upper Confidence Limit - Lognormal	884.9089	
95th Percentile - Nonparametric	4200.0000	
95th Percentile - Normal	2247.0068	
95th Percentile - Lognormal	1548.8525	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7491	
Corr Coeff - Detected - Lognormal	0.9635	
Corr Coeff - Total - Normal	0.6358	
Corr Coeff - Total - Lognormal	0.9310	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.4228	NA
W-Test - Lognormal	0.8728<0.92	NA
Type of Distribution	~~LOGNORMAL~~ Undefined	

Test Results:

000049

Dataset: UTMP_RES
Media : SOIL DATA (0 - 10') - CTO 129 (NSB-NLON)
Group : TORPEDO SHOPS

Parameter : TPH (MG/KG)

	Sample Results	Background Results
Count	20.0000	No samples
Number of Detects	12.0000	
Average	142.9725	
Detection Limit - Minimum	5.5500	
Detection Limits - Maximum	7.1000	
Positive Hits - Minimum	~~28.0000~~	
Positive Hits - Maximum	898.0000 UCL	
Average Of Positive Hits	~~234.1833~~	
Standard Deviation	215.7994	
Upper Confidence Limit - Normal	226.4040	
Upper Confidence Limit - Lognormal	1008.2513	
95th Percentile - Nonparametric	898.0000	
95th Percentile - Normal	497.9624	
95th Percentile - Lognormal	794.8957	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.4286	
Corr Coeff - Detected - Lognormal	0.1800	
Corr Coeff - Total - Normal	0.8136	
Corr Coeff - Total - Lognormal	0.9399	
Corr Coeff - Crit Val - Detected	0.9260	
Corr Coeff - Crit Val - Total	0.9500	
W-Test - Table Value	0.9050	NA
W-Test - Normal	0.6799	NA
W-Test - Lognormal	0.8603	NA
Type of Distribution	UNDEFINED	

Test Results:

00050

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	50	IR:	0
EF:	150	EF:	1
Fi:	0.5	Fi:	1
ED:	6	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	2190	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	1.47E–07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	1.26E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	0.96	1	0.00E+00	1.41E–07	1.21E–08		7.30E–01
Benzo(b)fluoranthene	1.2	1	0.00E+00	1.76E–07	1.51E–08		7.30E–01
Benzo(a)pyrene	0.76	1	0.00E+00	1.12E–07	9.56E–09		7.30E+00
Indeno(1,2,3–cd)pyrene	0.54	1	0.00E+00	7.93E–08	6.79E–09		7.30E–01
Aroclor–1254	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E–05	~~7.70E+00~~ 1E+0*
~~Aluminum~~	~~8110~~	~~1~~	~~0.00E+00~~	~~1.19E–03~~	~~1.02E–04~~	~~1.00E+00~~	
Antimony	5.2	1	0.00E+00	7.63E–07	6.54E–08	4.00E–04	
Arsenic	2.1	1	0.00E+00	3.08E–07	2.64E–08	3.00E–04	1.50E+00
Beryllium	0.32	1	0.00E+00	4.70E–08	4.03E–09	5.00E–03	4.30E+00
Cadmium	0.99	1	0.00E+00	1.45E–07	1.25E–08	5.00E–04	
Chromium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–03	
~~Iron~~	~~11900~~	~~1~~	~~0.00E+00~~	~~1.75E–03~~	~~1.50E–04~~	~~3.00E–01~~	
Manganese	218	1	0.00E+00	3.20E–05	2.74E–06	~~5.00E–03~~ 2.4E-2	
Thallium	0	1	0.00E+00	0.00E+00	0.00E+00	8.00E–05	
Vanadium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions
PG/97
JS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	8.82E–09
Benzo(b)fluoranthene	0.00E+00	0.00E+00	1.10E–08
Benzo(a)pyrene	0.00E+00	0.00E+00	6.98E–08
Indeno(1,2,3–cd)pyrene	0.00E+00	0.00E+00	4.96E–09
Aroclor–1254	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~1.19E–03~~	~~0.00E+00~~
Antimony	0.00E+00	1.91E–03	0.00E+00
Arsenic	0.00E+00	1.03E–03	3.96E–08
Beryllium	0.00E+00	9.39E–06	1.73E–08
Cadmium	0.00E+00	2.91E–04	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00
~~Iron~~	~~0.00E+00~~	~~5.82E–03~~	~~0.00E+00~~
Manganese	0.00E+00	~~6.40E–03~~ 1.33E-3	0.00E+00
Thallium	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~**1.00E–02**~~ 4.57E-3	**1.52E–07**

00053

Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C	= CONCENTRATION IN SOIL (MG/KG)		
SA1	= YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2	= ADULT SKIN SURFACE AREA (SQ CM/DAY):		3800
AF	= ADHERENCE FACTOR (MG/SQ CM):		0.2
ABS	= ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
		Dioxins:	0.03
		PCBS:	0.06
EF1	= YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2	= ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		150
ED1	= YOUTH EXPOSURE DURATION (YEARS):		1
ED2	= ADULT EXPOSURE DURATION (YEARS):		6
Fd	= FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
BW1	= BODY WEIGHT ADOLESCENT (KG):		1
BW2	= BODY WEIGHT ADULT (KG):		70
AT1	= AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2	= AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		2190
AT3	= AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 0.00E+00 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 1.91E–07
DOSEadult = (CF2)*(C)*(ABS) CF2 = 2.23E–06

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	0	0.06	0.00E+00	0.00E+00	0.00E+00	2.00E–05	~~7.70E+00~~ 1E+0 *
Cadmium	0.99	0.01	0.00E+00	2.21E–08	1.89E–09	~~1.50E–05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance EPA, September (1996).

Revisions
02/26/97
KLS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	~~1.47E-03~~ 8.82E-4	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	~~1.47E-03~~ 8.82E-4	0.00E+00

000057

Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	100	IR:	0
EF:	150	EF:	1
Fi:	1	Fi:	1
ED:	25	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	9125	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	5.87E–07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	2.10E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	2.7	1	0.00E+00	1.59E–06	5.66E–07		7.30E–01
Benzo(b)fluoranthene	3.2	1	0.00E+00	1.88E–06	6.71E–07		7.30E–01
Benzo(a)pyrene	1.9	1	0.00E+00	1.12E–06	3.98E–07		7.30E+00
Indeno(1,2,3–cd)pyrene	1.2	1	0.00E+00	7.05E–07	2.52E–07		7.30E–01
Aroclor–1254	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E–05	~~7.70E+00~~ 2E+0*
~~Aluminum~~	~~13700~~	~~1~~	~~0.00E+00~~	~~8.04E–03~~	~~2.87E–03~~	~~1.00E+00~~	
Antimony	19.4	1	0.00E+00	1.14E–05	4.07E–06	4.00E–04	
Arsenic	3.5	1	0.00E+00	2.05E–06	7.34E–07	3.00E–04	1.50E+00
Beryllium	0.58	1	0.00E+00	3.41E–07	1.22E–07	5.00E–03	4.30E+00
Cadmium	4.6	1	0.00E+00	2.70E–06	9.64E–07	5.00E–04	
Chromium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–03	
~~Iron~~	~~21600~~	~~1~~	~~0.00E+00~~	~~1.27E–02~~	~~4.53E–03~~	~~3.00E–01~~	
Manganese	367	1	0.00E+00	2.15E–04	7.69E–05	~~5.00E–03~~ 2.4E-2	
Thallium	0	1	0.00E+00	0.00E+00	0.00E+00	8.00E–05	
Vanadium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions 12/26/97 KMS

090060

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	4.13E–07
Benzo(b)fluoranthene	0.00E+00	0.00E+00	4.90E–07
Benzo(a)pyrene	0.00E+00	0.00E+00	2.91E–06
Indeno(1,2,3–cd)pyrene	0.00E+00	0.00E+00	1.84E–07
Aroclor–1254	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~8.04E–03~~	~~0.00E+00~~
Antimony	0.00E+00	2.85E–02	0.00E+00
Arsenic	0.00E+00	6.85E–03	1.10E–06
Beryllium	0.00E+00	6.81E–05	5.23E–07
Cadmium	0.00E+00	5.40E–03	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00
~~Iron~~	~~0.00E+00~~	~~4.23E–02~~	~~0.00E+00~~
Manganese	0.00E+00	~~4.31E–02~~ 8.98E-3	0.00E+00
Thallium	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~**1.34E–01**~~ 4.98E-2	**5.62E–06**

Revisions
08/19/96
KLS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		3800
AF = ADHERENCE FACTOR (MG/SQ CM):		1
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		150
ED1 = YOUTH EXPOSURE DURATION (YEARS):		1
ED2 = ADULT EXPOSURE DURATION (YEARS):		25
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		1
BW1 = BODY WEIGHT ADOLESCENT (KG):		1
BW2 = BODY WEIGHT ADULT (KG):		70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		9125
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS)	CF1 =	0.00E+00	CANCER RISK = (CF3)*(C)*(ABS)	CF3 =	7.97E–06
DOSEadult = (CF2)*(C)*(ABS)	CF2 =	2.23E–05			

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	0	0.06	0.00E+00	0.00E+00	0.00E+00	2.00E–05	~~7.70E+00~~ 2E+0 *
Cadmium	4.6	0.01	0.00E+00	1.03E–06	3.67E–07	~~1.50E–05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions 02/25/97 US

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	~~6.84E-02~~ 4.10E-2	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~6.84E-02~~ 4.10E-2	**0.00E+00**

Revisions
08/19/96

00065

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	240	IR:	0
EF:	60	EF:	1
Fi:	0.5	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	3.76E–07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	5.37E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	0.39	1	0.00E+00	1.47E–07	2.09E–09		7.30E–01
Benzo(b)fluoranthene	0.44	1	0.00E+00	1.65E–07	2.36E–09		7.30E–01
Benzo(a)pyrene	0.34	1	0.00E+00	1.28E–07	1.82E–09		7.30E+00
Indeno(1,2,3–cd)pyrene	0.28	1	0.00E+00	1.05E–07	1.50E–09		7.30E–01
Aroclor–1254	0.18	1	0.00E+00	6.76E–08	9.66E–10	2.00E–05	~~7.70E+00~~ 1E+0*
~~Aluminum~~	~~13500~~	~~1~~	~~0.00E+00~~	~~5.07E–03~~	~~7.25E–05~~	~~1.00E+00~~	
Antimony	7.5	1	0.00E+00	2.82E–06	4.03E–08	4.00E–04	
Arsenic	3.2	1	0.00E+00	1.20E–06	1.72E–08	3.00E–04	1.50E+00
Beryllium	0.56	1	0.00E+00	2.10E–07	3.01E–09	5.00E–03	4.30E+00
Cadmium	1.5	1	0.00E+00	5.64E–07	8.05E–09	5.00E–04	
Chromium	21.9	1	0.00E+00	8.23E–06	1.18E–07	5.00E–03	
~~Iron~~	~~16600~~	~~1~~	~~0.00E+00~~	~~6.24E–03~~	~~8.91E–05~~	~~3.00E–01~~	
Manganese	301	1	0.00E+00	1.13E–04	1.62E–06	~~5.00E–03~~ 2.4E-2	
Thallium	0.31	1	0.00E+00	1.16E–07	1.66E–09	8.00E–05	
Vanadium	35.6	1	0.00E+00	1.34E–05	1.91E–07	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions 02/26/97

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	1.53E−09
Benzo(b)fluoranthene	0.00E+00	0.00E+00	1.72E−09
Benzo(a)pyrene	0.00E+00	0.00E+00	1.33E−08
Indeno(1,2,3−cd)pyrene	0.00E+00	0.00E+00	1.10E−09
Aroclor−1254	0.00E+00	3.38E−03	~~7.44E−09~~ 9.66E-10 *
~~Aluminum~~	~~0.00E+00~~	~~5.67E−03~~	~~0.00E+00~~
Antimony	0.00E+00	7.05E−03	0.00E+00
Arsenic	0.00E+00	4.01E−03	2.58E−08
Beryllium	0.00E+00	4.21E−05	1.29E−08
Cadmium	0.00E+00	1.13E−03	0.00E+00
Chromium	0.00E+00	1.65E−03	0.00E+00
~~Iron~~	~~0.00E+00~~	~~2.08E−02~~	~~0.00E+00~~
Manganese	0.00E+00	~~2.28E−02~~ 4.71E-3	0.00E+00
Thallium	0.00E+00	1.46E−03	0.00E+00
Vanadium	0.00E+00	1.91E−03	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~6.91E−02~~ 2.53E-2	~~6.38E−08~~ 5.73E-8

* Based on new PCB guidance (USEPA, September 1996).

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RISK ASSESSMENT SPREADSHEET -- DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 7 -- Torpedo Shops
LOCATION: NSB-NLON, Groton, CT
DATE: 01/18/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		3800
AF = ADHERENCE FACTOR (MG/SQ CM):		0.2
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		80
ED1 = YOUTH EXPOSURE DURATION (YEARS):		1
ED2 = ADULT EXPOSURE DURATION (YEARS):		1
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
BW1 = BODY WEIGHT ADOLESCENT (KG):		1
BW2 = BODY WEIGHT ADULT (KG):		70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		365
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 0.00E+00 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 1.70E-08
DOSEadult = (CF2)*(C)*(ABS) CF2 = 1.19E-06

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG-DAY/MG)
Aroclors	0.18	0.06	0.00E+00	1.29E-08	1.84E-10	2.00E-05	~~7.70E+00~~ 1E+0 *
Cadmium	1.5	0.01	0.00E+00	1.78E-08	2.55E-10	~~1.50E-05~~ 2.5E-2	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

000672

* Based on new PCB guidance (USEPA, September 1996).

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RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	0.00E+00	6.43E-04	~~1.41E-09~~ 1.84E-10*
Cadmium	0.00E+00	~~1.19E-03~~ 7.14E-4	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	~~1.83E-03~~ 1.36E-3	~~1.41E-09~~ 1.84E-10

*Based on new PCB guidance (USEPA, September 1996)

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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, CTE

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE: Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY--STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	80
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.19E+01

CONVERSION FACTOR (CARCIN) = 1.70E-01

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker, CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Chloroform	0.003	O	1.10E+00	4.70E-01	8.90E-03	9.30E-03	2.37E-07
1,4-Dichlorobezene	0.004	O	3.30E+00	6.90E-01	6.20E-02	2.50E-01	2.07E-06
Bis(2-ethylhexyl)phthalate	0.021	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	2.48E-05
~~Aluminum~~	~~4.19~~	~~I~~			~~1.00E-03~~		~~3.34E-05~~
Antimony	0.0097	I			1.00E-03		7.76E-08
Arsenic	0.0068	I			1.00E-03		5.44E-08
Barium	0.0847	I			1.00E-03		6.78E-07
Beryllium	0.00069	I			1.00E-03		5.52E-09
Cadmium	0.0014	I			1.00E-03		1.12E-08
Chromium	0.0083	I			2.00E-03		1.33E-07
~~Copper~~	~~0.0421~~	~~I~~			~~1.00E-03~~		~~3.37E-07~~
~~Iron~~	~~9.83~~	~~I~~			~~1.00E-03~~		~~7.86E-05~~
Manganese	0.891	I			1.00E-03		7.13E-06
Mercury	0.00024	I			1.00E-03		1.92E-09
Nickel	0.0088	I			1.00E-03		7.04E-08
Selenium	0.0022	I			1.00E-03		1.76E-08
Silver	0.0022	I			1.00E-03		1.76E-08
Thallium	0.0027	I			1.00E-03		2.16E-08
Vanadium	0.0116	I			1.00E-03		9.28E-08
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
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							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

Revisions
08/19/96
FWS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Chloroform	2.82E-06	1.00E-02	2.82E-04
1,4-Dichlorobezene	2.46E-05		0.00E+00
Bis(2-ethylhexyl)phthalate	2.95E-04	1.10E-02	2.69E-02
~~Aluminum~~	~~3.98E-04~~	~~5.00E-02~~	~~7.96E-06~~
Antimony	9.23E-07	4.00E-04	2.31E-03
Arsenic	6.47E-07	2.80E-04	2.31E-03
Barium	8.06E-06	3.50E-03	2.30E-03
Beryllium	6.57E-08	2.50E-04	2.63E-04
Cadmium	1.33E-07	~~1.50E-05~~ 2.5E-2	~~8.88E-03~~ 5.33E-3
Chromium	1.56E-06	1.00E-04	1.56E-02
~~Copper~~	~~4.01E-08~~	~~2.20E-02~~	~~1.82E-04~~
~~Iron~~	~~9.36E-04~~	~~1.50E-02~~	~~6.24E-02~~
Manganese	8.48E-05	~~1.50E-04~~ 7.2E-4	~~5.65E-01~~ 1.18E-1
Mercury	2.28E-08	1.50E-05	1.52E-03
Nickel	8.38E-07	2.00E-03	4.19E-04
Selenium	2.09E-07	1.00E-03	2.09E-04
Silver	2.09E-07	2.40E-04	8.73E-04
Thallium	2.57E-07	4.00E-06	6.43E-02
Vanadium	1.10E-06	3.50E-04	3.15E-03
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~7.85E-01~~ 2.44E-1

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Revisions
08/19/96
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RISK ASSESSMENT SPREADSHEET -- DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 7 -- Torpedo Shops
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Chloroform	4.03E-08	6.10E-03	2.46E-10
1,4-Dichlorobezene	3.51E-07	2.40E-02	8.43E-09
Bis(2-ethylhexyl)phthalate	4.22E-06	2.50E-02	1.05E-07
~~Aluminum~~	~~5.88E-08~~		~~0.00E+00~~
Antimony	1.32E-08		0.00E+00
Arsenic	9.25E-09	1.60E+00	1.48E-08
Barium	1.15E-07		0.00E+00
Beryllium	9.38E-10	8.60E+01	8.07E-08
Cadmium	1.90E-09		0.00E+00
Chromium	2.26E-08		0.00E+00
~~Copper~~	~~5.72E-08~~		~~0.00E+00~~
~~Iron~~	~~1.34E-05~~		~~0.00E+00~~
Manganese	1.21E-08		0.00E+00
Mercury	3.26E-10		0.00E+00
Nickel	1.20E-08		0.00E+00
Selenium	2.99E-09		0.00E+00
Silver	2.99E-09		0.00E+00
Thallium	3.87E-09		0.00E+00
Vanadium	1.58E-08		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			2.10E-07

Revisions
08/19/96
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RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	480	IR:	0
EF:	120	EF:	1
Fi:	1	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	2.25E–06	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	3.22E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: *Construction Worker (All Soil), RME*
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	2.7	1	0.00E+00	6.09E−06	8.70E−08		7.30E−01
Benzo(b)fluoranthene	3.2	1	0.00E+00	7.21E−06	1.03E−07		7.30E−01
Benzo(a)pyrene	1.9	1	0.00E+00	4.28E−06	6.12E−08		7.30E+00
Indeno(1,2,3−cd)pyrene	1.2	1	0.00E+00	2.71E−06	3.86E−08		7.30E−01
Aroclor−1254	0.66	1	0.00E+00	1.49E−06	2.13E−08	2.00E−05	~~7.70E+00~~ 2E+0 *
~~Aluminum~~	~~13500~~	~~1~~	~~0.00E+00~~	~~3.04E−02~~	~~4.35E−04~~	~~1.00E+00~~	
Antimony	19.4	1	0.00E+00	4.37E−05	6.25E−07	4.00E−04	
Arsenic	3.2	1	0.00E+00	7.21E−06	1.03E−07	3.00E−04	1.50E+00
Beryllium	0.56	1	0.00E+00	1.26E−06	1.80E−08	5.00E−03	4.30E+00
Cadmium	5.1	1	0.00E+00	1.15E−05	1.64E−07	5.00E−04	
Chromium	21.9	1	0.00E+00	4.94E−05	7.05E−07	5.00E−03	
~~Iron~~	~~16600~~	~~1~~	~~0.00E+00~~	~~3.74E−02~~	~~5.35E−04~~	~~3.00E−01~~	
Manganese	301	1	0.00E+00	6.79E−04	9.69E−06	~~5.00E−03~~ 2.4E-2	
Thallium	1	1	0.00E+00	2.25E−06	3.22E−08	8.00E−05	
Vanadium	35.6	1	0.00E+00	8.03E−05	1.15E−06	7.00E−03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

*Based on new PCB guidance (USEPA, September 1996).

Revisions 02/26/97

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	6.35E−08
Benzo(b)fluoranthene	0.00E+00	0.00E+00	7.52E−08
Benzo(a)pyrene	0.00E+00	0.00E+00	4.47E−07
Indeno(1,2,3−cd)pyrene	0.00E+00	0.00E+00	2.82E−08
Aroclor−1254	0.00E+00	7.44E−02	~~1.64E−07~~ 4.26E-8*
~~Aluminum~~	~~0.00E+00~~	~~3.04E−02~~	~~0.00E+00~~
Antimony	0.00E+00	1.09E−01	0.00E+00
Arsenic	0.00E+00	2.40E−02	1.55E−07
Beryllium	0.00E+00	2.52E−04	7.76E−08
Cadmium	0.00E+00	2.30E−02	0.00E+00
Chromium	0.00E+00	9.87E−03	0.00E+00
~~Iron~~	~~0.00E+00~~	~~1.25E−01~~	~~0.00E+00~~
Manganese	0.00E+00	~~1.36E−01~~ 2.83E-2	0.00E+00
Thallium	0.00E+00	2.82E−02	0.00E+00
Vanadium	0.00E+00	1.15E−02	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~5.71E−01~~ 3.09E-2	~~1.01E−06~~ 8.89E-7

*Based on new PCB guidance (USEPA, September 1996).

Revisions 02/26/97 KWS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C	= CONCENTRATION IN SOIL (MG/KG)		
SA1	= YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2	= ADULT SKIN SURFACE AREA (SQ CM/DAY):		3800
AF	= ADHERENCE FACTOR (MG/SQ CM):		1
ABS	= ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
		Dioxins:	0.03
		PCBS:	0.06
EF1	= YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2	= ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		120
ED1	= YOUTH EXPOSURE DURATION (YEARS):		1
ED2	= ADULT EXPOSURE DURATION (YEARS):		1
Fd	= FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		1
BW1	= BODY WEIGHT ADOLESCENT (KG):		1
BW2	= BODY WEIGHT ADULT (KG):		70
AT1	= AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2	= AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		365
AT3	= AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 0.00E+00 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 2.55E-07
DOSEadult = (CF2)*(C)*(ABS) CF2 = 1.78E-05

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RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	0.66	0.06	0.00E+00	7.07E–07	1.01E–08	2.00E–05	~~7.70E+00~~ 2E+0 *
Cadmium	5.1	0.01	0.00E+00	9.10E–07	1.30E–08	~~1.50E–05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions 02/26/97 JS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	0.00E+00	3.53E-02	~~7.77E-08~~ 2.02E-8*
Cadmium	0.00E+00	~~0.07E-02~~ 3.64E-2	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	~~9.60E-02~~ 7.17E-2	~~7.77E-08~~ 2.02E-8

*Based on new PCB guidance (USEPA Synthesis of PBC)

Revisions 02/24/97

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: **Construction Worker, RME**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE: Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	120
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.78E+01

CONVERSION FACTOR (CARCIN) = 2.55E–01

00087

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker, RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Chloroform	0.003	O	1.10E+00	4.70E-01	8.90E-03	9.30E-03	2.37E-07
1,4-Dichlorobezene	0.004	O	3.30E+00	6.90E-01	6.20E-02	2.50E-01	2.07E-06
Bis(2-ethylhexyl)phthalate	0.19	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	2.25E-04
~~Aluminum~~	~~38.4~~	~~I~~			~~1.00E-03~~		~~2.81E-04~~
Antimony	0.0402	I			1.00E-03		3.22E-07
Arsenic	0.0568	I			1.00E-03		4.54E-07
Barium	0.416	I			1.00E-03		3.33E-06
Beryllium	0.0019	I			1.00E-03		1.52E-08
Cadmium	0.0022	I			1.00E-03		1.76E-08
Chromium	0.0633	I			2.00E-03		1.01E-06
~~Copper~~	~~0.481~~	~~I~~			~~1.00E-03~~		~~3.85E-06~~
~~Iron~~	~~50.8~~	~~I~~			~~1.00E-03~~		~~4.06E-04~~
Manganese	5	I			1.00E-03		4.00E-05
Mercury	0.002	I			1.00E-03		1.60E-08
Nickel	0.0532	I			1.00E-03		4.26E-07
Selenium	0.0102	I			1.00E-03		8.16E-08
Silver	0.0136	I			1.00E-03		1.09E-07
Thallium	0.006	I			1.00E-03		4.80E-08
Vanadium	0.0753	I			1.00E-03		6.02E-07
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Chloroform	4.23E-06	1.00E-02	4.23E-04
1,4-Dichlorobezene	3.69E-05		0.00E+00
Bis(2-ethylhexyl)phthalate	4.01E-03	1.10E-02	3.64E-01
~~Aluminum~~	~~5.20E-06~~	~~5.00E-02~~	~~1.04E-01~~
Antimony	5.74E-06	4.00E-04	1.43E-02
Arsenic	8.11E-06	2.80E-04	2.90E-02
Barium	5.94E-05	3.50E-03	1.70E-02
Beryllium	2.71E-07	2.50E-04	1.09E-03
Cadmium	3.14E-07	~~1.50E-05~~ 2.5E-5	~~2.09E-02~~ 1.25E-2
Chromium	1.81E-05	1.00E-04	1.81E-01
~~Copper~~	~~6.87E-05~~	~~2.20E-02~~	~~3.12E-03~~
~~Iron~~	~~7.25E-03~~	~~1.50E-02~~	~~4.84E-01~~
Manganese	7.14E-04	~~1.50E-04~~ 7.2E-4	~~4.76E+00~~ 9.92E-1
Mercury	2.86E-07	1.50E-05	1.90E-02
Nickel	7.60E-06	2.00E-03	3.80E-03
Selenium	1.46E-06	1.00E-03	1.46E-03
Silver	1.94E-06	2.40E-04	8.09E-03
Thallium	8.57E-07	4.00E-06	2.14E-01
Vanadium	1.08E-05	3.50E-04	3.07E-02
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~9.26E+00~~ 1.09E+0

00089

Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Chloroform	6.05E-08	6.10E-03	3.69E-10
1,4-Dichlorobezene	5.27E-07	2.40E-02	1.26E-08
Bis(2-ethylhexyl)phthalate	5.73E-05	2.50E-02	1.43E-06
~~Aluminum~~	~~7.42E-05~~		~~0.00E+00~~
Antimony	8.20E-08		0.00E+00
Arsenic	1.16E-07	1.60E+00	1.85E-07
Barium	8.49E-07		0.00E+00
Beryllium	3.88E-09	8.60E+01	3.33E-07
Cadmium	4.49E-09		0.00E+00
Chromium	2.58E-07		0.00E+00
~~Copper~~	~~0.81E-07~~		~~0.00E+00~~
~~Iron~~	~~1.04E-04~~		~~0.00E+00~~
Manganese	1.02E-05		0.00E+00
Mercury	4.08E-09		0.00E+00
Nickel	1.09E-07		0.00E+00
Selenium	2.08E-08		0.00E+00
Silver	2.77E-08		0.00E+00
Thallium	1.22E-08		0.00E+00
Vanadium	1.54E-07		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			1.96E-06

00090

Revisions
08/19/96
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RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	100
EDc:	2
BWc:	15
IRa:	50
EDa:	7
BWa:	70
IFadj:	18.33333
Fi:	0.5
EF:	150
AT(NONC):	3285
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 4.2E–07 CARCIN = 5.4E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.39	1	1.63E-07	2.10E-08		7.30E-01	0.00E+00	1.53E-08
Benzo(b)fluoranthene	0.44	1	1.84E-07	2.37E-08		7.30E-01	0.00E+00	1.73E-08
Benzo(a)pyrene	0.34	1	1.42E-07	1.83E-08		7.30E+00	0.00E+00	1.34E-07
Indeno(1,2,3-cd)pyrene	0.28	1	1.17E-07	1.51E-08		7.30E-01	0.00E+00	1.10E-08
Aroclor-1254	0.18	1	7.53E-08	9.69E-09	2.00E-05	~~7.70E+00~~ 1E+0*	3.77E-03	~~7.46E-08~~ 9.69 E-9*
~~Aluminum~~	~~13600~~	~~1~~	~~5.65E-03~~	~~7.27E-04~~	~~1.00E+00~~		~~5.65E-03~~	~~0.00E+00~~
Arntimony	7.5	1	3.14E-06	4.04E-07	4.00E-04		7.85E-03	0.00E+00
Arsenic	3.2	1	1.34E-06	1.72E-07	3.00E-04		4.46E-03	0.00E+00
Beryllium	0.56	1	2.34E-07	3.01E-08	5.00E-03		4.69E-05	0.00E+00
Cadmium	1.5	1	6.28E-07	8.07E-08	5.00E-04		1.26E-03	0.00E+00
Chromium	21.9	1	9.17E-06	1.18E-06	5.00E-03		1.83E-03	0.00E+00
~~Iron~~	~~16600~~	~~1~~	~~6.95E-03~~	~~8.93E-04~~	~~3.00E-01~~		~~2.32E-02~~	~~0.00E+00~~
Manganese	301	1	1.26E-04	1.62E-05	~~5.00E-03~~ 2.4E-2		~~2.52E-02~~ 5.25E-3	0.00E+00
Thallium	0.31	1	1.30E-07	1.67E-08	8.00E-05		1.62E-03	0.00E+00
Vanadium	35.6	1	1.49E-05	1.92E-06	7.00E-03		2.13E-03	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~7.70E-02~~ 2.02E-2	~~2.52E-07~~ 1.87E-7

Revisions 02/26/97

*Based on new PCB guidance (USEPA, September 1996).

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR DERMAL CONTACT WITH SOIL ARE CALCULATED BY THE FOLLOWING SPREADSHEETS USING AGE–ADJUSTED EXPOSURE FACTORS. ASUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

RELEVANT EQUATION: DEX = (C x SAadj x AF x ABS x EF x Fd)/(AT x CF) SAadj = (SAc x EDc)/BWc + (SAa x EDa)/BWa

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SAc = CHILD SKIN SURFACE AREA (CM**2/DAY):		2094
SAa = ADULT SKIN SURFACE AREA (CM**2/DAY):		3800
EDc = CHILD EXPOSURE DURATION (YEARS):		2
EDa = ADULT EXPOSURE DURATION (YEARS):		7
BWc = CHILD BODY WEIGHT (KG):		15
BWa = ADULT BODY WEIGHT (KG):		70
SAadj = AGE–ADJUSTED SKIN SURFACE AREA FACTOR (CM**2 YR/DAY KG)		659.2
AF = ADHERENCE FACTOR (MG/CM**2):		0.2
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF = EXPOSURE FREQUENCY (DAYS/YEAR):		150
Fd = FRACTION OF SOIL FROM CONTAMINATED SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
AT = AVERAGING TIME (DAYS), NONCARCINOGENS:		3285
AVERAGING TIME (DAYS), CARCINOGENS:		25550
CF = CONVERSION FACTOR (UNITLESS)		1.00E+06

DETERMINE CONVERSION FACTORS:

NONCARCIN = 3.01E–06 CARCIN = 3.87E–07

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Aroclors	0.18	0.06	3.25E-08	4.18E-09	1.00E-05	~~7.7~~ 1E+0*	3.25E-03	~~3.22E-08~~ 4.18E-9*
Cadmium	1.5	0.01	4.52E-08	5.81E-09	~~1.50E-05~~ 2.5E-2		~~3.01E-03~~ 1.81E-3	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~6.26E-03~~ 5.06E-3	~~3.22E-08~~ 4.18E-9

*Based on new PCB guidance (USEPA, September 1996).

Revisions 7/26/97 [illegible]

000094

RISK ASSESSMENT SPREADSHEET – EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS. THREE EXPOSURE ROUTES ARE CONSIDERED: INGESTION OF GROUNDWATER, DERMAL CONTACT WHILE SHOWERING/BATHING, AND INHALATION OF VOLATILES WHILE SHOWERING/BATHING. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child), CTE

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

INGESTION: IEX = (C x IR x EF x ED)/(BW x AT)

WHERE:
C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

INHALATION: ADDRESSED QUALITATIVELY; INHALATION RISK ASSOCIATED WITH VOCS IS ASSUMED TO BE EQUAL TO INGESTION RISK FOR VOCS.

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS:
IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1000 CM**3/L)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

INGESTION:

IR:	1.4	CONVERSION FACTOR (NONCAR) =	1.28E–02
EF:	234		
ED:	9		
BW:	70	CONVERSION FACTOR (CARCIN) =	1.65E–03
AT(NON):	3285		
AT(CAR):	25550		

DERMAL CONTACT:

EV:	1	CONVERSION FACTOR (NONCAR) =	1.83E+02
ED:	9		
EF:	234		
A:	20000	CONVERSION FACTOR (CARCIN) =	2.36E+01
tevent:	0.166667		
BW:	70		
AT(NON):	3285		
AT(CAR):	25550		

RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Future Resident (Adult/Child), CTE

CHEMICAL	GW CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Chloroform	0.003	O	1.10E+00	4.70E-01	8.90E-03	9.30E-03	2.07E-08
1,4-Dichlorobenzene	0.004	O	3.30E+00	6.90E-01	6.20E-02	2.50E-01	2.32E-07
Bis(2-ethylhexyl)phthalate	0.021	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	3.58E-06
~~Aluminum~~	~~4.18~~	~~I~~			~~1.00E-03~~		~~6.97E-07~~
Antimony	0.0097	I			1.00E-03		1.62E-09
Arsenic	0.0068	I			1.00E-03		1.13E-09
Barium	0.0847	I			1.00E-03		1.41E-08
Beryllium	0.00069	I			1.00E-03		1.15E-10
Cadmium	0.0014	I			1.00E-03		2.33E-10
Chromium	0.0083	I			2.00E-03		2.77E-09
~~Copper~~	~~0.0421~~	~~I~~			~~1.00E-03~~		~~7.02E-09~~
~~Iron~~	~~0.83~~	~~I~~			~~1.00E-03~~		~~1.64E-08~~
Manganese	0.891	I			1.00E-03		1.49E-07
Mercury	0.00024	I			1.00E-03		4.00E-11
Nickel	0.0088	I			1.00E-03		1.47E-09
Selenium	0.0022	I			1.00E-03		3.67E-10
Silver	0.0022	I			1.00E-03		3.67E-10
Thallium	0.0027	I			1.00E-03		4.50E-10
Vanadium	0.0116	I			1.00E-03		1.93E-09
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00

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Revisions
08/19/96
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RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Future Resident (Adult/Child), CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL INGESTION DOSE (MG/KG/DAY)	ANNUAL DERMAL DOSE (MG/KG/DAY)	INGESTION RfD (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX INGESTION	HAZARD INDEX DERMAL	HAZARD INDEX INHALATION	TOTAL HAZARD INDEX
Chloroform	3.85E-05	3.78E-06	1.00E-02	1.00E-02	3.85E-03	3.78E-04	3.85E-03	8.07E-03
1,4-Dichlorobenzene	5.13E-05	4.28E-05			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bis(2-ethylhexyl)phthalate	2.69E-04	6.58E-04	2.00E-02	1.10E-02	1.35E-02	5.97E-02	0.00E+00	7.31E-02
~~Aluminum~~	~~5.88E-02~~	~~1.28E-04~~	~~1.00E+00~~	~~5.88E-02~~	~~5.88E-02~~	~~2.55E-03~~	~~0.00E+00~~	~~5.91E-02~~
Antimony	1.24E-04	2.96E-07	4.00E-04	4.00E-04	3.11E-01	7.40E-04	0.00E+00	3.12E-01
Arsenic	8.72E-05	2.08E-07	3.00E-04	2.80E-04	2.91E-01	7.41E-04	0.00E+00	2.91E-01
Barium	1.09E-03	2.59E-06	7.00E-02	3.50E-03	1.55E-02	7.39E-04	0.00E+00	1.63E-02
Beryllium	8.85E-06	2.11E-08	5.00E-03	2.50E-04	1.77E-03	8.43E-05	0.00E+00	1.85E-03
Cadmium	1.80E-05	4.27E-08	5.00E-04	~~1.50E-05~~ 2.5E-5	3.59E-02	~~2.85E-03~~ 1.71E-3	0.00E+00	~~3.88E-02~~ 3.76E-2
Chromium	1.06E-04	5.07E-07	5.00E-03	1.00E-04	2.13E-02	5.07E-03	0.00E+00	2.64E-02
~~Copper~~	~~5.40E-04~~	~~1.28E-06~~	~~4.00E-02~~	~~2.20E-02~~	~~1.35E-02~~	~~5.84E-03~~	~~0.00E+00~~	~~1.30E-02~~
~~Iron~~	~~1.26E-01~~	~~3.00E-04~~	~~3.00E-01~~	~~1.50E-02~~	~~4.20E-01~~	~~2.00E-02~~	~~0.00E+00~~	~~4.40E-01~~
Manganese	1.14E-02	2.72E-05	~~5.00E-03~~ 2.4E-2	~~1.50E-04~~ 7.2E-4	~~2.28E+00~~ 4.75E-1	~~1.81E-01~~ 3.77E-2	0.00E+00	~~2.47E+00~~ 5.13E-1
Mercury	3.08E-06	7.33E-09	3.00E-04	1.50E-05	1.03E-02	4.88E-04	0.00E+00	1.07E-02
Nickel	1.13E-04	2.69E-07	2.00E-02	2.00E-03	5.64E-03	1.34E-04	0.00E+00	5.78E-03
Selenium	2.82E-05	6.72E-08	5.00E-03	1.00E-03	5.64E-03	6.72E-05	0.00E+00	5.71E-03
Silver	2.82E-05	6.72E-08	5.00E-03	2.40E-04	5.64E-03	2.80E-04	0.00E+00	5.92E-03
Thallium	3.46E-05	8.24E-08	8.00E-05	4.00E-06	4.33E-01	2.06E-02	0.00E+00	4.53E-01
Vanadium	1.49E-04	3.54E-07	7.00E-03	3.50E-04	2.12E-02	1.01E-03	0.00E+00	2.23E-02
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					~~3.85E+00~~ 1.65+0	~~2.87E-01~~ 1.29E-1	3.85E-03	~~4.25E+00~~ 1.78E+0

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Revisions
08/19/96
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RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE FOUR)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Future Resident (Adult/Child), CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE INGESTION DOSE (MG/KG/DAY)	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF INGESTION (KG/DAY/MG)	CSF DERMAL (KG/DAY/MG)	CANCER RISK INGESTION	CANCER RISK DERMAL CONTACT	CANCER RISK INHALATION	TOTAL CANCER RISK
Chloroform	4.95E-06	4.86E-07	6.10E-03	6.10E-03	3.02E-08	2.97E-09	3.02E-08	6.33E-08
1,4-Dichlorobenzene	6.59E-06	5.47E-06	2.40E-02	2.40E-02	1.58E-07	1.31E-07	1.58E-07	4.48E-07
Bis(2-ethylhexyl)phthalate	3.46E-05	8.44E-05	1.40E-02	2.50E-02	4.85E-07	2.11E-06	4.85E-07	3.08E-06
~~Aluminum~~	~~6.80E-03~~	~~1.64E-05~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	1.60E-05	3.81E-08			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	1.12E-05	2.67E-08	1.50E+00	1.60E+00	1.68E-05	4.27E-08	0.00E+00	1.69E-05
Barium	1.40E-04	3.32E-07			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	1.14E-06	2.71E-09	4.30E+00	8.60E+00	4.89E-06	2.33E-08	0.00E+00	4.91E-06
Cadmium	2.31E-06	5.50E-09			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium	1.37E-05	6.52E-08			0.00E+00	0.00E+00	0.00E+00	0.00E+00
~~Copper~~	~~6.94E-05~~	~~1.65E-07~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~1.62E-02~~	~~3.86E-05~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	1.47E-03	3.50E-06			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	3.96E-07	9.42E-10			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel	1.45E-05	3.45E-08			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	3.63E-06	8.64E-09			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Silver	3.63E-06	8.64E-09			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Thallium	4.45E-08	1.06E-08			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	1.91E-05	4.55E-08			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					2.24E-05	2.31E-06	6.73E-07	2.54E-05

Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	200
EDc:	6
BWc:	15
IRa:	100
EDa:	24
BWa:	70
IFadj:	114.2857
Fi:	1
EF:	150
AT(NONC):	10950
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 1.6E–06 CARCIN = 6.7E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Benzo(a)anthracene	2.7	1	4.23E−06	1.81E−06		7.30E−01	0.00E+00	1.32E−06
Benzo(b)fluoranthene	3.2	1	5.01E−06	2.15E−06		7.30E−01	0.00E+00	1.57E−06
Benzo(a)pyrene	1.9	1	2.97E−06	1.27E−06		7.30E+00	0.00E+00	9.31E−06
Indeno(1,2,3−cd)pyrene	1.2	1	1.88E−06	8.05E−07		7.30E−01	0.00E+00	5.88E−07
Aroclor−1254	0.66	1	1.03E−06	4.43E−07	2.00E−05	~~7.70E+00~~ 2E+0 *	5.17E−02	~~3.41E−06~~ 8.86E−7 *
~~Aluminum~~	~~13500~~	~~1~~	~~2.11E−02~~	~~9.06E−03~~	~~1.00E+00~~		~~2.11E−02~~	~~0.00E+00~~
Arntimony	19.4	1	3.04E−05	1.30E−05	4.00E−04		7.59E−02	0.00E+00
Arsenic	3.2	1	5.01E−06	2.15E−06	3.00E−04		1.67E−02	0.00E+00
Beryllium	0.56	1	8.77E−07	3.76E−07	5.00E−03		1.75E−04	0.00E+00
Cadmium	5.1	1	7.98E−06	3.42E−06	5.00E−04		1.60E−02	0.00E+00
Chromium	21.9	1	3.43E−05	1.47E−05	5.00E−03		6.86E−03	0.00E+00
~~Iron~~	~~16600~~	~~1~~	~~2.60E−02~~	~~1.11E−02~~	~~3.00E−01~~		~~8.66E−02~~	~~0.00E+00~~
Manganese	301	1	4.71E−04	2.02E−04	~~5.00E−03~~ 2.4E−2		~~9.42E−02~~ 1.96E−2	0.00E+00
Thallium	1	1	1.57E−06	6.71E−07	8.00E−05		1.96E−02	0.00E+00
Vanadium	35.6	1	5.57E−05	2.39E−05	7.00E−03		7.96E−03	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~3.07E−01~~ 2.14E−1	~~4.02E−05~~ 1.37E−5

* Based on new PCB guidance (USEPA, September 1996).

Revisions 02/26/97 MS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/16/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR DERMAL CONTACT WITH SOIL ARE CALCULATED BY THE FOLLOWING SPREADSHEETS USING AGE–ADJUSTED EXPOSURE FACTORS. ASUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

RELEVANT EQUATION: DEX = (C x SAadj x AF x ABS x EF x Fd)/(AT x CF) SAadj = (SAc x EDc)/BWc + (SAa x EDa)/BWa

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SAc = CHILD SKIN SURFACE AREA (CM**2/DAY):		2094
SAa = ADULT SKIN SURFACE AREA (CM**2/DAY):		3800
EDc = CHILD EXPOSURE DURATION (YEARS):		6
EDa = ADULT EXPOSURE DURATION (YEARS):		24
BWc = CHILD BODY WEIGHT (KG):		15
BWa = ADULT BODY WEIGHT (KG):		70
SAadj = AGE–ADJUSTED SKIN SURFACE AREA FACTOR (CM**2 YR/DAY KG)		2140.457
AF = ADHERENCE FACTOR (MG/CM**2):		1
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF = EXPOSURE FREQUENCY (DAYS/YEAR):		150
Fd = FRACTION OF SOIL FROM CONTAMINATED SOURCE AVAILABLE FOR DERMAL CONTACT		1
AT = AVERAGING TIME (DAYS), NONCARCINOGENS:		10950
AVERAGING TIME (DAYS), CARCINOGENS:		25550
CF = CONVERSION FACTOR (UNITLESS)		1.00E+06

DETERMINE CONVERSION FACTORS:

NONCARCIN = 2.93E–05 CARCIN = 1.26E–05

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Aroclors	0.66	0.06	1.16E−06	4.98E−07	1.00E−05	~~7.7~~ 2E0 *	1.16E−01	~~3.83E−06~~ 9.95E−7*
Cadmium	5.1	0.01	1.50E−06	6.41E−07	~~1.50E−05~~ 2.5E−5		~~9.97E−02~~ 5.98E−2	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~2.16E−01~~ 1.76E−1	~~3.83E−06~~ 9.95E−7

* Based on new PCB guidance (USEPA, September 1996).

Revisions 6/97

G00102

RISK ASSESSMENT SPREADSHEET – EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: Site 7 – Torpedo Shops
LOCATION: NSB–NLON, Groton, CT
DATE: 01/18/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS. THREE EXPOSURE ROUTES ARE CONSIDERED: INGESTION OF GROUNDWATER, DERMAL CONTACT WHILE SHOWERING/BATHING, AND INHALATION OF VOLATILES WHILE SHOWERING/BATHING. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child), RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

INGESTION: IEX = (C x IR x EF x ED)/(BW x AT)

WHERE:
C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

INHALATION: ADDRESSED QUALITATIVELY; INHALATION RISK ASSOCIATED WITH VOCS IS ASSUMED TO BE EQUAL TO INGESTION RISK FOR VOCS.

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS:
IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1000 CM**3/L)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

INGESTION:

IR:	2	CONVERSION FACTOR (NONCAR) =	2.74E–02
EF:	350		
ED:	30		
BW:	70	CONVERSION FACTOR (CARCIN) =	1.17E–02
AT(NON):	10950		
AT(CAR):	25550		

DERMAL CONTACT:

EV:	1	CONVERSION FACTOR (NONCAR) =	2.74E+02
ED:	30		
EF:	350		
A:	20000	CONVERSION FACTOR (CARCIN) =	1.17E+02
tevent:	0.25		
BW:	70		
AT(NON):	10950		
AT(CAR):	25550		

RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE TWO)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Future Resident (Adult/Child), RME

CHEMICAL	GW CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Chloroform	0.003	O	1.10E+00	4.70E-01	6.90E-03	9.30E-03	2.53E-08
1,4-Dichlorobenzene	0.004	O	3.30E+00	6.90E-01	6.20E-02	2.50E-01	2.85E-07
Bis(2-ethylhexyl)phthalate	0.19	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	3.97E-05
~~Aluminum~~	~~38.4~~	~~I~~			~~1.00E-03~~		~~8.10E-08~~
Antimony	0.0402	I			1.00E-03		1.01E-08
Arsenic	0.0568	I			1.00E-03		1.42E-08
Barium	0.416	I			1.00E-03		1.04E-07
Beryllium	0.0019	I			1.00E-03		4.75E-10
Cadmium	0.0022	I			1.00E-03		5.50E-10
Chromium	0.0633	I			2.00E-03		3.17E-08
~~Copper~~	~~0.481~~	~~I~~			~~1.00E-03~~		~~1.20E-07~~
~~Iron~~	~~50.8~~	~~I~~			~~1.00E-03~~		~~1.27E-03~~
Manganese	5	I			1.00E-03		1.25E-06
Mercury	0.002	I			1.00E-03		5.00E-10
Nickel	0.0532	I			1.00E-03		1.33E-08
Selenium	0.0102	I			1.00E-03		2.55E-09
Silver	0.0136	I			1.00E-03		3.40E-09
Thallium	0.006	I			1.00E-03		1.50E-09
Vanadium	0.0753	I			1.00E-03		1.88E-08
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

Revisions
08/19/96
KMS

RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE THREE)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Future Resident (Adult/Child), RME
CALCULATE DOSES:

CHEMICAL	ANNUAL INGESTION DOSE (MG/KG/DAY)	ANNUAL DERMAL DOSE (MG/KG/DAY)	INGESTION RID (MG/KG/DAY)	DERMAL RID (MG/KG/DAY)	HAZARD INDEX INGESTION	HAZARD INDEX DERMAL	HAZARD INDEX INHALATION	TOTAL HAZARD INDEX
Chloroform	8.22E-05	6.93E-06	1.00E-02	1.00E-02	8.22E-03	6.93E-04	8.22E-03	1.71E-02
1,4-Dichlorobenzene	1.10E-04	7.80E-05			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bis(2-ethylhexyl)phthalate	5.21E-03	1.09E-02	2.00E-02	1.10E-02	2.60E-01	9.89E-01	0.00E+00	1.25E+00
~~Aluminum~~	~~9.97E-01~~	~~2.49E-03~~	~~1.00E+00~~	~~5.00E-02~~	~~9.97E-01~~	~~4.99E-02~~	~~0.00E+00~~	~~1.03E+00~~
Antimony	1.10E-03	2.75E-06	4.00E-04	4.00E-04	2.75E+00	6.88E-03	0.00E+00	2.76E+00
Arsenic	1.56E-03	3.89E-06	3.00E-04	2.80E-04	5.19E+00	1.39E-02	0.00E+00	5.20E+00
Barium	1.14E-02	2.85E-05	7.00E-02	3.50E-03	1.63E-01	8.14E-03	0.00E+00	1.71E-01
Beryllium	5.21E-05	1.30E-07	5.00E-03	2.50E-04	1.04E-02	5.21E-04	0.00E+00	1.09E-02
Cadmium	6.03E-05	1.51E-07	5.00E-04	~~1.50E-05~~ 2.5E-5	1.21E-01	~~1.00E-02~~ 6.00E-3	0.00E+00	~~1.31E-01~~ 1.27E-1
Chromium	1.73E-03	8.67E-06	5.00E-03	1.00E-04	3.47E-01	8.67E-02	0.00E+00	4.34E-01
~~Copper~~	~~1.32E-02~~	~~3.29E-05~~	~~4.00E-02~~	~~2.20E-02~~	~~3.29E-01~~	~~1.50E-03~~	~~0.00E+00~~	~~3.31E-01~~
~~Iron~~	~~1.39E+00~~	~~3.48E-03~~	~~3.00E-01~~	~~1.50E-02~~	~~4.64E+00~~	~~2.32E-01~~	~~0.00E+00~~	~~4.87E+00~~
Manganese	1.37E-01	3.42E-04	~~5.00E-03~~ 2.4E-2	~~1.50E-04~~ 7.2E-4	~~2.74E+01~~ 5.71E+0	~~2.28E+00~~ 4.75E-1	0.00E+00	~~2.97E+01~~ 6.19E+0
Mercury	5.48E-05	1.37E-07	3.00E-04	1.50E-05	1.83E-01	9.13E-03	0.00E+00	1.92E-01
Nickel	1.46E-03	3.64E-06	2.00E-02	2.00E-03	7.29E-02	1.82E-03	0.00E+00	7.47E-02
Selenium	2.79E-04	6.99E-07	5.00E-03	1.00E-03	5.59E-02	6.99E-04	0.00E+00	5.66E-02
Silver	3.73E-04	9.32E-07	5.00E-03	2.40E-04	7.45E-02	3.88E-03	0.00E+00	7.84E-02
Thallium	1.64E-04	4.11E-07	8.00E-05	4.00E-06	2.05E+00	1.03E-01	0.00E+00	2.16E+00
Vanadium	2.06E-03	5.16E-06	7.00E-03	3.50E-04	2.95E-01	1.47E-02	0.00E+00	3.09E-01
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					~~4.48E+01~~ 1.73E+1	~~3.82E+00~~ 1.72E+0	8.22E-03	~~4.88E+01~~ 1.90E+1

00105

Revisions
08/19/96
JLS

RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE FOUR)
Site 7 – Torpedo Shops
EXPOSURE SCENARIO: Future Resident (Adult/Child), RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE INGESTION DOSE (MG/KG/DAY)	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF INGESTION (KG/DAY/MG)	CSF DERMAL (KG/DAY/MG)	CANCER RISK INGESTION	CANCER RISK DERMAL CONTACT	CANCER RISK INHALATION	TOTAL CANCER RISK
Chloroform	3.52E-05	2.97E-06	6.10E-03	6.10E-03	2.15E-07	1.81E-08	2.15E-07	4.48E-07
1,4-Dichlorobenzene	4.70E-05	3.34E-05	2.40E-02	2.40E-02	1.13E-06	8.02E-07	1.13E-06	3.06E-06
Bis(2-ethylhexyl)phthalate	2.23E-03	4.66E-03	1.40E-02	2.50E-02	3.12E-05	1.17E-04	3.12E-05	1.79E-04
~~Aluminum~~	~~4.27E-01~~	~~1.07E-03~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	4.72E-04	1.18E-06			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	6.67E-04	1.67E-06	1.50E+00	1.60E+00	1.00E-03	2.67E-06	0.00E+00	1.00E-03
Barium	4.88E-03	1.22E-05			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	2.23E-05	5.58E-08	4.30E+00	8.60E+00	9.59E-05	4.80E-07	0.00E+00	9.84E-05
Cadmium	2.58E-05	6.46E-08			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium	7.43E-04	3.72E-06			0.00E+00	0.00E+00	0.00E+00	0.00E+00
~~Copper~~	~~5.65E-03~~	~~1.41E-05~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~5.98E-01~~	~~1.49E-03~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	5.87E-02	1.47E-04			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	2.35E-05	5.87E-08			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel	6.25E-04	1.56E-06			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	1.20E-04	2.99E-07			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Silver	1.60E-04	3.99E-07			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Thallium	7.05E-05	1.76E-07			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	8.84E-04	2.21E-06			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					1.13E-03	1.21E-04	3.26E-05	1.28E-03

Revisions
08/19/96
JAS

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 1 OF 2)

SITE NAME: Site 7 - Torpedo Shops
LOCATION: NSB-NLON, Groton, CT
DATE: 01/18/96

EXPOSURE SCENARIO: CTE

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 6.80 ug Pb/L
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	200.0	200.0
1-2	200.0	200.0
2-3	200.0	200.0
3-4	200.0	200.0
4-5	200.0	200.0
5-6	200.0	200.0
6-7	200.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

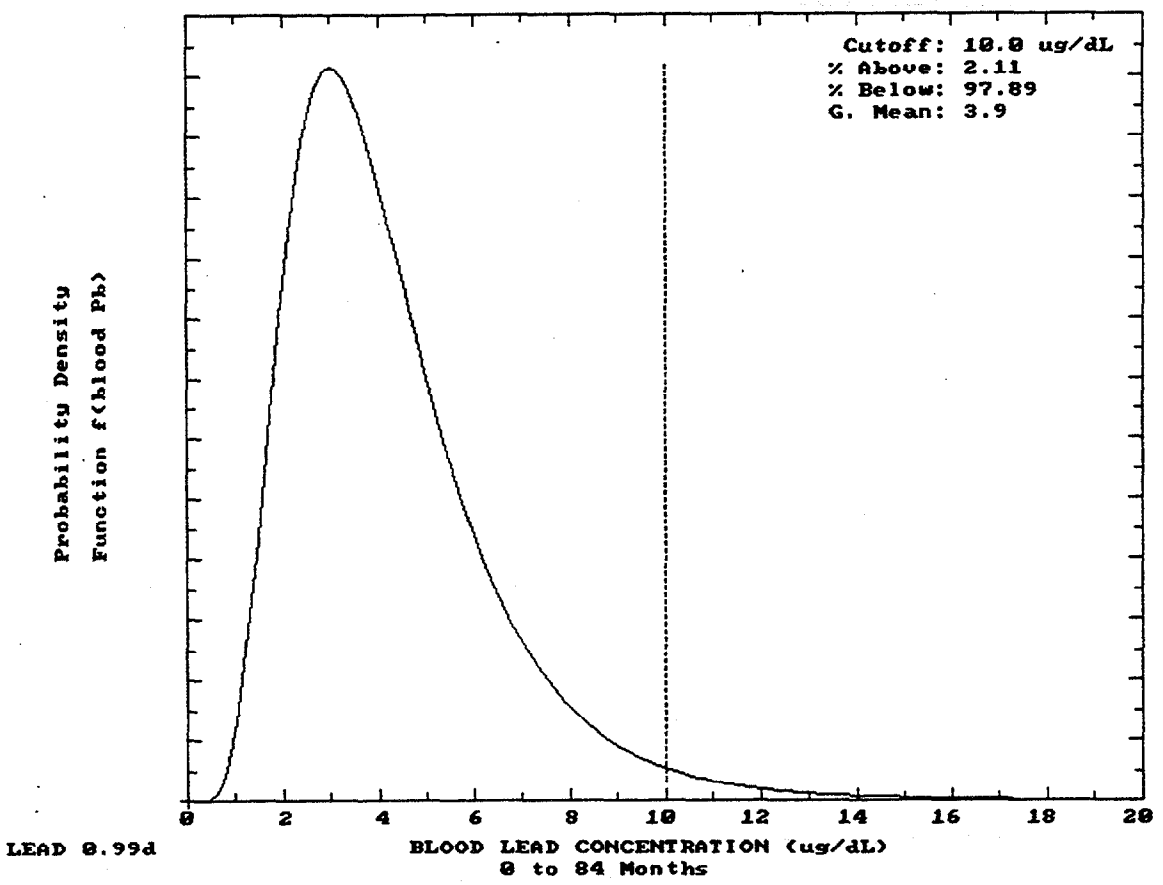
YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	4.2	7.83	4.66
1-2:	4.8	11.50	7.32
2-3:	4.5	12.05	7.40
3-4:	4.2	12.12	7.50
4-5:	3.6	10.34	5.67
5-6:	3.2	10.13	5.14
6-7:	2.9	10.23	4.87

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.53	0.62	0.00	0.02
1-2:	2.61	1.54	0.00	0.03
2-3:	2.97	1.62	0.00	0.06
3-4:	2.89	1.67	0.00	0.07
4-5:	2.84	1.77	0.00	0.07
5-6:	3.02	1.88	0.00	0.09
6-7:	3.35	1.92	0.00	0.09

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 2 OF 2)

SITE NAME: Site 7 - Torpedo Shops
LOCATION: NSB-NLON, Groton, CT
DATE: 01/18/96

EXPOSURE SCENARIO: CTE



IEUBK MODEL - EXPOSURE TO LEAD (PAGE 1 OF 2)

SITE NAME: Site 7 - Torpedo Shops
LOCATION: NSB-NLON, Groton, CT
DATE: 01/18/96

EXPOSURE SCENARIO: RME

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 51.90 ug Pb/L
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	200.0	200.0
1-2	200.0	200.0
2-3	200.0	200.0
3-4	200.0	200.0
4-5	200.0	200.0
5-6	200.0	200.0
6-7	200.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

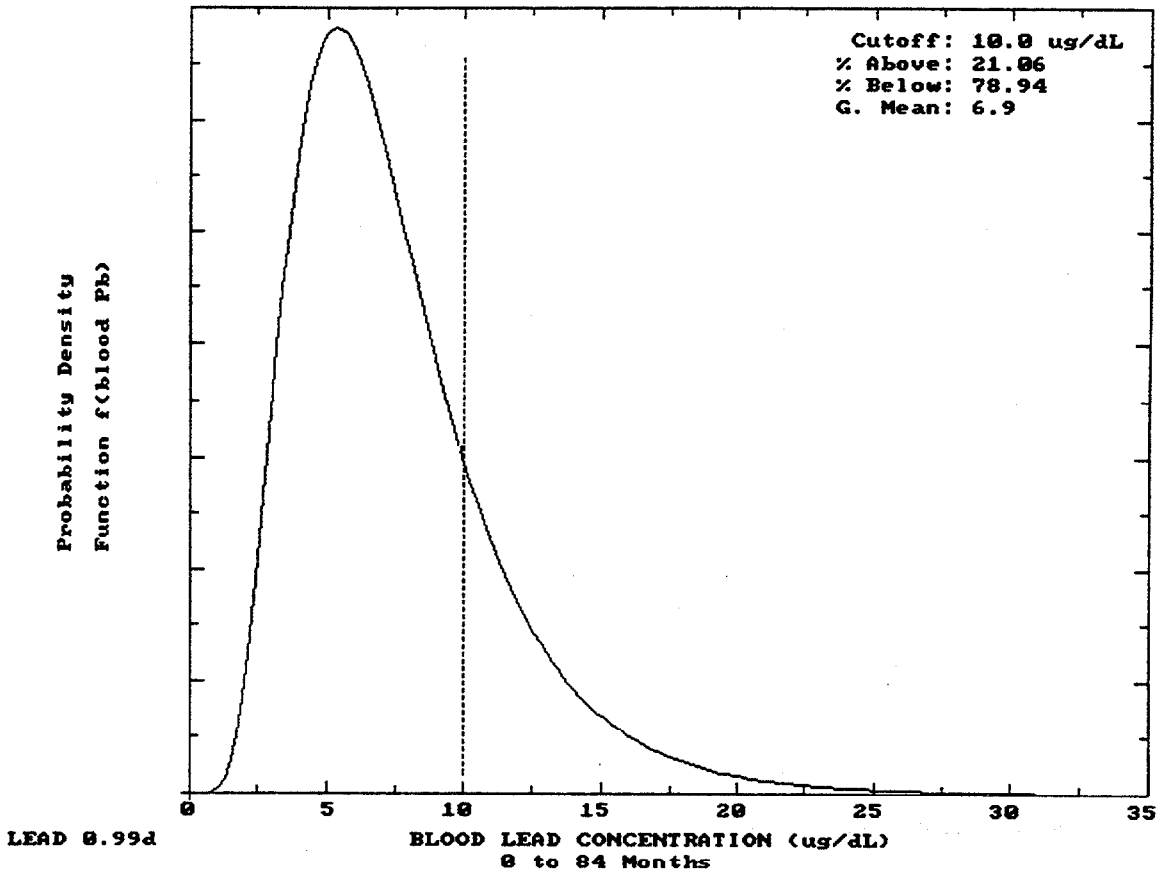
YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	6.1	11.46	4.47
1-2:	8.0	20.06	6.77
2-3:	7.8	21.21	6.90
3-4:	7.5	21.77	7.04
4-5:	7.0	20.81	5.35
5-6:	6.5	21.37	4.86
6-7:	6.1	21.78	4.62

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.42	4.55	0.00	0.02
1-2:	2.42	10.84	0.00	0.03
2-3:	2.76	11.49	0.00	0.06
3-4:	2.71	11.95	0.00	0.07
4-5:	2.68	12.72	0.00	0.07
5-6:	2.85	13.55	0.00	0.09
6-7:	3.17	13.88	0.00	0.09

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 2 OF 2)

SITE NAME: Site 7 - Torpedo Shops
LOCATION: NSB-NLON, Groton, CT
DATE: 01/18/96

EXPOSURE SCENARIO: RME



SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 7 TORPEDO SHOPS - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
1,1-Dichloroethene	0.003	0.003	1	9.5	0.14	1.4
2-Butanone	0.032	0.032	500	1000	8	80
Acetone	0.17	0.07	500	1000	14	140
Benzene	0.004	0.004	21	200	0.02	0.2
Carbon disulfide	0.005	0.004	-	-	-	-
Methylene chloride	0.42	0.05	82	760	0.1 *	1.0
Tetrachloroethene	0.018	0.008	12	110	0.1	1
Toluene	0.008	0.005	500	1000	20	67
Xylenes (total)	0.011	0.003	500	1000	19.5	19.5
2-Methylnaphthalene	0.17	0.10	-	-	-	-
4-Methylphenol	0.56	0.56	-	-	-	-
Acenaphthene	0.79	0.36	-	-	-	-
Acenaphthylene	0.055	0.034	1000	2500	8.4	84
Anthracene	1.3	0.6	1000	2500	40	400
Benzo(a)anthracene	2.7	0.8	1 *	7.8	1 *	1 *
Benzo(a)pyrene	1.9	0.5	1 *	1 *	1 *	1 *
Benzo(b)fluoranthene	3.2	0.8	1 *	7.8	1 *	1 *
Benzo(g,h,i)perylene	1.3	0.4	-	-	-	-
Benzo(k)fluoranthene	0.52	0.20	8.4	78	1	1
Benzoic acid	0.13	0.06	-	-	-	-
Bis(2-Ethylhexyl)phthalate	0.74	0.28	44	410	1	11
Butyl benzyl phthalate	0.026	0.026	1000	2500	20	200
Carbazole	0.66	0.35	-	-	-	-
Chrysene	2.4	0.6	-	-	-	-
Di-N-butyl phthalate	0.17	0.07	1000	2500	14	140
Dibenzo(a,h)anthracene	0.063	0.063	-	-	-	-
Dibenzofuran	0.35	0.24	-	-	-	-
Diethyl phthalate	14	7	-	-	-	-
Fluoranthene	3.8	0.7	1000	2500	5.6	56

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 7 TORPEDO SHOPS - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Fluorene	0.71	0.42	1000	2500	5.6	56
Indeno(1,2,3-Cd)pyrene	1.2	0.4	-	-	-	-
Naphthalene	0.31	0.29	1000	2500	5.6	56
Phenanthrene	4.3	1.3	1000	2500	4 *	40
Pyrene	4.2	0.8	1000	2500	4 *	40
4,4'-DDD	0.025	0.012	-	-	-	-
4,4'-DDE	0.21	0.06	-	-	-	-
4,4'-DDT	0.026	0.014	-	-	-	-
Aroclor-1254	0.66	0.66	1	10	-	-
Endosulfan sulfate	0.035	0.024	-	-	-	-
Endrin aldehyde	0.0055	0.0055	-	-	-	-
Endrin ketone	0.0068	0.0068	-	-	-	-
Heptachlor	0.0047	0.0047	0.14	1.3	0.013	0.013
Methoxychlor	0.032	0.032	340	1E+4	0.8	8
Aluminum	20000	12043	-	-	-	-
Antimony	19.4	12.7	27	8200	-	-
Arsenic	8.1	2.9	10	10	-	-
Barium	506	81	4700	1.4E+5	-	-
Beryllium	1	0.53	2	2	-	-
Cadmium	5.1	2.7	34	1000	-	-
Calcium	5830	1594	-	-	-	-
Chromium (total)	61.1	18.1	100 (6)	100 (6)	-	-
Cobalt	19.2	7.7	-	-	-	-
Copper	45	20	2500	7.6E+4	-	-
Iron	32900	14112	-	-	-	-
Lead	27.5	10.5	500	1000	-	-
Magnesium	19500	4316	-	-	-	-
Manganese	725	234	-	-	-	-
Mercury	1.2	0.4	20	610	-	-

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SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 7 TORPEDO SHOPS - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Nickel	42.1	12.3	1400	7500	-	-
Potassium	18400	2860	-	-	-	-
Selenium	0.77	0.77	340	1E+4	-	-
Silver	5.5	3.3	340	1E+4	-	-
Sodium	708	200	-	-	-	-
Thallium	1	0.50	5.4	160	-	-
Vanadium	86.7	30.5	470	1.4E+4	-	-
Zinc	133	46	2E+4	6.1E+5	-	-
TPH	898	239	500 *	2500	500 *	2500

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 7 TORPEDO SHOPS - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
1,1,1-Trichloroethane	42	10	200	200	62000
1,1-Dichloroethane	30	9	-	70	-
1,1-Dichloroethene	2	2	7	7	96
2-Butanone	10	10	-	400	-
4-Methyl-2-pentanone	21	21	-	350	-
Carbon disulfide	2	2	-	-	-
Chlorobenzene	3	3	100	100	420000
Chloroform	4	4	100	6	14100
Methylene chloride	4	2	5	5	48000
Trichloroethene	1	1	5	5	2340
1,4-Dichlorobenzene	2	2	75	75	26000
2-Methylnaphthalene	9	9	-	-	-
Acenaphthene	4	3	-	-	-
Acenaphthylene	0.5	0.50	-	420	0.3 *
Anthracene	0.8	0.80	-	2000	1100000
Benzoic acid	2	1	-	-	-
Bis(2-Ethylhexyl)phthalate	380	380	6 *	2 *	59 *
Di-N-butyl phthalate	2	1	-	700	120000
Dibenzofuran	3	2	-	-	-
Diethyl phthalate	1	1	-	-	-
Fluorene	5	4	-	280	140000
Phenanthrene	6	6	-	200	0.077 *
Phenol	2	1	-	4000	92000000
Aluminum	56200	7705	-	-	-
Antimony	108	61	6 *	6 *	86000
Arsenic	112	19	50 *	50 *	4 *
Barium	585	90	2000	1000	-
Beryllium	3.3	2.3	4	4	4
Boron	185	119	-	-	-

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 7 TORPEDO SHOPS - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Cadmium	4	3	5	5	6
Calcium	79600	29934	-	-	-
Chromium (total)	104	33	100 (5) *	50 (5) *	110 (6)
Cobalt	41.7	15.8	-	-	-
Copper	797	72	-	1300	48 *
Iron	81800	12450	-	-	-
Lead	84.1	12.7	-	15 *	13 *
Magnesium	29300	7079	-	-	-
Manganese	7830	821	5000 (7) *	-	-
Mercury	3	2	2 *	2 *	0.4 *
Nickel	94	59	100	100	880
Potassium	29100	6254	-	-	-
Selenium	18.8	8.7	50	50	50
Silver	38.9	22.0	50	36 *	12 *
Sodium	194000	61719	28000 (8) *	-	-
Thallium	11	7	2 *	5 *	63
Vanadium	114	41	-	50 *	-
Zinc	412	72	-	5000	123 *
TPH	1200	950	-	500 *	-

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 7 TORPEDO SHOPS - FILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Antimony	17.1	16.2	6 *	6 *	86000
Arsenic	4.5	3.1	50	50	4 *
Barium	153	54	2000	1000	-
Boron	204	111	-	-	-
Cadmium	3.1	3.1	5	5	6
Calcium	81500	29469	-	-	-
Cobalt	13.6	13.6	-	-	-
Copper	11.7	10.2	-	1300	48
Iron	14200	2524	-	-	-
Lead	8.3	4.3	-	15	13
Magnesium	11700	5990	-	-	-
Manganese	3530	638	5000 (7)	-	-
Nickel	24.9	22.0	100	100	880
Potassium	8720	5127	-	-	-
Sodium	212000	67362	28000 (8) *	-	-
Thallium	6.4	5.4	2 *	5 *	63
Zinc	77.2	45.5	-	5000	123

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 7 TORPEDO SHOPS - UNFILTERED SURFACE WATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Water Quality Standards (2)			
			Aquatic Life		Human Health	
			Freshwater	Saltwater	Organisms	Water and Organisms
Di-N-butyl phthalate	0.6	0.60	-	-	12000	2700
Aluminum	356	356	-	-	-	-
Barium	30.5	24.6	-	-	-	-
Calcium	32700	31750	-	-	-	-
Copper	16.2	10.3	4.8 *	2.9 *	-	-
Iron	558	307	-	-	-	-
Lead	4.4	4.4	1.3 *	8.5	-	50
Magnesium	2650	2545	-	-	-	-
Manganese	32.1	21.3	-	-	-	-
Potassium	4270	3635	-	-	-	-
Selenium	1.2	1.2	5	71	6800	100
Sodium	17000	13075	-	-	-	-
Zinc	54.1	44.3	12.3 *	86	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 Connecticut Water Quality Standards, 1992.
3 Chromium (hexavalent).

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SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 7 TORPEDO SHOPS - SEDIMENT (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Methylene chloride	0.018	0.018	82	760	0.1	1.0
Benzo(a)anthracene	0.14	0.10	1	7.8	1	1
Benzo(a)pyrene	0.1	0.08	1	1	1	1
Benzo(b)fluoranthene	0.13	0.13	1	7.8	1	1
Benzo(k)fluoranthene	0.13	0.13	8.4	78	1	1
Benzoic acid	0.074	0.065	-	-	-	-
Chrysene	0.18	0.13	-	-	-	-
Fluoranthene	0.21	0.17	1000	2500	5.6	56
Indeno(1,2,3-Cd)pyrene	0.071	0.051	-	-	-	-
Phenanthrene	0.14	0.10	1000	2500	4	40
Pyrene	0.24	0.17	1000	2500	4	40
4,4'-DDD	0.093	0.093	-	-	-	-
4,4'-DDE	0.012	0.012	-	-	-	-
Aluminum	11900	8833	-	-	-	-
Antimony	5	5	27	8200	-	-
Arsenic	13.6	9.6	10 *	10 *	-	-
Barium	45.6	41.2	4700	1.4E+5	-	-
Beryllium	0.49	0.41	2	2	-	-
Cadmium	2.4	1.2	34	1000	-	-
Calcium	2300	1933	-	-	-	-
Chromium (total)	15	14	100 (6)	100 (6)	-	-
Copper	30.3	20.9	2500	7.6E+4	-	-
Iron	11600	10967	-	-	-	-
Lead	119	53	500	1000	-	-
Magnesium	3120	2933	-	-	-	-
Manganese	173	159	-	-	-	-
Mercury	0.24	0.24	20	610	-	-
Nickel	9.5	8.1	1400	7500	-	-

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 7 TORPEDO SHOPS - SEDIMENT (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Potassium	1560	1219	-	-	-	-
Selenium	0.28	0.28	340	1E+4	-	-
Sodium	248	184	-	-	-	-
Vanadium	27.3	25.5	470	1.4E+4	-	-
Zinc	101	71	2E+4	6.1E+5	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

APPENDIX F.12

SITE 8 - GOSS COVE LANDFILL

SUMMARY OF COC SELECTION
SITE 8 GOSS COVE LANDFILL - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
2-Butanone	1/10	0.036	8TB4	0.01 - 0.03	4700	6900 (7)	-	N	2
Ethylbenzene	1/10	0.002	8TB11	0.01 - 0.03	780	260	5	N	2
Styrene	1/10	0.004	8MW8S	0.01 - 0.014	1600	1400	2	N	2
Tetrachloroethene	4/10	0.001 - 0.008	8MW8S	0.01 - 0.014	12	11	0.04	N	2
Toluene	2/10	0.002	8TB8 / 8TB11	0.01 - 0.03	1600	520	5	N	2
Trichloroethene	1/10	0.001	8TB8	0.01 - 0.03	58	3	0.02	N	2
Xylenes, total	3/10	0.008 - 0.018	8MW8S	0.01 - 0.011	16000	320	74	N	2
2-Methylnaphthalene	4/10	0.03 - 4.4	8MW8S	0.35 - 3.7	-	-	-	N	1
Acenaphthene	6/10	0.16 - 4	8MW8S	0.35 - 3.7	470	-	200	N	2
Acenaphthylene	5/10	0.025 - 11	8MW8S	0.35 - 1.4	-	-	-	N	1
Anthracene	7/10	0.072 - 18	8MW8S	0.35 - 0.38	2300	-	4300	N	2
Benzo(a)anthracene	10/10	0.13 - 55	8MW8S	-	0.88	-	0.7	Y	3
Benzo(a)pyrene	10/10	0.16 - 44	8MW8S	-	0.088	-	4	Y	3
Benzo(b)fluoranthene	10/10	0.18 - 40	8MW8S	-	0.88	-	4	Y	3
Benzo(g,h,i)perylene	8/10	0.097 - 7.5	8MW8S	0.38 - 3.7	-	-	-	N	1
Benzo(k)fluoranthene	9/10	0.17 - 33	8MW8S	0.37	8.8	-	4	Y	3
Benzoic acid	1/6	0.11	8TB11	0.36 - 12	31000	-	280	N	2
Bis(2-ethylhexyl)phthalate	1/10	1.6	8MW8S	0.15 - 3.7	46	210	11	N	2
Butyl benzyl phthalate	1/10	0.03	8TB11	0.35 - 12	1600	530	68	N	2
Carbazole	6/10	0.17 - 7.2	8MW8S	0.35 - 3.7	32	-	0.2	N	2
Chrysene	10/10	0.19 - 61	8MW8S	-	88	-	1	N	2
Di-n-butyl phthalate	1/10	0.042	8TB11	0.35 - 12	780	100	120	N	2
Di-n-octyl phthalate	1/10	0.02	8TB11	0.35 - 12	160	-	1000000	N	2
Dibenzo(a,h)anthracene	6/10	0.39 - 10	8MW8S	0.35 - 0.38	0.088	-	11	Y	3
Dibenzofuran	6/10	0.075 - 5.2	8MW8S	0.35 - 3.7	31	-	-	N	2
Diethyl phthalate	2/10	0.022 - 0.19	8TB4	0.35 - 12	6300	520	110	N	2
Fluoranthene	10/10	0.34 - 90	8MW8S	-	310	-	980	N	2
Fluorene	7/10	0.18 - 13	8MW8S	0.35 - 0.38	310	-	160	N	2
Indeno(1,2,3-cd)pyrene	9/10	0.1 - 25	8MW8S	0.38	0.88	-	35	Y	3
Naphthalene	5/10	0.054 - 6.6	8MW8S	0.35 - 3.7	310	-	30	N	2
Phenanthrene	10/10	0.16 - 72	8MW8S	-	-	-	-	N	1

SUMMARY OF COC SELECTION (Continued)
SITE 8 GOSS COVE LANDFILL - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Phenol	1/10	20	8MW8S	0.35 - 3.7	4700	-	49	N	2
Pyrene	10/10	0.29 - 77	8MW8S	-	230	-	1400	N	2
4,4'-DDD	2/9	0.0052 - 0.012	8MW7S	0.0034 - 0.039	2.7	-	0.7	N	2
4,4'-DDE	4/10	0.0019 - 0.0081	8MW8S	0.0034 - 0.037	1.9	-	0.5	N	2
4,4'-DDT	7/10	0.0054 - 0.12	8MW8S	0.0034 - 0.037	1.9	80	1.0	N	2
Aldrin	1/10	0.0087	8MW8S	0.0017 - 0.019	0.038	0.5	0.005	N	2
alpha-Chlordane	1/10	0.0083	8MW7S	0.0017 - 0.02	0.49 (8)	10 (8)	2 (8)	N	2
Aroclor-1254	4/10	0.062 - 0.17	8-SS02-03	0.039 - 0.39	0.16	-	-	Y	3
Aroclor-1260	1/7	0.18	8MW7S	0.039 - 0.39	0.083	-	-	Y	3
Dieldrin	2/10	0.0042 - 0.016	8TB6	0.0034 - 0.039	0.04	2	0.001	N	2
Endosulfan II	1/10	0.0074	8MW7S	0.0034 - 0.039	47	-	3	N	2
Endosulfan sulfate	2/10	0.018 - 0.037	8MW8S	0.0034 - 0.037	-	-	-	N	1
Endrin	6/10	0.013 - 0.18	8MW8S	0.0034 - 0.0039	2.3	-	0.4	N	2
Endrin aldehyde	1/10	0.0075	8MW7S	0.0034 - 0.039	-	-	-	N	1
Endrin ketone	4/10	0.013 - 0.081	8TB11	0.0034 - 0.036	-	-	-	N	1
gamma-BHC	2/10	0.003 - 0.0033	8MW8S	0.0017 - 0.019	0.49	-	0.006	N	2
gamma-Chlordane	2/10	0.0046 - 0.0067	8MW7S	0.0017 - 0.02	0.49 (8)	10 (8)	2 (8)	N	2
Heptachlor	2/10	0.0037 - 0.0047	8MW8S	0.0017 - 0.019	0.14	0.3	0.06	N	2
Heptachlor epoxide	2/10	0.0032 - 0.017	8MW8S	0.0017 - 0.019	0.07	1	0.03	N	2
Aluminum	10/10	5650 - 11200	8-SS02-03	-	7800	-	-	~~Y~~ N	~~3~~ 4
Arsenic	10/10	1.4 - 9	8TB11	-	0.43	380	15	Y	3
Barium	10/10	38.9 - 83.5	8-SS02-03	-	550	350000	32	N	2
Beryllium	3/10	0.55 - 0.73	8-SS02-03	0.17 - 0.54	0.15	690	180	Y	3
Boron	4/6	11.5 - 15.3	8TB8	11.1 - 11.5	700	-	-	N	2
Cadmium	3/10	0.56 - 0.76	8-SS02-03	0.29 - 0.46	3.9	920	6	N	2
Calcium	10/10	1050 - 5660	8TB4	-	-	-	-	N	1
Chromium (total)	10/10	8.8 - 34.9	8TB11	-	39 (9)	140 (9)	19 (9)	N	2
Cobalt	8/10	3.5 - 17.7	8-SS02-03	5.2 - 6.2	470	-	-	N	2
Copper	10/10	16.2 - 330	8TB11	-	290	-	-	~~Y~~ N	~~3~~ 4

Revisions
08/20/96
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SUMMARY OF COC SELECTION (Continued)
SITE 8 GOSS COVE LANDFILL - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Iron	10/10	8220 - 16100	8-SS02-03	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	10/10	8.9 - 170	8MW7S	-	400 (10)	-	-	N	2
Magnesium	10/10	2160 - 4720	8TB8	-	-	-	-	N	1
Manganese	10/10	123 - 262	8TB6	-	~~30~~ 190	-	-	Y	3
Mercury	7/10	0.16 - 12.1	8TB11	0.11 - 0.19	2.3	7	3	Y	3
Nickel	10/10	3.7 - 22.5	8TB11	-	160	6900	21	N	2
Potassium	10/10	1120 - 2900	8TB6	-	-	-	-	N	1
Selenium	2/10	0.35 - 0.64	8-SS02-03	0.32 - 0.46	39	-	3	N	2
Silver	2/10	0.67 - 0.77	8TB8	0.36 - 0.46	39	-	-	N	2
Sodium	6/10	73.8 - 176	8TB8	272 - 341	-	-	-	N	1
Thallium	1/10	0.3	8TB8	0.22 - 0.65	0.55 (11)	-	0.4	N	2
Vanadium	10/10	15.6 - 30.5	8TB11	-	55	-	-	N	2
Zinc	10/10	24.6 - 322	8-SS02-03	-	2300	-	42000	N	2

Footnotes:

1 Results in mg/kg unless otherwise noted. Surface soil designated as soil from depths of 0 to 2 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Calculated using soil screening level guidance (see Appendix F.3).
8 Total chlordane.
9 Hexavalent chromium.
10 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
11 Thallic oxide.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 8 GOSS COVE LANDFILL - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
2-Butanone	36	9.8889
Ethylbenzene	2	6.2778
Styrene	4	5.4444
Tetrachloroethene	8	4.5
Toluene	2	5.8889
Trichloroethene	1	6.1667
Xylenes, total	18	7.5
2-Methylnaphthalene	4400	898.8889
Acenaphthene	4000	1039.4444
Acenaphthylene	11000	1634.4444
Anthracene	18000	3340.7778
Benzo(a)anthracene	55000	10541.1111
Benzo(a)pyrene	44000	6865.5556
Benzo(b)fluoranthene	40000	8814.4444
Benzo(g,h,i)perylene	7500	1454.1111
Benzo(k)fluoranthene	33000	6819.4444
Benzoic acid	110	1806.6667
Bis(2-ethylhexyl)phthalate	1600	747.7778
Butyl benzyl phthalate	30	1238.8889
Carbazole	7200	1497.2222
Chrysene	61000	11110
Di-n-butyl phthalate	42	1240.2222
Di-n-octyl phthalate	20	1237.7778
Dibenzo(a,h)anthracene	10000	2023.8889
Dibenzofuran	5200	1072.7778
Diethyl phthalate	190	1053.5556
Fluoranthene	90000	16037.7778
Fluorene	13000	2089.4444
Indeno(1,2,3-cd)pyrene	25000	3971.1111
Naphthalene	6600	1113.3333
Phenanthrene	72000	11893.3333
Phenol	20000	2811.6667
Pyrene	77000	13107.7778
4,4'-DDD	12	10.7278
4,4'-DDE	8.1	9.0611
4,4'-DDT	120	30.1833
Aldrin	8.7	6.4944
alpha-Chlordane	8.3	6.5056
Aroclor-1254	170	149.5
Aroclor-1260	180	160.6429
Dieldrin	16	11.0611
Endosulfan II	7.4	11.6944
Endosulfan sulfate	37	14.7611

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 8 GOSS COVE LANDFILL - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg) (Continued)		
Endrin	180	37.15
Endrin aldehyde	7.5	11.7056
Endrin ketone	81	25.5389
gamma-BHC (Lindane)	3.3	5.1722
gamma-Chlordane	6.7	5.7833
Heptachlor	4.7	5.4056
Heptachlor epoxide	17	6.7167
Inorganics (mg/kg)		
Aluminum	11200	8461.1111
Arsenic	9	3.8556
Barium	83.5	58.7889
Beryllium	0.73	0.3233
Boron	15.3	10.75
Cadmium	0.76	0.3444
Calcium	5660	2193.3333
Chromium (total)	34.9	18.2
Cobalt	17.7	7.2333
Copper	330	141.3667
Iron	16100	12248.8889
Lead	170	101.1667
Magnesium	4720	3144.4444
Manganese	262	189.4444
Mercury	12.1	1.925
Nickel	22.5	14.2333
Potassium	2900	1810
Selenium	0.64	0.2767
Silver	0.77	0.3211
Sodium	176	131.3556
Thallium	0.3	0.2011
Vanadium	30.5	23.6556
Zinc	322	182.3667

SUMMARY OF COC SELECTION
SITE 8 GOSS COVE - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
1,2-Dichloroethene (total)	1/24	0.024	8TB9	0.005 - 55	70	1500/3600 (7)	0.2/0.3 (7)	N	2
2-Butanone	6/28	0.028 - 0.12	8MW6D	0.01 - 110	4700	6900 (8)	-	N	2
4-Methyl-2-pentanone	1/28	0.007	8MW4	0.01 - 110	630	1000	-	N	2
Acetone	6/28	0.064 - 0.3	8TB9	0.01 - 200	780	62000	8	N	2
Carbon disulfide	1/28	0.003	8MW1	0.005 - 55	780	11	14	N	2
Chloromethane	3/28	0.004 - 0.008	8MW2D	0.01 - 110	49	0.3	0.0066	N	2
Ethylbenzene	7/28	0.001 - 3.3	8TB12	0.005 - 55	780	260	5	N	2
Methylene chloride	2/28	0.058 - 1.8	8TB12	0.005 - 55	85	7	0.01	N	2
Styrene	2/28	0.004 - 0.01	8TB2	0.005 - 55	1600	1400	2	N	2
Tetrachloroethene	10/28	0.001 - 0.028	8TB13	0.005 - 55	12	11	0.04	N	2
Toluene	8/28	0.001 - 22	8MW3	0.005 - 1.3	1600	520	5	N	2
Trichloroethene	4/28	0.001 - 0.008	8TB9	0.005 - 55	58	3	0.02	N	2
Xylenes, total	13/28	0.004 - 25	8MW3/8TB12	0.005 - 55	16000	320	74	N	2
2,4-Dimethylphenol	1/28	0.14	8TB12	0.35 - 12	160	-	3	N	2
2-Methylnaphthalene	16/28	0.029 - 40	8TB6	0.35 - 3.7	-	-	-	N	1
2-Methylphenol	2/28	0.029 - 0.57	8TB12	0.35 - 12	390	-	6	N	2
3,3'-Dichlorobenzidine	1/28	15	8TB2	0.35 - 12	1.4	-	0.01	Y	3
4-Methylphenol	5/28	0.033 - 2.2	8TB12	0.35 - 12	39	-	-	N	2
Acenaphthene	20/28	0.051 - 65	8TB6	0.35 - 3.7	470	-	200	N	2
Acenaphthylene	15/28	0.025 - 11	8MW8S	0.35 - 1.8	-	-	-	N	1
Anthracene	22/28	0.043 - 55	8TB6	0.35 - 1.8	2300	-	4300	N	2
Benzo(a)anthracene	28/28	0.13 - 55	8MW8S	-	0.88	-	0.7	Y	3
Benzo(a)pyrene	24/28	0.15 - 44	8MW8S	0.36 - 1.8	0.088	-	4	Y	3
Benzo(b)fluoranthene	26/28	0.17 - 40	8MW8S	1.8	0.88	-	4	Y	3
Benzo(g,h,i)perylene	19/28	0.097 - 7.5	8MW8S	0.35 - 7.7	-	-	-	N	1
Benzo(k)fluoranthene	21/28	0.099 - 33	8MW8S	0.35 - 1.8	8.8	-	4	Y	3
Benzoic acid	5/24	0.063 - 0.42	8TB12	0.36 - 37	31000	-	280	N	2
Bis(2-ethylhexyl)phthalate	6/28	0.12 - 31	8TB9	0.15 - 7.7	46	210	11	N	2
Butyl benzyl phthalate	2/28	0.028 - 0.03	8TB11	0.35 - 12	1600	530	68	N	2

SUMMARY OF COC SELECTION (Continued)
SITE 8 GOSS COVE - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Carbazole	17/22	0.083 - 35	8TB6	0.35 - 3.7	32	-	0.2	Y	3
Chrysene	28/28	0.19 - 61	8MW8S	-	88	-	1	N	2
Di-n-butyl phthalate	5/28	0.02 - 0.19	8MW5S	0.35 - 12	780	100	120	N	2
Di-n-octyl phthalate	1/28	0.02	8TB11	0.35 - 12	160	-	1000000	N	2
Dibenzo(a,h)anthracene	17/28	0.39 - 10	8MW8S	0.35 - 7.7	0.088	-	11	Y	3
Dibenzofuran	19/28	0.037 - 42	8TB6	0.35 - 3.7	31	-	-	Y	3
Diethyl phthalate	4/28	0.022 - 6.5	8TB9	0.35 - 12	6300	520	110	N	2
Fluoranthene	28/28	0.29 - 110	8TB6	-	310	-	980	N	2
Fluorene	21/28	0.053 - 65	8TB6	0.35 - 1.8	310	-	160	N	2
Indeno(1,2,3-cd)pyrene	21/28	0.1 - 25	8MW8S	0.35 - 7.7	0.88	-	35	Y	3
Isophorone	1/28	0.44	8TB1	0.35 - 12	670	3400	0.2	N	2
Naphthalene	18/28	0.027 - 99	8TB6	0.35 - 3.7	310	-	30	N	2
Phenanthrene	28/28	0.16 - 190	8TB6	-	-	-	-	N	1
Phenol	4/28	0.4 - 20	8MW8S	0.35 - 7.7	4700	-	49	N	2
Pyrene	28/28	0.26 - 77	8MW8S	-	230	-	1400	N	2
4,4'-DDD	11/27	0.0052 - 0.17	8TB6	0.0034 - 0.17	2.7	-	0.7	N	2
4,4'-DDE	13/28	0.0019 - 0.27	8TB6	0.0034 - 0.17	1.9	-	0.5	N	2
4,4'-DDT	19/28	0.0054 - 0.45	8TB6	0.0034 - 0.039	1.9	80	1.0	N	2
Aldrin	4/28	0.0074 - 0.062	8TB6	0.0017 - 0.085	0.038	0.5	0.005	Y	3
alpha-Chlordane	5/28	0.0021 - 0.008	8MW7S	0.0017 - 0.85	0.49 (9)	10 (9)	2 (9)	N	2
Aroclor-1248	3/28	0.091 - 4.9	8TB2	0.034 - 0.85	0.083	-	-	Y	3
Aroclor-1254	6/28	0.062 - 0.36	8TB9	0.039 - 1.7	0.16	-	-	Y	3
Aroclor-1260	4/25	0.18 - 0.5	8MW6D	0.039 - 1.7	0.083	-	-	Y	3
Dieldrin	6/28	0.0042 - 0.13	8TB6	0.0034 - 0.17	0.04	2	0.001	Y	3
Endosulfan II	4/28	0.0074 - 0.019	8MW6D	0.0034 - 0.17	47	-	3	N	2
Endosulfan sulfate	3/28	0.008 - 0.037	8MW8S	0.0034 - 0.17	-	-	-	N	1
Endrin	12/28	0.013 - 0.8	8TB6	0.0034 - 0.17	2.3	-	0.4	N	2
Endrin aldehyde	7/22	0.0044 - 0.031	8TB4	0.0034 - 0.039	-	-	-	N	1
Endrin ketone	8/28	0.005 - 0.43	8TB6	0.0034 - 0.17	-	-	-	N	1

SUMMARY OF COC SELECTION (Continued)
SITE 8 GOSS COVE - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
gamma-BHC (lindane)	2/28	0.003 - 0.0033	8MW8S	0.0017 - 0.085	0.49	-	0.006	N	2
gamma-Chlordane	5/28	0.003 - 0.0088	8MW6D	0.0017 - 0.85	0.49 (9)	10 (9)	2 (9)	N	2
Heptachlor	7/28	0.0027 - 0.026	8TB9	0.0017 - 0.085	0.14	0.3	0.06	N	2
Heptachlor epoxide	4/28	0.0032 - 0.092	8TB6	0.0017 - 0.085	0.07	1	0.03	Y	3
Methoxychlor	2/28	0.19 - 0.32	8TB7	0.017 - 0.85	39	-	62	N	2
Aluminum	28/28	5080 - 31200	8TB1	-	7800	-	-	~~Y~~ N	~~3~~ 4
Antimony	3/23	24.3 - 42	8MW6D	2 - 12.3	3.1	-	-	Y	3
Arsenic	28/28	1.4 - 121	8TB1	-	0.43	380	15	Y	3
Barium	28/28	38.9 - 716	8TB1	-	550	350000	32	Y	3
Beryllium	17/28	0.24 - 4.2	8MW2D	0.17 - 0.58	0.15	690	180	Y	3
Boron	10/13	11.5 - 15.3	8TB8	11.1 - 11.8	700	-	-	N	2
Cadmium	16/27	0.51 - 20.7	8TB1	0.29 - 1.3	3.9	920	6	Y	3
Calcium	28/28	1050 - 14400	8TB9	-	-	-	-	N	1
Chromium (total)	28/28	8.8 - 298	8TB9	-	39 (10)	140 (10)	19 (10)	Y	3
Cobalt	26/28	3.5 - 106	8TB1	5.2 - 6.2	470	-	-	N	2
Copper	28/28	16.2 - 3980	8TB12	-	290	-	-	~~Y~~ N	~~3~~ 4
Iron	28/28	8220 - 132000	8TB1	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	28/28	8.9 - 3540	8TB9	-	400 (11)	-	-	Y	3
Magnesium	28/28	1710 - 6910	8MW3	-	-	-	-	N	1
Manganese	28/28	123 - 771	8TB9	-	~~39~~ 190	-	-	Y	3
Mercury	24/28	0.12 - 63.6	8MW5S	0.11 - 0.19	2.3	7	3	Y	3
Nickel	28/28	3.7 - 183	8MW6D	-	160	6900	21	Y	3
Potassium	28/28	1080 - 6310	8MW3	-	-	-	-	N	1
Selenium	5/28	0.35 - 1.2	8MW6D	0.32 - 0.48	39	-	3	N	2
Silver	10/28	0.51 - 6.5	8TB9	0.36 - 1.7	39	-	-	N	2
Sodium	19/27	73.8 - 1660	8MW6D	239 - 372	-	-	-	N	1
Thallium	2/28	0.23 - 0.3	8TB8	0.22 - 0.73	0.55 (12)	-	0.4	N	2
Vanadium	28/28	15.6 - 64.8	8TB1	-	55	-	-	Y	3
Zinc	28/28	24.6 - 5550	8MW2D	-	2300	-	42000	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 8 GOSS COVE - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in mg/kg unless otherwise noted. All soil designated as soil from depths of 0 to 10 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Cis- and trans- isomer values presented.
8 Calculated using soil screening level guidance (see Appendix F.3).
9 Total chlordane.
10 Hexavalent chromium.
11 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
12 Thallic oxide.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 8 GOSS COVE LANDFILL - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (µg/kg)		
1,2-Dichloroethene (total)	24	1184.4792
2-Butanone	120	2169.5385
4-Methyl-2-pentanone	7	2157.0962
Acetone	300	3937.6538
Carbon disulfide	3	1094.0192
Chloromethane	8	2157.0385
Ethylbenzene	3300	1196.25
Methylene chloride	1800	1140.0962
Styrene	10	1093.8462
Tetrachloroethene	28	1094.2885
Toluene	22000	881.0577
Trichloroethene	8	1092.7692
Xylenes, total	25000	1964.5962
2,4-Dimethylphenol	140	1109.6154
2-Methylnaphthalene	40000	2701.1538
2-Methylphenol	570	1119.7692
3,3'-Dichlorobenzidine	15000	1646.5385
4-Methylphenol	2200	1177
Acenaphthene	65000	4763.0385
Acenaphthylene	11000	918.7692
Anthracene	55000	4778.2692
Benzo(a)anthracene	55000	7140.3846
Benzo(a)pyrene	44000	4543.8462
Benzo(b)fluoranthene	40000	6162.3077
Benzo(g,h,i)perylene	7500	1014.6923
Benzo(k)fluoranthene	33000	4319.3846
Benzoic acid	420	2440.7826
Bis(2-ethylhexyl)phthalate	31000	1949.8077
Butyl benzyl phthalate	30	1098.3846
Carbazole	35000	3162.2857
Chrysene	61000	7985.3846
Di-n-butyl phthalate	190	1083.9231
Di-n-octyl phthalate	20	1104.6154
Dibenzo(a,h)anthracene	10000	1398.4615
Dibenzofuran	42000	3014.1154
Diethyl phthalate	6500	1221.8077
Fluoranthene	110000	15488.0769
Fluorene	65000	4846.9615
Indeno(1,2,3-cd)pyrene	25000	2519.4231
Isophorone	440	1121.1538
Naphthalene	99000	6656.0385
Phenanthrene	190000	17543.8462
Phenol	20000	1942.6923
Pyrene	77000	13556.9231

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 8 GOSS COVE LANDFILL - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg) (Continued)		
4,4'-DDD	170	27.3481
4,4'-DDE	270	23.9865
4,4'-DDT	450	50.1712
Aldrin	62	10.8827
alpha-Chlordane	8.3	29.075
Aroclor-1248	4900	345.1154
Aroclor-1254	360	188.0962
Aroclor-1260	500	206.2292
Dieldrin	130	20.1981
Endosulfan II	19	16.5788
Endosulfan sulfate	37	17.975
Endrin	800	66.4942
Endrin aldehyde	31	14.5929
Endrin ketone	430	38.7442
gamma-BHC (lindane)	3.3	8.5596
gamma-Chlordane	8.8	29.1096
Heptachlor	26	8.225
Heptachlor epoxide	92	12.0404
Methoxychlor	320	102.7885
Inorganics (mg/kg)		
Aluminum	31200	9809.6154
Antimony	42	7.181
Arsenic	121	10.9654
Barium	716	148.3308
Beryllium	4.2	0.6727
Boron	15.3	11.3769
Cadmium	20.7	1.7966
Calcium	14400	4087.3077
Chromium (total)	298	52.3231
Cobalt	106	16.8115
Copper	3980	658.1154
Iron	132000	23490
Lead	3540	515.7423
Magnesium	6910	3100.7692
Manganese	771	254.6923
Mercury	63.6	4.2315
Nickel	183	37.0654
Potassium	6310	1959.6154
Selenium	1.2	0.32
Silver	6.5	1.2163
Sodium	1660	339.972
Thallium	0.3	0.2077
Vanadium	64.8	27.6385
Zinc	5550	855.8962

SUMMARY OF COC SELECTION
SITE 8 GOSS COVE LANDFILL - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
1,1,1-Trichloroethane	1/30	1	8GW6S	5 - 400	200	200	130	N	2
1,2-Dichloroethene (total)	9/30	1 - 12	8GW3S	10 - 400	70/100 (7)	70/100 (7)	5.5	Y	3
2-Butanone	1/30	5	8GW6D	10 - 400	-	-	190	N	2
2-Hexanone	1/30	49	8GW8D	10 - 250	-	-	-	N	1
4-Methyl-2-pentanone	3/30	2 - 200	8GW3S	10 - 400	-	-	290	N	2
Acetone	2/30	220 - 700	8GW3S	10 - 410	-	-	370	Y	3
Benzene	7/30	1 - 5	8GW3S	5 - 400	5	5	0.36	Y	3
Bromodichloromethane	1/30	6	8GW6D	5 - 400	100	100	0.17	Y	3
Carbon disulfide	5/30	1 - 58	8GW8D	5 - 250	-	-	100	N	2
Chloroform	1/30	18	8GW6D	5 - 400	100	100	0.15	Y	3
Ethylbenzene	16/30	1 - 120	8GW2S / 8GW3	10 - 400	700	700	130	N	2
Tetrachloroethene	11/30	1 - 5600	8GW8D	5 - 50	5	5	1.1	Y	3
Toluene	5/30	1 - 450	8GW3S	5 - 400	1000	1000	75	Y	3
Trichloroethene	2/30	7 - 8	8GW2D	5 - 400	5	5	1.6	Y	3
Vinyl chloride	1/30	5	8GW2S	10 - 400	2	2	0.019	Y	3
Xylenes, total	18/30	2 - 610	8GW3S	10 - 400	10000	10000	1200	N	2
2,4-Dimethylphenol	14/30	0.6 - 320	8GW3S	10	-	-	73	Y	3
2-Methylnaphthalene	14/30	1 - 12	8GW3S	10	-	-	-	N	1
2-Methylphenol	7/30	3 - 140	8GW3S	10	-	-	180	N	2
4-Bromophenyl phenyl ether	1/30	2	8GW1S	10 - 50	-	-	210	N	2
4-Methylphenol	8/30	4 - 500	8GW2S	10	-	-	18	Y	3
Acenaphthene	12/30	2 - 11	8GW2S	10 - 50	-	-	220	N	2
Acenaphthylene	1/30	0.7	8GW6S	10 - 50	-	-	-	N	1
Anthracene	6/30	1 - 3	8GW3S	10 - 50	-	-	1100	N	2
Benzo(a)anthracene	4/30	0.6 - 4	8GW3S	10 - 50	-	-	0.092	Y	3
Benzo(a)pyrene	4/30	0.6 - 4	8GW3S	10 - 50	0.2	0.2	0.0092	Y	3
Benzo(b)fluoranthene	4/30	1 - 4	8GW3S	10 - 50	-	-	0.092	Y	3
Benzo(g,h,i)perylene	3/30	1 - 4	8GW3S	10 - 50	-	-	-	N	1
Benzo(k)fluoranthene	5/30	0.6 - 5	8GW3S	10 - 50	-	-	0.92	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 8 GOSS COVE LANDFILL - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Benzoic acid	11/30	0.8 - 21	8GW6D	50 - 250	-	-	15000	N	2
Bis(2-ethylhexyl)phthalate	11/30	1 - 140	8GW8S	10 - 50	6	6	4.8	Y	3
Butyl benzyl phthalate	2/30	0.6 - 0.7	8GW5S	10 - 50	-	-	730	N	2
Carbazole	8/26	2 - 16	8GW3S	10	-	-	3.4	Y	3
Chrysene	5/30	0.8 - 7	8GW3S	10 - 50	-	-	9.2	N	2
Di-n-butyl phthalate	2/30	0.5 - 0.6	8GW5S	10 - 50	-	-	370	N	2
Di-n-octyl phthalate	1/30	0.7	8GW3S	10 - 50	-	-	73	N	2
Dibenzo(a,h)anthracene	1/30	0.8	8GW2S	10 - 50	-	-	0.0092	Y	3
Dibenzofuran	10/30	0.8 - 4	8GW2S / 8GW3	10 - 50	-	-	15	N	2
Fluoranthene	13/30	0.6 - 15	8GW3S	10 - 50	-	-	150	N	2
Fluorene	17/30	0.8 - 8	8GW2S	10	-	-	150	N	2
Indeno(1,2,3-cd)pyrene	3/30	0.9 - 4	8GW3S	10 - 50	-	-	0.092	Y	3
N-Nitrosodiphenylamine	1/30	1	8GW3S	10 - 50	-	-	14	N	2
Naphthalene	15/30	2 - 62	8GW3S	10	-	-	150	N	2
Phenanthrene	17/30	0.7 - 14	8GW2S / 8GW3	10 - 50	-	-	-	N	1
Phenol	7/30	0.8 - 26	8GW2S	10 - 50	-	-	2200	N	2
Pyrene	9/30	0.5 - 11	8GW3S	10 - 50	-	-	110	N	2
Aluminum	14/30	36.6 - 53200	8GW7S	10 - 85.5	50 - 200 (8)	-	3700	~~Y~~ N	~~3~~ 4
Antimony	2/28	17.8 - 157	8GW7S	5 - 25	6	6	1.5	Y	3
Arsenic	15/30	2.3 - 29.8	8GW2D	1 - 20	50	50	0.045	Y	3
Barium	30/30	30.8 - 1340	8GW4S	-	2000	2000	260	Y	3
Beryllium	1/30	3.2	8GW7S	1	4	4	0.016	Y	3
Boron	25/26	59.4 - 3360	8GW6D	51.4	-	-	330	Y	3
Cadmium	5/28	1 - 8.1	8GW8S	1 - 2	5	5	1.8	Y	3
Calcium	30/30	30100 - 36000	8GW6D	-	-	-	-	N	1
Chromium (total)	11/28	1.1 - 221	8GW7S	1 - 5	100	100	18 (10)	Y	3
Cobalt	4/30	4.2 - 35.9	8GW7S	1 - 5	-	-	220	N	2
Copper	21/29	2.8 - 3850	8GW7S	2 - 5	1300 (9)	-	150	~~Y~~ N	~~3~~ 4
Iron	30/30	235 - 141000	8GW7S	-	300 (8)	-	1100	~~Y~~ N	~~3~~ 4

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SUMMARY OF COC SELECTION (Continued)
SITE 8 GOSS COVE LANDFILL - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Lead	17/30	1.1 - 1600	8GW7S	1 - 50	15 (9)	-	-	Y	4
Magnesium	30/30	7530 - 765000	8GW6D	-	-	-	-	N	1
Manganese	30/30	53.8 - 3250	8GW6D	-	50 (8)	-	~~18~~ 88	Y	3
Mercury	5/30	0.24 - 3.9	8GW7S	0.2	2	2	1.1	Y	3
Nickel	6/30	4.8 - 138	8GW7S	3 - 10	100	100	73	Y	3
Potassium	30/30	8700 - 436000	8GW6D	-	-	-	-	N	1
Selenium	1/30	7	8GW1S	1 - 30	50	50	18	N	2
Silver	2/30	10.5 - 28.7	8GW2S	2 - 7	100 (8)	50	18	Y	3
Sodium	30/30	6700 - 780000	8GW6D	-	-	-	-	N	1
Thallium	1/30	10.2	8GW7S	1 - 20	2	2	0.26 (11)	Y	3
Vanadium	7/27	1.1 - 136	8GW7S	1 - 20	-	-	26	Y	3
Zinc	26/30	5.4 - 4530	8GW7S	2 - 3.6	5000 (8)	-	1100	Y	3

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample-specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Values for cis- and trans- isomers presented.
8 Secondary MCL (SMCL) based on aesthetic water qualities.
9 Action level.
10 Hexavalent chromium.
11 Thallic oxide.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 No COC screening level available; maximum is greater than or equal to Federal Action Level.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 8 GOSS COVE LANDFILL - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
1,1,1-Trichloroethane	3	19.5152
1,2-Dichloroethene (total)	5.6667	18.9849
2-Butanone	5	20.6818
2-Hexanone	87	13.8182
4-Methyl-2-pentanone	69	25.4091
Acetone	238.1667	46.8712
Benzene	11	19.2424
Bromodichloromethane	5.5	19.7424
Carbon disulfide	91.5	13
Chloroform	11.5	20.2879
Ethylbenzene	109.6667	34.9091
Tetrachloroethene	4650	437.1515
Toluene	233.3333	40.3485
Trichloroethene	7.5	19.9243
Vinyl chloride	5	20.6818
Xylenes, total	506.6667	81.5758
2,4-Dimethylphenol	276.6667	38.6939
2-Methylnaphthalene	8.6667	4.4242
2-Methylphenol	113.3333	15.8788
4-Bromophenyl phenyl ether	4	5.8182
4-Methylphenol	211	41.9848
Acenaphthene	12.6667	5.3333
Acenaphthylene	2.85	5.7136
Anthracene	12.6667	5.1212
Benzo(a)anthracene	13	5.4667
Benzo(a)pyrene	13	5.4667
Benzo(b)fluoranthene	13	5.4848
Benzo(g,h,i)perylene	13	5.6667
Benzo(k)fluoranthene	13.3333	5.3606
Benzoic acid	23	21.6455
Bis(2-ethylhexyl)phthalate	72.5	18.1061
Butyl benzyl phthalate	2.85	5.447
Carbazole	12	5.4697
Chrysene	14	5.4909
Di-n-butyl phthalate	5.1667	5.5727
Di-n-octyl phthalate	11.9	5.7788
Dibenzo(a,h)anthracene	5.2667	5.7818
Dibenzofuran	10.6667	4.5849
Fluoranthene	16.6667	5.2576
Fluorene	5.6667	3.803
Indeno(1,2,3-cd)pyrene	13	5.6636
N-Nitrosodiphenylamine	12	5.7879
Naphthalene	45.6667	10.3333

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 8 GOSS COVE LANDFILL - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L) (Continued)		
Phenanthrene	16.3333	5.8954
Phenol	18.6667	6.6273
Pyrene	15.3333	5.3303
Inorganics (ug/L)		
Aluminum	17759.6667	3136.4674
Antimony	54	11.7212
Arsenic	26.9	5.997
Barium	1218.3333	360.2939
Beryllium	1.4	0.5818
Boron	2440	999.6788
Cadmium	4.55	1.4409
Calcium	294000	96245.4545
Chromium (total)	74	10.3318
Cobalt	12.3	3.3129
Copper	1284.3333	142.1909
Iron	53883.3333	9200.5455
Lead	534.7667	62.8841
Magnesium	415500	162615
Manganese	1713.3333	601.6197
Mercury	1.3667	0.2362
Nickel	47	8.8712
Potassium	238450	81973.4849
Selenium	7.5	3.7879
Silver	10.2333	2.3545
Sodium	4123500	1506866.667
Thallium	4.0667	2.5136
Vanadium	45.6667	10.6652
Zinc	1514.85	183.7303

SUMMARY OF COC SELECTION
SITE 8 GOSS COVE LANDFIL - FILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Aluminum	2/26	16.2 - 9160	8GW7S	10 - 30.9	50 - 200 (7)	-	3700	N	1
Antimony	4/26	5.6 - 53.5	8GW7S	5 - 35.9	6	6	1.5	N	1
Arsenic	12/26	2.5 - 44.9	8GW2D	1 - 20	50	50	0.045	N	1
Barium	26/26	30 - 1380	8GW4S	-	2000	2000	260	N	1
Beryllium	1/26	1.6	8GW7S	1	4	4	0.016	N	1
Boron	25/26	58.4 - 3530	8GW6D	44.8	-	-	330	N	1
Calcium	26/26	29900 - 294000	8GW6D	-	-	-	-	N	1
Chromium	2/26	1.1 - 71.9	8GW7S	1 - 10.1	100	100	18 (8)	N	1
Cobalt	2/26	7.4 - 10.7	8GW7S	1 - 4	-	-	220	N	1
Copper	15/26	3.1 - 47.8	8GW6D	2 - 3	1300 (9)	-	150	N	1
Iron	20/26	94.6 - 86600	8GW7S	17 - 1100	300 (7)	-	1100	N	1
Magnesium	26/26	184 - 585000	8GW5S	-	-	-	-	N	1
Manganese	25/26	24.9 - 3380	8GW6D	2.2	50 (7)	-	~~18~~ 88	N	1
Mercury	4/26	0.2 - 0.22	8GW4S	0.2	2	2	1.1	N	1
Nickel	2/26	10.1 - 43.1	8GW7S	3 - 14.1	100	100	73	N	1
Potassium	26/26	7110 - 468000	8GW6D	-	-	-	-	N	1
Silver	1/26	3.5	8GW6D	2 - 3	100 (7)	50	18	N	1
Sodium	25/26	15600 - 5050000	8GW5S	774000	-	-	-	N	1
Vanadium	3/26	1.1 - 50.2	8GW7S	1 - 5.6	-	-	26	N	1
Zinc	8/26	1 - 1130	8GW7S	2 - 9.2	5000 (7)	-	1100	N	1

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample-specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL based on aesthetic water qualities.
8 Hexavalent chromium.
9 Action level.

Rationale Designations:

1 Chemical detected in unfiltered samples; filtered results are not used in risk assessment.

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SUMMARY OF COC SELECTION
SITE 8 GOSS COVE LANDFILL - UNFILTERED SURFACE WATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	AWQC (4)	Risk-based COC Screening Level (5)	Selected as COC?	Rationale
Toluene	1/7	2	8SW4	5 - 10	6800	75	N	2
Trichloroethene	1/7	3	8SW2	5 - 10	2.7	1.6	Y	3
Bis(2-ethylhexyl)phthalate	2/7	1 - 5	8SW4	10	1.8	4.8	Y	3
Butyl benzyl phthalate	1/7	1	8SW4	10	3000	730	N	2
Heptachlor	1/7	0.05	8SW5	0.05	0.00021	0.0023	Y	3
Aluminum	4/7	15.7 - 136	8SW5	14 - 276	-	3700	N	2
Boron	6/6	806 - 2150	8SW6	-	-	330	Y	3
Calcium	7/7	68300 - 172000	8SW6	-	-	-	N	1
Copper	3/3	8 - 12.5	8SW4	-	1300	150	N	2
Iron	7/7	90.6 - 452	8SW4	-	-	1100	N	2
Lead	2/7	1.7 - 3.3	8SW4	1 - 10	50	15 (6)	N	2
Magnesium	7/7	201000 - 539000	8SW6	-	-	-	N	1
Manganese	7/7	17.7 - 47.5	8SW4	-	-	~~18~~ 88	~~Y~~ N	~~3~~ 2
Nickel	2/7	12.6 - 13.7	8SW5	7 - 11	610	73	N	2
Potassium	7/7	69200 - 236000	8SW2	-	-	-	N	1
Selenium	1/7	4.8	8SW1	2 - 10	100	18	N	2
Sodium	7/7	83000 - 526000	8SW6	-	-	-	N	1
Vanadium	3/7	3 - 5	8SW2	5 - 20	-	26	N	2
Zinc	1/7	14.6	8SW1	2 - 5.6	-	1100	N	2

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as two samples. Non-validated and rejected results not used in risk assessment.
3 Sample-specific.
4 Ambient water quality criteria for the consumption of water and organisms (USEPA, June 15, 1990).
5 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
6 Action level.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 8 GOSS COVE LANDFILL - UNFILTERED SURFACE WATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
Toluene	2	4.0833
Trichloroethene	3	4.25
Bis(2-ethylhexyl)phthalate	3	4.6667
Butyl benzyl phthalate	1	4.3333
Heptachlor	0.05	0.0292
Inorganics (ug/L)		
Aluminum	136	71.9083
Boron	2150	1766.4
Calcium	172000	133541.6667
Copper	12.1	11.175
Iron	389.5	188.8333
Lead	2.5	3.0833
Magnesium	539000	415500
Manganese	47.2	28.4833
Nickel	13.7	7.55
Potassium	236000	167733.3333
Selenium	4.8	3
Sodium	5260000	2576166.667
Vanadium	5	4.9417
Zinc	14.6	3.7333

SUMMARY OF COC SELECTION
SITE 8 GOSS COVE LANDFILL - SEDIMENT (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
2-Butanone	1/6	0.12	8SD2	0.017 - 0.062	4700	N	2
Acetone	4/7	0.11 - 0.74	8SD3	0.017 - 0.28	780	N	2
Carbon disulfide	1/6	0.077	8SD3	0.017 - 0.05	780	N	2
Chloromethane	2/6	0.013 - 0.049	8SD4	0.017 - 0.062	49	N	2
Methylene chloride	2/6	0.037 - 0.071	8SD3	0.016 - 0.063	85	N	2
Tetrachloroethene	2/6	0.004 - 0.007	8SD2	0.033 - 0.062	12	N	2
2-Methylnaphthalene	1/6	0.057	8SD2	1.1 - 5.5	-	N	1
Acenaphthene	1/6	0.13	8SD2	1.1 - 5.5	470	N	2
Acenaphthylene	3/6	0.082 - 0.29	8SD4	1.1 - 5.5	-	N	1
Anthracene	4/7	0.098 - 0.34	8SD3	0.97 - 5.5	2300	N	2
Benzo(a)anthracene	6/7	0.51 - 3	8SD2	5.5	0.88	Y	3
Benzo(a)pyrene	6/7	0.72 - 4	8SD2	5.5	0.088	Y	3
Benzo(b)fluoranthene	7/7	0.32 - 3.3	8SD2	-	0.88	Y	3
Benzo(g,h,i)perylene	6/7	0.46 - 0.87	8SD4	5.5	-	N	1
Benzo(k)fluoranthene	3/7	1.1 - 1.9	8SD4	0.97 - 5.5	8.8	N	2
Benzoic acid	2/7	0.58 - 0.68	8SD4	3.3 - 27	31000	N	2
Bis(2-ethylhexyl)phthalate	2/6	1.2 - 1.3	8SD4	0.28 - 2.2	46	N	2
Carbazole	3/7	0.094 - 0.22	8SD2	1.1 - 5.5	32	N	2
Chrysene	6/7	0.97 - 2.7	8SD2	5.5	88	N	2
Di-n-butyl phthalate	1/7	0.088	EC-8SD3	0.97 - 5.5	780	N	2
Di-n-octyl phthalate	1/6	0.41	8SD3	0.97 - 5.5	160	N	2
Dibenzo(a,h)anthracene	4/7	0.35 - 0.56	8SD4	2.1 - 5.5	0.088	Y	3
Dibenzofuran	1/6	0.14	8SD2	1.1 - 5.5	31	N	2
Fluoranthene	6/7	0.73 - 7	8SD2	5.5	310	N	2
Fluorene	2/6	0.12 - 0.27	8SD2	1.1 - 5.5	310	N	2
Indeno(1,2,3-cd)pyrene	6/7	0.56 - 1.4	8SD2	5.5	0.88	Y	3
Naphthalene	1/6	0.074	8SD2	1.1 - 5.5	310	N	2
Phenanthrene	6/7	0.26 - 3.3	8SD2	5.5	-	N	1
Pyrene	7/7	0.37 - 8	8SD2	-	230	N	2

SUMMARY OF COC SELECTION (Continued)
SITE 8 GOSS COVE LANDFILL - SEDIMENT (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
4,4'-DDD	4/7	0.054 - 0.2	8SD5	0.055 - 0.16	2.7	N	2
4,4'-DDE	2/6	0.016 - 0.035	8SD5	0.055 - 0.21	1.9	N	2
4,4'-DDT	4/7	0.043 - 0.063	8SD2	0.055 - 0.16	1.9	N	2
alpha-Chlordane	3/6	0.021 - 0.036	8SD3	0.028 - 0.085	0.49 (5)	N	2
Aroclor-1254	1/7	0.627	EC-8SD3	0.55 - 2.1	0.16	Y	3
Aroclor-1260	5/6	0.54 - 1	8SD4	0.55	0.083	Y	3
Dieldrin	2/6	0.019 - 0.024	8SD3	0.055 - 0.16	0.04	N	2
Endosulfan II	1/6	0.016	8SD5	0.055 - 0.21	47	N	2
Endrin	1/6	0.0094	8SD2	0.055 - 0.21	2.3	N	2
Endrin aldehyde	3/6	0.024 - 0.064	8SD5	0.055 - 0.16	-	N	1
gamma-Chlordane	3/6	0.015 - 0.022	8SD3	0.028 - 0.085	0.49 (5)	N	2
Heptachlor	2/6	0.0083 - 0.022	8SD3	0.028 - 0.085	0.14	N	2
Aluminum	7/7	1970 - 21000	8SD2	-	7800	~~Y~~ N	~~3~~ 4
Arsenic	5/7	1.2 - 247	8SD4	6.9 - 8.1	0.43	Y	3
Barium	7/7	16 - 79.3	8SD2	-	550	N	2
Beryllium	1/6	0.42	8SD6	0.39 - 1.7	0.15	Y	3
Boron	2/7	35.2 - 72.2	8SD2	12.7 - 50	700	N	2
Cadmium	2/7	0.98 - 2.7	8SD3	0.51 - 2.7	3.9	N	2
Calcium	7/7	1440 - 58600	8SD2	-	-	N	1
Chromium (total)	7/7	9 - 51.2	8SD3	-	39 (6)	Y	3
Cobalt	7/7	3.3 - 6	EC-8SD3	-	470	N	2
Copper	7/7	60.1 - 199	8SD3	-	290	N	2
Iron	7/7	4640 - 19900	8SD2	-	2300	~~Y~~ N	~~3~~ 4
Lead	7/7	71.9 - 646	8SD3	-	400 (7)	Y	3
Magnesium	7/7	1160 - 27700	8SD2	-	-	N	1
Manganese	7/7	86.2 - 508	8SD2	-	~~39~~ 190	Y	3
Mercury	6/7	0.17 - 1.2	8SD3	0.6	2.3	N	2
Nickel	7/7	11.7 - 38.1	8SD3	-	160	N	2
Potassium	7/7	556 - 4540	8SD2	-	-	N	1

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SUMMARY OF COC SELECTION (Continued)
SITE 8 GOSS COVE LANDFILL - SEDIMENT (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
Silver	1/5	0.58	8SD6	0.79 - 3.2	39	N	2
Sodium	5/7	2540 - 15600	EC-8SD3	18000 - 34400	-	N	1
Thallium	1/7	4.3	EC-8SD3	0.25 - 1.8	0.55 (8)	Y	3
Vanadium	7/7	6.6 - 38.7	8SD3	-	55	N	2
Zinc	7/7	110 - 320	8SD6	-	2300	N	2

Footnotes:

1 Results presented in mg/kg unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Total chlordane.
6 Hexavalent chromium.
7 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
8 Thallic oxide.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 8 GOSS COVE LANDFILL - SEDIMENT
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
2-Butanone	120	40.2
Acetone	740	286.4167
Carbon disulfide	77	28.3
Chloromethane	49	23.9
Methylene chloride	71	32.8
Tetrachloroethene	7	16.7
2-Methylnaphthalene	57	1211.4
Acenaphthene	130	1226
Acenaphthylene	290	944.4
Anthracene	340	690.5
Benzo(a)anthracene	3000	1646.6667
Benzo(a)pyrene	4000	2061.6667
Benzo(b)fluoranthene	3300	1731.6667
Benzo(g,h,i)perylene	870	1048.3333
Benzo(k)fluoranthene	1900	1305.8333
Benzoic acid	680	4301.6667
Bis(2-ethylhexyl)phthalate	1300	662
Carbazole	220	904
Chrysene	2700	2003.3333
Di-n-butyl phthalate	88	1095.5
Di-n-octyl phthalate	410	1169
Dibenzo(a,h)anthracene	560	908.3333
Dibenzofuran	140	1228
Fluoranthene	7000	3163.3333
Fluorene	270	1068
Indeno(1,2,3-cd)pyrene	1400	1300
Naphthalene	74	1214.8
Phenanthrene	3300	1540
Pyrene	8000	3028.3333
4,4'-DDD	200	101.9167
4,4'-DDE	35	52.7
4,4'-DDT	63	54.0833
alpha-Chlordane	36	27.7
Aroclor-1254	627	631.1667
Aroclor-1260	1000	689
Dieldrin	24	41.1
Endosulfan II	16	55.4
Endrin	9.4	55.38
Endrin aldehyde	64	44.5
gamma-Chlordane	22	21.9
Heptachlor	22	22.36

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 8 GOSS COVE LANDFILL - SEDIMENT
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (mg/kg)		
Aluminum	21000	10416.6667
Arsenic	247	44.3833
Barium	79.3	44.5167
Beryllium	0.42	0.549
Boron	72.2	28.7333
Cadmium	2.7	1.1392
Calcium	58600	14203.3333
Chromium (total)	51.2	32.7167
Cobalt	6	5.0167
Copper	199	113.9167
Iron	19900	14706.6667
Lead	646	345.3167
Magnesium	27700	9081.6667
Manganese	508	212.3667
Mercury	1.2	0.71
Nickel	38.1	20.3833
Potassium	4540	3219.3333
Silver	0.58	0.825
Sodium	15600	11573.3333
Thallium	4.3	1.1658
Vanadium	38.7	28.2667
Zinc	320	219.3333

SUMMARY OF COC SELECTION
SITE 8 GOSS COVE LANDFILL - 1994 AIR DATA (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2) (ng/L)	Location of Maximum	Range of Nondetects (3) (ng/L)	Maximum in mg/m^3	Risk-based COC Screening Level For Air (4) (mg/m^3)	TLV - TWA (5) (mg/m^3)	TLV - STEL (6) (mg/m^3)	Selected as COC?	Rationale
Acetone	8/8	71 - 8900	8AS2-S1	-	8.90E+00	3.70E-02	1.78E+03	2.38E+03	Y	3
2-Butanone	4/8	9.4 - 23	8AS3	8.4 - 8.7	2.30E-02	1.00E-01	5.90E+02	8.85E+02	N	2
1,1-Dichloroethene (7)	1/8	77 - 99	8AS1	8.4 - 8.7	9.90E-02	3.60E-05	2.00E+01	7.90E+01	Y	3
Methylene chloride	1/8	90	8AS2-S2	8.4 - 8.7	9.00E-02	3.80E-03	1.74E+02	-	Y	3
Styrene	1/8	10	8AS2-S1	8.4 - 8.7	1.00E-02	1.00E-01	2.13E+02	4.26E+02	N	2
Toluene	4/8	16 - 29	8AS1-02	8.4 - 8.7	2.90E-02	4.20E-02	1.88E+02	-	N	2
1,1,1-Trichloroethane	3/8	300 - 380	8AS2-S1	8.4 - 8.7	3.80E-01	1.00E-01	1.91E+03	2.46E+03	Y	3
Trichloroethene (7)	1/8	45	8AS1-02	8.4 - 8.7	4.50E-02	1.00E-03	2.69E+02	5.37E+02	Y	3

Footnote:

1 Data presented for Rounds 1 (July) and 2 (August).
2 Sample and duplicate counted as separate samples.
3 Sample-specific.
4 For ambient air, (USEPA, Region III, October 20, 1995).
5 Threshold Limit Value - Time Weighted Allowance (ACGIH, 1995).
6 Threshold Limit Value - Short Term Exposure Limit (ACGIH, 1995).
7 Chemical detected in biolerroom samples only.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.

SUMMARY OF COC SELECTION
SITE 8 GOSS COVE LANDFILL - 1995 AIR DATA (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2) (ppm)	Location of Maximum	Range of Nondetects (3) (ppm)	MW (4) (g/mole)	Maximum in mg/m^3 (5)	Risk-based COC Screening Level For Air (6) (mg/m^3)	TLV - TWA (7) (mg/m^3)	TLV - STEL (8) (mg/m^3)	Selected as COC?	Rationale
Acetone	3/10	0.08 - 0.2	8AS1-03-T1	0.08 - 0.09	58.08	4.75E-01	3.70E-02	1.78E+03	2.38E+03	Y	1

Footnote:

1 Data presented for additional investigation (July 1995).
2 Sample and duplicate counted as separate samples.
3 Sample-specific.
4 Molecular weight.
5 Conversion performed using molecular weight. Concentration in ppm multiplied by molecular weight divided by 24.45.
6 For ambient air, (USEPA, Region III, October 20, 1995).
7 Threshold Limit Value - Time Weighted Allowance (ACGIH, 1995).
8 Threshold Limit Value - Short Term Exposure Limit (ACGIH, 1995).

Rationale Designations:

1 Maximum is greater than or equal to the COC screening level.

Soil Data (0-10') - Goss L Landfill

~~Table X~~

Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
ALUMINUM	26/26	5080.0000 31200.0000	Und ✓	9809.6154	31,200(d)	na	na	na	na	na	
ARSENIC	26/26	1.4000 121.0000	Und ✓	10.9654	121(d)	na	na	na	na	na	
BARIUM	26/26	38.9000 716.0000	Und ✓	148.3308	716(d)	na	na	na	na	na	
BERYLLIUM	16/26	0.2400 4.2000	Log ✓	0.9663	0.96(b)	na	na	na	na	na	
BORON	10/13	11.5000 15.3000	Und ✓	13.0700	15.3(d)	na	na	na	na	na	
CADMIUM	15/25	0.5100 20.7000	Und ✓	2.8107	20.7(d)	na	na	na	na	na	
CALCIUM	26/26	1050.0000 14400.0000	Log ✓	4087.3077	5570(b)	na	na	na	na	na	
CHROMIUM	26/26	8.8000 298.0000	Und ✓	52.3231	298(d)	na	na	na	na	na	
COBALT	25/26	3.5000 106.0000	Und ✓	17.3600	106(d)	na	na	na	na	na	
COPPER	26/26	16.2000 3980.0000	Log ✓	658.1154	1950(b)	na	na	na	na	na	
IRON	26/26	8220.0000 *****.****	Und ✓	23490.0000	132,000(d)	na	na	na	na	na	
LEAD	26/26	8.9000 3540.0000	Log ✓	515.7423	1280(b)	na	na	na	na	na	

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
MAGNESIUM	26/26	1710.0000 6910.0000	Log ✓	3100.7692	3460(b)	na	na	na	na	na	
MANGANESE	26/26	123.0000 771.0000	Und ✓	254.6923	771(d)	na	na	na	na	na	
MERCURY	23/26	0.1200 63.6000	Log ✓	4.7743	11.2(b)	na	na	na	na	na	
NICKEL	26/26	3.7000 183.0000	Log ✓	37.0654	55.9(b)	na	na	na	na	na	
POTASSIUM	26/26	1080.0000 6310.0000	Und ✓	1959.6154	6310(d)	na	na	na	na	na	
SODIUM	17/25	73.8000 1660.0000	Und ✓	426.8706	1660(d)	na	na	na	na	na	
VANADIUM	26/26	15.6000 64.8000	Log ✓	27.6385	31.3(b)	na	na	na	na	na	
ZINC	26/26	24.6000 5550.0000	Log ✓	855.8962	2040(b)	na	na	na	na	na	
XYLENES, TOTAL	13/26	4.0000 25000.0000	Und ✓	3924.1538	25,000(d)	na	na	na	na	na	
2-METHYLNAPHTHALENE	16/26	29.0000 40000.0000	Log ✓	3900.0000	8910(b)	na	na	na	na	na	
ACENAPHTHENE	20/26	51.0000 65000.0000	Und ✓	5982.2000	65,000(d)	na	na	na	na	na	
ACENAPHTHYLENE	15/26	25.0000 11000.0000	Log ✓	1280.5333	2030(b)	na	na	na	na	na	

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
ANTHRACENE	22/26	43.0000 55000.0000	Log ✓	5548.1818	22800(b)	na	na	na	na	na	
BENZO(A)ANTHRACENE	26/26	130.0000 55000.0000	Log ✓	7140.3846	25500(b)	na	na	na	na	na	
BENZO(A)PYRENE	23/26	150.0000 44000.0000	Log ✓	5019.1304	10900(b)	na	na	na	na	na	
BENZO(B)FLUORANTHENE	25/26	170.0000 40000.0000	Log ✓	6372.8000	21200(b)	na	na	na	na	na	
BENZO(G,H,I)PERYLENE	18/26	97.0000 7500.0000	Log ✓	968.7222	1710(b)	na	na	na	na	na	
BENZO(K)FLUORANTHENE	20/26	99.0000 33000.0000	Und ✓	5522.9500	33000(d)	na	na	na	na	na	
CARBAZOLE	17/21	83.0000 35000.0000	Log ✓	3765.4706	8790(b)	na	na	na	na	na	
CHRYSENE	26/26	190.0000 61000.0000	Log ✓	7985.3846	29300(b)	na	na	na	na	na	
DIBENZO(A,H)ANTHRACENE	17/26	390.0000 10000.0000	Log ✓	1700.5882	2300(b)	na	na	na	na	na	
DIBENZOFURAN	19/26	37.0000 42000.0000	Und ✓	3894.5789	42000(d)	na	na	na	na	na	
FLUORANTHENE	26/26	340.0000 *****.****	Log ✓	15488.0769	54300(b)	na	na	na	na	na	
FLUORENE	21/26	53.0000 65000.0000	Und	5889.3333	65000(d)	na	na	na	na	na	

000037

Table X
Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection	Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
INDENO(1,2,3-CD)PYRENE	20/26	100.0000 25000.0000	Log ✓	2929.5000	5080(b)	na	na	na	na	na	
NAPHTHALENE	18/26	27.0000 99000.0000	Und ✓	9268.7222	99000(d)	na	na	na	na	na	
PHENANTHRENE	26/26	160.0000 *****.****	Log ✓	17543.8462	87300(b)	na	na	na	na	na	
PYRENE	26/26	290.0000 77000.0000	Log ✓	13556.9231	51400(b)	na	na	na	na	na	
4,4'-DDE	13/26	1.9000 270.0000	Und ✓	29.8077	270(d)	na	na	na	na	na	
4,4'-DDT	17/26	5.8000 450.0000	Log ✓	70.4882	99.2(b)	na	na	na	na	na	

000038

Dataset: UT ES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : ALUMINUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	9809.6154	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	~~5080.0000~~	
Positive Hits - Maximum	31200.0000 ucl	
Average Of Positive Hits	~~9809.6154~~	
Standard Deviation	4811.3520	
Upper Confidence Limit - Normal	11421.2564	
Upper Confidence Limit - Lognormal	11012.5711	
95th Percentile - Nonparametric	31200.0000	
95th Percentile - Normal	17724.2894	
95th Percentile - Lognormal	16072.6145	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7500	
Corr Coeff - Detected - Lognormal	0.9129	
Corr Coeff - Total - Normal	0.7500	
Corr Coeff - Total - Lognormal	0.9129	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6003	NA
W-Test - Lognormal	0.8628	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000039

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : ARSENIC (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	10.9654	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	~~1.4000~~	
Positive Hits - Maximum	121.0000 ucl	
Average Of Positive Hits	~~10.9654~~	
Standard Deviation	23.2037	
Upper Confidence Limit - Normal	18.7379	
Upper Confidence Limit - Lognormal	14.5657	
95th Percentile - Nonparametric	121.0000	
95th Percentile - Normal	49.1355	
95th Percentile - Lognormal	27.8035	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5935	
Corr Coeff - Detected - Lognormal	0.9357	
Corr Coeff - Total - Normal	0.5935	
Corr Coeff - Total - Lognormal	0.9357	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.3876	NA
W-Test - Lognormal	0.8859	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

0000

Dataset: UTI ES
Media : SOIL ATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : BARIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	148.3308	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	38.9000	
Positive Hits - Maximum	716.0000 ucc	
Average Of Positive Hits	148.3308	
Standard Deviation	184.5329	
Upper Confidence Limit - Normal	210.1431	
Upper Confidence Limit - Lognormal	197.1046	
95th Percentile - Nonparametric	716.0000	
95th Percentile - Normal	451.8874	
95th Percentile - Lognormal	373.1946	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7537	
Corr Coeff - Detected - Lognormal	0.9178	
Corr Coeff - Total - Normal	0.7537	
Corr Coeff - Total - Lognormal	0.9178	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5768	NA
W-Test - Lognormal	0.8363	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

00041

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : BERYLLIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	16.0000	
Average	0.6727	
Detection Limit - Minimum	0.0850	
Detection Limits - Maximum	0.2900	
Positive Hits - Minimum	0.2400	
Positive Hits - Maximum	4.2000	
Average Of Positive Hits	0.9663	
Standard Deviation	0.9145	
Upper Confidence Limit - Normal	~~0.9790~~	
Upper Confidence Limit - Lognormal	0.9613 UCL	
95th Percentile - Nonparametric	~~4.2000~~	
95th Percentile - Normal	2.1771	
95th Percentile - Lognormal	1.8393	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5573	
Corr Coeff - Detected - Lognormal	0.5295	
Corr Coeff - Total - Normal	0.7447	
Corr Coeff - Total - Lognormal	0.9729	
Corr Coeff - Crit Val - Detected	0.9400	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5774	NA
W-Test - Lognormal	0.9510	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00042

Dataset: UTI ES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : BORON (MG/KG)

	Sample Results	Background Results
Count	13.0000	No samples
Number of Detects	10.0000	
Average	11.3769	
Detection Limit - Minimum	5.5500	
Detection Limits - Maximum	5.9000	
Positive Hits - Minimum	11.6000	
Positive Hits - Maximum	15.3000 UCL	
Average Of Positive Hits	13.0700	
Standard Deviation	3.4477	
Upper Confidence Limit - Normal	13.0809	
Upper Confidence Limit - Lognormal	14.2577	
95th Percentile - Nonparametric	15.3000	
95th Percentile - Normal	17.0484	
95th Percentile - Lognormal	19.8281	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8669	
Corr Coeff - Detected - Lognormal	0.8738	
Corr Coeff - Total - Normal	0.9185	
Corr Coeff - Total - Lognormal	0.8782	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9310	
W-Test - Table Value	0.8660	NA
W-Test - Normal	0.8270	NA
W-Test - Lognormal	0.7571	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000043

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : CADMIUM (MG/KG)

	Sample Results	Background Results
Count	25.0000	No samples
Number of Detects	15.0000	
Average	1.7966	
Detection Limit - Minimum	0.1500	
Detection Limits - Maximum	0.6500	
Positive Hits - Minimum	0.5100	
Positive Hits - Maximum	20.7000 UCL	
Average Of Positive Hits	2.8107	
Standard Deviation	4.1031	
Upper Confidence Limit - Normal	3.2007	
Upper Confidence Limit - Lognormal	2.8995	
95th Percentile - Nonparametric	20.7000	
95th Percentile - Normal	8.5461	
95th Percentile - Lognormal	5.1082	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6218	
Corr Coeff - Detected - Lognormal	0.5579	
Corr Coeff - Total - Normal	0.6087	
Corr Coeff - Total - Lognormal	0.9560	
Corr Coeff - Crit Val - Detected	0.9370	
Corr Coeff - Crit Val - Total	0.9580	
W-Test - Table Value	0.9180	NA
W-Test - Normal	0.4043	NA
W-Test - Lognormal	0.9146	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

00044

Dataset: UT[illegible]ES
Media : SOI[illegible]ATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : CALCIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	4087.3077	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	1050.0000	
Positive Hits - Maximum	14400.0000	
Average Of Positive Hits	4087.3077	
Standard Deviation	3147.6081	
Upper Confidence Limit - Normal	5141.6505	
Upper Confidence Limit - Lognormal	5567.9462 uc	
95th Percentile - Nonparametric	14400.0000	
95th Percentile - Normal	9265.1229	
95th Percentile - Lognormal	10239.9272	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9065	
Corr Coeff - Detected - Lognormal	0.9834	
Corr Coeff - Total - Normal	0.9065	
Corr Coeff - Total - Lognormal	0.9834	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.8295	NA
W-Test - Lognormal	0.9563	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00045

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : CHROMIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	52.3231	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	8.8000	
Positive Hits - Maximum	298.0000	
Average Of Positive Hits	~~52.3231~~	
Standard Deviation	73.4270	
Upper Confidence Limit - Normal	76.9186	
Upper Confidence Limit - Lognormal	75.8255	
95th Percentile - Nonparametric	298.0000	
95th Percentile - Normal	173.1105	
95th Percentile - Lognormal	145.1611	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7479	
Corr Coeff - Detected - Lognormal	0.9494	
Corr Coeff - Total - Normal	0.7479	
Corr Coeff - Total - Lognormal	0.9494	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5727	NA
W-Test - Lognormal	0.8951	NA
Type of Distribution	UNDEFINED	

Test Results:

000046

Dataset: UT RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : COBALT (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	25.0000	
Average	16.8115	
Detection Limit - Minimum	3.1000	
Detection Limits - Maximum	3.1000	
Positive Hits - Minimum	3.5000	
Positive Hits - Maximum	106.0000 ucl	
Average Of Positive Hits	17.3600	
Standard Deviation	23.4463	
Upper Confidence Limit - Normal	24.6653	
Upper Confidence Limit - Lognormal	22.9926	
95th Percentile - Nonparametric	106.0000	
95th Percentile - Normal	55.3807	
95th Percentile - Lognormal	43.9245	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7573	
Corr Coeff - Detected - Lognormal	0.9507	
Corr Coeff - Total - Normal	0.7376	
Corr Coeff - Total - Lognormal	0.9434	
Corr Coeff - Crit Val - Detected	0.9580	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5654	NA
W-Test - Lognormal	0.8906	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000047

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : COPPER (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	658.1154	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	16.2000	
Positive Hits - Maximum	3980.0000	
Average Of Positive Hits	658.1154	
Standard Deviation	1033.3093	
Upper Confidence Limit - Normal	~~1004.2392~~	
Upper Confidence Limit - Lognormal ...	1952.7951 ucl	
95th Percentile - Nonparametric.....	~~3980.0000~~	
95th Percentile - Normal.....	2357.9091	
95th Percentile - Lognormal	2837.7539	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7858	
Corr Coeff - Detected - Lognormal	0.9857	
Corr Coeff - Total - Normal	0.7858	
Corr Coeff - Total - Lognormal	0.9857	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6267	NA
W-Test - Lognormal	0.9599	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000048

Dataset: UT RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : IRON (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	23490.0000	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	~~8220.0000~~	
Positive Hits - Maximum	132000.0000 wrc	
Average Of Positive Hits	~~23490.0000~~	
Standard Deviation	25415.0042	
Upper Confidence Limit - Normal	32003.1714	
Upper Confidence Limit - Lognormal	29229.8883	
95th Percentile - Nonparametric	132000.0000	
95th Percentile - Normal	65297.6820	
95th Percentile - Lognormal	52791.5994	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7303	
Corr Coeff - Detected - Lognormal	0.9161	
Corr Coeff - Total - Normal	0.7303	
Corr Coeff - Total - Lognormal	0.9161	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5625	NA
W-Test - Lognormal	0.8456	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000049

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : LEAD (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	515.7423	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	8.9000	
Positive Hits - Maximum	3540.0000	
Average Of Positive Hits	515.7423	
Standard Deviation	876.9652	
Upper Confidence Limit - Normal	~~809.4961~~	
Upper Confidence Limit - Lognormal ...	1281.8633 ucl	
95th Percentile - Nonparametric.....	~~3540.0000~~	
95th Percentile - Normal.....	1958.3500	
95th Percentile - Lognormal	2005.5795	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7504	
Corr Coeff - Detected - Lognormal	0.9820	
Corr Coeff - Total - Normal	0.7504	
Corr Coeff - Total - Lognormal	0.9820	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5778	NA
W-Test - Lognormal	0.9651	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000050

Dataset: UTI ES
Media : SOIL ATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : MAGNESIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	3100.7692	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	1710.0000	
Positive Hits - Maximum	6910.0000	
Average Of Positive Hits	3100.7692	
Standard Deviation	1087.4591	
Upper Confidence Limit - Normal	~~3465.0315~~	
Upper Confidence Limit - Lognormal ...	3459.7899 ucl	
95th Percentile - Nonparametric.....	6910.0000	
95th Percentile - Normal.....	4889.6395	
95th Percentile - Lognormal	4887.3392	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9091	
Corr Coeff - Detected - Lognormal	0.9739	
Corr Coeff - Total - Normal	0.9091	
Corr Coeff - Total - Lognormal	0.9739	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.8451	NA
W-Test - Lognormal	0.9576	NA
Type of Distribution	LOGNORMAL	

Test Results:

000051

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : MANGANESE (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	254.6923	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	123.0000	
Positive Hits - Maximum	771.0000 ucl	
Average Of Positive Hits	254.6923	
Standard Deviation	147.5305	
Upper Confidence Limit - Normal	304.1101	
Upper Confidence Limit - Lognormal	300.6813	
95th Percentile - Nonparametric	771.0000	
95th Percentile - Normal	497.3801	
95th Percentile - Lognormal	482.5298	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8594	
Corr Coeff - Detected - Lognormal	0.9504	
Corr Coeff - Total - Normal	0.8594	
Corr Coeff - Total - Lognormal	0.9504	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.7530	NA
W-Test - Lognormal	0.9025	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000052

Dataset: UT ES
Media : SOIL ATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : MERCURY (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	23.0000	
Average	4.2315	
Detection Limit - Minimum	0.0550	
Detection Limits - Maximum	0.0950	
Positive Hits - Minimum	0.1200	
Positive Hits - Maximum	63.6000	
Average Of Positive Hits	4.7743	
Standard Deviation	12.4342	
Upper Confidence Limit - Normal	~~8.3966~~	
Upper Confidence Limit - Lognormal	11.2569 UCL	
95th Percentile - Nonparametric	~~63.6000~~	
95th Percentile - Normal	24.6857	
95th Percentile - Lognormal	13.8175	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5084	
Corr Coeff - Detected - Lognormal	0.9297	
Corr Coeff - Total - Normal	0.5548	
Corr Coeff - Total - Lognormal	0.9838	
Corr Coeff - Crit Val - Detected	0.9550	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.3425	NA
W-Test - Lognormal	0.9696	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000053

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : NICKEL (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	37.0654	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	3.7000	
Positive Hits - Maximum	183.0000	
Average Of Positive Hits	37.0654	
Standard Deviation	46.8280	
Upper Confidence Limit - Normal	52.7512	
Upper Confidence Limit - Lognormal	55.9320 UCL	
95th Percentile - Nonparametric	183.0000	
95th Percentile - Normal	114.0975	
95th Percentile - Lognormal	107.0743	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7894	
Corr Coeff - Detected - Lognormal	0.9637	
Corr Coeff - Total - Normal	0.7894	
Corr Coeff - Total - Lognormal	0.9637	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6323	NA
W-Test - Lognormal	0.9294	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000054

Dataset: UT ES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : POTASSIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	1959.6154	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	1080.0000	
Positive Hits - Maximum	6310.0000 ucl	
Average Of Positive Hits	1959.6154	
Standard Deviation	1066.2963	
Upper Confidence Limit - Normal	2316.7888	
Upper Confidence Limit - Lognormal ...	2246.7694	
95th Percentile - Nonparametric.....	6310.0000	
95th Percentile - Normal.....	3713.6728	
95th Percentile - Lognormal	3434.8227	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8082	
Corr Coeff - Detected - Lognormal	0.9411	
Corr Coeff - Total - Normal	0.8082	
Corr Coeff - Total - Lognormal	0.9411	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6799	NA
W-Test - Lognormal	0.8954	NA
Type of Distribution	UNDEFINED	

Test Results:

00055

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : SODIUM (MG/KG)

	Sample Results	Background Results
Count	25.0000	No samples
Number of Detects	17.0000	
Average	339.9720	
Detection Limit - Minimum	119.5000	
Detection Limits - Maximum	186.0000	
Positive Hits - Minimum	73.8000	
Positive Hits - Maximum	1660.0000 ucl	
Average Of Positive Hits	426.8706	
Standard Deviation	383.9306	
Upper Confidence Limit Normal	471.3531	
Upper Confidence Limit - Lognormal ...	483.7195	
95th Percentile - Nonparametric.....	1660.0000	
95th Percentile - Normal.....	971.5379	
95th Percentile - Lognormal	911.7296	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6991	
Corr Coeff - Detected - Lognormal	0.8149	
Corr Coeff - Total - Normal	0.8151	
Corr Coeff - Total - Lognormal	0.9455	
Corr Coeff - Crit Val - Detected	0.9420	
Corr Coeff - Crit Val - Total	0.9580	
W-Test - Table Value	0.9180	NA
W-Test - Normal	0.6775	NA
W-Test - Lognormal	0.8872	NA
Type of Distribution	UNDEFINED	

Test Results:

000056

Dataset: UT RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : VANADIUM (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	27.6385	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	15.6000	
Positive Hits - Maximum	64.8000	
Average Of Positive Hits	27.6385	
Standard Deviation	10.8371	
Upper Confidence Limit - Normal	~~31.2685~~	
Upper Confidence Limit - Lognormal ...	31.2779 UCL	
95th Percentile - Nonparametric.....	~~64.8000~~	
95th Percentile - Normal.....	45.4655	
95th Percentile - Lognormal	45.6373	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.9118	
Corr Coeff - Detected - Lognormal	0.9786	
Corr Coeff - Total - Normal	0.9118	
Corr Coeff - Total - Lognormal	0.9786	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.8451	NA
W-Test - Lognormal	0.9582	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000057

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : ZINC (MG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	855.8962	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	24.6000	
Positive Hits - Maximum	5550.0000	
Average Of Positive Hits	855.8962	
Standard Deviation	1361.2521	
Upper Confidence Limit - Normal	1311.8698	
Upper Confidence Limit - Lognormal	2042.0350 ucl	
95th Percentile - Nonparametric	5550.0000	
95th Percentile - Normal	3095.1559	
95th Percentile - Lognormal	3257.0691	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7829	
Corr Coeff - Detected - Lognormal	0.9784	
Corr Coeff - Total - Normal	0.7829	
Corr Coeff - Total - Lognormal	0.9784	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6261	NA
W-Test - Lognormal	0.9512	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000058

Dataset: UT ES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : XYLENES, TOTAL (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	13.0000	
Average	1964.5962	
Detection Limit - Minimum	2.5000	
Detection Limits - Maximum	6.0000	
Positive Hits - Minimum	~~4.0000~~	
Positive Hits - Maximum	25000.0000 uu	
Average Of Positive Hits	~~3924.1538~~	
Standard Deviation	6782.3067	
Upper Confidence Limit - Normal	4236.4407	
Upper Confidence Limit - Lognormal	4946.5305	
95th Percentile - Nonparametric	25000.0000	
95th Percentile - Normal	13121.4907	
95th Percentile - Lognormal	1149.1292	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7389	
Corr Coeff - Detected - Lognormal	0.9559	
Corr Coeff - Total - Normal	0.5394	
Corr Coeff - Total - Lognormal	0.8050	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.3086	NA
W-Test - Lognormal	0.6532	NA
Type of Distribution	~~LOGNORMAL~~, Undefined	

Test Results:

000059

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : 2-METHYLNAPHTHALENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	16.0000	
Average	2701.1538	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	1850.0000	
Positive Hits - Minimum	29.0000	
Positive Hits - Maximum	40000.0000	
Average Of Positive Hits	3900.0000	
Standard Deviation	8038.4966	
Upper Confidence Limit - Normal	5393.7798	
Upper Confidence Limit - Lognormal	8912.0920 UCL	
95th Percentile - Nonparametric	40000.0000	
95th Percentile - Normal	15924.4808	
95th Percentile - Lognormal	8393.3702	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5293	
Corr Coeff - Detected - Lognormal	0.8779	
Corr Coeff - Total - Normal	0.5714	
Corr Coeff - Total - Lognormal	0.9740	
Corr Coeff - Crit Val - Detected	0.9400	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.3596	NA
W-Test - Lognormal	0.9438	NA
Type of Distribution	LOGNORMAL✓	

Test Results:

000060

Dataset: UT[illegible]ES
Media : SOI[illegible]ATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : ACENAPHTHENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	20.0000	
Average	4763.0385	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	1850.0000	
Positive Hits - Minimum	~~51.0000~~	
Positive Hits - Maximum	65000.0000 ucl	
Average Of Positive Hits	~~5982.2000~~	
Standard Deviation	13883.6170	
Upper Confidence Limit - Normal	9413.5831	
Upper Confidence Limit - Lognormal	11832.6335	
95th Percentile - Nonparametric	65000.0000	
95th Percentile - Normal	27601.5884	
95th Percentile - Lognormal	12269.5186	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.4756	
Corr Coeff - Detected - Lognormal	0.8471	
Corr Coeff - Total - Normal	0.5898	
Corr Coeff - Total - Lognormal	0.9549	
Corr Coeff - Crit Val - Detected	0.9500	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.3772	NA
W-Test - Lognormal	0.9111	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : ACENAPHTHYLENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	15.0000	
Average	918.7692	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	900.0000	
Positive Hits - Minimum	25.0000	
Positive Hits - Maximum	11000.0000	
Average Of Positive Hits	1280.5333	
Standard Deviation	2139.2034	
Upper Confidence Limit - Normal	1635.3304	
Upper Confidence Limit - Lognormal ...	2028.6054 uca	
95th Percentile - Nonparametric.....	11000.0000	
95th Percentile - Normal.....	4437.7589	
95th Percentile - Lognormal	3162.7496	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6719	
Corr Coeff - Detected - Lognormal	0.9706	
Corr Coeff - Total - Normal	0.6090	
Corr Coeff - Total - Lognormal	0.9756	
Corr Coeff - Crit Val - Detected	0.9370	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.4059	NA
W-Test - Lognormal	0.9542	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000062

Dataset: UT RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : ANTHRACENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	22.0000	
Average	4778.2692	
Detection Limit - Minimum	185.0000	
Detection Limits - Maximum	900.0000	
Positive Hits - Minimum	43.0000	
Positive Hits - Maximum	55000.0000	
Average Of Positive Hits	5548.1818	
Standard Deviation	11161.7331	
Upper Confidence Limit - Normal	~~8517.0743~~	
Upper Confidence Limit - Lognormal ...	22773.7973 uca	
95th Percentile - Nonparametric.....	~~55000.0000~~	
95th Percentile - Normal.....	23139.3202	
95th Percentile - Lognormal	20434.4989	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5607	
Corr Coeff - Detected - Lognormal	0.9643	
Corr Coeff - Total - Normal	0.6556	
Corr Coeff - Total - Lognormal	0.9880	
Corr Coeff - Crit Val - Detected	0.9540	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.4614	NA
W-Test - Lognormal	0.9678	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000063

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : BENZO(A)ANTHRACENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	7140.3846	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	130.0000	
Positive Hits - Maximum	55000.0000	
Average Of Positive Hits	7140.3846	
Standard Deviation	12465.8267	
Upper Confidence Limit - Normal	11316.0172	
Upper Confidence Limit - Lognormal	25518.8619 UCL	
95th Percentile - Nonparametric	55000.0000	
95th Percentile - Normal	27646.6696	
95th Percentile - Lognormal	31583.1672	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7676	
Corr Coeff - Detected - Lognormal	0.9896	
Corr Coeff - Total - Normal	0.7676	
Corr Coeff - Total - Lognormal	0.9896	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6090	NA
W-Test - Lognormal	0.9671	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000064

Dataset: UT RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : BENZO(A)PYRENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	23.0000	
Average	4543.8462	
Detection Limit - Minimum	900.0000	
Detection Limits - Maximum	900.0000	
Positive Hits - Minimum	150.0000	
Positive Hits - Maximum	44000.0000	
Average Of Positive Hits	5019.1304	
Standard Deviation	8601.0614	
Upper Confidence Limit - Normal	7424.9124	
Upper Confidence Limit - Lognormal	10898.1282 UCL	
95th Percentile - Nonparametric	~~44000.0000~~	
95th Percentile - Normal	18692.5921	
95th Percentile - Lognormal	17574.8753	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6000	
Corr Coeff - Detected - Lognormal	0.9809	
Corr Coeff - Total - Normal	0.6719	
Corr Coeff - Total - Lognormal	0.9892	
Corr Coeff - Crit Val - Detected	0.9550	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.4852	NA
W-Test - Lognormal	0.9762	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000065

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : BENZO(B)FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	25.0000	
Average	6162.3077	
Detection Limit - Minimum	900.0000	
Detection Limits - Maximum	900.0000	
Positive Hits - Minimum	170.0000	
Positive Hits - Maximum	40000.0000	
Average Of Positive Hits	6372.8000	
Standard Deviation	9498.1010	
Upper Confidence Limit - Normal	9343.8520	
Upper Confidence Limit - Lognormal	21151.4857 UCL	
95th Percentile - Nonparametric	40000.0000	
95th Percentile - Normal	21786.6838	
95th Percentile - Lognormal	29095.2349	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7972	
Corr Coeff - Detected - Lognormal	0.9898	
Corr Coeff - Total - Normal	0.7992	
Corr Coeff - Total - Lognormal	0.9903	
Corr Coeff - Crit Val - Detected	0.9580	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6535	NA
W-Test - Lognormal	0.9654	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000066

Dataset: UT RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : BENZO(G,H,I)PERYLENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	18.0000	
Average	1014.6923	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	3850.0000	
Positive Hits - Minimum	97.0000	
Positive Hits - Maximum	7500.0000	
Average Of Positive Hits	968.7222	
Standard Deviation	1529.8565	
Upper Confidence Limit - Normal	~~1527.1428~~	
Upper Confidence Limit - Lognormal ...	1707.8122 UCL	
95th Percentile - Nonparametric.....	~~7500.0000~~	
95th Percentile - Normal.....	3531.3062	
95th Percentile - Lognormal	3219.8546	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5595	
Corr Coeff - Detected - Lognormal	0.9328	
Corr Coeff - Total - Normal	0.7215	
Corr Coeff - Total - Lognormal	0.9738	
Corr Coeff - Crit Val - Detected	0.9450	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5495	NA
W-Test - Lognormal	0.9470	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000067

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : BENZO(K)FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	20.0000	
Average	4319.3846	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	900.0000	
Positive Hits - Minimum	99.0000	
Positive Hits - Maximum	33000.0000 UCL	
Average Of Positive Hits	5522.9500	
Standard Deviation	7480.4503	
Upper Confidence Limit - Normal	6825.0838	
Upper Confidence Limit - Lognormal	21478.0587	
95th Percentile - Nonparametric	33000.0000	
95th Percentile - Normal	16624.7253	
95th Percentile - Lognormal	21394.8296	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6115	
Corr Coeff - Detected - Lognormal	0.9240	
Corr Coeff - Total - Normal	0.7742	
Corr Coeff - Total - Lognormal	0.9611	
Corr Coeff - Crit Val - Detected	0.9500	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6189	NA
W-Test - Lognormal	0.9047	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000068

Dataset: UT RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : CARBAZOLE (UG/KG)

	Sample Results	Background Results
Count	21.0000	No samples
Number of Detects	17.0000	
Average	3162.2857	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	1850.0000	
Positive Hits - Minimum	83.0000	
Positive Hits - Maximum	35000.0000	
Average Of Positive Hits	3765.4706	
Standard Deviation	7833.6299	
Upper Confidence Limit - Normal	~~6111.0666~~	
Upper Confidence Limit - Lognormal ...	8793.1163 UCL	
95th Percentile - Nonparametric.....	~~35000.0000~~	
95th Percentile - Normal.....	16048.6069	
95th Percentile - Lognormal	9683.4494	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5176	
Corr Coeff - Detected - Lognormal	0.8706	
Corr Coeff - Total - Normal	0.6348	
Corr Coeff - Total - Lognormal	0.9539	
Corr Coeff - Crit Val - Detected	0.9420	
Corr Coeff - Crit Val - Total	0.9520	
W-Test - Table Value	0.9080	NA
W-Test - Normal	0.4305	NA
W-Test - Lognormal	0.9080	NA
Type of Distribution	~~UNDEFINED~~ Lognormal	

Test Results:

000099

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : CHRYSENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	7985.3846	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	190.0000	
Positive Hits - Maximum	61000.0000	
Average Of Positive Hits	7985.3846	
Standard Deviation	13656.9338	
Upper Confidence Limit - Normal	12559.9980	
Upper Confidence Limit - Lognormal	29300.9392 UCL	
95th Percentile - Nonparametric	~~61000.0000~~	
95th Percentile - Normal	30451.0408	
95th Percentile - Lognormal	36102.2302	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7747	
Corr Coeff - Detected - Lognormal	0.9861	
Corr Coeff - Total - Normal	0.7747	
Corr Coeff - Total - Lognormal	0.9861	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6205	NA
W-Test - Lognormal	0.9569	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000070

Dataset: UTI ES
Media : SOIL ATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : DIBENZO(A,H)ANTHRACENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	17.0000	
Average	1398.4615	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	3850.0000	
Positive Hits - Minimum	390.0000	
Positive Hits - Maximum	10000.0000	
Average Of Positive Hits	1700.5882	
Standard Deviation	2135.5289	
Upper Confidence Limit - Normal	2113.7919	
Upper Confidence Limit - Lognormal	2300.2335 UCL	
95th Percentile - Nonparametric	~~10000.0000~~	
95th Percentile - Normal	4911.4065	
95th Percentile - Lognormal	4327.5610	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7976	
Corr Coeff - Detected - Lognormal	0.8708	
Corr Coeff - Total - Normal	0.7422	
Corr Coeff - Total - Lognormal	0.9728	
Corr Coeff - Crit Val - Detected	0.9420	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5754	NA
W-Test - Lognormal	0.9385	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000071

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : DIBENZOFURAN (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	19.0000	
Average	3014.1154	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	1850.0000	
Positive Hits - Minimum	37.0000	
Positive Hits - Maximum	42000.0000 UCL	
Average Of Positive Hits	3894.5789	
Standard Deviation	8787.5175	
Upper Confidence Limit - Normal	5957.6381	
Upper Confidence Limit - Lognormal	6601.9138	
95th Percentile - Nonparametric	42000.0000	
95th Percentile - Normal	17469.5818	
95th Percentile - Lognormal	7688.7929	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5454	
Corr Coeff - Detected - Lognormal	0.8648	
Corr Coeff - Total - Normal	0.5852	
Corr Coeff - Total - Lognormal	0.9518	
Corr Coeff - Crit Val - Detected	0.9470	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.3731	NA
W-Test - Lognormal	0.9079	NA
Type of Distribution	UNDEFINED	

Test Results:

000072

Dataset: UT RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : FLUORANTHENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	15488.0769	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	340.0000	
Positive Hits - Maximum	110000.0000	
Average Of Positive Hits	15488.0769	
Standard Deviation	29059.1342	
Upper Confidence Limit - Normal	25221.9093	
Upper Confidence Limit - Lognormal ...	54326.5358 ucl	
95th Percentile - Nonparametric.....	110000.0000	
95th Percentile - Normal.....	63290.3527	
95th Percentile - Lognormal	62418.3476	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7513	
Corr Coeff - Detected - Lognormal	0.9769	
Corr Coeff - Total - Normal	0.7513	
Corr Coeff - Total - Lognormal	0.9769	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5750	NA
W-Test - Lognormal	0.9377	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000073

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : FLUORENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	21.0000	
Average	4846.9615	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	900.0000	
Positive Hits - Minimum	53.0000	
Positive Hits - Maximum	65000.0000 nc	
Average Of Positive Hits	~~5889.3333~~	
Standard Deviation	13521.8540	
Upper Confidence Limit - Normal	9376.3278	
Upper Confidence Limit - Lognormal	12573.4175	
95th Percentile - Nonparametric	65000.0000	
95th Percentile - Normal	27090.4114	
95th Percentile - Lognormal	13271.6596	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.4887	
Corr Coeff - Detected - Lognormal	0.8650	
Corr Coeff - Total - Normal	0.6058	
Corr Coeff - Total - Lognormal	0.9532	
Corr Coeff - Crit Val - Detected	0.9520	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.3978	NA
W-Test - Lognormal	0.9080	NA
Type of Distribution	UNDEFINED	

Test Results:

000074

Dataset: UTI RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : INDENO(1,2,3-CD)PYRENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	20.0000	
Average	2519.4231	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	3850.0000	
Positive Hits - Minimum	100.0000	
Positive Hits - Maximum	25000.0000	
Average Of Positive Hits	2929.5000	
Standard Deviation	4852.4028	
Upper Confidence Limit - Normal	~~4144.8148~~	
Upper Confidence Limit - Lognormal	5079.4706 UCL	
95th Percentile - Nonparametric	~~25000.0000~~	
95th Percentile - Normal	10501.6256	
95th Percentile - Lognormal	8847.4430	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5207	
Corr Coeff - Detected - Lognormal	0.9153	
Corr Coeff - Total - Normal	0.6535	
Corr Coeff - Total - Lognormal	0.9867	
Corr Coeff - Crit Val - Detected	0.9500	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.4617	NA
W-Test - Lognormal	0.9770	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000075

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : NAPHTHALENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	18.0000	
Average	6656.0385	
Detection Limit - Minimum	175.0000	
Detection Limits - Maximum	1850.0000	
Positive Hits - Minimum	~~27.0000~~	
Positive Hits - Maximum	99000.0000 acc	
Average Of Positive Hits	~~9268.7222~~	
Standard Deviation	20675.6064	
Upper Confidence Limit - Normal	13581.6711	
Upper Confidence Limit - Lognormal	32999.5159	
95th Percentile - Nonparametric	99000.0000	
95th Percentile - Normal	40667.4110	
95th Percentile - Lognormal	17210.0634	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5822	
Corr Coeff - Detected - Lognormal	0.8970	
Corr Coeff - Total - Normal	0.5769	
Corr Coeff - Total - Lognormal	0.9600	
Corr Coeff - Crit Val - Detected	0.9450	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.3637	NA
W-Test - Lognormal	0.9155	NA
Type of Distribution	UNDEFINED ✓	

Test Results:

000076

Dataset: UT RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : PHENANTHRENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	17543.8462	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	160.0000	
Positive Hits - Maximum	190000.0000	
Average Of Positive Hits	17543.8462	
Standard Deviation	40808.2990	
Upper Confidence Limit - Normal	31213.2535	
Upper Confidence Limit - Lognormal	87344.7594 UCL	
95th Percentile - Nonparametric	~~190000.0000~~	
95th Percentile - Normal	84673.4980	
95th Percentile - Lognormal	70053.2868	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6725	
Corr Coeff - Detected - Lognormal	0.9809	
Corr Coeff - Total - Normal	0.6725	
Corr Coeff - Total - Lognormal	0.9809	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.4797	NA
W-Test - Lognormal	0.9510	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000077

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : PYRENE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	26.0000	
Average	13556.9231	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	290.0000	
Positive Hits - Maximum	77000.0000	
Average Of Positive Hits	13556.9231	
Standard Deviation	21914.9428	
Upper Confidence Limit - Normal	~~20897.6917~~	
Upper Confidence Limit - Lognormal ...	51455.2594 ucl	
95th Percentile - Nonparametric.....	~~77000.0000~~	
95th Percentile - Normal.....	49607.0040	
95th Percentile - Lognormal	61848.9609	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.8016	
Corr Coeff - Detected - Lognormal	0.9841	
Corr Coeff - Total - Normal	0.8016	
Corr Coeff - Total - Lognormal	0.9841	
Corr Coeff - Crit Val - Detected	0.9590	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.6450	NA
W-Test - Lognormal	0.9499	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

00078

Dataset: UT RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : 4,4'-DDE (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	13.0000	
Average	23.9865	
Detection Limit - Minimum	1.7000	
Detection Limits - Maximum	85.0000	
Positive Hits - Minimum	1.9000	
Positive Hits - Maximum	270.0000 ucl	
Average Of Positive Hits	29.8077	
Standard Deviation	52.8264	
Upper Confidence Limit - Normal	41.6816	
Upper Confidence Limit - Lognormal	34.6686	
95th Percentile - Nonparametric	270.0000	
95th Percentile - Normal	110.8859	
95th Percentile - Lognormal	64.9624	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.5901	
Corr Coeff - Detected - Lognormal	0.8476	
Corr Coeff - Total - Normal	0.5961	
Corr Coeff - Total - Lognormal	0.9480	
Corr Coeff - Crit Val - Detected	0.9310	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.3899	NA
W-Test - Lognormal	0.9122	NA
Type of Distribution	UNDEFINED	

Test Results:

00079

Dataset: UTMP_RES
Media : SOIL DATA(0-10') - (NSB-NLON)
Group : GOSS COVE LANDFILL

Parameter : 4,4'-DDT (UG/KG)

	Sample Results	Background Results
Count	26.0000	No samples
Number of Detects	17.0000	
Average	50.1712	
Detection Limit - Minimum	1.7000	
Detection Limits - Maximum	19.5000	
Positive Hits - Minimum	5.8000	
Positive Hits - Maximum	450.0000	
Average Of Positive Hits	70.4882	
Standard Deviation	93.1915	
Upper Confidence Limit - Normal	81.3872	
Upper Confidence Limit - Lognormal	99.1811 ucl	
95th Percentile - Nonparametric	450.0000	
95th Percentile - Normal	203.4712	
95th Percentile - Lognormal	171.8290	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6068	
Corr Coeff - Detected - Lognormal	0.7827	
Corr Coeff - Total - Normal	0.6927	
Corr Coeff - Total - Lognormal	0.9803	
Corr Coeff - Crit Val - Detected	0.9420	
Corr Coeff - Crit Val - Total	0.9590	
W-Test - Table Value	0.9200	NA
W-Test - Normal	0.5092	NA
W-Test - Lognormal	0.9657	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000080

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	50	IR:	0
EF:	150	EF:	1
Fi:	0.5	Fi:	1
ED:	6	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	2190	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 1.47E–07 (AVG ANNUAL DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

ADULT/YOUTH (CANCER RISK):
CF: 1.26E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	11	1	0.00E+00	1.61E–06	1.38E–07		7.30E–01
Benzo(b)fluoranthene	8.8	1	0.00E+00	1.29E–06	1.11E–07		7.30E–01
Benzo(k)fluoranthene	6.9	1	0.00E+00	1.01E–06	8.68E–08		7.30E–02
Benzo(a)pyrene	6.9	1	0.00E+00	1.01E–06	8.68E–08		7.30E+00
Dibenz(a,h)anthracene	2	1	0.00E+00	2.94E–07	2.52E–08		7.30E+00
Indeno(1,2,3–cd)pyrene	4	1	0.00E+00	5.87E–07	5.03E–08		7.30E–01
Carbazole	0	1	0.00E+00	0.00E+00	0.00E+00		2.00E–02
3,3'–Dichlorobenzidine	0	1	0.00E+00	0.00E+00	0.00E+00		4.50E–01
Dibenzofuran	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–03	
Aldrin	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E–05	1.50E+01
Dieldrin	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–05	1.60E+01
Heptachlor epoxide	0	1	0.00E+00	0.00E+00	0.00E+00	1.30E–05	9.10E+00
Aroclors	0.31	1	0.00E+00	4.55E–08	3.90E–09	2.00E–05	~~7.70E+00~~ 1E+0*
~~Aluminum~~	~~8460~~	~~1~~	~~0.00E+00~~	~~1.24E–03~~	~~1.06E–04~~	~~1.00E+00~~	
Antimony	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–04	
Arsenic	3.9	1	0.00E+00	5.72E–07	4.91E–08	3.00E–04	1.50E+00
Barium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–02	
Beryllium	0.32	1	0.00E+00	4.70E–08	4.03E–09	5.00E–03	4.30E+00
Cadmium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–04	
Chromium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–03	
~~Copper~~	~~141~~	~~1~~	~~0.00E+00~~	~~2.07E–05~~	~~1.77E–06~~	~~4.00E–02~~	
~~Iron~~	~~12200~~	~~1~~	~~0.00E+00~~	~~1.79E–03~~	~~1.53E–04~~	~~3.00E–01~~	
Manganese	189	1	0.00E+00	2.77E–05	2.38E–06	~~5.00E–03~~ 2.4E-2	
Mercury	1.9	1	0.00E+00	2.79E–07	2.39E–08	3.00E–04	
Nickel	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E–02	
Vanadium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–03	
Zinc	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E–01	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

*Based on new PCB guidance (USEPA, September 1996).

Revisions
02/26/97
KMS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	1.01E–07
Benzo(b)fluoranthene	0.00E+00	0.00E+00	8.08E–08
Benzo(k)fluoranthene	0.00E+00	0.00E+00	6.34E–09
Benzo(a)pyrene	0.00E+00	0.00E+00	6.34E–07
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	1.84E–07
Indeno(1,2,3–cd)pyrene	0.00E+00	0.00E+00	3.67E–08
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3'–Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	0.00E+00
Dieldrin	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00
Aroclors	0.00E+00	2.27E–03	~~3.00E–08~~ 3.90E-9 *
~~Aluminum~~	~~0.00E+00~~	~~1.24E–03~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	1.91E–03	7.36E–08
Barium	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	9.39E–06	1.73E–08
Cadmium	0.00E+00	0.00E+00	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00
~~Copper~~	~~0.00E+00~~	~~5.17E–04~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~5.97E–03~~	~~0.00E+00~~
Manganese	0.00E+00	~~5.55E–03~~ 1.16E-3	0.00E+00
Mercury	0.00E+00	9.30E–04	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~1.84E–02~~ 6.28E-3	~~1.10E–00~~ 1.14E-6

* Based on new PCB guidance (USEPA, September 1996).

Revisions 02/26/97 KMS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		3800
AF = ADHERENCE FACTOR (MG/SQ CM):		0.2
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		150
ED1 = YOUTH EXPOSURE DURATION (YEARS):		1
ED2 = ADULT EXPOSURE DURATION (YEARS):		6
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
BW1 = BODY WEIGHT ADOLESCENT (KG):		1
BW2 = BODY WEIGHT ADULT (KG):		70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		2190
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 0.00E+00 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 1.91E–07
DOSEadult = (CF2)*(C)*(ABS) CF2 = 2.23E–06

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)

Site 8 – Goss Cove Landfill

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE

CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	0.31	0.06	0.00E+00	4.15E–08	3.56E–09	2.00E–05	~~7.70E+00~~ 1E+0*
Cadmium	0	0.01	0.00E+00	0.00E+00	0.00E+00	~~1.50E–05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

*Based on new PCB guidance EPA, September 1996).

Revisions
02/26/97
TAS

000086

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	0.00E+00	2.07E–03	~~2.74E–08~~ 3.56E-9 *
Cadmium	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	2.07E–03	~~2.74E–08~~ 3.56E-9

*Based on new PCB guidance (USEPA, September 1996).

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000087

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INHALATION OF AMBIENT AIR ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Full–Time Employee, CTE

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x ET x EF x ED)/(BW x AT)

WHERE:
C = MEAN CONCENTRATION IN AIR (MG/M3)
IR = INHALATION RATE (M3/HOUR)
ET = EXPOSURE TIME (HOURS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	2.5	IR:	0
EF:	150	EF:	1
ET:	8	ET:	1
ED:	6	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	2190	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 1.17E–01 (AVG ANNUAL DOSE)
CF: 1.01E–02 (LIFETIME DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

000089

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee, CTE
CALCULATE DOSES:

CHEMICAL	C (mg/kg)	C (MG/M3)	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	11	1.98E–07	0.00E+00	2.32E–08	1.99E–09		
Benzo(b)fluoranthene	8.8	1.58E–07	0.00E+00	1.86E–08	1.59E–09		
Benzo(k)fluoranthene	6.9	1.24E–07	0.00E+00	1.46E–08	1.25E–09		
Benzo(a)pyrene	6.9	1.24E–07	0.00E+00	1.46E–08	1.25E–09		6.10E+00
Dibenz(a,h)anthracene	2	3.60E–08	0.00E+00	4.23E–09	3.62E–10		
Indeno(1,2,3–cd)pyrene	4	7.20E–08	0.00E+00	8.45E–09	7.25E–10		
Carbazole	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
3,3–Dichlorobenzidine	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Dibenzofuran	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Aldrin	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1.51E+01
Dieldrin	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1.61E+01
Heptachlor epoxide	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		9.10E+00
Aroclors	0.31	5.58E–09	0.00E+00	6.55E–10	5.62E–11		
~~Aluminum~~	~~8460~~	~~1.52E–04~~	~~0.00E+00~~	~~1.78E–05~~	~~1.53E–06~~		
Antimony	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Arsenic	3.9	7.02E–08	0.00E+00	8.24E–09	7.07E–10		1.51E+01
Barium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E–04	
Beryllium	0.32	5.76E–09	0.00E+00	6.76E–10	5.80E–11		8.40E+00
Cadmium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.71E–05	6.30E+00
Chromium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		4.20E+01
~~Copper~~	~~141~~	~~2.54E–06~~	~~0.00E+00~~	~~2.98E–07~~	~~2.55E–08~~		
~~Iron~~	~~12200~~	~~2.20E–04~~	~~0.00E+00~~	~~2.58E–05~~	~~2.21E–06~~		
Manganese	189	3.40E–06	0.00E+00	3.99E–07	3.42E–08	1.43E–05	
Mercury	1.9	3.42E–08	0.00E+00	4.02E–09	3.44E–10	8.57E–05	
Nickel	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Vanadium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Zinc	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/20/96
KMS

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee, CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	0.00E+00
Benzo(b)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	0.00E+00	7.62E–09
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3–cd)pyrene	0.00E+00	0.00E+00	0.00E+00
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3–Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	0.00E+00
Dieldrin	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00
Aroclors	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	1.07E–08
Barium	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	4.87E–10
Cadmium	0.00E+00	0.00E+00	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00
~~Copper~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	0.00E+00	2.79E–02	0.00E+00
Mercury	0.00E+00	4.69E–05	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	**2.80E–02**	**1.88E–08**

Revisions
08/20/96
KMO

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	100	IR:	0
EF:	150	EF:	1
Fi:	1	Fi:	1
ED:	25	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	9125	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	5.87E–07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	2.10E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	55	1	0.00E+00	3.23E–05	1.15E–05		7.30E–01
Benzo(b)fluoranthene	40	1	0.00E+00	2.35E–05	8.39E–06		7.30E–01
Benzo(k)fluoranthene	33	1	0.00E+00	1.94E–05	6.92E–06		7.30E–02
Benzo(a)pyrene	44	1	0.00E+00	2.58E–05	9.23E–06		7.30E+00
Dibenz(a,h)anthracene	10	1	0.00E+00	5.87E–06	2.10E–06		7.30E+00
Indeno(1,2,3–cd)pyrene	25	1	0.00E+00	1.47E–05	5.24E–06		7.30E–01
Carbazole	0	1	0.00E+00	0.00E+00	0.00E+00		2.00E–02
3,3'–Dichlorobenzidine	0	1	0.00E+00	0.00E+00	0.00E+00		4.50E–01
Dibenzofuran	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–03	
Aldrin	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E–05	1.50E+01
Dieldrin	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–05	1.60E+01
Heptachlor epoxide	0	1	0.00E+00	0.00E+00	0.00E+00	1.30E–05	9.10E+00
Aroclors	0.35	1	0.00E+00	2.05E–07	7.34E–08	2.00E–05	~~7.70E+00~~ 2E+0 *
~~Aluminum~~	~~11200~~	~~1~~	~~0.00E+00~~	~~6.58E–03~~	~~2.35E–03~~	~~1.00E+00~~	
Antimony	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–04	
Arsenic	9	1	0.00E+00	5.28E–06	1.89E–06	3.00E–04	1.50E+00
Barium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–02	
Beryllium	0.73	1	0.00E+00	4.29E–07	1.53E–07	5.00E–03	4.30E+00
Cadmium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–04	
Chromium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–03	
~~Copper~~	~~330~~	~~1~~	~~0.00E+00~~	~~1.94E–04~~	~~6.92E–05~~	~~4.00E–02~~	
~~Iron~~	~~16100~~	~~1~~	~~0.00E+00~~	~~9.46E–03~~	~~3.38E–03~~	~~3.00E–01~~	
Manganese	262	1	0.00E+00	1.54E–04	5.49E–05	~~5.00E–03~~ 2.4E-2	
Mercury	12.1	1	0.00E+00	7.10E–06	2.54E–06	3.00E–04	
Nickel	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E–02	
Vanadium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–03	
Zinc	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E–01	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions
02/26/97
KAE

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	8.42E–06
Benzo(b)fluoranthene	0.00E+00	0.00E+00	6.12E–06
Benzo(k)fluoranthene	0.00E+00	0.00E+00	5.05E–07
Benzo(a)pyrene	0.00E+00	0.00E+00	6.73E–05
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	1.53E–05
Indeno(1,2,3–cd)pyrene	0.00E+00	0.00E+00	3.83E–06
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3'–Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	0.00E+00
Dieldrin	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00
Aroclors	0.00E+00	1.03E–02	~~5.65E–07~~ 1.47E-7 *
~~Aluminum~~	~~0.00E+00~~	~~6.58E–03~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	1.76E–02	2.83E–06
Barium	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	8.57E–05	6.58E–07
Cadmium	0.00E+00	0.00E+00	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00
~~Copper~~	~~0.00E+00~~	~~4.84E–03~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~3.15E–02~~	~~0.00E+00~~
Manganese	0.00E+00	~~3.08E–02~~ 6.42E-3	0.00E+00
Mercury	0.00E+00	2.37E–02	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~1.25E–01~~ 5.81E-2	~~1.06E–04~~ 1.05E-4 *

* Based on new PCB guidance (USEPA, September 1996).

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000595

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		3800
AF = ADHERENCE FACTOR (MG/SQ CM):		1
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		150
ED1 = YOUTH EXPOSURE DURATION (YEARS):		1
ED2 = ADULT EXPOSURE DURATION (YEARS):		25
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		1
BW1 = BODY WEIGHT ADOLESCENT (KG):		1
BW2 = BODY WEIGHT ADULT (KG):		70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		9125
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 0.00E+00 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 7.97E–06
DOSEadult = (CF2)*(C)*(ABS) CF2 = 2.23E–05

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	0.35	0.06	0.00E+00	4.68E–07	1.67E–07	2.00E–05	~~7.70E+00~~ 2E+0 *
Cadmium	0	0.01	0.00E+00	0.00E+00	0.00E+00	~~1.50E–05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

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RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	0.00E+00	2.34E–02	~~1.29E–06~~ 3.35E-7 *
Cadmium	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	2.34E–02	~~1.29E–06~~ 3.35E-7

* Based on new PCB guidance (USEPA, September 1996).

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RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INHALATION OF AMBIENT AIR ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Full–Time Employee, RME

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x ET x EF x ED)/(BW x AT)

WHERE:
C = MEAN CONCENTRATION IN AIR (MG/M3)
IR = INHALATION RATE (M3/HOUR)
ET = EXPOSURE TIME (HOURS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	2.5	IR:	0
EF:	150	EF:	1
ET:	8	ET:	1
ED:	25	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	9125	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 1.17E–01 (AVG ANNUAL DOSE)
CF: 4.19E–02 (LIFETIME DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee, RME
CALCULATE DOSES:

CHEMICAL	C (mg/kg)	C (MG/M3)	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	55	9.90E–07	0.00E+00	1.16E–07	4.15E–08		
Benzo(b)fluoranthene	40	7.20E–07	0.00E+00	8.45E–08	3.02E–08		
Benzo(k)fluoranthene	33	5.94E–07	0.00E+00	6.97E–08	2.49E–08		
Benzo(a)pyrene	44	7.92E–07	0.00E+00	9.30E–08	3.32E–08		6.10E+00
Dibenz(a,h)anthracene	10	1.80E–07	0.00E+00	2.11E–08	7.55E–09		
Indeno(1,2,3–cd)pyrene	25	4.50E–07	0.00E+00	5.28E–08	1.89E–08		
Carbazole	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
3,3–Dichlorobenzidine	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Dibenzofuran	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Aldrin	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1.51E+01
Dieldrin	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1.61E+01
Heptachlor epoxide	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		9.10E+00
Aroclors	0.35	6.30E–09	0.00E+00	7.40E–10	2.64E–10		
~~Aluminum~~	~~11200~~	~~2.02E–04~~	~~0.00E+00~~	~~2.37E–05~~	~~8.45E–06~~		
Antimony	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Arsenic	9	1.62E–07	0.00E+00	1.90E–08	6.79E–09		1.51E+01
Barium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E–04	
Beryllium	0.73	1.31E–08	0.00E+00	1.54E–09	5.51E–10		8.40E+00
Cadmium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.71E–05	6.30E+00
Chromium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		4.20E+01
~~Copper~~	~~330~~	~~5.94E–06~~	~~0.00E+00~~	~~6.97E–07~~	~~2.49E–07~~		
~~Iron~~	~~16100~~	~~2.90E–04~~	~~0.00E+00~~	~~3.40E–05~~	~~1.22E–05~~		
Manganese	262	4.72E–06	0.00E+00	5.54E–07	1.98E–07	1.43E–05	
Mercury	12.1	2.18E–07	0.00E+00	2.56E–08	9.13E–09	8.57E–05	
Nickel	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Vanadium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Zinc	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee, RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	0.00E+00
Benzo(b)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	0.00E+00	2.03E–07
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3–cd)pyrene	0.00E+00	0.00E+00	0.00E+00
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3–Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	0.00E+00
Dieldrin	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00
Aroclors	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	1.03E–07
Barium	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	4.63E–09
Cadmium	0.00E+00	0.00E+00	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00
~~Copper~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	0.00E+00	3.87E–02	0.00E+00
Mercury	0.00E+00	2.98E–04	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	3.90E–02	3.10E–07

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RISK ASSESSMENT SPREADSHEET – INHALATION OF INDOOR MUSEUM AIR

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INHALATION OF AMBIENT AIR ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Full–Time Employee, RME

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x ET x EF x ED)/(BW x AT)

WHERE:
C = MEAN CONCENTRATION IN AIR (MG/M3)
IR = INHALATION RATE (M3/HOUR)
ET = EXPOSURE TIME (HOURS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	2.5	IR:	0
EF:	250	EF:	1
ET:	8	ET:	1
ED:	25	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	9125	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 1.96E–01 (AVG ANNUAL DOSE)
CF: 6.99E–02 (LIFETIME DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

RISK ASSESSMENT SPREADSHEET – INHALATION OF INDOOR MUSEUM AIR (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee, RME
CALCULATE DOSES:

CHEMICAL	C (MG/M3)	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Acetone	8.9	0.00E+00	1.74E+00	6.22E–01		
Methylene chloride	0.09	0.00E+00	1.76E–02	6.29E–03	8.57E–01	1.64E–03
1,1,1–Trichloroethane	0.38	0.00E+00	7.44E–02	2.66E–02	2.86E–01	
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		
		0.00E+00	0.00E+00	0.00E+00		

RISK ASSESSMENT SPREADSHEET – INHALATION OF INDOOR MUSEUM AIR (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Full–Time Employee, RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Acetone	0.00E+00	0.00E+00	0.00E+00
Methylene chloride	0.00E+00	2.06E–02	1.03E–05
1,1,1–Trichloroethane	0.00E+00	2.60E–01	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	**2.81E–01**	**1.03E–05**

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	240	IR:	0
EF:	80	EF:	1
Fi:	0.5	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	3.76E–07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	5.37E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	26	1	0.00E+00	9.77E−06	1.40E−07		7.30E−01
Benzo(b)fluoranthene	21	1	0.00E+00	7.89E−06	1.13E−07		7.30E−01
Benzo(k)fluoranthene	4.3	1	0.00E+00	1.62E−06	2.31E−08		7.30E−02
Benzo(a)pyrene	11	1	0.00E+00	4.13E−06	5.90E−08		7.30E+00
Dibenz(a,h)anthracene	2.3	1	0.00E+00	8.64E−07	1.23E−08		7.30E+00
Indeno(1,2,3−cd)pyrene	5.1	1	0.00E+00	1.92E−06	2.74E−08		7.30E−01
Carbazole	8.8	1	0.00E+00	3.31E−06	4.72E−08		2.00E−02
3,3'−Dichlorobenzidine	1.6	1	0.00E+00	6.01E−07	8.59E−09		4.50E−01
Dibenzofuran	3	1	0.00E+00	1.13E−06	1.61E−08	4.00E−03	
Aldrin	0.011	1	0.00E+00	4.13E−09	5.90E−11	3.00E−05	1.50E+01
Dieldrin	0.02	1	0.00E+00	7.51E−09	1.07E−10	5.00E−05	1.60E+01
Heptachlor epoxide	0.012	1	0.00E+00	4.51E−09	6.44E−11	1.30E−05	9.10E+00
Aroclors	0.74	1	0.00E+00	2.78E−07	3.97E−09	2.00E−05	~~7.70E+00~~ 1E+0*
~~Aluminum~~	~~9810~~	~~1~~	~~0.00E+00~~	~~3.69E−03~~	~~5.27E−05~~	~~1.00E+00~~	
Antimony	7.2	1	0.00E+00	2.71E−06	3.86E−08	4.00E−04	
Arsenic	11	1	0.00E+00	4.13E−06	5.90E−08	3.00E−04	1.50E+00
Barium	148	1	0.00E+00	5.56E−05	7.94E−07	7.00E−02	
Beryllium	0.96	1	0.00E+00	3.61E−07	5.15E−09	5.00E−03	4.30E+00
Cadmium	1.8	1	0.00E+00	6.76E−07	9.66E−09	5.00E−04	
Chromium	52.3	1	0.00E+00	1.97E−05	2.81E−07	5.00E−03	
~~Copper~~	~~1950~~	~~1~~	~~0.00E+00~~	~~7.33E−04~~	~~1.05E−05~~	~~4.00E−02~~	
~~Iron~~	~~23500~~	~~1~~	~~0.00E+00~~	~~8.83E−03~~	~~1.26E−04~~	~~3.00E−01~~	
Manganese	255	1	0.00E+00	9.58E−05	1.37E−06	~~5.00E−03~~ 2.4E-2	
Mercury	11.2	1	0.00E+00	4.21E−06	6.01E−08	3.00E−04	
Nickel	55.9	1	0.00E+00	2.10E−05	3.00E−07	2.00E−02	
Vanadium	31.3	1	0.00E+00	1.18E−05	1.68E−07	7.00E−03	
Zinc	2040	1	0.00E+00	7.66E−04	1.09E−05	3.00E−01	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

*Based on new PCB guidance (USEPA, September 1996).

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RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	1.02E-07
Benzo(b)fluoranthene	0.00E+00	0.00E+00	8.23E-08
Benzo(k)fluoranthene	0.00E+00	0.00E+00	1.68E-09
Benzo(a)pyrene	0.00E+00	0.00E+00	4.31E-07
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	9.01E-08
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	2.00E-08
Carbazole	0.00E+00	0.00E+00	9.45E-10
3,3'-Dichlorobenzidine	0.00E+00	0.00E+00	3.86E-09
Dibenzofuran	0.00E+00	2.82E-04	0.00E+00
Aldrin	0.00E+00	1.38E-04	8.86E-10
Dieldrin	0.00E+00	1.50E-04	1.72E-09
Heptachlor epoxide	0.00E+00	3.47E-04	5.86E-10
Aroclors	0.00E+00	1.39E-02	~~9.06E-08~~ 3.97E-9 *
~~Aluminum~~	~~0.00E+00~~	~~3.69E-03~~	~~0.00E+00~~
Antimony	0.00E+00	6.76E-03	0.00E+00
Arsenic	0.00E+00	1.38E-02	8.86E-08
Barium	0.00E+00	7.94E-04	0.00E+00
Beryllium	0.00E+00	7.21E-05	2.22E-08
Cadmium	0.00E+00	1.35E-03	0.00E+00
Chromium	0.00E+00	3.93E-03	0.00E+00
~~Copper~~	~~0.00E+00~~	~~1.08E-02~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~2.94E-02~~	~~0.00E+00~~
Manganese	0.00E+00	~~1.92E-02~~ 4.00E-3	0.00E+00
Mercury	0.00E+00	1.40E-02	0.00E+00
Nickel	0.00E+00	1.05E-03	0.00E+00
Vanadium	0.00E+00	1.68E-03	0.00E+00
Zinc	0.00E+00	2.55E-03	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~1.31E-01~~ 6.48E-2	~~6.76E-07~~ 8.50E-7

*Based on new PCB guidance (USEPA, September 1996).

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RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 6 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		3800
AF = ADHERENCE FACTOR (MG/SQ CM):		0.2
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		80
ED1 = YOUTH EXPOSURE DURATION (YEARS):		1
ED2 = ADULT EXPOSURE DURATION (YEARS):		1
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
BW1 = BODY WEIGHT ADOLESCENT (KG):		1
BW2 = BODY WEIGHT ADULT (KG):		70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		365
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 0.00E+00 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 1.70E-08
DOSEadult = (CF2)*(C)*(ABS) CF2 = 1.19E-06

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	0.74	0.06	0.00E+00	5.28E−08	7.55E−10	2.00E−05	~~7.70E+00~~ 1E+0 *
Cadmium	1.8	0.01	0.00E+00	2.14E−08	3.06E−10	~~1.50E−05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

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RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	0.00E+00	2.64E-03	~~5.81E-09~~ 7.55E-10 *
Cadmium	0.00E+00	~~1.43E-03~~ 8.58E-4	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	~~4.07E-03~~ 3.50E-3	~~5.81E-09~~ 7.55E-10

*Based on new PCB guidance (USEPA, September 1996).

Revisions 03/26/97

00115

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 6 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/24/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: **Construction Worker, CTE**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	80
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.19E+01

CONVERSION FACTOR (CARCIN) = 1.70E–01

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker, CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Acetone	0.047	O	4.80E-01	2.00E-01	5.70E-04	5.80E-05	2.25E-07
Benzene	0.011	O	6.30E-01	2.60E-01	1.10E-01	1.30E-02	1.02E-05
Bromodichloromethane	0.006	O	2.10E+00	6.70E-01	5.80E-03	1.20E-02	3.37E-07
Chloroform	0.012	O	1.10E+00	4.70E-01	8.90E-03	9.30E-03	9.49E-07
1,2-Dichloroethene	0.006	O	8.20E-01	3.40E-01	1.00E-02	7.20E-03	5.18E-07
Toluene	0.04	O	7.70E-01	3.20E-01	4.50E-02	5.40E-02	1.49E-05
Tetrachloroethene	0.44	O	4.30E+00	9.00E-01	4.80E-02	2.50E-01	1.88E-04
Trichloroethene	0.008	O	1.30E+00	5.50E+01	1.60E-02	2.60E-02	1.58E-05
4-Methylphenol	0.042	O	9.60E-01	4.00E-01	9.60E-03	8.30E-03	3.53E-06
2,4-Dimethylphenol	0.039	O	1.20E+00	4.90E-01	1.50E-02	2.00E-02	5.18E-06
Vinyl chloride	0.005	O	5.10E-01	2.10E-01	7.30E-03	2.30E-03	3.07E-07
Benzo(a)anthracene	0.005	O	1.00E+01	2.20E+00	8.10E-01	4.60E+01	4.70E-05
Benzo(b)fluoranthene	0.005	O	1.40E+01	3.00E+00	1.20E+00	1.30E+02	8.12E-05
Benzo(k)fluoranthene	0.005	O	1.40E+01	3.00E+00	1.20E+00	1.30E+02	8.12E-05
Benzo(a)pyrene	0.005	O	1.40E+01	2.90E+00	1.20E+00	1.30E+02	7.99E-05
Dibenz(a,h)anthracene	0.005	O	2.10E+01	4.40E+00	2.70E+00	6.90E+02	2.21E-04
Indeno(1,2,3-cd)pyrene	0.006	O	2.00E+01	4.20E+00	1.90E+00	3.80E+02	1.83E-04
Bis(2-ethylhexyl)phthalate	0.018	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	2.13E-05
Carbazole	0.005	O	3.80E+00	9.20E-01	3.90E-02	1.95E-01	1.78E-06
~~Aluminum~~	~~3.14~~	~~I~~			~~1.00E-03~~		~~2.51E-05~~
Antimony	0.0117	I			1.00E-03		9.36E-08
Arsenic	0.006	I			1.00E-03		4.80E-08
Barium	0.36	I			1.00E-03		2.88E-06
Beryllium	0.00058	I			1.00E-03		4.64E-09
Boron	1	I			1.00E-03		8.00E-06
Cadmium	0.0014	I			1.00E-03		1.12E-08
Chromium	0.0103	I			2.00E-03		1.65E-07
~~Copper~~	~~0.143~~	~~I~~			~~1.00E-03~~		~~1.14E-06~~
~~Iron~~	~~9.2~~	~~I~~			~~1.00E-03~~		~~7.36E-05~~
Manganese	0.602	I			1.00E-03		4.82E-06
Mercury	0.00024	I			1.00E-03		1.92E-09
Nickel	0.0088	I			1.00E-03		7.04E-08
Silver	0.0024	I			1.00E-03		1.92E-08
Thallium	0.0025	I			1.00E-03		2.00E-08
Vanadium	0.0107	I			1.00E-03		8.56E-08
Zinc	0.184	I			6.00E-04		8.83E-07
Zinc							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

Revisions
08/20/96
KAS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Acetone	2.68E-06	1.00E-01	2.68E-05
Benzene	1.21E-04		0.00E+00
Bromodichloromethane	4.01E-06	2.00E-02	2.01E-04
Chloroform	1.13E-05	1.00E-02	1.13E-03
1,2-Dichloroethene	6.16E-06	9.00E-03	6.85E-04
Toluene	1.78E-04	2.00E-01	8.88E-04
Tetrachloroethene	2.24E-03	1.00E-02	2.24E-01
Trichloroethene	1.88E-04	6.00E-03	3.13E-02
4-Methylphenol	4.20E-05	5.00E-03	8.39E-03
2,4-Dimethylphenol	6.17E-05	2.00E-02	3.08E-03
Vinyl chloride	3.65E-06		0.00E+00
Benzo(a)anthracene	5.59E-04		0.00E+00
Benzo(b)fluoranthene	9.67E-04		0.00E+00
Benzo(k)fluoranthene	9.67E-04		0.00E+00
Benzo(a)pyrene	9.50E-04		0.00E+00
Dibenz(a,h)anthracene	2.63E-03		0.00E+00
Indeno(1,2,3-cd)pyrene	2.17E-03		0.00E+00
Bis(2-ethylhexyl)phthalate	2.53E-04	1.10E-02	2.30E-02
Carbazole	2.12E-05		0.00E+00
~~Aluminum~~	~~2.99E-04~~	~~5.00E-02~~	~~5.98E-03~~
Antimony	1.11E-06	4.00E-04	2.78E-03
Arsenic	5.71E-07	2.80E-04	2.04E-03
Barium	3.43E-05	3.50E-03	9.79E-03
Beryllium	5.52E-08	2.50E-04	2.21E-04
Boron	9.52E-05	4.50E-03	2.12E-02
Cadmium	1.33E-07	~~1.50E-05~~ 2.5E-5	~~9.88E-03~~ 5.33E-3
Chromium	1.96E-06	1.00E-04	1.96E-02
~~Copper~~	~~1.35E-05~~	~~2.00E-02~~	~~6.14E-04~~
~~Iron~~	~~9.76E-04~~	~~1.50E-02~~	~~5.84E-02~~
Manganese	5.73E-05	~~1.50E-04~~ 7.2E-4	~~8.82E-01~~ 7.96E-2
Mercury	2.28E-08	1.50E-05	1.52E-03
Nickel	8.38E-07	2.00E-03	4.19E-04
Silver	2.28E-07	2.40E-04	9.52E-04
Thallium	2.38E-07	4.00E-06	5.95E-02
Vanadium	1.02E-06	3.50E-04	2.91E-03
Zinc	1.05E-05	1.50E-01	7.01E-05
Zinc	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~8.70E-01~~ 4.99E-1

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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Acetone	3.82E-08		0.00E+00
Benzene	1.73E-06	2.90E-02	5.03E-08
Bromodichloromethane	5.73E-08	6.20E-02	3.55E-09
Chloroform	1.61E-07	6.10E-03	9.84E-10
1,2-Dichloroethene	6.60E-08		0.00E+00
Toluene	2.54E-06		0.00E+00
Tetrachloroethene	3.20E-05	5.20E-02	1.67E-06
Trichloroethene	2.68E-06	1.10E-02	2.95E-08
4-Methylphenol	5.99E-07		0.00E+00
2,4-Dimethylphenol	8.81E-07		0.00E+00
Vinyl chloride	5.21E-08	1.90E+00	9.91E-08
Benzo(a)anthracene	7.96E-06		0.00E+00
Benzo(b)fluoranthene	1.38E-05		0.00E+00
Benzo(k)fluoranthene	1.38E-05		0.00E+00
Benzo(a)pyrene	1.36E-05		0.00E+00
Dibenz(a,h)anthracene	3.76E-05		0.00E+00
Indeno(1,2,3-cd)pyrene	3.10E-05		0.00E+00
Bis(2-ethylhexyl)phthalate	3.62E-06	2.50E-02	9.04E-08
Carbazole	3.03E-07	2.00E-02	6.06E-09
~~Aluminum~~	~~4.07E-08~~		~~0.00E+00~~
Antimony	1.59E-08		0.00E+00
Arsenic	8.16E-09	1.60E+00	1.31E-08
Barium	4.90E-07		0.00E+00
Beryllium	7.89E-10	8.60E+01	6.78E-08
Boron	1.36E-06		0.00E+00
Cadmium	1.90E-09		0.00E+00
Chromium	2.80E-08		0.00E+00
~~Copper~~	~~1.93E-07~~		~~0.00E+00~~
~~Iron~~	~~1.25E-05~~		~~0.00E+00~~
Manganese	8.19E-07		0.00E+00
Mercury	3.26E-10		0.00E+00
Nickel	1.20E-08		0.00E+00
Silver	3.26E-09		0.00E+00
Thallium	3.40E-09		0.00E+00
Vanadium	1.45E-08		0.00E+00
Zinc	1.50E-07		0.00E+00
Zinc	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			2.03E-06

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RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INHALATION OF AMBIENT AIR ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, CTE

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x ET x EF x ED)/(BW x AT)

WHERE:
C = MEAN CONCENTRATION IN AIR (MG/M3)
IR = INHALATION RATE (M3/HOUR)
ET = EXPOSURE TIME (HOURS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	3.9	IR:	0
EF:	60	EF:	1
ET:	8	ET:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 9.77E–02 (AVG ANNUAL DOSE)
CF: 1.40E–03 (LIFETIME DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE DOSES:

CHEMICAL	C (mg/kg)	C (MG/M3)	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	26	2.34E–06	0.00E+00	2.29E–07	3.27E–09		
Benzo(b)fluoranthene	21	1.89E–06	0.00E+00	1.85E–07	2.64E–09		
Benzo(k)fluoranthene	4.3	3.87E–07	0.00E+00	3.78E–08	5.40E–10		
Benzo(a)pyrene	11	9.90E–07	0.00E+00	9.67E–08	1.38E–09		6.10E+00
Dibenz(a,h)anthracene	2.3	2.07E–07	0.00E+00	2.02E–08	2.89E–10		
Indeno(1,2,3–cd)pyrene	5.1	4.59E–07	0.00E+00	4.48E–08	6.41E–10		
Carbazole	8.8	7.92E–07	0.00E+00	7.74E–08	1.11E–09		
3,3–Dichlorobenzidine	1.6	1.44E–07	0.00E+00	1.41E–08	2.01E–10		
Dibenzofuran	3	2.70E–07	0.00E+00	2.64E–08	3.77E–10		
Aldrin	0.011	9.90E–10	0.00E+00	9.67E–11	1.38E–12		1.51E+01
Dieldrin	0.02	1.80E–09	0.00E+00	1.76E–10	2.51E–12		1.61E+01
Heptachlor epoxide	0.012	1.08E–09	0.00E+00	1.06E–10	1.51E–12		9.10E+00
Aroclors	0.74	6.66E–08	0.00E+00	6.51E–09	9.29E–11		
~~Aluminum~~	~~9810~~	~~8.83E–04~~	~~0.00E+00~~	~~8.68E–05~~	~~1.23E–06~~		
Antimony	7.2	6.48E–07	0.00E+00	6.33E–08	9.04E–10		
Arsenic	11	9.90E–07	0.00E+00	9.67E–08	1.38E–09		1.51E+01
Barium	148	1.33E–05	0.00E+00	1.30E–06	1.86E–08	1.43E–04	
Beryllium	0.96	8.64E–08	0.00E+00	8.44E–09	1.21E–10		8.40E+00
Cadmium	1.8	1.62E–07	0.00E+00	1.58E–08	2.26E–10	5.71E–05	6.30E+00
Chromium	52.3	4.71E–06	0.00E+00	4.60E–07	6.57E–09		4.20E+01
~~Copper~~	~~1950~~	~~1.76E–04~~	~~0.00E+00~~	~~1.71E–05~~	~~2.45E–07~~		
~~Iron~~	~~23500~~	~~2.12E–03~~	~~0.00E+00~~	~~2.07E–04~~	~~2.95E–06~~		
Manganese	255	2.30E–05	0.00E+00	2.24E–06	3.20E–08	1.43E–05	
Mercury	11.2	1.01E–06	0.00E+00	9.85E–08	1.41E–09	8.57E–05	
Nickel	55.9	5.03E–06	0.00E+00	4.91E–07	7.02E–09		
Vanadium	31.3	2.82E–06	0.00E+00	2.75E–07	3.93E–09		
Zinc	2040	1.84E–04	0.00E+00	1.79E–05	2.56E–07		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker, CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	0.00E+00
Benzo(b)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	0.00E+00	8.43E−09
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3−cd)pyrene	0.00E+00	0.00E+00	0.00E+00
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3−Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	2.09E−11
Dieldrin	0.00E+00	0.00E+00	4.04E−11
Heptachlor epoxide	0.00E+00	0.00E+00	1.37E−11
Aroclors	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	2.09E−08
Barium	0.00E+00	9.10E−03	0.00E+00
Beryllium	0.00E+00	0.00E+00	1.01E−09
Cadmium	0.00E+00	2.77E−04	1.42E−09
Chromium	0.00E+00	0.00E+00	2.76E−07
~~Copper~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	0.00E+00	1.57E−01	0.00E+00
Mercury	0.00E+00	1.15E−03	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	**1.67E−01**	**3.08E−07**

000123

Revisions
08/20/96
JMS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	480	IR:	0
EF:	120	EF:	1
Fi:	1	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	2.25E–06	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	3.22E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	26	1	0.00E+00	5.86E−05	8.37E−07		7.30E−01
Benzo(b)fluoranthene	21	1	0.00E+00	4.73E−05	6.76E−07		7.30E−01
Benzo(k)fluoranthene	33	1	0.00E+00	7.44E−05	1.06E−06		7.30E−02
Benzo(a)pyrene	11	1	0.00E+00	2.48E−05	3.54E−07		7.30E+00
Dibenz(a,h)anthracene	2.3	1	0.00E+00	5.19E−06	7.41E−08		7.30E+00
Indeno(1,2,3−cd)pyrene	5.1	1	0.00E+00	1.15E−05	1.64E−07		7.30E−01
Carbazole	8.8	1	0.00E+00	1.98E−05	2.83E−07		2.00E−02
3,3'−Dichlorobenzidine	15	1	0.00E+00	3.38E−05	4.83E−07		4.50E−01
Dibenzofuran	42	1	0.00E+00	9.47E−05	1.35E−06	4.00E−03	
Aldrin	0.062	1	0.00E+00	1.40E−07	2.00E−09	3.00E−05	1.50E+01
Dieldrin	0.13	1	0.00E+00	2.93E−07	4.19E−09	5.00E−05	1.60E+01
Heptachlor epoxide	0.092	1	0.00E+00	2.07E−07	2.96E−09	1.30E−05	9.10E+00
Aroclors	5.8	1	0.00E+00	1.31E−05	1.87E−07	2.00E−05	~~7.70E+00~~ 2E+0 *
~~Aluminum~~	~~31200~~	~~1~~	~~0.00E+00~~	~~7.03E−02~~	~~1.00E−03~~	~~1.00E+00~~	
Antimony	42	1	0.00E+00	9.47E−05	1.35E−06	4.00E−04	
Arsenic	121	1	0.00E+00	2.73E−04	3.90E−06	3.00E−04	1.50E+00
Barium	716	1	0.00E+00	1.61E−03	2.31E−05	7.00E−02	
Beryllium	0.96	1	0.00E+00	2.16E−06	3.09E−08	5.00E−03	4.30E+00
Cadmium	20.7	1	0.00E+00	4.67E−05	6.67E−07	5.00E−04	
Chromium	298	1	0.00E+00	6.72E−04	9.60E−06	5.00E−03	
~~Copper~~	~~1950~~	~~1~~	~~0.00E+00~~	~~4.40E−03~~	~~6.28E−05~~	~~4.00E−02~~	
~~Iron~~	~~132000~~	~~1~~	~~0.00E+00~~	~~2.98E−01~~	~~4.25E−03~~	~~3.00E−01~~	
Manganese	771	1	0.00E+00	1.74E−03	2.48E−05	~~5.00E−03~~ 2.4E-2	
Mercury	11.2	1	0.00E+00	2.52E−05	3.61E−07	3.00E−04	
Nickel	55.9	1	0.00E+00	1.26E−04	1.80E−06	2.00E−02	
Vanadium	31.3	1	0.00E+00	7.06E−05	1.01E−06	7.00E−03	
Zinc	2040	1	0.00E+00	4.60E−03	6.57E−05	3.00E−01	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions
02/27/97
KMS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	6.11E-07
Benzo(b)fluoranthene	0.00E+00	0.00E+00	4.94E-07
Benzo(k)fluoranthene	0.00E+00	0.00E+00	7.76E-08
Benzo(a)pyrene	0.00E+00	0.00E+00	2.59E-06
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	5.41E-07
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	1.20E-07
Carbazole	0.00E+00	0.00E+00	5.67E-09
3,3'-Dichlorobenzidine	0.00E+00	0.00E+00	2.17E-07
Dibenzofuran	0.00E+00	2.37E-02	0.00E+00
Aldrin	0.00E+00	4.66E-03	3.00E-08
Dieldrin	0.00E+00	5.86E-03	6.70E-08
Heptachlor epoxide	0.00E+00	1.60E-02	2.70E-08
Aroclors	0.00E+00	6.54E-01	~~1.44E-06~~ 3.74E-7 *
~~Aluminum~~	~~0.00E+00~~	~~7.03E-02~~	~~0.00E+00~~
Antimony	0.00E+00	2.37E-01	0.00E+00
Arsenic	0.00E+00	9.09E-01	5.85E-06
Barium	0.00E+00	2.31E-02	0.00E+00
Beryllium	0.00E+00	4.33E-04	1.33E-07
Cadmium	0.00E+00	9.33E-02	0.00E+00
Chromium	0.00E+00	1.34E-01	0.00E+00
~~Copper~~	~~0.00E+00~~	~~1.10E-01~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~9.92E-01~~	~~0.00E+00~~
Manganese	0.00E+00	~~3.48E-01~~ 7.25E-2	0.00E+00
Mercury	0.00E+00	8.42E-02	0.00E+00
Nickel	0.00E+00	6.30E-03	0.00E+00
Vanadium	0.00E+00	1.01E-02	0.00E+00
Zinc	0.00E+00	1.53E-02	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~3.74E+00~~ 2.29E+0	~~1.22E-05~~ 1.11E-5

* Based on new PCB guidance (USEPA, September 1996).

Revisions
02/27/97
KMS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: *Site 8 – Goss Cove Landfill*
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		3800
AF = ADHERENCE FACTOR (MG/SQ CM):		1
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		120
ED1 = YOUTH EXPOSURE DURATION (YEARS):		1
ED2 = ADULT EXPOSURE DURATION (YEARS):		1
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		1
BW1 = BODY WEIGHT ADOLESCENT (KG):		1
BW2 = BODY WEIGHT ADULT (KG):		70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		365
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS)	CF1 =	0.00E+00	CANCER RISK = (CF3)*(C)*(ABS)	CF3 =	2.55E-07
DOSEadult = (CF2)*(C)*(ABS)	CF2 =	1.78E-05			

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)

Site 8 – Goss Cove Landfill

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	5.8	0.06	0.00E+00	6.21E–06	8.87E–08	2.00E–05	~~7.70E+00~~ 2E+0*
Cadmium	20.7	0.01	0.00E+00	3.69E–06	5.28E–08	~~1.50E–05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions 02/27/97

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	0.00E+00	3.11E-01	~~6.00E-07~~ 1.77E-7 *
Cadmium	0.00E+00	~~2.40E-01~~ 1.48E-1	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	~~5.57E-01~~ 4.59E-1	~~6.83E-07~~ 1.77E-7

* Based on new PCB guidance (USEPA, September 1996).

Revisions 02/27/97

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/24/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS:
IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS

EV:	1
ED:	1
EF:	120
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.78E+01

CONVERSION FACTOR (CARCIN) = 2.55E–01

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker, RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Acetone	0.24	O	4.80E-01	2.00E-01	5.70E-04	5.80E-05	1.15E-06
Benzene	0.011	O	6.30E-01	2.60E-01	1.10E-01	1.30E-02	1.02E-05
Bromodichloromethane	0.006	O	2.10E+00	8.70E-01	5.80E-03	1.20E-02	3.37E-07
Chloroform	0.012	O	1.10E+00	4.70E-01	8.90E-03	9.30E-03	9.49E-07
1,2-Dichloroethane	0.006	O	8.20E-01	3.40E-01	1.00E-02	7.20E-03	5.18E-07
Toluene	0.23	O	7.70E-01	3.20E-01	4.50E-02	5.40E-02	8.59E-05
Tetrachloroethene	4.7	O	4.30E+00	9.00E-01	4.80E-02	2.50E-01	2.01E-03
Trichloroethene	0.008	O	1.30E+00	5.50E+01	1.60E-02	2.60E-02	1.58E-05
4-Methylphenol	0.211	O	9.60E-01	4.00E-01	9.60E-03	8.30E-03	1.77E-05
2,4-Dimethylphenol	0.28	O	1.20E+00	4.90E-01	1.50E-02	2.00E-02	3.72E-05
Vinyl chloride	0.005	O	5.10E-01	2.10E-01	7.30E-03	2.30E-03	3.07E-07
Benzo(a)anthracene	0.013	O	1.00E+01	2.20E+00	8.10E-01	4.60E+01	1.22E-04
Benzo(b)fluoranthene	0.013	O	1.40E+01	3.00E+00	1.20E+00	1.30E+02	2.11E-04
Benzo(k)fluoranthene	0.013	O	1.40E+01	3.00E+00	1.20E+00	1.30E+02	2.11E-04
Benzo(a)pyrene	0.013	O	1.40E+01	2.90E+00	1.20E+00	1.30E+02	2.08E-04
Dibenz(a,h)anthracene	0.005	O	2.10E+01	4.40E+00	2.70E+00	6.90E+02	2.21E-04
Indeno(1,2,3-cd)pyrene	0.013	O	2.00E+01	4.20E+00	1.90E+00	3.80E+02	3.96E-04
Bis(2-ethylhexyl)phthalate	0.073	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	8.63E-05
Carbazole	0.012	O	3.80E+00	9.20E-01	3.90E-02	1.95E-01	4.28E-06
~~Aluminum~~	~~17.8~~	~~I~~			~~1.00E-03~~		~~1.42E-04~~
Antimony	0.054	I			1.00E-03		4.32E-07
Arsenic	0.0269	I			1.00E-03		2.15E-07
Barium	1.22	I			1.00E-03		9.76E-06
Beryllium	0.0014	I			1.00E-03		1.12E-08
Boron	2.44	I			1.00E-03		1.95E-05
Cadmium	0.0046	I			1.00E-03		3.68E-08
Chromium	0.074	I			2.00E-03		1.18E-06
~~Copper~~	~~1.28~~	~~I~~			~~1.00E-03~~		~~1.02E-05~~
~~Iron~~	~~58.9~~	~~I~~			~~1.00E-03~~		~~4.71E-04~~
Manganese	1.71	I			1.00E-03		1.37E-05
Mercury	0.0014	I			1.00E-03		1.12E-08
Nickel	0.047	I			1.00E-03		3.76E-07
Silver	0.0102	I			1.00E-03		8.16E-08
Thallium	0.0041	I			1.00E-03		3.28E-08
Vanadium	0.0457	I			1.00E-03		3.66E-07
Zinc	1.51	I			6.00E-04		7.25E-06
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

Revisions
08/20/96
KAS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Acetone	2.05E-05	1.00E-01	2.05E-04
Benzene	1.82E-04		0.00E+00
Bromodichloromethane	6.02E-06	2.00E-02	3.01E-04
Chloroform	1.69E-05	1.00E-02	1.69E-03
1,2-Dichloroethene	9.24E-06	9.00E-03	1.03E-03
Toluene	1.53E-03	2.00E-01	7.66E-03
Tetrachloroethene	3.59E-02	1.00E-02	3.59E+00
Trichloroethene	2.82E-04	6.00E-03	4.70E-02
4-Methylphenol	3.16E-04	5.00E-03	6.32E-02
2,4-Dimethylphenol	6.64E-04	2.00E-02	3.32E-02
Vinyl chloride	5.47E-06		0.00E+00
Benzo(a)anthracene	2.18E-03		0.00E+00
Benzo(b)fluoranthene	3.77E-03		0.00E+00
Benzo(k)fluoranthene	3.77E-03		0.00E+00
Benzo(a)pyrene	3.71E-03		0.00E+00
Dibenz(a,h)anthracene	3.95E-03		0.00E+00
Indeno(1,2,3-cd)pyrene	7.06E-03		0.00E+00
Bis(2-ethylhexyl)phthalate	1.54E-03	1.10E-02	1.40E-01
Carbazole	7.63E-05		0.00E+00
~~Aluminum~~	~~2.54E-03~~	~~5.00E-02~~	~~5.08E-02~~
Antimony	7.71E-06	4.00E-04	1.93E-02
Arsenic	3.84E-06	2.80E-04	1.37E-02
Barium	1.74E-04	3.50E-03	4.98E-02
Beryllium	2.00E-07	2.50E-04	8.00E-04
Boron	3.46E-04	4.50E-03	7.74E-02
Cadmium	6.57E-07	~~1.50E-05~~ 2.5E-5	~~4.38E-02~~ 2.63E-2
Chromium	2.11E-05	1.00E-04	2.11E-01
~~Copper~~	~~1.83E-04~~	~~2.20E-02~~	~~8.31E-03~~
~~Iron~~	~~7.70E-03~~	~~1.50E-02~~	~~5.13E-01~~
Manganese	2.44E-04	~~1.50E-04~~ 7.2E-4	~~1.63E+00~~ 3.40E-1
Mercury	2.00E-07	1.50E-05	1.33E-02
Nickel	6.71E-06	2.00E-03	3.36E-03
Silver	1.46E-06	2.40E-04	6.07E-03
Thallium	5.85E-07	4.00E-06	1.46E-01
Vanadium	6.52E-06	3.50E-04	1.86E-02
Zinc	1.29E-04	1.50E-01	8.62E-04
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~8.60E+00~~ 4.81E+0

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KMG

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Acetone	2.93E-07		0.00E+00
Benzene	2.60E-06	2.90E-02	7.54E-08
Bromodichloromethane	8.59E-08	6.20E-02	5.33E-09
Chloroform	2.42E-07	6.10E-03	1.48E-09
1,2-Dichloroethene	1.32E-07		0.00E+00
Toluene	2.19E-05		0.00E+00
Tetrachloroethene	5.13E-04	5.20E-02	2.67E-05
Trichloroethene	4.03E-06	1.10E-02	4.43E-08
4-Methylphenol	4.52E-06		0.00E+00
2,4-Dimethylphenol	9.49E-06		0.00E+00
Vinyl chloride	7.82E-08	1.90E+00	1.49E-07
Benzo(a)anthracene	3.11E-05		0.00E+00
Benzo(b)fluoranthene	5.39E-05		0.00E+00
Benzo(k)fluoranthene	5.39E-05		0.00E+00
Benzo(a)pyrene	5.30E-05		0.00E+00
Dibenz(a,h)anthracene	5.64E-05		0.00E+00
Indeno(1,2,3-cd)pyrene	1.01E-04		0.00E+00
Bis(2-ethylhexyl)phthalate	2.20E-05	2.50E-02	5.50E-07
Carbazole	1.09E-06	2.00E-02	2.18E-08
Aluminum	3.63E-05		0.00E+00
Antimony	1.10E-07		0.00E+00
Arsenic	5.49E-08	1.60E+00	8.78E-08
Barium	2.49E-06		0.00E+00
Beryllium	2.86E-09	8.60E+01	2.46E-07
Boron	4.98E-06		0.00E+00
Cadmium	9.38E-09		0.00E+00
Chromium	3.02E-07		0.00E+00
Copper	2.61E-06		0.00E+00
Iron	1.10E-04		0.00E+00
Manganese	3.49E-06		0.00E+00
Mercury	2.86E-09		0.00E+00
Nickel	9.59E-08		0.00E+00
Silver	2.08E-08		0.00E+00
Thallium	8.36E-09		0.00E+00
Vanadium	9.32E-08		0.00E+00
Zinc	1.85E-06		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			2.79E-05

Revisions
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RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INHALATION OF AMBIENT AIR ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, RME

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x ET x EF x ED)/(BW x AT)

WHERE:
C = MEAN CONCENTRATION IN AIR (MG/M3)
IR = INHALATION RATE (M3/HOUR)
ET = EXPOSURE TIME (HOURS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	3.9	IR:	0
EF:	120	EF:	1
ET:	8	ET:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 1.47E–01 (AVG ANNUAL DOSE)
CF: 2.09E–03 (LIFETIME DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE DOSES:

CHEMICAL	C (mg/kg)	C (MG/M3)	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	26	2.34E–06	0.00E+00	3.43E–07	4.90E–09		
Benzo(b)fluoranthene	21	1.89E–06	0.00E+00	2.77E–07	3.96E–09		
Benzo(k)fluoranthene	33	2.97E–06	0.00E+00	4.35E–07	6.22E–09		
Benzo(a)pyrene	11	9.90E–07	0.00E+00	1.45E–07	2.07E–09		6.10E+00
Dibenz(a,h)anthracene	2.3	2.07E–07	0.00E+00	3.03E–08	4.33E–10		
Indeno(1,2,3–cd)pyrene	5.1	4.59E–07	0.00E+00	6.73E–08	9.61E–10		
Carbazole	8.8	7.92E–07	0.00E+00	1.16E–07	1.66E–09		
3,3–Dichlorobenzidine	15	1.35E–06	0.00E+00	1.98E–07	2.83E–09		
Dibenzofuran	42	3.78E–06	0.00E+00	5.54E–07	7.91E–09		
Aldrin	0.062	5.58E–09	0.00E+00	8.18E–10	1.17E–11		1.51E+01
Dieldrin	0.13	1.17E–08	0.00E+00	1.71E–09	2.45E–11		1.61E+01
Heptachlor epoxide	0.092	8.28E–09	0.00E+00	1.21E–09	1.73E–11		9.10E+00
Aroclors	5.8	5.22E–07	0.00E+00	7.65E–08	1.09E–09		
~~Aluminum~~	~~31200~~	~~2.81E–03~~	~~0.00E+00~~	~~4.11E–04~~	~~5.88E–06~~		
Antimony	42	3.78E–06	0.00E+00	5.54E–07	7.91E–09		
Arsenic	121	1.09E–05	0.00E+00	1.60E–06	2.28E–08		1.51E+01
Barium	716	6.44E–05	0.00E+00	9.44E–06	1.35E–07	1.43E–04	
Beryllium	0.96	8.64E–08	0.00E+00	1.27E–08	1.81E–10		8.40E+00
Cadmium	20.7	1.86E–06	0.00E+00	2.73E–07	3.90E–09	5.71E–05	6.30E+00
Chromium	298	2.68E–05	0.00E+00	3.93E–06	5.61E–08		4.20E+01
~~Copper~~	~~1950~~	~~1.76E–04~~	~~0.00E+00~~	~~2.57E–05~~	~~3.67E–07~~		
~~Iron~~	~~132000~~	~~1.19E–02~~	~~0.00E+00~~	~~1.74E–03~~	~~2.49E–05~~		
Manganese	771	6.94E–05	0.00E+00	1.02E–05	1.45E–07	1.43E–05	
Mercury	11.2	1.01E–06	0.00E+00	1.48E–07	2.11E–09	8.57E–05	
Nickel	55.9	5.03E–06	0.00E+00	7.37E–07	1.05E–08		
Vanadium	31.3	2.82E–06	0.00E+00	4.13E–07	5.90E–09		
Zinc	2040	1.84E–04	0.00E+00	2.69E–05	3.84E–07		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
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RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Construction Worker, RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	0.00E+00
Benzo(b)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	0.00E+00	1.26E−08
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3−cd)pyrene	0.00E+00	0.00E+00	0.00E+00
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3−Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	1.76E−10
Dieldrin	0.00E+00	0.00E+00	3.94E−10
Heptachlor epoxide	0.00E+00	0.00E+00	1.58E−10
Aroclors	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	3.44E−07
Barium	0.00E+00	6.60E−02	0.00E+00
Beryllium	0.00E+00	0.00E+00	1.52E−09
Cadmium	0.00E+00	4.78E−03	2.46E−08
Chromium	0.00E+00	0.00E+00	2.36E−06
~~Copper~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	0.00E+00	7.11E−01	0.00E+00
Mercury	0.00E+00	1.72E−03	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	**7.84E−01**	**2.74E−06**

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RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 6 – Goss Cove Landfill
LOCATION: NSB-NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	50
EF:	1	EF:	52
Fi:	1	Fi:	0.5
ED:	1	ED:	3
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	1095

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	8.28E-08	(AVG ANNUAL DOSE)	CF:	3.55E-09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	11	1	9.11E–07	0.00E+00	3.90E–08		7.30E–01
Benzo(b)fluoranthene	8.8	1	7.29E–07	0.00E+00	3.12E–08		7.30E–01
Benzo(k)fluoranthene	6.9	1	5.72E–07	0.00E+00	2.45E–08		7.30E–02
Benzo(a)pyrene	6.9	1	5.72E–07	0.00E+00	2.45E–08		7.30E+00
Dibenz(a,h)anthracene	2	1	1.66E–07	0.00E+00	7.10E–09		7.30E+00
Indeno(1,2,3–cd)pyrene	4	1	3.31E–07	0.00E+00	1.42E–08		7.30E–01
Carbazole	0	1	0.00E+00	0.00E+00	0.00E+00		2.00E–02
3,3'–Dichlorobenzidine	0	1	0.00E+00	0.00E+00	0.00E+00		4.50E–01
Dibenzofuran	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–03	
Aldrin	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E–05	1.50E+01
Dieldrin	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–05	1.60E+01
Heptachlor epoxide	0	1	0.00E+00	0.00E+00	0.00E+00	1.30E–05	9.10E+00
Aroclors	0.31	1	2.57E–08	0.00E+00	1.10E–09	2.00E–05	~~7.70E+00~~ 1E+0*
~~Aluminum~~	~~8460~~	~~1~~	~~7.01E–04~~	~~0.00E+00~~	~~3.00E–05~~	~~1.00E+00~~	
Antimony	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–04	
Arsenic	3.9	1	3.23E–07	0.00E+00	1.38E–08	3.00E–04	1.50E+00
Barium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–02	
Beryllium	0.32	1	2.65E–08	0.00E+00	1.14E–09	5.00E–03	4.30E+00
Cadmium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–04	
Chromium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–03	
~~Copper~~	~~141~~	~~1~~	~~1.17E–05~~	~~0.00E+00~~	~~5.01E–07~~	~~4.00E–02~~	
~~Iron~~	~~12200~~	~~1~~	~~1.01E–03~~	~~0.00E+00~~	~~4.33E–05~~	~~3.00E–01~~	
Manganese	189	1	1.57E–05	0.00E+00	6.71E–07	~~5.00E–03~~ 2.4E-2	
Mercury	1.9	1	1.57E–07	0.00E+00	6.74E–09	3.00E–04	
Nickel	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E–02	
Vanadium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–03	
Zinc	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E–01	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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* Based on new PCB guidance (USEPA, September 1996).

Revisions
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RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	2.85E-08
Benzo(b)fluoranthene	0.00E+00	0.00E+00	2.28E-08
Benzo(k)fluoranthene	0.00E+00	0.00E+00	1.79E-09
Benzo(a)pyrene	0.00E+00	0.00E+00	1.79E-07
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	5.18E-08
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	1.04E-08
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3'-Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	0.00E+00
Dieldrin	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00
Aroclors	1.28E-03	0.00E+00	~~8.47E-09~~ 1.10E-9 *
~~Aluminum~~	~~7.91E-04~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	1.08E-03	0.00E+00	2.08E-08
Barium	0.00E+00	0.00E+00	0.00E+00
Beryllium	5.30E-06	0.00E+00	4.88E-09
Cadmium	0.00E+00	0.00E+00	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00
~~Copper~~	~~2.92E-04~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~3.37E-03~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	~~3.13E-03~~ 6.52E-4	0.00E+00	0.00E+00
Mercury	5.25E-04	0.00E+00	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	~~1.04E-02~~ 3.54E-3	**0.00E+00**	~~8.28E-07~~ 3.21E-7

* Based on new PCB guidance (USEPA, September 1996).

Revisions 02/27/97 KMS

RISK ASSESSMENT SPREADSHEET -- DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 8 -- Goss Cove Landfill
LOCATION: NSB--NLON, Groton, CT
DATE: 01/25/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Older CHild Trespasser (Surface Soil), CTE

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		3150
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		0
AF = ADHERENCE FACTOR (MG/SQ CM):		0.2
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		120
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		1
ED1 = YOUTH EXPOSURE DURATION (YEARS):		10
ED2 = ADULT EXPOSURE DURATION (YEARS):		1
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
BW1 = BODY WEIGHT ADOLESCENT (KG):		43
BW2 = BODY WEIGHT ADULT (KG):		1
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		3650
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		365
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 2.41E-06 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 3.44E-07
DOSEadult = (CF2)*(C)*(ABS) CF2 = 0.00E+00

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), CTE
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	0.31	0.06	4.48E–08	0.00E+00	6.40E–09	2.00E–05	~~7.70E+00~~ 1E+0*
Cadmium	0	0.01	0.00E+00	0.00E+00	0.00E+00	~~1.50E–05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

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RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 6 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	2.24E-03	0.00E+00	~~4.93E-08~~ 6.40E-9 *
Cadmium	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	2.24E-03	0.00E+00	~~4.93E-08~~ 6.40E-9

* Based on new PCB guidance (USEPA, September 1996).

Revisions
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KAB

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INHALATION OF AMBIENT AIR ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser, CTE

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x ET x EF x ED)/(BW x AT)

WHERE:
C = MEAN CONCENTRATION IN AIR (MG/M3)
IR = INHALATION RATE (M3/HOUR)
ET = EXPOSURE TIME (HOURS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	3.2
EF:	1	EF:	52
ET:	1	ET:	2
ED:	1	ED:	3
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	1095

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:		
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	2.12E–02	(AVG ANNUAL DOSE)
CF:	9.09E–04	(LIFETIME DOSE)			

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, CTE
CALCULATE DOSES:

CHEMICAL	C (mg/kg)	C (MG/M3)	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	11	1.98E–07	4.20E–09	0.00E+00	1.80E–10		
Benzo(b)fluoranthene	8.8	1.58E–07	3.36E–09	0.00E+00	1.44E–10		
Benzo(k)fluoranthene	6.9	1.24E–07	2.63E–09	0.00E+00	1.13E–10		
Benzo(a)pyrene	6.9	1.24E–07	2.63E–09	0.00E+00	1.13E–10		6.10E+00
Dibenz(a,h)anthracene	2	3.60E–08	7.63E–10	0.00E+00	3.27E–11		
Indeno(1,2,3–cd)pyrene	4	7.20E–08	1.53E–09	0.00E+00	6.54E–11		
Carbazole	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
3,3–Dichlorobenzidine	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Dibenzofuran	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Aldrin	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1.51E+01
Dieldrin	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1.61E+01
Heptachlor epoxide	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		9.10E+00
Aroclors	0.31	5.58E–09	1.18E–10	0.00E+00	5.07E–12		
~~Aluminum~~	~~8469~~	~~1.52E–04~~	~~3.23E–06~~	~~0.00E+00~~	~~1.38E–07~~		
Antimony	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Arsenic	3.9	7.02E–08	1.49E–09	0.00E+00	6.38E–11		1.51E+01
Barium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E–04	
Beryllium	0.32	5.76E–09	1.22E–10	0.00E+00	5.23E–12		8.40E+00
Cadmium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.71E–05	6.30E+00
Chromium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		4.20E+01
~~Copper~~	~~141~~	~~3.54E–06~~	~~5.38E–08~~	~~0.00E+00~~	~~2.31E–09~~		
~~Iron~~	~~12200~~	~~2.20E–04~~	~~4.66E–06~~	~~0.00E+00~~	~~2.00E–07~~		
Manganese	189	3.40E–06	7.21E–08	0.00E+00	3.09E–09	1.43E–05	
Mercury	1.9	3.42E–08	7.25E–10	0.00E+00	3.11E–11	8.57E–05	
Nickel	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Vanadium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Zinc	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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KMS

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	0.00E+00
Benzo(b)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	0.00E+00	6.88E−10
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3−cd)pyrene	0.00E+00	0.00E+00	0.00E+00
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3−Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	0.00E+00
Dieldrin	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00
Aroclors	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	9.63E−10
Barium	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	4.40E−11
Cadmium	0.00E+00	0.00E+00	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00
~~Copper~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	5.04E−03	0.00E+00	0.00E+00
Mercury	8.46E−06	0.00E+00	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**5.05E−03**	**0.00E+00**	**1.70E−09**

Revisions
08/20/96
KMS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	100
EF:	1	EF:	120
Fi:	1	Fi:	1
ED:	1	ED:	10
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	3650

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	7.65E–07	(AVG ANNUAL DOSE)	CF:	1.09E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	55	1	4.21E–05	0.00E+00	6.01E–06		7.30E–01
Benzo(b)fluoranthene	40	1	3.06E–05	0.00E+00	4.37E–06		7.30E–01
Benzo(k)fluoranthene	33	1	2.52E–05	0.00E+00	3.60E–06		7.30E–02
Benzo(a)pyrene	44	1	3.36E–05	0.00E+00	4.81E–06		7.30E+00
Dibenz(a,h)anthracene	10	1	7.65E–06	0.00E+00	1.09E–06		7.30E+00
Indeno(1,2,3–cd)pyrene	25	1	1.91E–05	0.00E+00	2.73E–06		7.30E–01
Carbazole	0	1	0.00E+00	0.00E+00	0.00E+00		2.00E–02
3,3'–Dichlorobenzidine	0	1	0.00E+00	0.00E+00	0.00E+00		4.50E–01
Dibenzofuran	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–03	
Aldrin	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E–05	1.50E+01
Dieldrin	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–05	1.60E+01
Heptachlor epoxide	0	1	0.00E+00	0.00E+00	0.00E+00	1.30E–05	9.10E+00
Aroclors	0.35	1	2.68E–07	0.00E+00	3.82E–08	2.00E–05	~~7.70E+00~~ 2E+0*
~~Aluminum~~	~~11200~~	~~1~~	~~8.56E–03~~	~~0.00E+00~~	~~1.22E–03~~	~~1.00E+00~~	
Antimony	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–04	
Arsenic	9	1	6.88E–06	0.00E+00	9.83E–07	3.00E–04	1.50E+00
Barium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–02	
Beryllium	0.73	1	5.58E–07	0.00E+00	7.97E–08	5.00E–03	4.30E+00
Cadmium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–04	
Chromium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–03	
~~Copper~~	~~330~~	~~1~~	~~2.52E–04~~	~~0.00E+00~~	~~3.60E–05~~	~~4.00E–02~~	
~~Iron~~	~~16100~~	~~1~~	~~1.23E–02~~	~~0.00E+00~~	~~1.76E–03~~	~~3.00E–01~~	
Manganese	262	1	2.00E–04	0.00E+00	2.86E–05	~~5.00E–03~~ 2.4E-2	
Mercury	12.1	1	9.25E–06	0.00E+00	1.32E–06	3.00E–04	
Nickel	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E–02	
Vanadium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–03	
Zinc	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E–01	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

*Based on new PCB guidance (USEPA, September 1996).

Revisions
02/27/97
KM

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	4.39E-06
Benzo(b)fluoranthene	0.00E+00	0.00E+00	3.19E-06
Benzo(k)fluoranthene	0.00E+00	0.00E+00	2.63E-07
Benzo(a)pyrene	0.00E+00	0.00E+00	3.51E-05
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	7.97E-06
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	1.99E-06
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3'-Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	0.00E+00
Dieldrin	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00
Aroclors	1.34E-02	0.00E+00	~~2.94E-07~~ 7.64E-8 *
~~Aluminum~~	~~8.56E-03~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	2.29E-02	0.00E+00	1.47E-06
Barium	0.00E+00	0.00E+00	0.00E+00
Beryllium	1.12E-04	0.00E+00	3.43E-07
Cadmium	0.00E+00	0.00E+00	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00
~~Copper~~	~~6.31E-03~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~4.10E-02~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	~~4.01E-02~~ 8.35E-3	0.00E+00	0.00E+00
Mercury	3.08E-02	0.00E+00	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	~~1.63E-01~~ 7.56E-2	0.00E+00	~~5.60E-05~~ 5.48E-5

*Based on new PCB guidance (USEPA, September 1996).

Revisions
02/27/97
KAB

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), RME

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		3150
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		0
AF = ADHERENCE FACTOR (MG/SQ CM):		1
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		52
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		1
ED1 = YOUTH EXPOSURE DURATION (YEARS):		3
ED2 = ADULT EXPOSURE DURATION (YEARS):		1
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		1
BW1 = BODY WEIGHT ADOLESCENT (KG):		43
BW2 = BODY WEIGHT ADULT (KG):		1
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		1095
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		365
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 1.04E–05 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 4.47E–07
DOSEadult = (CF2)*(C)*(ABS) CF2 = 0.00E+00

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older CHild Trespasser (Surface Soil), RME
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aroclors	0.35	0.06	2.19E–07	0.00E+00	9.39E–09	2.00E–05	~~7.70E+00~~ 2E+0 *
Cadmium	0	0.01	0.00E+00	0.00E+00	0.00E+00	~~1.50E–05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions
02/27/97
KAS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	1.10E-02	0.00E+00	~~7.23E-08~~ 1.88E-8 *
Cadmium	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	1.10E-02	0.00E+00	~~7.23E-08~~ 1.88E-8

*Based on new PCB guidance (USEPA, September 1996).

Revisions
02/27/97
KMS

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INHALATION OF AMBIENT AIR ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser, RME

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x ET x EF x ED)/(BW x AT)

WHERE:
C = MEAN CONCENTRATION IN AIR (MG/M3)
IR = INHALATION RATE (M3/HOUR)
ET = EXPOSURE TIME (HOURS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	3.2
EF:	1	EF:	120
ET:	1	ET:	4
ED:	1	ED:	10
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	3650

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:		
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	9.79E–02	(AVG ANNUAL DOSE)
CF:	1.40E–02	(LIFETIME DOSE)			

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, RME
CALCULATE DOSES:

CHEMICAL	C (mg/kg)	C (MG/M3)	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	55	9.90E–07	9.69E–08	0.00E+00	1.38E–08		
Benzo(b)fluoranthene	40	7.20E–07	7.05E–08	0.00E+00	1.01E–08		
Benzo(k)fluoranthene	33	5.94E–07	5.81E–08	0.00E+00	8.30E–09		
Benzo(a)pyrene	44	7.92E–07	7.75E–08	0.00E+00	1.11E–08		6.10E+00
Dibenz(a,h)anthracene	10	1.80E–07	1.76E–08	0.00E+00	2.52E–09		
Indeno(1,2,3–cd)pyrene	25	4.50E–07	4.40E–08	0.00E+00	6.29E–09		
Carbazole	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
3,3–Dichlorobenzidine	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Dibenzofuran	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Aldrin	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1.51E+01
Dieldrin	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1.61E+01
Heptachlor epoxide	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		9.10E+00
Aroclors	0.35	6.30E–09	6.17E–10	0.00E+00	8.81E–11		
~~Aluminum~~	~~11200~~	~~2.02E–04~~	~~1.97E–05~~	~~0.00E+00~~	~~2.82E–06~~		
Antimony	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Arsenic	9	1.62E–07	1.59E–08	0.00E+00	2.26E–09		1.51E+01
Barium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E–04	
Beryllium	0.73	1.31E–08	1.29E–09	0.00E+00	1.84E–10		8.40E+00
Cadmium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.71E–05	6.30E+00
Chromium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		4.20E+01
~~Copper~~	~~330~~	~~5.94E–06~~	~~5.81E–07~~	~~0.00E+00~~	~~8.30E–08~~		
~~Iron~~	~~16100~~	~~2.00E–04~~	~~2.84E–05~~	~~0.00E+00~~	~~4.05E–06~~		
Manganese	262	4.72E–06	4.62E–07	0.00E+00	6.59E–08	1.43E–05	
Mercury	12.1	2.18E–07	2.13E–08	0.00E+00	3.05E–09	8.57E–05	
Nickel	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Vanadium	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
Zinc	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/20/96
KMS

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR /DUST (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	0.00E+00
Benzo(b)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	0.00E+00	6.75E-08
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3-Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	0.00E+00
Dieldrin	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00
Aroclors	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	3.42E-08
Barium	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	1.54E-09
Cadmium	0.00E+00	0.00E+00	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00
~~Copper~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	3.23E-02	0.00E+00	0.00E+00
Mercury	2.49E-04	0.00E+00	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**3.25E-02**	**0.00E+00**	**1.03E-07**

Revisions
08/20/96
KMO

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site B – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (Surface Soil), CTE

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	100
EDc:	2
BWc:	15
IRa:	50
EDa:	7
BWa:	70
IFadj:	18.33333
Fi:	0.5
EF:	150
AT(NONC):	3285
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 4.2E–07 CARCIN = 5.4E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site – Goss Cove Landfill
EXPOSURE SCENARIO: Future Resident (Adult/Child) (Surface Soil), CTE

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Benzo(a)anthracene	26	1	1.09E−05	1.40E−06		7.30E−01	0.00E+00	1.02E−06
Benzo(b)fluoranthene	21	1	8.79E−06	1.13E−06		7.30E−01	0.00E+00	8.25E−07
Benzo(k)fluoranthene	4.3	1	1.80E−06	2.31E−07		7.30E−02	0.00E+00	1.69E−08
Benzo(a)pyrene	11	1	4.60E−06	5.92E−07		7.30E+00	0.00E+00	4.32E−06
Dibenz(a,h)anthracene	2.3	1	9.63E−07	1.24E−07		7.30E+00	0.00E+00	9.04E−07
Indeno(1,2,3−cd)pyren	5.1	1	2.13E−06	2.74E−07		7.30E−01	0.00E+00	2.00E−07
Carbazole	8.8	1	3.68E−06	4.74E−07		2.00E−02	0.00E+00	9.47E−09
3,3'−Dichlorobenzidine	1.6	1	6.70E−07	8.61E−08		4.50E−01	0.00E+00	3.87E−08
Dibenzofuran	3	1	1.26E−06	1.61E−07	4.00E−03		3.14E−04	0.00E+00
Aldrin	0.011	1	4.60E−09	5.92E−10	3.00E−05	1.50E+01	1.53E−04	8.88E−09
Dieldrin	0.02	1	8.37E−09	1.08E−09	5.00E−05	1.60E+01	1.67E−04	1.72E−08
heptachlor epoxide	0.012	1	5.02E−09	6.46E−10	1.30E−05	9.10E+00	3.86E−04	5.88E−09
Aroclors	0.74	1	3.10E−07	3.98E−08	2.00E−05	7.70E+00	1.55E−02	~~5.07E−07~~ 3.98E-8 *
~~Aluminum~~	~~9810~~	~~1~~	~~4.11E−03~~	~~5.28E−04~~	~~1.00E+00~~		~~4.11E−03~~	~~0.00E+00~~
Antimony	7.2	1	3.01E−06	3.87E−07	4.00E−04		7.53E−03	0.00E+00
Arsenic	11	1	4.60E−06	5.92E−07	3.00E−04	1.50E+00	1.53E−02	8.88E−07
Barium	148	1	6.19E−05	7.96E−06	7.00E−02		8.85E−04	0.00E+00
Beryllium	0.96	1	4.02E−07	5.17E−08	5.00E−03	4.30E+00	8.04E−05	2.22E−07
Cadmium	1.8	1	7.53E−07	9.69E−08	5.00E−04		1.51E−03	0.00E+00
Chromium	52.3	1	2.19E−05	2.81E−06	5.00E−03		4.38E−03	0.00E+00
~~Copper~~	~~1950~~	~~1~~	~~8.16E−04~~	~~1.05E−04~~	~~4.00E−02~~		~~2.04E−02~~	~~0.00E+00~~
~~Iron~~	~~23500~~	~~1~~	~~9.84E−03~~	~~1.26E−03~~	~~3.00E−01~~		~~3.28E−02~~	~~0.00E+00~~
Manganese	255	1	1.07E−04	1.37E−05	~~5.00E−03~~ 8.4E-2		~~2.13E−02~~ 4.44E-3	0.00E+00
Mercury	11.2	1	4.69E−06	6.03E−07	3.00E−04		1.56E−02	0.00E+00
Nickel	55.9	1	2.34E−05	3.01E−06	2.00E−02		1.17E−03	0.00E+00
Vanadium	31.3	1	1.31E−05	1.68E−06	7.00E−03		1.87E−03	0.00E+00
Zinc	2040	1	8.54E−04	1.10E−04	3.00E−01		2.85E−03	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~1.46E−01~~ 7.21E-2	~~8.79E−06~~ 8.52E-6

*Based on new PCB guidance (USEPA, September 1996).

Revisions 02/ '97 K

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: SNB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR DERMAL CONTACT WITH SOIL ARE CALCULATED BY THE FOLLOWING SPREADSHEETS USING AGE–ADJUSTED EXPOSURE FACTORS. ASUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

RELEVANT EQUATION: DEX = (C x SAadj x AF x ABS x EF x Fd)/(AT x CF) SAadj = (SAc x EDc)/BWc + (SAa x EDa)/BWa

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SAc = CHILD SKIN SURFACE AREA (CM**2/DAY):		2094
SAa = ADULT SKIN SURFACE AREA (CM**2/DAY):		3800
EDc = CHILD EXPOSURE DURATION (YEARS):		2
EDa = ADULT EXPOSURE DURATION (YEARS):		7
BWc = CHILD BODY WEIGHT (KG):		15
BWa = ADULT BODY WEIGHT (KG):		70
SAadj = AGE–ADJUSTED SKIN SURFACE AREA FACTOR (CM**2 YR/DAY KG)		659.2
AF = ADHERENCE FACTOR (MG/CM**2):		0.2
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF = EXPOSURE FREQUENCY (DAYS/YEAR):		150
Fd = FRACTION OF SOIL FROM CONTAMINATED SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
AT = AVERAGING TIME (DAYS), NONCARCINOGENS:		3285
AVERAGING TIME (DAYS), CARCINOGENS:		25550
CF = CONVERSION FACTOR (UNITLESS)		1.00E+06

DETERMINE CONVERSION FACTORS:

NONCARCIN = 3.01E–06 CARCIN = 3.87E–07

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Aroclors	0.74	0.06	1.34E−07	1.72E−08	2.00E−05	~~7.7~~ 1E+0*	6.68E−03	~~1.32E−07~~ 1.72E-8 *
Cadmium	1.8	0.01	5.42E−08	6.97E−09	~~1.50E−05~~ 2.5E-5		~~3.61E−03~~ 2.17E-3	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~1.03E−02~~ 8.85E-3	~~1.32E−07~~ 1.72E-8

* Based on new PCB guidance (USEPA, September 1996).

Revisions 02/27/97 KHE

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
TWO EXPOSURE ROUTES ARE CONSIDERED: INCIDENTAL INGESTION AND DERMAL CONTACT.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser, CTE

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

INGESTION: IEX = (C x CR x ET x EF x ED)/(BW x AT)

WHERE:
C = SURFACE WATER CONCENTRATION (MG/L)
CR = CONTACT RATE (L/HR)
ET = EXPOSURE TIME (HRS/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1000 CM**3/L)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

INGESTION:

CR:	0.05	CONVERSION FACTOR (NONCAR) =	3.31E–04
ET:	2		
EF:	52		
ED:	3	CONVERSION FACTOR (CARCIN) =	1.42E–05
BW:	43		
AT(NOCN):	1095		
AT(CAR):	25550		

DERMAL CONTACT:

EV:	1	CONVERSION FACTOR (NONCAR) =	1.04E+01
ED:	3		
EF:	52		
A:	3150	CONVERSION FACTOR (CARCIN) =	4.47E–01
tevent:	2		
BW:	43		
AT(NON):	1095		
AT(CAR):	25550		

RISK ASSESSMENT SPREADSHEET -- SURFACE WATER EXPOSURES (PAGE TWO)
Site 8 -- Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Trichloroethene	0.003	O	1.30E+00	5.50E-01	1.60E-02	2.60E-02	1.49E-07
Bis(2-ethylhexyl)phthalate	0.003	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	1.77E-06
Heptachlor	0.000029	O	9.40E+01	1.70E+01	1.10E-02	1.90E+00	5.14E-09
Boron	1.77	I			1.00E-03		3.54E-06
~~Manganese~~	~~0.0284~~	~~I~~			~~1.00E-03~~		~~5.68E-06~~
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

Revisions
08/20/96
KMS

0001170

RISK ASSESSMENT SPREADSHEET -- SURFACE WATER EXPOSURES (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL INGESTION DOSE (MG/KG/DAY)	ANNUAL DERMAL DOSE (MG/KG/DAY)	INGESTION RfD (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX INGESTION	HAZARD INDEX DERMAL	TOTAL HAZARD INDEX
Trichloroethene	9.94E-07	1.56E-06	6.00E-03	6.00E-03	1.66E-04	2.59E-04	4.25E-04
Bis(2-ethylhexyl)phthalate	9.94E-07	1.85E-05	2.00E-02	1.10E-02	4.97E-05	1.68E-03	1.73E-03
Heptachlor	9.61E-09	5.37E-08	5.00E-04	5.00E-04	1.92E-05	1.07E-04	1.27E-04
Boron	5.86E-04	3.69E-05	9.00E-02	4.50E-03	6.52E-03	8.21E-03	1.47E-02
~~Manganese~~	~~6.44E-08~~	~~5.98E-07~~	~~5.00E-03~~	~~1.50E-04~~	~~1.88E-03~~	~~8.95E-03~~	~~5.83E-03~~
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					~~8.83E-03~~ 6.75E-3	~~1.42E-02~~ 1.03E-2	~~2.26E-02~~ 1.70E-2

Revisions
08/20/96
KMS

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE FOUR)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE INGESTION DOSE (MG/KG/DAY)	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF INGESTION (KG/DAY/MG)	CSF DERMAL (KG/DAY/MG)	CANCER RISK INGESTION	CANCER RISK DERMAL CONTACT	TOTAL CANCER RISK
Trichloroethene	4.26E-08	6.67E-08	1.10E-02	1.10E-02	4.69E-10	7.33E-10	1.20E-09
Bis(2-ethylhexyl)phthalate	4.26E-08	7.93E-07	1.40E-02	2.50E-02	5.96E-10	1.98E-08	2.04E-08
Heptachlor	4.12E-10	2.30E-09	4.50E+00	4.50E+00	1.85E-09	1.03E-08	1.22E-08
Boron	2.51E-05	1.58E-06			0.00E+00	0.00E+00	0.00E+00
~~Manganese~~	~~4.03E-07~~	~~2.54E-08~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					2.92E-09	3.09E-08	3.38E-08

Revisions
08/20/96
KN

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF ~~soil~~ SEDIMENT

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB-NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser, CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN ~~SOIL~~ SEDIMENT SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	50
EF:	1	EF:	52
Fi:	1	Fi:	0.5
ED:	1	ED:	3
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	1095

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	8.28E-08	(AVG ANNUAL DOSE)	CF:	3.55E-09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF ~~SOIL~~ SEDIMENT (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG-DAY/MG)
Benzo(a)anthracene	1.6	1	1.33E-07	0.00E+00	5.68E-09		7.30E-01
Benzo(b)fluoranthene	1.7	1	1.41E-07	0.00E+00	6.03E-09		7.30E-01
Benzo(k)fluoranthene	0	1	0.00E+00	0.00E+00	0.00E+00		7.30E-02
Benzo(a)pyrene	2.1	1	1.74E-07	0.00E+00	7.45E-09		7.30E+00
Dibenz(a,h)anthracene	0.56	1	4.64E-08	0.00E+00	1.99E-09		7.30E+00
Indeno(1,2,3-cd)pyrene	1.3	1	1.08E-07	0.00E+00	4.61E-09		7.30E-01
Carbazole	0	1	0.00E+00	0.00E+00	0.00E+00		2.00E-02
3,3'-Dichlorobenzidine	0	1	0.00E+00	0.00E+00	0.00E+00		4.50E-01
Dibenzofuran	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E-03	
Aldrin	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E-05	1.50E+01
Dieldrin	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E-05	1.60E+01
Heptachlor epoxide	0	1	0.00E+00	0.00E+00	0.00E+00	1.30E-05	9.10E+00
Aroclors	1.3	1	1.08E-07	0.00E+00	4.61E-09	2.00E-05	~~7.70E+00~~ 1E+0*
~~Aluminum~~	~~10400~~	~~1~~	~~8.61E-04~~	~~0.00E+00~~	~~3.69E-05~~	~~1.00E+00~~	
Antimony	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E-04	
Arsenic	44.4	1	3.68E-06	0.00E+00	1.58E-07	3.00E-04	1.50E+00
Barium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E-02	
Beryllium	0.42	1	3.48E-08	0.00E+00	1.49E-09	5.00E-03	4.30E+00
Cadmium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E-04	
Chromium	32.7	1	2.71E-06	0.00E+00	1.16E-07	5.00E-03	
~~Copper~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~4.00E-02~~	
~~Iron~~	~~14700~~	~~1~~	~~1.22E-03~~	~~0.00E+00~~	~~5.22E-05~~	~~3.00E-01~~	
Manganese	212	1	1.76E-05	0.00E+00	7.53E-07	~~5.00E-03~~ 2.4E-2	
Mercury	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E-04	
Nickel	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E-02	
Thallium	1.2	1	9.94E-08	0.00E+00	4.26E-09	8.00E-05	
Zinc	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E-01	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
02/27/97
KMS

* Based on new PCB guidance (USEPA, September 1996).

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF ~~SOIL~~ SEDIMENT (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	4.15E−09
Benzo(b)fluoranthene	0.00E+00	0.00E+00	4.41E−09
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	0.00E+00	5.44E−08
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	1.45E−08
Indeno(1,2,3−cd)pyrene	0.00E+00	0.00E+00	3.37E−09
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3'−Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	0.00E+00
Dieldrin	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00
Aroclors	5.38E−03	0.00E+00	~~3.55E−08~~ 4.61E-9 *
~~Aluminum~~	~~8.61E−04~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	1.23E−02	0.00E+00	2.36E−07
Barium	0.00E+00	0.00E+00	0.00E+00
Beryllium	6.96E−06	0.00E+00	6.41E−09
Cadmium	0.00E+00	0.00E+00	0.00E+00
Chromium	5.42E−04	0.00E+00	0.00E+00
~~Copper~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~4.06E−03~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	~~8.51E−03~~ 7.31E-4	0.00E+00	0.00E+00
Mercury	0.00E+00	0.00E+00	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Thallium	1.24E−03	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	~~2.70E−02~~ 2.02E-2	0.00E+00	~~3.59E−07~~ 3.28E-7

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* Based on new PCB guidance (USEPA, September 1996).

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SEDIMENT

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Older Child Trespasser, CTE

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SEDIMENT (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		3150
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		0
AF = ADHERENCE FACTOR (MG/SQ CM):		0.2
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		52
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		1
ED1 = YOUTH EXPOSURE DURATION (YEARS):		3
ED2 = ADULT EXPOSURE DURATION (YEARS):		1
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
BW1 = BODY WEIGHT ADOLESCENT (KG):		43
BW2 = BODY WEIGHT ADULT (KG):		1
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		1095
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		365
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 1.04E–06 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 4.47E–08
DOSEadult = (CF2)*(C)*(ABS) CF2 = 0.00E+00

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH ~~SOIL~~ SEDIMENT (PAGE TWO)
Site 8 – Goss Cove Landfill

EXPOSURE SCENARIO: Older Child Trespasser, CTE
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG-DAY/MG)
Aroclors	1.3	0.06	8.14E-08	0.00E+00	3.49E-09	2.00E-05	~~7.70E+00~~ 1E+0*
Cadmium	0	0.01	0.00E+00	0.00E+00	0.00E+00	~~1.50E-05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

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RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH ~~SOIL~~ SEDIMENT (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	4.07E-03	0.00E+00	~~2.69E-08~~ 3.49E-9 *
Cadmium	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	4.07E-03	0.00E+00	~~2.69E-08~~ 3.49E-9

* Based on new guidance (USEPA September 1996).

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RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INHALATION OF AMBIENT AIR ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child). CTE

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x ET x EF x ED)/(BW x AT)

WHERE:
C = MEAN CONCENTRATION IN AIR (MG/M3)
IR = INHALATION RATE (M3/HOUR)
ET = EXPOSURE TIME (HOURS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0.833	IR:	0
EF:	234	EF:	1
ET:	24	ET:	1
ED:	9	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	3285	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 1.83E–01 (AVG ANNUAL DOSE)
CF: 2.35E–02 (LIFETIME DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Future Resident (Adult/Child), CTE
CALCULATE DOSES:

CHEMICAL	C (mg/kg)	C (MG/M3)	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	26	4.68E–07	0.00E+00	8.57E–08	1.10E–08		
Benzo(b)fluoranthene	21	3.78E–07	0.00E+00	6.92E–08	8.90E–09		
Benzo(k)fluoranthene	4.3	7.74E–08	0.00E+00	1.42E–08	1.82E–09		
Benzo(a)pyrene	11	1.98E–07	0.00E+00	3.63E–08	4.66E–09		6.10E+00
Dibenz(a,h)anthracene	2.3	4.14E–08	0.00E+00	7.58E–09	9.75E–10		
Indeno(1,2,3–cd)pyrene	5.1	9.18E–08	0.00E+00	1.68E–08	2.16E–09		
Carbazole	8.8	1.58E–07	0.00E+00	2.90E–08	3.73E–09		
3,3–Dichlorobenzidine	1.6	2.88E–08	0.00E+00	5.27E–09	6.78E–10		
Dibenzofuran	3	5.40E–08	0.00E+00	9.89E–09	1.27E–09		
Aldrin	0.011	1.98E–10	0.00E+00	3.63E–11	4.66E–12		1.51E+01
Dieldrin	0.02	3.60E–10	0.00E+00	6.59E–11	8.47E–12		1.61E+01
Heptachlor epoxide	0.012	2.16E–10	0.00E+00	3.95E–11	5.08E–12		9.10E+00
Aroclors	0.74	1.33E–08	0.00E+00	2.44E–09	3.14E–10		
~~Aluminum~~	~~9810~~	~~1.77E–04~~	~~0.00E+00~~	~~3.23E–05~~	~~4.16E–06~~		
Antimony	7.2	1.30E–07	0.00E+00	2.37E–08	3.05E–09		
Arsenic	11	1.98E–07	0.00E+00	3.63E–08	4.66E–09		1.51E+01
Barium	148	2.66E–06	0.00E+00	4.88E–07	6.27E–08	1.43E–04	
Beryllium	0.96	1.73E–08	0.00E+00	3.16E–09	4.07E–10		8.40E+00
Cadmium	1.8	3.24E–08	0.00E+00	5.93E–09	7.63E–10	5.71E–05	6.30E+00
Chromium	52.3	9.41E–07	0.00E+00	1.72E–07	2.22E–08		4.20E+01
~~Copper~~	~~1950~~	~~3.51E–05~~	~~0.00E+00~~	~~6.43E–06~~	~~8.26E–07~~		
~~Iron~~	~~23500~~	~~4.23E–04~~	~~0.00E+00~~	~~7.75E–05~~	~~9.96E–06~~		
Manganese	255	4.59E–06	0.00E+00	8.40E–07	1.08E–07	1.43E–05	
Mercury	11.2	2.02E–07	0.00E+00	3.69E–08	4.75E–09	8.57E–05	
Nickel	55.9	1.01E–06	0.00E+00	1.84E–07	2.37E–08		
Vanadium	31.3	5.63E–07	0.00E+00	1.03E–07	1.33E–08		
Zinc	2040	3.67E–05	0.00E+00	6.72E–06	8.64E–07		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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RISK ASSESSMENT SPREADSHEET -- INHALATION OF OUTDOOR AIR/DUST (PAGE THREE)
Site 8 -- Goss Cove Landfill
EXPOSURE SCENARIO: Future Resident (Adult/Child), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	0.00E+00
Benzo(b)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	0.00E+00	2.84E-08
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3-Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	7.04E-11
Dieldrin	0.00E+00	0.00E+00	1.36E-10
Heptachlor epoxide	0.00E+00	0.00E+00	4.63E-11
Aroclors	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	7.04E-08
Barium	0.00E+00	3.41E-03	0.00E+00
Beryllium	0.00E+00	0.00E+00	3.42E-09
Cadmium	0.00E+00	1.04E-04	4.81E-09
Chromium	0.00E+00	0.00E+00	9.31E-07
~~Copper~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	0.00E+00	5.88E-02	0.00E+00
Mercury	0.00E+00	4.31E-04	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	**6.27E-02**	**1.04E-06**

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RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 6 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (Surface Soil), RME

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	200
EDc:	6
BWc:	15
IRa:	100
EDa:	24
BWa:	70
IFadj:	114.2857
Fi:	1
EF:	150
AT(NONC):	10950
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 1.6E–06 CARCIN = 6.7E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site – Goss Cove Landfill
EXPOSURE SCENARIO: Future Resident (Adult/Child) (Surface Soil), RME

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Benzo(a)anthracene	26	1	4.07E−05	1.74E−05		7.30E−01	0.00E+00	1.27E−05
Benzo(b)fluoranthene	21	1	3.29E−05	1.41E−05		7.30E−01	0.00E+00	1.03E−05
Benzo(k)fluoranthene	33	1	5.17E−05	2.21E−05		7.30E−02	0.00E+00	1.62E−06
Benzo(a)pyrene	11	1	1.72E−05	7.38E−06		7.30E+00	0.00E+00	5.39E−05
Dibenz(a,h)anthracene	2.3	1	3.60E−06	1.54E−06		7.30E+00	0.00E+00	1.13E−05
Indeno(1,2,3−cd)pyren	5.1	1	7.98E−06	3.42E−06		7.30E−01	0.00E+00	2.50E−06
Carbazole	8.8	1	1.38E−05	5.90E−06		2.00E−02	0.00E+00	1.18E−07
3,3'−Dichlorobenzidine	15	1	2.35E−05	1.01E−05		4.50E−01	0.00E+00	4.53E−06
Dibenzofuran	42	1	6.58E−05	2.82E−05	4.00E−03		1.64E−02	0.00E+00
Aldrin	0.062	1	9.71E−08	4.16E−08	3.00E−05	1.50E+01	3.24E−03	6.24E−07
Dieldrin	0.13	1	2.04E−07	8.72E−08	5.00E−05	1.60E+01	4.07E−03	1.40E−06
heptachlor epoxide	0.092	1	1.44E−07	6.17E−08	1.30E−05	9.10E+00	1.11E−02	5.62E−07
Aroclors	5.8	1	9.08E−06	3.89E−06	2.00E−05	~~7.70E+00~~ 2E+0*	4.54E−01	~~3.00E−05~~ 7.79E−6*
~~Aluminum~~	~~31200~~	~~1~~	~~4.88E−02~~	~~2.09E−02~~	~~1.00E+00~~		~~4.88E−02~~	~~0.00E+00~~
Antimony	42	1	6.58E−05	2.82E−05	4.00E−04		1.64E−01	0.00E+00
Arsenic	121	1	1.89E−04	8.12E−05	3.00E−04	1.50E+00	6.31E−01	1.22E−04
Barium	716	1	1.12E−03	4.80E−04	7.00E−02		1.60E−02	0.00E+00
Beryllium	0.96	1	1.50E−06	6.44E−07	5.00E−03	4.30E+00	3.01E−04	2.77E−06
Cadmium	20.7	1	3.24E−05	1.39E−05	5.00E−04		6.48E−02	0.00E+00
Chromium	298	1	4.67E−04	2.00E−04	5.00E−03		9.33E−02	0.00E+00
~~Copper~~	~~1950~~	~~1~~	~~3.05E−03~~	~~1.31E−03~~	~~4.00E−02~~		~~7.63E−02~~	~~0.00E+00~~
~~Iron~~	~~132000~~	~~1~~	~~2.07E−01~~	~~8.86E−02~~	~~3.00E−01~~		~~6.89E−01~~	~~0.00E+00~~
Manganese	771	1	1.21E−03	5.17E−04	~~5.00E−03~~ 2.4E−2		~~2.41E−01~~ 5.02E−2	0.00E+00
Mercury	11.2	1	1.75E−05	7.51E−06	3.00E−04		5.84E−02	0.00E+00
Nickel	55.9	1	8.75E−05	3.75E−05	2.00E−02		4.38E−03	0.00E+00
Vanadium	31.3	1	4.90E−05	2.10E−05	7.00E−03		7.00E−03	0.00E+00
Zinc	2040	1	3.19E−03	1.37E−03	3.00E−01		1.06E−02	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~2.59E+00~~ 1.59E+0	~~2.54E−04~~ 2.32E−4*

* Based on new PCB guidance (USEPA, September 1996).

Revisions 02/27/97 KMS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: SNB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR DERMAL CONTACT WITH SOIL ARE CALCULATED BY THE FOLLOWING SPREADSHEETS USING AGE–ADJUSTED EXPOSURE FACTORS. ASUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

RELEVANT EQUATION: DEX = (C x SAadj x AF x ABS x EF x Fd)/(AT x CF) SAadj = (SAc x EDc)/BWc + (SAa x EDa)/BWa

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SAc = CHILD SKIN SURFACE AREA (CM**2/DAY):		2094
SAa = ADULT SKIN SURFACE AREA (CM**2/DAY):		3800
EDc = CHILD EXPOSURE DURATION (YEARS):		6
EDa = ADULT EXPOSURE DURATION (YEARS):		24
BWc = CHILD BODY WEIGHT (KG):		15
BWa = ADULT BODY WEIGHT (KG):		70
SAadj = AGE–ADJUSTED SKIN SURFACE AREA FACTOR (CM**2 YR/DAY KG)		2140.457
AF = ADHERENCE FACTOR (MG/CM**2):		1
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF = EXPOSURE FREQUENCY (DAYS/YEAR):		150
Fd = FRACTION OF SOIL FROM CONTAMINATED SOURCE AVAILABLE FOR DERMAL CONTACT		1
AT = AVERAGING TIME (DAYS), NONCARCINOGENS:		10950
AVERAGING TIME (DAYS), CARCINOGENS:		25550
CF = CONVERSION FACTOR (UNITLESS)		1.00E+06

DETERMINE CONVERSION FACTORS:

NONCARCIN = 2.93E–05 CARCIN = 1.26E–05

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Aroclors	5.8	0.06	1.02E-05	4.37E-06	2.00E-05	~~7.7~~ 2E+0*	5.10E-01	~~8.37E-05~~ 8.75E-6*
Cadmium	20.7	0.01	6.07E-06	2.60E-06	~~1.50E-03~~ 2.5E-5		~~4.05E-01~~ 2.43E-1	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~9.15E-01~~ 7.53E-1	~~8.37E-05~~ 8.75E-6*

*Based on new PCB guidance (USEPA, September 1996).

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RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
TWO EXPOSURE ROUTES ARE CONSIDERED: INCIDENTAL INGESTION AND DERMAL CONTACT.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser, RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

INGESTION: IEX = (C x CR x ET x EF x ED)/(BW x AT)

WHERE:
C = SURFACE WATER CONCENTRATION (MG/L)
CR = CONTACT RATE (L/HR)
ET = EXPOSURE TIME (HRS/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1000 CM**3/L)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

INGESTION:

CR:	0.05	CONVERSION FACTOR (NONCAR) =	1.53E–03
ET:	4		
EF:	120		
ED:	10	CONVERSION FACTOR (CARCIN) =	2.18E–04
BW:	43		
AT(NOCN):	3650		
AT(CAR):	25550		

DERMAL CONTACT:

EV:	1	CONVERSION FACTOR (NONCAR) =	2.41E+01
ED:	10		
EF:	120		
A:	3150	CONVERSION FACTOR (CARCIN) =	3.44E+00
tevent:	4		
BW:	43		
AT(NON):	3650		
AT(CAR):	25550		

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Trichloroethene	0.003	O	1.30E+00	5.50E-01	1.60E-02	2.60E-02	2.43E-07
Bis(2-ethylhexyl)phthalate	0.003	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	2.51E-06
Heptachlor	0.00005	O	9.40E+01	1.70E+01	1.10E-02	1.90E+00	1.25E-08
Boron	2.15	I			1.00E-03		8.60E-06
~~Manganese~~	~~0.0472~~	~~I~~			~~1.00E-03~~		~~1.89E-07~~
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00

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RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, RME
CALCULATE DOSES:

CHEMICAL	ANNUAL INGESTION DOSE (MG/KG/DAY)	ANNUAL DERMAL DOSE (MG/KG/DAY)	INGESTION RfD (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX INGESTION	HAZARD INDEX DERMAL	TOTAL HAZARD INDEX
Trichloroethene	4.59E−06	5.84E−06	6.00E−03	6.00E−03	7.65E−04	9.74E−04	1.74E−03
Bis(2−ethylhexyl)phthalate	4.59E−06	6.04E−05	2.00E−02	1.10E−02	2.29E−04	5.49E−03	5.72E−03
Heptachlor	7.65E−08	3.02E−07	5.00E−04	5.00E−04	1.53E−04	6.04E−04	7.57E−04
Boron	3.29E−03	2.07E−04	9.00E−02	4.50E−03	3.65E−02	4.60E−02	8.26E−02
~~Manganese~~	~~7.22E−05~~	~~4.55E−06~~	~~5.00E−03~~	~~1.50E−04~~	~~1.44E−02~~	~~3.03E−02~~	~~4.47E−02~~
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					~~5.21E−02~~ 3.76E-2	~~8.84E−02~~ 5.31E-2	~~1.38E−01~~ 9.08E-2

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RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE FOUR)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE INGESTION DOSE (MG/KG/DAY)	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF INGESTION (KG/DAY/MG)	CSF DERMAL (KG/DAY/MG)	CANCER RISK INGESTION	CANCER RISK DERMAL CONTACT	TOTAL CANCER RISK
Trichloroethene	6.55E−07	8.35E−07	1.10E−02	1.10E−02	7.21E−09	9.18E−09	1.64E−08
Bis(2−ethylhexyl)phthalate	6.55E−07	8.63E−06	1.40E−02	2.50E−02	9.17E−09	2.16E−07	2.25E−07
Heptachlor	1.09E−08	4.31E−08	4.50E+00	4.50E+00	4.92E−08	1.94E−07	2.43E−07
Boron	4.70E−04	2.96E−05			0.00E+00	0.00E+00	0.00E+00
~~Manganese~~	~~1.03E−05~~	~~9.50E−07~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					6.55E−08	4.19E−07	4.85E−07

000182

Revisions
08/20/96
K

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF ~~soil~~ SEDIMENT

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB-NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA ING ESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser, RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN ~~soil~~ SEDIMENT SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	100
EF:	1	EF:	120
Fi:	1	Fi:	1
ED:	1	ED:	10
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	3650

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	7.65E-07	(AVG ANNUAL DOSE)	CF:	1.09E-07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF ~~SOIL~~ SEDIMENT (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	3	1	2.29E–06	0.00E+00	3.28E–07		7.30E–01
Benzo(b)fluoranthene	3.3	1	2.52E–06	0.00E+00	3.60E–07		7.30E–01
Benzo(k)fluoranthene	0	1	0.00E+00	0.00E+00	0.00E+00		7.30E–02
Benzo(a)pyrene	4	1	3.06E–06	0.00E+00	4.37E–07		7.30E+00
Dibenz(a,h)anthracene	0.91	1	6.96E–07	0.00E+00	9.94E–08		7.30E+00
Indeno(1,2,3–cd)pyrene	1.4	1	1.07E–06	0.00E+00	1.53E–07		7.30E–01
Carbazole	0	1	0.00E+00	0.00E+00	0.00E+00		2.00E–02
3,3'–Dichlorobenzidine	0	1	0.00E+00	0.00E+00	0.00E+00		4.50E–01
Dibenzofuran	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–03	
Aldrin	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E–05	1.50E+01
Dieldrin	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–05	1.60E+01
Heptachlor epoxide	0	1	0.00E+00	0.00E+00	0.00E+00	1.30E–05	9.10E+00
Aroclors	1.6	1	1.22E–06	0.00E+00	1.75E–07	2.00E–05	~~7.70E+00~~ 2E+0*
~~Aluminum~~	~~21000~~	~~1~~	~~1.61E–02~~	~~0.00E+00~~	~~2.29E–03~~	~~1.00E+00~~	
Antimony	0	1	0.00E+00	0.00E+00	0.00E+00	4.00E–04	
Arsenic	247	1	1.89E–04	0.00E+00	2.70E–05	3.00E–04	1.50E+00
Barium	0	1	0.00E+00	0.00E+00	0.00E+00	7.00E–02	
Beryllium	0.42	1	3.21E–07	0.00E+00	4.59E–08	5.00E–03	4.30E+00
Cadmium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–04	
Chromium	51.2	1	3.91E–05	0.00E+00	5.59E–06	5.00E–03	
~~Copper~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~4.00E–02~~	
~~Iron~~	~~10000~~	~~1~~	~~1.52E–02~~	~~0.00E+00~~	~~2.17E–03~~	~~3.00E–01~~	
Manganese	508	1	3.88E–04	0.00E+00	5.55E–05	~~5.00E–03~~ 2.4E-2	
Mercury	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E–04	
Nickel	0	1	0.00E+00	0.00E+00	0.00E+00	2.00E–02	
Thallium	4.3	1	3.29E–06	0.00E+00	4.70E–07	8.00E–05	
Zinc	0	1	0.00E+00	0.00E+00	0.00E+00	3.00E–01	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions
02/27/97
KMD

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF ~~SOIL~~ SEDIMENT (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	2.39E-07
Benzo(b)fluoranthene	0.00E+00	0.00E+00	2.63E-07
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	0.00E+00	3.19E-06
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	7.26E-07
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	1.12E-07
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3'-Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	0.00E+00
Dieldrin	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00
Aroclors	6.12E-02	0.00E+00	~~1.36E-06~~ 3.51E-7*
~~Aluminum~~	~~1.61E-02~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	6.29E-01	0.00E+00	4.05E-05
Barium	0.00E+00	0.00E+00	0.00E+00
Beryllium	6.42E-05	0.00E+00	1.97E-07
Cadmium	0.00E+00	0.00E+00	0.00E+00
Chromium	7.83E-03	0.00E+00	0.00E+00
~~Copper~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~5.07E-02~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	~~7.77E-02~~ 1.62E-2	0.00E+00	0.00E+00
Mercury	0.00E+00	0.00E+00	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Thallium	4.11E-02	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	~~8.84E-01~~ 7.55E-1	**0.00E+00**	~~4.65E-05~~ 4.56E-5

* Based on new PCB guidance (USEPA, September 1996).

Revisions
02/27/97
KMB

000195

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SEDIMENT

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Older Child Trespasser, RME

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SEDIMENT (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		3150
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		0
AF = ADHERENCE FACTOR (MG/SQ CM):		1
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		120
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		1
ED1 = YOUTH EXPOSURE DURATION (YEARS):		10
ED2 = ADULT EXPOSURE DURATION (YEARS):		1
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		1
BW1 = BODY WEIGHT ADOLESCENT (KG):		43
BW2 = BODY WEIGHT ADULT (KG):		1
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		3650
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		365
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS) CF1 = 2.41E–05 CANCER RISK = (CF3)*(C)*(ABS) CF3 = 3.44E–06
DOSEadult = (CF2)*(C)*(ABS) CF2 = 0.00E+00

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH ~~SOIL~~ SEDIMENT (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, RME
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG--DAY/MG)
Aroclors	1.6	0.06	2.31E-06	0.00E+00	3.30E-07	2.00E-05	~~7.70E+00~~ 2E+0 *
Cadmium	0	0.01	0.00E+00	0.00E+00	0.00E+00	~~1.50E-05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

* Based on new PCB guidance (USEPA, September 1996).

Revisions
02/27/97
KMS

000198

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH ~~SOIL~~ SEDIMENT (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Older Child Trespasser, RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aroclors	1.16E−01	0.00E+00	~~2.54E−06~~ 6.60E-7*
Cadmium	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	1.16E−01	0.00E+00	~~2.54E−06~~ 6.60E-7

* Based on new PCB guidance (USEPA September 1996).

Revisions
02/27/97
KMS

000199

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST

SITE NAME: Site 8 – Goss Cove Landfill
LOCATION: NSB–NLON, Groton, CT
DATE: 01/25/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INHALATION OF AMBIENT AIR ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child), RME

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x ET x EF x ED)/(BW x AT)

WHERE:
C = MEAN CONCENTRATION IN AIR (MG/M3)
IR = INHALATION RATE (M3/HOUR)
ET = EXPOSURE TIME (HOURS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0.833	IR:	0
EF:	350	EF:	1
ET:	24	ET:	1
ED:	30	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	10950	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 2.74E–01 (AVG ANNUAL DOSE)
CF: 1.17E–01 (LIFETIME DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE TWO)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Future Resident (Adult/Child), RME
CALCULATE DOSES:

CHEMICAL	C (mg/kg)	C (MG/M3)	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	26	4.68E–07	0.00E+00	1.28E–07	5.49E–08		
Benzo(b)fluoranthene	21	3.78E–07	0.00E+00	1.04E–07	4.44E–08		
Benzo(k)fluoranthene	33	5.94E–07	0.00E+00	1.63E–07	6.97E–08		
Benzo(a)pyrene	11	1.98E–07	0.00E+00	5.42E–08	2.32E–08		6.10E+00
Dibenz(a,h)anthracene	2.3	4.14E–08	0.00E+00	1.13E–08	4.86E–09		
Indeno(1,2,3–cd)pyrene	5.1	9.18E–08	0.00E+00	2.51E–08	1.08E–08		
Carbazole	8.8	1.58E–07	0.00E+00	4.34E–08	1.86E–08		
3,3–Dichlorobenzidine	15	2.70E–07	0.00E+00	7.39E–08	3.17E–08		
Dibenzofuran	42	7.56E–07	0.00E+00	2.07E–07	8.87E–08		
Aldrin	0.062	1.12E–09	0.00E+00	3.06E–10	1.31E–10		1.51E+01
Dieldrin	0.13	2.34E–09	0.00E+00	6.41E–10	2.75E–10		1.61E+01
Heptachlor epoxide	0.092	1.66E–09	0.00E+00	4.54E–10	1.94E–10		9.10E+00
Aroclors	5.8	1.04E–07	0.00E+00	2.86E–08	1.23E–08		
~~Aluminum~~	~~31200~~	~~5.62E–04~~	~~0.00E+00~~	~~1.54E–04~~	~~6.59E–05~~		
Antimony	42	7.56E–07	0.00E+00	2.07E–07	8.87E–08		
Arsenic	121	2.18E–06	0.00E+00	5.96E–07	2.56E–07		1.51E+01
Barium	716	1.29E–05	0.00E+00	3.53E–06	1.51E–06	1.43E–04	
Beryllium	0.96	1.73E–08	0.00E+00	4.73E–09	2.03E–09		8.40E+00
Cadmium	20.7	3.73E–07	0.00E+00	1.02E–07	4.37E–08	5.71E–05	6.30E+00
Chromium	298	5.36E–06	0.00E+00	1.47E–06	6.30E–07		4.20E+01
~~Copper~~	~~1950~~	~~3.51E–05~~	~~0.00E+00~~	~~9.61E–06~~	~~4.12E–06~~		
~~Iron~~	~~182000~~	~~2.98E–08~~	~~0.00E+00~~	~~6.51E–04~~	~~2.79E–04~~		
Manganese	771	1.39E–05	0.00E+00	3.80E–06	1.63E–06	1.43E–05	
Mercury	11.2	2.02E–07	0.00E+00	5.52E–08	2.37E–08	8.57E–05	
Nickel	55.9	1.01E–06	0.00E+00	2.76E–07	1.18E–07		
Vanadium	31.3	5.63E–07	0.00E+00	1.54E–07	6.61E–08		
Zinc	2040	3.67E–05	0.00E+00	1.01E–05	4.31E–06		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/20/96
KMS

RISK ASSESSMENT SPREADSHEET – INHALATION OF OUTDOOR AIR/DUST (PAGE THREE)
Site 8 – Goss Cove Landfill
EXPOSURE SCENARIO: Future Resident (Adult/Child), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	0.00E+00
Benzo(b)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	0.00E+00	1.42E-07
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00
Carbazole	0.00E+00	0.00E+00	0.00E+00
3,3-Dichlorobenzidine	0.00E+00	0.00E+00	0.00E+00
Dibenzofuran	0.00E+00	0.00E+00	0.00E+00
Aldrin	0.00E+00	0.00E+00	1.98E-09
Dieldrin	0.00E+00	0.00E+00	4.42E-09
Heptachlor epoxide	0.00E+00	0.00E+00	1.77E-09
Aroclors	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	3.86E-06
Barium	0.00E+00	2.47E-02	0.00E+00
Beryllium	0.00E+00	0.00E+00	1.70E-08
Cadmium	0.00E+00	1.79E-03	2.76E-07
Chromium	0.00E+00	0.00E+00	2.64E-05
~~Copper~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
~~Iron~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	0.00E+00	2.66E-01	0.00E+00
Mercury	0.00E+00	6.44E-04	0.00E+00
Nickel	0.00E+00	0.00E+00	0.00E+00
Vanadium	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	**2.93E-01**	**3.07E-05**

Revisions
08/20/96
MS

002293

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 8 GOSS COVE LANDFILL - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
1,2-Dichloroethene (total)	0.024	0.024	500 (3)	1000 (3)	1.4 (3)	14 (3)
2-Butanone	0.12	0.06	500	1000	8	80
4-Methyl-2-pentanone	0.007	0.007	500	1000	7	14
Acetone	0.3	0.21	500	1000	14	140
Carbon disulfide	0.003	0.003	-	-	-	-
Chloromethane	0.008	0.006	-	-	-	-
Ethylbenzene	3.3	0.5	500	1000	10.1	10.1
Methylene chloride	1.8	0.9	82	760	0.1 *	1.0 *
Styrene	0.01	0.007	500	1000	2	20
Tetrachloroethene	0.028	0.007	12	110	0.1	1
Toluene	22	5	500	1000	20 *	67
Trichloroethene	0.008	0.003	56	520	0.1	1
Xylenes (total)	25	4	500	1000	19.5 *	19.5 *
2,4-Dimethylphenol	0.14	0.14	-	-	-	-
2-Methylnaphthalene	40	4	-	-	-	-
2-Methylphenol	0.57	0.30	-	-	-	-
3,3'-Dichlorobenzidine	15	15	-	-	-	-
4-Methylphenol	2.2	0.5	-	-	-	-
Acenaphthene	65	6	-	-	-	-
Acenaphthylene	11	1	1000	2500	8.4 *	84
Anthracene	55	6	1000	2500	40 *	400
Benzo(a)anthracene	55	7	1 *	7.8 *	1 *	1 *
Benzo(a)pyrene	44	5	1 *	1 *	1 *	1 *
Benzo(b)fluoranthene	40	6	1 *	7.8 *	1 *	1 *
Benzo(g,h,i)perylene	7.5	0.9	-	-	-	-
Benzo(k)fluoranthene	33	5	8.4 *	78	1 *	1 *
Benzoic acid	0.42	0.18	-	-	-	-
Bis(2-Ethylhexyl)phthalate	31	6	44	410	1 *	11 *
Butyl benzyl phthalate	0.03	0.029	1000	2500	20	200

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 8 GOSS COVE LANDFILL - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Carbazole	35	4	-	-	-	-
Chrysene	61	7	-	-	-	-
Di-N-butyl phthalate	0.19	0.07	1000	2500	14	140
Di-N-octyl phthalate	0.02	0.020	1000	2500	2	20
Dibenzo(a,h)anthracene	10	2	-	-	-	-
Dibenzofuran	42	4	-	-	-	-
Diethyl phthalate	6.5	1.7	-	-	-	-
Fluoranthene	110	14	1000	2500	5.6 *	56 *
Fluorene	65	6	1000	2500	5.6 *	56 *
Indeno(1,2,3-Cd)pyrene	25	3	-	-	-	-
Isophorone	0.44	0.44	-	-	-	-
Naphthalene	99	9	1000	2500	5.6 *	56 *
Phenanthrene	190	16	1000	2500	4 *	40 *
Phenol	20	8	1000	2500	80	800
Pyrene	77	13	1000	2500	4 *	40 *
4,4'-DDD	0.17	0.04	-	-	-	-
4,4'-DDE	0.27	0.03	-	-	-	-
4,4'-DDT	0.45	0.07	-	-	-	-
Aldrin	0.062	0.022	-	-	-	-
Alpha-Chlordane	0.0083	0.0057	0.49 (5)	2.2 (5)	0.066 (5)	0.066 (5)
Aroclor-1248	4.9	1.7	1 *	10	-	-
Aroclor-1254	0.36	0.16	1	10	-	-
Aroclor-1260	0.5	0.28	1	10	-	-
Dieldrin	0.13	0.03	0.038 *	0.36	0.007 *	0.007 *
Endosulfan II	0.019	0.011	-	-	-	-
Endosulfan sulfate	0.037	0.021	-	-	-	-
Endrin	0.8	0.12	20	610	-	-
Endrin aldehyde	0.031	0.014	-	-	-	-
Endrin ketone	0.43	0.09	-	-	-	-

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 1 OF 2)

SITE NAME: Site 8 - Goss Cove Landfill
LOCATION: NSB-NLON, Groton, CT
DATE: 01/25/96

EXPOSURE SCENARIO: CTE & RME (All Soil)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	1280.0	200.0
1-2	1280.0	200.0
2-3	1280.0	200.0
3-4	1280.0	200.0
4-5	1280.0	200.0
5-6	1280.0	200.0
6-7	1280.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

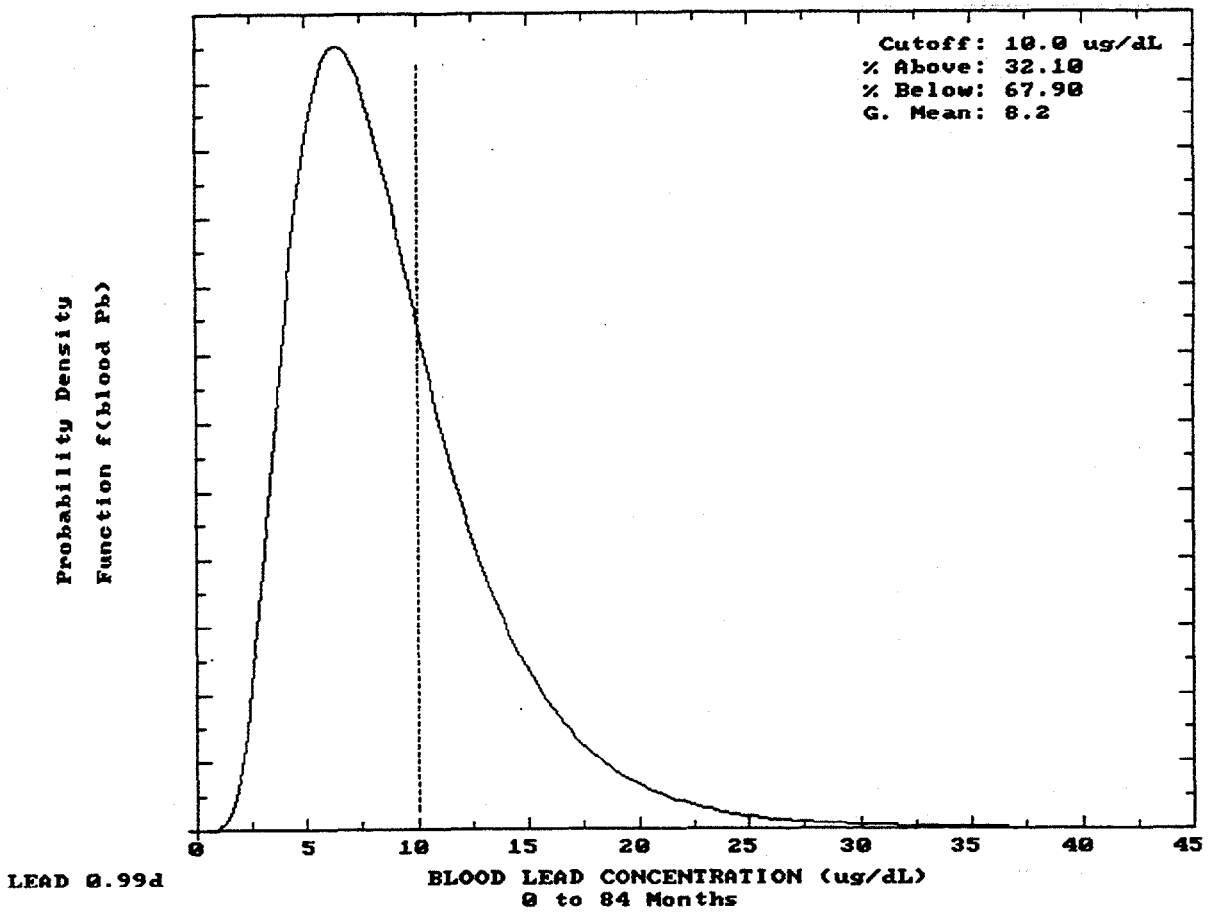
YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	9.0	16.97	14.35
1-2:	10.3	25.25	22.12
2-3:	9.7	26.30	22.73
3-4:	9.3	26.91	23.33
4-5:	7.7	21.92	18.22
5-6:	6.6	20.74	16.73
6-7:	5.8	20.33	15.97

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.27	0.33	0.00	0.02
1-2:	2.30	0.80	0.00	0.03
2-3:	2.65	0.85	0.00	0.06
3-4:	2.62	0.89	0.00	0.07
4-5:	2.66	0.97	0.00	0.07
5-6:	2.86	1.05	0.00	0.09
6-7:	3.19	1.08	0.00	0.09

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 2 OF 2)

SITE NAME: Site 8 - Goss Cove Landfill
LOCATION: NSB-NLON, Groton, CT
DATE: 01/25/96

EXPOSURE SCENARIO: CTE & RME (All Soil)



SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 8 GOSS COVE LANDFILL - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Gamma-BHC (lindane)	0.0033	0.0032	20	610	0.02	0.04
Gamma-Chlordane	0.0088	0.0058	0.49 (5)	2.2 (5)	0.066 (5)	0.066 (5)
Heptachlor	0.026	0.007	0.14	1.3	0.013 *	0.013 *
Heptachlor epoxide	0.092	0.029	0.067 *	0.63	0.02 *	0.02 *
Methoxychlor	0.32	0.26	340	1E+4	0.8	8
Aluminum	31200	9827	-	-	-	-
Antimony	42	36	27 *	8200	-	-
Arsenic	121	10	10 *	10 *	-	-
Barium	716	145	4700	1.4E+5	-	-
Beryllium	4.2	0.9	2 *	2 *	-	-
Boron	15.3	13.1	-	-	-	-
Cadmium	20.7	2.8	34	1000	-	-
Calcium	14400	3991	-	-	-	-
Chromium (total)	298	50	100 (6) *	100 (6) *	-	-
Cobalt	106	17	-	-	-	-
Copper	3980	616	2500 *	7.6E+4	-	-
Iron	132000	22831	-	-	-	-
Lead	3540	485	500 *	1000 *	-	-
Magnesium	6910	3166	-	-	-	-
Manganese	771	255	-	-	-	-
Mercury	63.6	4.6	20 *	610	-	-
Nickel	183	35	1400	7500	-	-
Potassium	6310	2046	-	-	-	-
Selenium	1.2	0.7	340	1E+4	-	-
Silver	6.5	2.6	340	1E+4	-	-
Sodium	1660	416	-	-	-	-
Thallium	0.3	0.27	5.4	160	-	-
Vanadium	64.8	27.8	470	1.4E+4	-	-
Zinc	5550	802	2E+4	6.1E+5	-	-

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 8 GOSS COVE LANDFILL - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 8 GOSS COVE LANDFILL - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
1,1,1-Trichloroethane	1	1	200	200	62000
1,2-Dichloroethene (total)	12	4	70 (4)	70 (4)	-
2-Butanone	5	5	-	400	-
2-Hexanone	49	49	-	-	-
4-Methyl-2-pentanone	200	71	-	350	-
Acetone	700	460	-	700	-
Benzene	5	2	5	1 *	710
Bromodichloromethane	6	6	100	-	-
Carbon disulfide	58	14	-	-	-
Chloroform	18	18	100	6 *	14100
Ethylbenzene	120	38	700	700	580000
Tetrachloroethene	5600	868	5 *	5 *	88 *
Toluene	450	144	1000	1000	4000000
Trichloroethene	8	8	5 *	5 *	2340
Vinyl chloride	5	5	2 *	2 *	15750
Xylenes (total)	610	129	10000	530 *	-
2,4-Dimethylphenol	320	85	-	-	-
2-Methylnaphthalene	12	4	-	-	-
2-Methylphenol	140	56	-	-	-
4-Bromophenyl phenyl ether	2	2	-	-	-
4-Methylphenol	500	158	-	-	-
Acenaphthene	11	5	-	-	-
Acenaphthylene	0.7	0.70	-	420	0.3 *
Anthracene	3	1	-	2000	1100000
Benzo(a)anthracene	4	2	-	0.06 *	0.3 *
Benzo(a)pyrene	4	2	0.2 *	0.2 *	0.3 *
Benzo(b)fluoranthene	4	2	-	0.08 *	0.3 *
Benzo(g,h,i)perylene	4	2	-	-	-
Benzo(k)fluoranthene	5	2	-	0.5 *	0.3 *

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SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 8 GOSS COVE LANDFILL - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Benzoic acid	21	4	-	-	-
Bis(2-Ethylhexyl)phthalate	140	30	6 *	2 *	59 *
Butyl benzyl phthalate	0.7	0.65	-	1000	-
Carbazole	16	6	-	-	-
Chrysene	7	3	-	-	-
Di-N-butyl phthalate	0.6	0.55	-	700	120000
Di-N-octyl phthalate	0.7	0.70	-	100	-
Dibenzo(a,h)anthracene	0.8	0.80	-	-	-
Dibenzofuran	4	2	-	-	-
Fluoranthene	15	4	-	280	3700
Fluorene	8	3	-	280	140000
Indeno(1,2,3-Cd)pyrene	4	2	-	-	-
N-Nitrosodiphenylamine	1	-	-	-	-
Naphthalene	62	17	-	280	-
Phenanthrene	14	5	-	200	0.077 *
Phenol	26	10	-	4000	92000000
Pyrene	11	3	-	200	110000
Aluminum	53200	6202	-	-	-
Antimony	157	87	6 *	6 *	86000
Arsenic	29.8	8.2	50	50	4 *
Barium	1340	414	2000	1000 *	-
Beryllium	3.2	3.2	4	4	4
Boron	3360	1054	-	-	-
Cadmium	8.1	4.1	5 *	5 *	6 *
Calcium	360000	92657	-	-	-
Chromium (total)	221	26	100 (5) *	50 (5) *	110 (6) *
Cobalt	35.9	14.8	-	-	-
Copper	3850	213	-	1300 *	48 *
Iron	141000	9122	-	-	-

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 8 GOSS COVE LANDFILL - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Lead	1600	113	-	15 *	13 *
Magnesium	765000	165781	-	-	-
Manganese	3250	535	5000 (7)	-	-
Mercury	3.9	1.0	2 *	2 *	0.4 *
Nickel	138	31	100 *	100 *	880
Potassium	436000	81442	-	-	-
Selenium	7	7	50	50	50
Silver	28.7	19.6	50	36	12 *
Sodium	7800000	1523370	28000 (8) *	-	-
Thallium	10.2	10.2	2 *	5 *	63
Vanadium	136	33	-	50 *	-
Zinc	4530	221	-	5000	123 *

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 8 GOSS COVE LANDFILL - FILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Aluminum	9160	4588	-	-	-
Antimony	53.5	18.8	6 *	6 *	86000
Arsenic	44.9	8.5	50	50	4 *
Barium	1380	348	2000	1000 *	-
Beryllium	1.6	1.6	4	4	4
Boron	3530	1074	-	-	-
Calcium	294000	94392	-	-	-
Chromium (total)	71.9	36.5	100 (5)	50 (5) *	110 (6)
Cobalt	10.7	9.1	-	-	-
Copper	47.8	11.5	-	1300	48
Iron	86600	6927	-	-	-
Magnesium	585000	107071	-	-	-
Manganese	3380	522	5000 (7)	-	-
Mercury	0.22	0.21	2	2	0.4
Nickel	43.1	26.6	100	100	880
Potassium	468000	87043	-	-	-
Silver	3.5	3.5	50	36	12
Sodium	5050000	981156	28000 (8) *	-	-
Vanadium	50.2	19.1	-	50 *	-
Zinc	1130	153	-	5000	123 *

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 8 GOSS COVE LANDFILL - UNFILTERED SURFACE WATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Water Quality Standards (2)			
			Aquatic Life		Human Health	
			Freshwater	Saltwater	Organisms	Water and Organisms
Toluene	2	2	-	-	200000	6800
Trichloroethene	3	3	-	-	81	2.7 *
Bis(2-Ethylhexyl)phthalate	5	3	-	-	5.9	1.8 *
Butyl benzyl phthalate	1	1	-	-	-	-
Heptachlor	0.05	0.050	0.0038 *	0.0036 *	0.00021 *	0.00021 *
Aluminum	136	76	-	-	-	-
Boron	2150	1612	-	-	-	-
Calcium	172000	124586	-	-	-	-
Copper	12.5	10.9	4.8 *	2.9 *	-	-
Iron	452	218	-	-	-	-
Lead	3.3	2.5	1.3 *	8.5	-	50
Magnesium	539000	386000	-	-	-	-
Manganese	47.5	31.2	-	-	-	-
Nickel	13.7	13.2	88	8.3 *	4600	610
Potassium	236000	154071	-	-	-	-
Selenium	4.8	4.8	5	71	6800	100
Sodium	5260000	2488143	-	-	-	-
Vanadium	5	4	-	-	-	-
Zinc	14.6	14.6	12.3 *	86	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 Connecticut Water Quality Standards, 1992.
3 Chromium (hexavalent).

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 8 GOSS COVE LANDFILL - FILTERED SURFACE WATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Water Quality Standards (2)			
			Aquatic Life		Human Health	
			Freshwater	Saltwater	Organisms	Water and Organisms
Boron	930	580	-	-	-	-
Calcium	81400	79700	-	-	-	-
Copper	5.8	5.7	4.8 *	2.9 *	-	-
Iron	80.5	78.9	-	-	-	-
Magnesium	241000	237000	-	-	-	-
Manganese	40.7	39.2	-	-	-	-
Potassium	83300	81950	-	-	-	-
Sodium	2290000	2205000	-	-	-	-
Vanadium	3.5	3.4	-	-	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 Connecticut Water Quality Standards, 1992.
3 Chromium (hexavalent).

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 8 GOSS COVE LANDFILL - SEDIMENT (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
2-Butanone	0.12	0.12	500	1000	8	80
Acetone	0.74	0.39	500	1000	14	140
Carbon disulfide	0.077	0.077	-	-	-	-
Chloromethane	0.049	0.031	-	-	-	-
Methylene chloride	0.071	0.054	82	760	0.1	1.0
Tetrachloroethene	0.007	0.006	12	110	0.1	1
2-Methylnaphthalene	0.057	0.057	-	-	-	-
Acenaphthene	0.13	0.13	-	-	-	-
Acenaphthylene	0.29	0.20	1000	2500	8.4	84
Anthracene	0.34	0.23	1000	2500	40	400
Benzo(a)anthracene	3	1	1 *	7.8	1 *	1 *
Benzo(a)pyrene	4	2	1 *	1 *	1 *	1 *
Benzo(b)fluoranthene	3.3	1.7	1 *	7.8	1 *	1 *
Benzo(g,h,i)perylene	0.87	0.67	-	-	-	-
Benzo(k)fluoranthene	1.9	1.6	8.4	78	1 *	1 *
Benzoic acid	0.68	0.63	-	-	-	-
Bis(2-Ethylhexyl)phthalate	1.3	1.3	44	410	1 *	11
Carbazole	0.22	0.16	-	-	-	-
Chrysene	2.7	1.8	-	-	-	-
Di-N-butyl phthalate	0.088	0.088	1000	2500	14	140
Di-N-octyl phthalate	0.41	0.41	1000	2500	2	20
Dibenzo(a,h)anthracene	0.56	0.41	-	-	-	-
Dibenzofuran	0.14	0.14	-	-	-	-
Fluoranthene	7	3	1000	2500	5.6 *	56
Fluorene	0.27	0.20	1000	2500	5.6	56
Indeno(1,2,3-Cd)pyrene	1.4	1.0	-	-	-	-
Naphthalene	0.074	0.074	1000	2500	5.6	56
Phenanthrene	3.3	1.2	1000	2500	4	40
Pyrene	8	3	1000	2500	4 *	40

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SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 8 GOSS COVE LANDFILL - SEDIMENT (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
4,4'-DDD	0.2	0.13	-	-	-	-
4,4'-DDE	0.035	0.026	-	-	-	-
4,4'-DDT	0.063	0.054	-	-	-	-
Alpha-Chlordane	0.036	0.027	0.49 (5)	2.2 (5)	0.066 (5)	0.066 (5)
Aroclor-1254	0.627	0.627	1	10	-	-
Aroclor-1260	1	0.78	1	10	-	-
Dieldrin	0.024	0.022	0.038	0.36	0.007 *	0.007 *
Endosulfan II	0.016	0.016	-	-	-	-
Endrin	0.0094	0.0094	20	610	-	-
Endrin aldehyde	0.064	0.038	-	-	-	-
Gamma-Chlordane	0.022	0.018	0.49 (5)	2.2 (5)	0.066 (5)	0.066 (5)
Heptachlor	0.022	0.015	0.14	1.3	0.013 *	0.013 *
Aluminum	21000	9741	-	-	-	-
Arsenic	247	52	10 *	10 *	-	-
Barium	79.3	41.6	4700	1.4E+5	-	-
Beryllium	0.42	0.42	2	2	-	-
Boron	72.2	53.7	-	-	-	-
Cadmium	2.7	1.8	34	1000	-	-
Calcium	58600	12380	-	-	-	-
Chromium (total)	51.2	30.7	100 (6)	100 (6)	-	-
Cobalt	6	5	-	-	-	-
Copper	199	109	2500	7.6E+4	-	-
Iron	19900	13774	-	-	-	-
Lead	646	314	500 *	1000	-	-
Magnesium	27700	8219	-	-	-	-
Manganese	508	197	-	-	-	-
Mercury	1.2	0.7	20	610	-	-
Nickel	38.1	19.2	1400	7500	-	-
Potassium	4540	3028	-	-	-	-

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 8 GOSS COVE LANDFILL - SEDIMENT (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Silver	0.58	0.58	340	1E+4	-	-
Sodium	15600	9970	-	-	-	-
Thallium	4.3	4.3	5.4	160	-	-
Vanadium	38.7	26.8	470	1.4E+4	-	-
Zinc	320	204	2E+4	6.1E+5	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

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SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 8 GOSS COVE LANDFILL - AIR (MG/M^3)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Target Indoor Air Concentration(2)	
		Residential	Industrial
Acetone	8.9	0.834 *	1.17 *
2-Butanone	0.023	1.04	1.46
1,1-Dichloroethene (3)	0.099	4.87E-5 *	8.18E-5 *
Methylene chloride	0.09	0.6	0.6
Styrene	0.01	0.005 *	0.00717 *
Toluene	0.029	0.417	0.584
1,1,1-Trichloroethane	0.38	1.04	1.46
Trichloroethene (3)	0.045	0.005 *	0.005 *

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Chemical detected in boilerroom sampls only.

000220

APPENDIX F.13

LOWER SUBASE

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 1 - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Lead	4/4	2.6 - 112	13TB15	-	400 (7)	-	-	N	2
TPH	3/3	23.8 - 263	13TB13	-	500 (8)	-	2500 (8)	N	2

Footnotes:

1 Results in mg/kg unless otherwise noted. Surface soil designated as soil from depths of 0 to 5 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
8 CTDEP, October 3, 1995.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.

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KMS

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 - LOWER SUBASE ZONE 1 - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (mg/kg)		
Lead	112	41.375
Miscellaneous (mg/kg)		
TPH	263	166.6

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 1 - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Carbon disulfide	1/4	0.005	13MW7	0.005 - 0.006	780	11	14	N	2
Aluminum	4/4	3250 - 6490	13MW4	-	7800	-	-	N	2
Arsenic	3/4	0.53 - 1.9	13MW4	0.47	0.43	380	15	Y	3
Barium	4/4	14.7 - 37.1	13MW4	-	550	350000	32	N	2
Beryllium	1/4	0.4	13MW4	0.24	0.15	690	180	Y	3
Cadmium	4/4	0.57 - 1.4	13MW8	-	3.9	920	6	N	2
Calcium	4/4	539 - 1870	13MW4	-	-	-	-	N	1
Chromium (total)	4/4	4.6 - 13.8	13MW4	-	39 (7)	140 (7)	19 (7)	N	2
Cobalt	4/4	1.8 - 5.5	13MW4	-	470	-	-	N	2
Copper	4/4	7.7 - 59.6	13MW4	-	290	-	-	N	2
Iron	4/4	3770 - 9030	13MW4	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	11/11	3.4 - 383	13MW4	-	400 (8)	-	-	N	2
Magnesium	4/4	1310 - 3020	13MW4	-	-	-	-	N	1
Manganese	4/4	56.1 - 148	13MW4	-	~~38~~ 190	-	-	~~Y~~ N	~~3~~ 2
Mercury	2/4	0.12 - 0.48	13MW4	0.1 - 0.12	2.3	7	3	N	2
Nickel	4/4	2.4 - 12	13MW4	-	160	6900	21	N	2
Potassium	4/4	1170 - 1950	13MW4	-	-	-	-	N	1
Silver	1/4	2.2	13MW4	1.7	39	-	-	N	2
Sodium	4/4	184 - 821	13MW9	-	-	-	-	N	1
Vanadium	4/4	5.7 - 27.1	13MW4	-	55	-	-	N	2
Zinc	4/4	20.3 - 70.4	13MW4	-	2300	-	42000	N	2
TPH	10/11	23.8 - 4900	13MW8	70	500 (9)	-	2500 (9)	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 13 LOWER SUBASE, ZONE 1 - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in mg/kg unless otherwise noted. All soil designated as soil from depths of 0 to 10 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Hexavalent chromium.
8 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
9 CTDEP, October 3, 1995.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 LOWER SUBASE ZONE 1 - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
Carbon disulfide	5	3.375
Inorganics (mg/kg)		
Aluminum	6490	4150
Arsenic	1.9	0.8538
Barium	37.1	23.425
Beryllium	0.4	0.19
Cadmium	1.4	0.9175
Calcium	1870	990
Chromium (total)	13.8	8.225
Cobalt	5.5	3.375
Copper	59.6	23
Iron	9030	6115
Lead	383	67.9636
Magnesium	3020	1870
Manganese	148	107.075
Mercury	0.48	0.1775
Nickel	12	5.875
Potassium	1950	1557.5
Silver	2.2	1.1875
Sodium	821	453.5
Vanadium	27.1	15.325
Zinc	70.4	37.975
Miscellaneous (mg/kg)		
TPH	4900	791.2545

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 1 - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Benzene	2/31	3	13GW2	5 - 10	5	5	0.36	Y	3
Carbon disulfide	3/31	1 - 3	13GW9	5 - 10	-	-	100	N	2
Ethylbenzene	3/31	2 - 11	13GW19	5 - 10	700	700	130	N	2
Styrene	1/31	2	13GW8	5 - 10	100	100	160	N	2
Xylenes, total	2/31	8 - 44	13GW19	5 - 10	10000	10000	1200	N	2
1,1-Dichloroethane	1/31	3	13GW19	5 - 10	-	-	81	N	2
1,2,4-Trichlorobenzene	1/21	0.7	NESO4	10	70	70	19	N	2
1,3-Dichlorobenzene	2/21	0.5	13GW3/NESO4	10	60	-	54	N	2
2-Methylnaphthalene	6/21	1 - 47	13GW2	10	-	-	-	N	1
4-Methylphenol	4/21	1 - 6	13GW3	10	-	-	18	N	2
Acenaphthene	10/21	0.6 - 10	13GW2	10	-	-	220	N	2
Acenaphthylene	1/21	1	13GW2	10	-	-	-	N	1
Anthracene	2/21	1 - 2	13GW2	10	-	-	1100	N	2
Benzoic acid	1/21	0.6	13GW1	50	-	-	15000	N	2
Bis(2-ethylhexyl)phthalate	3/21	0.8 - 3	13GW1	10	6	6	4.8	N	2
Carbazole	4/21	1	13GW20 / 13GW2	10	-	-	3.4	N	2
Di-n-butyl phthalate	2/21	0.6 - 1	13GW21	10	-	-	370	N	2
Dibenzofuran	5/21	1 - 11	13GW2	10	-	-	15	N	2
Diethyl phthalate	5/21	0.6 - 3	13GW1	10	-	-	2900	N	2
Fluoranthene	4/21	0.7 - 2	13GW2	10	-	-	150	N	2
Fluorene	5/21	1 - 15	13GW2	10	-	-	150	N	2
Naphthalene	5/21	1 - 28	13GW2	10	-	-	150	N	2
Phenanthrene	4/21	1 - 9	13GW2	10	-	-	-	N	1
Phenol	1/21	28	13GW3	10	-	-	2200	N	2
Pyrene	6/21	0.5 - 1	13GW9 / 13GW2	10	-	-	110	N	2
Aluminum	16/31	23.5 - 26100	13GW19	10 - 342	50 - 200 (7)	-	3700	~~Y~~ N	~~3~~ 5
Arsenic	16/31	1.5 - 16.8	13GW21	2 - 3	50	50	0.045	Y	3
Barium	19/31	9.6 - 210	13GW5	2.9 - 40.6	2000	2000	260	N	2
Beryllium	1/31	1.3	13GW19	1	4	4	0.016	Y	3
Boron	18/21	52 - 1430	13GW9	50	-	-	330	Y	3
Cadmium	4/31	1.4 - 20.9	NESO4	2 - 5	5	5	1.8	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 13 LOWER SUBASE, ZONE 1 - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Calcium	31/31	4820 - 139000	13GW9	-	-	-	-	N	1
Chromium (total)	5/31	5.1 - 11.6	13GW7	1 - 14	100	100	18 (8)	N	2
Cobalt	3/31	5.4 - 8.2	13GW3	1 - 5	-	-	220	N	2
Copper	10/31	2.6 - 68.4	13GW19	2 - 5	1300 (9)	-	150	N	2
Iron	29/31	43.1 - 11600	13GW2	17 - 40.5	300 (7)	-	1100	~~Y~~ N	~~3~~ 5
Lead	14/30	2 - 39.3	13GW19	1 - 10	15 (9)	-	-	Y	4
Magnesium	27/31	129 - 443000	13GW9	399 - 5800	-	-	-	N	1
Manganese	31/31	10.2 - 2290	13GW8	-	50 (7)	-	~~18~~ 88	Y	3
Mercury	2/31	0.43 - 0.97	13GW19	0.2	2	2	1.1	N	2
Nickel	12/31	10.4 - 27.2	13GW1	3 - 11	100	100	73	N	2
Potassium	31/31	2090 - 138000	13GW9	-	-	-	-	N	1
Selenium	2/31	1 - 22	13GW9	1 - 30	50	50	18	Y	3
Silver	1/31	7.4	13GW8	2 - 7	100 (7)	50	18	N	2
Sodium	31/31	4800 - 298000	13GW9	-	-	-	-	N	1
Vanadium	9/31	3.2 - 689	13GW19	1 - 20	-	-	26	Y	3
Zinc	20/31	4 - 121	13GW19	2 - 26.5	5000 (7)	-	1100	N	2
TPH	8/31	600 - 2100	13GW19	500 - 3000	-	-	500 (10)	Y	3

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample-specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL based on aesthetic water qualities.
8 Hexavalent chromium.
9 Action level.
10 CTDEP, October 3, 1995.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 No COC screening level available; maximum is greater than or equal to Action Level.
5 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 LOWER SUBASE ZONE 1 - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
1,1-Dichloroethane	4	3.9616
Benzene	2.8333	3.9359
Carbon disulfide	3.5	3.718
Ethylbenzene	8	4.2949
Styrene	4	4.0257
Xylenes, total	24.5	5.6539
1,2,4-Trichlorobenzene	2.85	4.785
1,3-Dichlorobenzene	2.75	4.55
2-Methylnaphthalene	35.5	7.45
4-Methylphenol	5.5	4.65
Acenaphthene	6.5	4.18
Acenaphthylene	3	4.8
Anthracene	1.5	4.65
Benzoic acid	12.8	23.78
Bis(2-ethylhexyl)phthalate	4	4.485
Carbazole	3	4.4
Di-n-butyl phthalate	3	4.58
Dibenzofuran	7.5	5
Diethyl phthalate	3	4.13
Fluoranthene	3	4.23
Fluorene	10.5	5.3
Naphthalene	20.5	6.15
Phenanthrene	6.5	4.95
Phenol	16.5	6.15
Pyrene	2.8	3.72
Inorganics (ug/L)		
Aluminum	13730	2336.8051
Arsenic	9.3	3.5564
Barium	210	41.432
Beryllium	0.9	0.5308
Boron	1220	207.89
Cadmium	9.9333	2.0103
Calcium	118700	34433.0769
Chromium (total)	10.15	3.466
Cobalt	4.2333	2.5872
Copper	35.45	8.5955
Iron	7613.3333	2184.109
Lead	20.15	5.4179
Magnesium	327666.6667	32620.7051
Manganese	918.5667	306.841
Mercury	0.535	0.1462
Nickel	23.5	11.8449
Potassium	110400	14803.5897

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 13 LOWER SUBASE ZONE 1 - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (ug/L) (Continued)		
Selenium	11.1667	2.7949
Silver	3.1333	2.0615
Sodium	2416666.667	352375.641
Vanadium	353.45	42.1679
Zinc	63.75	15.3532
Miscellaneous (ug/L)		
TPH	1433.3333	967.9487

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 1 - FILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Aluminum	7/21	20 - 18700	13GW19	10 - 88.7	50 - 200 (7)	-	3700	N	1
Antimony	1/21	5.7	NESO4	5 - 15.6	6	6	1.5	Y	2
Arsenic	11/21	1.2 - 24.8	13GW19	2	50	50	0.045	N	1
Barium	10/21	14.1 - 95	13GW18	1.4 - 40.3	2000	2000	260	N	1
Beryllium	1/21	1	13GW19	1	4	4	0.016	N	1
Boron	18/21	50 - 1410	13GW9	50	-	-	330	N	1
Calcium	21/21	5730 - 138000	13GW9	-	-	-	-	N	1
Chromium (total)	6/21	1 - 9.3	13GW19	3 - 4	100	100	18 (9)	N	1
Copper	8/21	2.3 - 44.2	13GW19	2 - 5	1300 (8)	-	150	N	1
Iron	18/21	127 - 7520	13GW2	17 - 47.6	300 (7)	-	1100	N	1
Lead	3/19	7.7 - 13.5	13GW21	1 - 2	15 (8)	-	-	N	1
Magnesium	21/21	195 - 449000	13GW9	-	-	-	-	N	1
Manganese	19/21	8.4 - 1930	13GW8	8.3 - 10.6	50 (7)	-	~~18~~ 08	N	1
Mercury	2/21	0.31 - 0.35	13GW21	0.2	2	2	1.1	N	1
Potassium	21/21	4120 - 141000	13GW9	-	-	-	-	N	1
Sodium	21/21	30100 - 3660000	13GW9	-	-	-	-	N	1
Vanadium	7/21	1.5 - 593	13GW19	4 - 5	-	-	26	N	1
Zinc	6/21	3.4 - 20	13GW19	2 - 15.7	5000 (7)	-	1100	N	1

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL (SMCL) based on aesthetic water qualities.
8 Action Level.
9 Hexavalent chromium.

Rationale Designations:

1 Chemical detected in unfiltered sample; filtered results not used in risk assessment.
2 Chemical not detected in unfiltered samples; maximum is greater than or equal to the COC screening level.

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SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 2 - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Aluminum	1/1	7210	13MW11	-	7800	-	-	N	2
Arsenic	1/1	1.8	13MW11	-	0.43	380	15	Y	3
Barium	1/1	30.1	13MW11	-	550	350000	32	N	2
Beryllium	1/1	0.29	13MW11	-	0.15	690	180	Y	3
Cadmium	1/1	1.3	13MW11	-	3.9	920	6	N	2
Calcium	1/1	1540	13MW11	-	-	-	-	N	1
Chromium (total)	1/1	12.4	13MW11	-	39 (7)	140 (7)	19 (7)	N	2
Cobalt	1/1	4.1	13MW11	-	470	-	-	N	2
Copper	1/1	17.8	13MW11	-	290	-	-	N	2
Iron	1/1	9560	13MW11	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	3/3	149 - 178	13MW11	-	400 (8)	-	-	N	2
Magnesium	1/1	2330	13MW11	-	-	-	-	N	1
Manganese	1/1	153	13MW11	-	~~39~~ 190	-	-	~~Y~~ N	~~3~~ 2
Mercury	1/1	0.11	13MW11	-	2.3	7	3	N	2
Nickel	1/1	8.2	13MW11	-	160	6900	21	N	2
Potassium	1/1	1590	13MW11	-	-	-	-	N	1
Sodium	1/1	184	13MW11	-	-	-	-	N	1
Vanadium	1/1	16.8	13MW11	-	55	-	-	N	2
Zinc	1/1	54.3	13MW11	-	2300	-	42000	N	2
TPH	3/3	26.8 - 856	13TB8	-	500 (9)	-	2500 (9)	Y	3

Footnotes:

1 Results in mg/kg unless otherwise noted. Surface soil designated as soil from depths of 0 to 4 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Hexavalent chromium..
8 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
9 CTDEP, October 3, 1995.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 LOWER SUBASE ZONE 2 - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (mg/kg)		
Aluminum	7210	7210
Arsenic	1.8	1.8
Barium	30.1	30.1
Beryllium	0.29	0.29
Cadmium	1.3	1.3
Calcium	1540	1540
Chromium (total)	12.4	12.4
Cobalt	4.1	4.1
Copper	17.8	17.8
Iron	9560	9560
Lead	178	159
Magnesium	2330	2330
Manganese	153	153
Mercury	0.11	0.11
Nickel	8.2	8.2
Potassium	1590	1590
Sodium	184	184
Vanadium	16.8	16.8
Zinc	54.3	54.3
Miscellaneous (mg/kg)		
TPH	856	344.2667

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 2 - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Methylene chloride	1/3	0.002	13MW17	0.005	85	7	0.01	N	2
Trichloroethene	1/3	0.001	13MW17	0.005	58	3	0.02	N	2
Aluminum	3/3	2670 - 7210	13MW11	-	7800	-	-	N	2
Arsenic	2/3	1.8 - 1.9	13MW10	0.71	0.43	380	15	Y	3
Barium	3/3	15.3 - 30.1	13MW11	-	550	350000	32	N	2
Beryllium	1/3	0.29	13MW11	0.22 - 0.24	0.15	690	180	Y	3
Cadmium	3/3	0.6 - 1.3	13MW11	-	3.9	920	6	N	2
Calcium	3/3	604 - 1650	13MW10	-	-	-	-	N	1
Chromium (total)	3/3	3.9 - 12.4	13MW11	-	39 (7)	140 (7)	19 (7)	N	2
Cobalt	3/3	2.2 - 4.1	13MW11	-	470	-	-	N	2
Copper	3/3	8.6 - 17.8	13MW11	-	290	-	-	N	2
Iron	3/3	4310 - 9560	13MW11	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	6/6	5.4 - 404	13TB11	-	400 (8)	-	-	Y	3
Magnesium	3/3	1150 - 2330	13MW11	-	-	-	-	N	1
Manganese	3/3	125 - 208	13MW17	-	~~39~~ 190	-	-	Y	3
Mercury	1/3	0.11	13MW11	0.1	2.3	7	3	N	2
Nickel	3/3	3.8 - 8.2	13MW11	-	160	6900	21	N	2
Potassium	3/3	1120 - 1590	13MW11	-	-	-	-	N	1
Sodium	3/3	184 - 250	13MW10	-	-	-	-	N	1
Vanadium	3/3	6 - 16.8	13MW11	-	55	-	-	N	2
Zinc	3/3	14 - 54.3	13MW11	-	2300	-	42000	N	2
TPH	5/6	26.8 - 856	13TB8	80	500 (9)	-	2500 (9)	Y	3

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000019

SUMMARY OF COC SELECTION (Continued)
SITE 13 LOWER SUBASE, ZONE 2 - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in mg/kg unless otherwise noted. All soil designated as soil from depths of 0 to 10 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Hexavalent chromium.
8 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
9 CTDEP, October 3, 1995.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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000020

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 LOWER SUBASE ZONE 2 - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
Methylene chloride	2	2.3333
Trichloroethene	1	2
Inorganics (mg/kg)		
Aluminum	7210	4823.3333
Arsenic	1.9	1.3517
Barium	30.1	23.3667
Beryllium	0.29	0.1733
Cadmium	1.3	0.8633
Calcium	1650	1264.6667
Chromium (total)	12.4	7.7667
Cobalt	4.1	2.9
Copper	17.8	11.7
Iron	9560	6330
Lead	404	149
Magnesium	2330	1776.6667
Manganese	208	162
Mercury	0.11	0.07
Nickel	8.2	5.8333
Potassium	1590	1366.6667
Sodium	250	224
Vanadium	16.8	10.7333
Zinc	54.3	29.5
Miscellaneous (mg/kg)		
Tph	856	228.6333

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 2 - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
1,1,1-Trichloroethane	1/18	3	13GW6	5 - 10	200	200	130	N	2
Carbon disulfide	1/18	2	NESO6	5 - 10	-	-	100	N	2
Chloroform	1/18	1	13GW10	5 - 10	100/80	100	0.15	Y	3
Tetrachloroethene	1/18	2	13GW6	5 - 10	5	5	1.1	Y	3
Benzoic acid	1/12	1	NESO6	50	-	-	15000	N	2
Bis(2-ethylhexyl)phthalate	1/12	0.8	13GW10	10	6	6	4.8	N	2
Aluminum	2/18	17.3 - 23.8	13GW6	10 - 67.5	50 - 200 (7)	-	3700	N	2
Arsenic	3/18	1.3 - 4.7	13GW11	2 - 10	50	50	0.045	Y	3
Barium	7/18	18.4 - 41.8	13GW11	5.6 - 26	2000	2000	260	N	2
Boron	10/12	60.8 - 630	13GW10	50 - 72.9	-	-	330	Y	3
Cadmium	1/18	3.3	13GW10	1 - 3.1	5	5	1.8	Y	3
Calcium	18/18	15300 - 11300	13GW10	-	-	-	-	N	1
Chromium (total)	2/18	1.1 - 1.2	13GW11	1 - 5	100	100	18 (8)	N	2
Copper	3/18	4 - 34.7	13GW11	2 - 5	1300 (9)	-	150	N	2
Iron	10/18	29.2 - 6620	13GW11	4 - 50.3	300 (7)	-	1100	~~Y~~ N	~~3~~ 5
Lead	9/17	1.3 - 23.2	13GW11	1 - 10	15 (9)	-	-	Y	4
Magnesium	18/18	4540 - 215000	13GW10	-	-	-	-	N	1
Manganese	7/18	9.5 - 356	13GW11	1 - 7.3	50 (7)	-	~~18~~ 88	Y	3
Nickel	7/18	12.4 - 23.9	NESO6	3 - 12	100	100	73	N	2
Potassium	18/18	3970 - 68800	13GW10	-	-	-	-	N	1
Selenium	3/17	1.2 - 2.8	13GW10	1 - 3	50	50	18	N	2
Sodium	18/18	5500 - 185000	13GW10	-	-	-	-	N	1
Zinc	12/18	5 - 37.6	13GW10	2.9 - 10.5	5000 (7)	-	1100	N	2
TPH	2/18	600	13GW6 / 13GW11	500 - 3000	-	-	500 (10)	Y	3

000023

SUMMARY OF COC SELECTION (Continued)
SITE 13 LOWER SUBASE, ZONE 2 - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample-specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL based on aesthetic water qualities.
8 Hexavalent chromium.
9 Action level.
10 CTDEP, October 3, 1995.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 No COC screening level available; maximum is greater than or equal to Action Level.
5 USEPA Region I does not advocate quantitative evaluation of this chemical.

Revisions
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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 LOWER SUBASE ZONE 2 - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
1,1,1-Trichloroethane	3.5	4.0334
Carbon disulfide	4	4.1334
Chloroform	2.8333	3.9
Tetrachloroethene	3.1667	3.9667
Benzoic acid	13	22.6
Bis(2-ethylhexyl)phthalate	2.9	4.58
Inorganics (ug/L)		
Aluminum	15.2667	14.59
Arsenic	3.6	1.94
Barium	20.7667	15.1167
Boron	463.5	176.605
Cadmium	1.9333	1.1233
Calcium	60316.6667	41293.3333
Chromium (total)	1.7333	1.7333
Copper	12.7333	4.4
Iron	5100	1063.8067
Lead	8.8	3.5967
Magnesium	116266.6667	37871.3333
Manganese	303.3333	64.8767
Nickel	13.6667	10.2867
Potassium	39883.3333	15339.3333
Selenium	1.6667	1.18
Sodium	928083.3333	318856.6667
Zinc	27.6167	14.545
Miscellaneous (ug/L)		
TPH	866.6667	696.6667

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 2 - FILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Aluminum	1/12	33.9	13GW11	10 - 24.8	50 - 200 (7)	-	3700	N	1
Antimony	5/12	5.2 - 15.1	13GW11	5 - 15	6	6	1.5	Y	2
Arsenic	3/12	3.1 - 10	13GW10	2	50	50	0.045	N	1
Barium	6/12	6.3 - 44.3	13GW11	5 - 23.6	2000	2000	260	N	1
Boron	10/12	57 - 627	13GW10	50 - 78.4	-	-	330	N	1
Calcium	12/12	21900 - 113000	13GW10	-	-	-	-	N	1
Chromium (total)	2/12	1.3 - 3.5	13GW11	1 - 4	100	100	18 (9)	N	1
Copper	5/12	2.2 - 5.3	NES06	2 - 5	1300 (8)	-	150	N	1
Iron	2/12	3320 - 5070	13GW11	8.1 - 37.8	300 (7)	-	1100	N	1
Lead	1/8	1.6	13GW17	1 - 20	15 (8)	-	-	N	1
Magnesium	12/12	5600 - 212000	13GW10	-	-	-	-	N	1
Manganese	6/12	1.1 - 387	13GW11	1 - 4.9	50 (7)	-	~~18~~ 88	N	1
Potassium	12/12	5910 - 68100	13GW10	-	-	-	-	N	1
Selenium	2/10	2.2 - 2.7	13GW17	2 - 3	50	50	18	N	1
Sodium	12/12	5300 - 188000	13GW10	-	-	-	-	N	1
Zinc	4/12	4.5 - 37.7	13GW10	3.2 - 14.5	5000	-	1100	N	1

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL (SMCL) based on aesthetic water qualities.
8 Action Level.
9 Hexavalent chromium.

Rationale Designations:

1 Chemical detected in unfiltered sample; filtered results not used in risk assessment.
2 Chemical not detected in unfiltered samples; maximum is greater than or equal to the COC screening level.

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 3 - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Lead	3/3	36.8 - 1320	13TB18	-	400 (7)	-	-	Y	3
TPH	3/3	65.2 - 552	13TB5A	-	500 (8)	-	2500 (8)	Y	3

Footnotes:

1 Results in mg/kg unless otherwise noted. Surface soil designated as soil from depths of 0 to 4 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
8 CTDEP, October 3, 1995.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 LOWER SUBASE ZONE 3 - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (mg/kg)		
Lead	1320	502.6
Miscellaneous (mg/kg)		
TPH	552	355.7333

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 3 - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Aluminum	1/1	8120	13MW12	-	7800	-	-	~~Y~~ N	~~3~~ 4
Arsenic	1/1	2.8	13MW12	-	0.43	380	15	Y	3
Barium	1/1	29.2	13MW12	-	550	350000	32	N	2
Beryllium	1/1	0.33	13MW12	-	0.15	690	180	Y	3
Cadmium	1/1	0.83	13MW12	-	3.9	920	6	N	2
Calcium	1/1	1100	13MW12	-	-	-	-	N	1
Chromium (total)	1/1	10.5	13MW12	-	39 (7)	140 (7)	19 (7)	N	2
Cobalt	1/1	4.4	13MW12	-	470	-	-	N	2
Copper	1/1	8.8	13MW12	-	290	-	-	N	2
Iron	1/1	7230	13MW12	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	5/5	2.6 - 1320	13TB18	-	400 (8)	-	-	Y	3
Magnesium	1/1	1930	13MW12	-	-	-	-	N	1
Manganese	1/1	88.1	13MW12	-	~~39~~ 190	-	-	~~Y~~ N	~~3~~ 2
Nickel	1/1	7	13MW12	-	160	6900	21	N	2
Potassium	1/1	910	13MW12	-	-	-	-	N	1
Sodium	1/1	114	13MW12	-	-	-	-	N	1
Vanadium	1/1	15.7	13MW12	-	55	-	-	N	2
Zinc	1/1	17	13MW12	-	2300	-	42000	N	2
TPH	5/5	65.2 - 3400	13MW12	-	500 (9)	-	2500 (9)	Y	3

Footnotes:

1 Results in mg/kg unless otherwise noted. All soil designated as soil from depths of 0 to 10 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Hexavalent chromium.
8 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
9 CTDEP, October 3, 1995.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 LOWER SUBASE ZONE 3 - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (mg/kg)		
Aluminum	8120	8120
Arsenic	2.8	2.8
Barium	29.2	29.2
Beryllium	0.33	0.33
Cadmium	0.83	0.83
Calcium	1100	1100
Chromium (total)	10.5	10.5
Cobalt	4.4	4.4
Copper	8.8	8.8
Iron	7230	7230
Lead	1320	358.48
Magnesium	1930	1930
Manganese	88.1	88.1
Nickel	7	7
Potassium	910	910
Sodium	114	114
Vanadium	15.7	15.7
Zinc	17	17
Miscellaneous (mg/kg)		
TPH	3400	921.04

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 3 - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Bis(2-ethylhexyl)phthalate	2/3	0.6 - 1	13GW12	10	6	6	4.8	N	2
Fluorene	2/3	1	13GW12	10	-	-	150	N	2
Arsenic	2/4	2.6 - 2.8	13GW12	2 - 3	50	50	0.045	Y	3
Barium	4/4	22.4 - 56.9	13GW12	-	2000	2000	260	N	2
Calcium	4/4	24400 - 28000	13GW12	-	-	-	-	N	1
Iron	4/4	3160 - 6040	13GW12	-	300 (7)	-	1100	~~Y~~ N	~~3~~ 5
Lead	2/4	2.2 - 3.2	13GW12	2	15 (8)	-	-	N	4
Magnesium	4/4	2980 - 3690	13GW12	-	-	-	-	N	1
Manganese	4/4	253 - 329	13GW12	-	50 (7)	-	~~18~~ 88	Y	3
Nickel	1/4	19.1	13GW12	10 - 11	100	100	73	N	2
Potassium	4/4	4020 - 6570	13GW12	-	-	-	-	N	1
Sodium	4/4	39200 - 99700	13GW12	-	-	-	-	N	1
Zinc	1/4	27.8	13GW12	3 - 3.7	5000 (7)	-	1100	N	2

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample-specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL based on aesthetic water qualities.
8 Action level.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 No risk-based COC screening level available; maximum is less than Action Level.
5 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 LOWER SUBASE ZONE 3 - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
Bis(2-ethylhexyl)phthalate	2.9	2.9
Fluorene	3	3
Inorganics (ug/L)		
Arsenic	1.7333	1.7333
Barium	42.2833	42.2833
Calcium	26300	26300
Iron	4875	4875
Lead	2.1333	2.1333
Magnesium	3348.3333	3348.3333
Manganese	289.8333	289.8333
Nickel	9.8667	9.8667
Potassium	5548.3333	5548.3333
Sodium	76600	76600
Zinc	10.3833	10.3833

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 3 - FILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Arsenic	2/3	2.6 - 3.2	13GW12	2	50	50	0.045	N	1
Barium	3/3	46.3 - 54.1	13GW12	-	2000	2000	260	N	1
Calcium	3/3	24000 - 27300	13GW12	-	-	-	-	N	1
Iron	3/3	5200 - 5900	13GW12	-	300 (7)	-	1100	N	1
Magnesium	3/3	2940 - 3290	13GW12	-	-	-	-	N	1
Manganese	3/3	282 - 321	13GW12	-	50 (7)	-	~~18~~ 88	N	1
Potassium	3/3	6050 - 6380	13GW12	-	-	-	-	N	1
Selenium	1/3	3.2	13GW12	2	50	50	18	N	2
Sodium	3/3	86800 - 97700	13GW12	-	-	-	-	N	1
Zinc	1/3	5.1	13GW12	3 - 9.6	5000 (7)	-	1100	N	1

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL (SMCL) based on aesthetic water qualities.

Rationale Designations:

1 Chemical detected in unfiltered sample; filtered results not used in risk assessment.
2 Chemical not detected in unfiltered samples; maximum is less than the COC screening level.

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 4 - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Lead	4/4	280 - 10600	WE4A	-	400 (7)	-	-	Y	3
TPH	4/4	69.2 - 3440	13TB4A	-	500 (8)	-	2500 (8)	Y	3

Footnotes:

1 Results in mg/kg unless otherwise noted. Surface soil designated as soil from depths of 0 to 5 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
8 CTDEP, October 3, 1995.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 LOWER SUBASE ZONE 4 - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (mg/kg)		
Lead	10600	6373.3333
Miscellaneous (mg/kg)		
TPH	3440	1562

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 4 - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Methylene chloride	2/2	0.01 - 0.012	13MW13	-	85	7	0.01	N	2
Tetrachloroethene	2/2	0.006 - 0.008	13MW13	-	12	11	0.04	N	2
Trichloroethene	2/2	0.005	13MW13	-	58	3	0.02	N	2
Aluminum	2/2	4850 - 6510	13MW13	-	7800	-	-	N	2
Arsenic	2/2	1.9 - 2.2	13MW13	-	0.43	380	15	Y	3
Barium	2/2	27.9 - 48.3	13MW13	-	550	350000	32	N	2
Cadmium	2/2	0.79 - 1	13MW13	-	3.9	920	6	N	2
Calcium	2/2	738 - 867	13MW13	-	-	-	-	N	1
Chromium (total)	2/2	7.8 - 17.5	13MW13	-	39 (7)	140 (7)	19 (7)	N	2
Cobalt	2/2	3.5 - 4.1	13MW13	-	470	-	-	N	2
Copper	2/2	9.7 - 14	13MW13	-	290	-	-	N	2
Iron	2/2	5880 - 8560	13MW13	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	8/8	25.2 - 10600	WE4A	-	400 (8)	-	-	Y	3
Magnesium	2/2	1870 - 2660	13MW13	-	-	-	-	N	1
Manganese	2/2	100 - 155	13MW13	-	~~99~~ 190	-	-	~~Y~~ N	~~3~~ 2
Nickel	2/2	5.8 - 9.5	13MW13	-	160	6900	21	N	1
Potassium	2/2	1280 - 1890	13MW13	-	-	-	-	N	1
Sodium	2/2	124 - 126	13MW13	-	-	-	-	N	1
Vanadium	2/2	10.6 - 16.1	13MW13	-	55	-	-	N	2
Zinc	2/2	28.1 - 62.4	13MW13	-	2300	-	42000	N	2
TPH	9/9	69.2 - 11800	13TB2A	-	500 (9)	-	2500 (9)	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 13 LOWER SUBASE, ZONE 4 - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in mg/kg unless otherwise noted. Surface soil designated as soil from depths of 0 to 10 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Hexavalent chromium.
8 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
9 CTDEP, October 3, 1995.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 LOWER SUBASE ZONE 4 - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
Methylene chloride	12	12
Tetrachloroethene	8	8
Trichloroethene	5	5
Inorganics (mg/kg)		
Aluminum	6510	6510
Arsenic	2.2	2.2
Barium	48.3	48.3
Cadmium	1	1
Calcium	867	867
Chromium (total)	17.5	17.5
Cobalt	4.1	4.1
Copper	14	14
Iron	8560	8560
Lead	10600	3524.85
Magnesium	2660	2660
Manganese	155	155
Nickel	9.5	9.5
Potassium	1890	1890
Sodium	126	126
Vanadium	16.1	16.1
Zinc	62.4	62.4
Miscellaneous (mg/kg)		
TPH	11800	2611.2857

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 4 - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
1,1,1-Trichloroethane	1/26	1	NESO11	5 - 10	200	200	130	N	2
1,1-Dichloroethane	7/26	1 - 15	13GW13	5 - 10	-	-	81	N	2
1,1-Dichloroethene	4/26	4 - 57	13GW13	5 - 10	7	7	0.044	Y	3
Ethylbenzene	2/26	2 - 8	WE1	5 - 10	700	700	130	N	2
Methylene chloride	1/26	9	WE5	5 - 11	5	5	4.1	Y	3
Toluene	1/26	36	NESO10	5 - 10	1000	1000	75	N	2
Vinyl chloride	2/26	5 - 12	13GW13	10	2	2	0.019	Y	3
Xylenes, total	3/26	5 - 27	WE1	5 - 10	10000	10000	1200	N	2
Acenaphthene	2/16	0.8 - 1	13GW16	10	-	-	220	N	2
Benzo(a)anthracene	1/16	1	NESO11	10	-	-	0.092	Y	3
Benzo(a)pyrene	1/16	0.8	NESO11	10	0.2	0.2	0.0092	Y	3
Benzo(b)fluoranthene	1/16	0.6	NESO11	10	-	-	0.092	Y	3
Benzo(g,h,i)perylene	1/16	1	NESO11	10	-	-	-	N	1
Benzo(k)fluoranthene	1/16	1	NESO11	10	-	-	0.92	Y	3
Bis(2-ethylhexyl)phthalate	2/16	1 - 10	NESO11	10	6	6	4.8	Y	3
Chrysene	1/16	0.9	NESO11	10	-	-	9.2	N	2
Di-n-butyl phthalate	1/16	0.6	13GW16	10	-	-	370	N	2
Fluoranthene	1/16	2	NESO11	10	-	-	150	N	2
Indeno(1,2,3-cd)pyrene	1/16	0.7	NESO11	10	-	-	0.092	Y	3
Naphthalene	2/16	0.6 - 0.8	13GW15	10	-	-	150	N	2
Phenanthrene	1/16	1	NESO11	10	-	-	-	N	1
Pyrene	3/16	1 - 2	NESO11	10	-	-	110	N	2
Aluminum	5/26	18.2 - 40800	NESO11	14 - 78.7	50 - 200 (7)	-	3700	~~Y~~	~~3~~ 5
Arsenic	14/26	1.3 - 29.6	WE5	2 - 20	50	50	0.045	Y	3
Barium	21/26	6 - 283	NESO11	10.9 - 37.6	2000	2000	260	Y	3
Beryllium	2/26	1.1 - 2.6	NESO11	1	4	4	0.016	Y	3
Boron	16/16	80.8 - 2070	13GW15	-	-	-	330	Y	3
Cadmium	4/25	1.5 - 25.5	NESO10	1 - 3	5	5	1.8	Y	3
Calcium	26/26	22400 - 18100	13GW15	-	-	-	-	N	1
Chromium (total)	2/26	1.4 - 116	NESO11	1 - 5	100	100	18 (8)	Y	3
Cobalt	1/26	25.6	NESO11	1 - 5	-	-	220	N	2

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SUMMARY OF COC SELECTION (Continued)
SITE 13 LOWER SUBASE, ZONE 4 - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Copper	8/25	5 - 649	NESO11	1 - 5	1300 (9)	-	150	~~Y~~ N	~~3~~ 5
Iron	24/26	95.2 - 36700	NESO11	16 - 40.6	300 (7)	-	1100	~~Y~~ N	~~3~~ 5
Lead	13/22	1.6 - 2760	NESO11	2 - 20	15 (9)	-	-	Y	4
Magnesium	26/26	2530 - 776000	13GW15	-	-	-	-	N	1
Manganese	25/26	3.4 - 1980	NESO11	11.9	50 (7)	-	~~18~~ 88	Y	3
Mercury	1/26	0.47	NESO11	0.2	2	2	1.1	N	2
Nickel	12/26	11.6 - 80	NESO11	3 - 12	100	100	73	Y	3
Potassium	26/26	4490 - 259000	13GW15	-	-	-	-	N	1
Selenium	1/23	7.7	13GW14	1 - 30	50	50	18	N	2
Sodium	26/26	0800 - 631000	13GW15	-	-	-	-	N	1
Thallium	4/17	3.6 - 11.5	13GW15	1 - 10	2	2	0.26 (10)	Y	3
Vanadium	3/26	4.6 - 105	NESO11	1 - 20	-	-	26	Y	3
Zinc	18/26	4.9 - 924	NESO11	2 - 10	5000 (7)	-	1100	N	2
TPH	4/26	500 - 5400	13GW16	500 - 3000	-	-	500 (11)	Y	3

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample-specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL based on aesthetic water qualities.
8 Hexavalent chromium.
9 Action level.
10 Thallic oxide.
11 CTDEP, October 3, 1995.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 No risk-based COC screening level available; maximum is greater than or equal to Action Level.
5 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 13 LOWER SUBASE ZONE 4 - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
1,1,1-Trichloroethane	3.6667	3.926
1,1-Dichloroethane	8.3333	4.1852
1,1-Dichloroethene	27.3333	6.6111
Ethylbenzene	5.1667	4.0741
Methylene chloride	5.5	4.1482
Toluene	15.3333	5.2222
Vinyl chloride	7.3333	5.2593
Xylenes, total	11.5	5.3704
Acenaphthene	0.9	4.4875
Benzo(a)anthracene	3	4.75
Benzo(a)pyrene	2.9	4.7375
Benzo(b)fluoranthene	2.8	4.725
Benzo(g,h,i)perylene	3	4.75
Benzo(k)fluoranthene	3	4.75
Bis(2-ethylhexyl)phthalate	7.5	5.0625
Chrysene	2.95	4.7438
Di-n-butyl phthalate	2.8	4.725
Fluoranthene	3.5	4.8125
Indeno(1,2,3-cd)pyrene	2.85	4.7313
Naphthalene	2.9	4.4625
Phenanthrene	3	4.75
Pyrene	3.5	4.3125
Inorganics (ug/L)		
Aluminum	13607.9333	1538.5907
Arsenic	15.5333	6.8926
Barium	116.1333	44.8241
Beryllium	1.2	0.6
Boron	1980	786.8813
Cadmium	9.3333	2.6148
Calcium	172166.6667	77088.8889
Chromium (total)	40.1667	6.0889
Cobalt	10.2	2.8926
Copper	221.0667	27.0583
Iron	17166.6667	5159.3704
Lead	931.2	114.5519
Magnesium	646833.3333	196129.6296
Manganese	798.6667	248.7019
Mercury	0.2233	0.1137
Nickel	35.4667	12.9037
Potassium	229166.6667	71864.4445
Selenium	11.35	2.863
Sodium	5573333.333	1674392.593
Thallium	7.325	4.4219
Vanadium	39	9.163
Zinc	331.9333	49.1556
Miscellaneous (ug/L)		
TPH	2300	829.6296

SUMMARY OF COC SELECTION
SITE 13 LOWER SUBASE, ZONE 4 - FILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Aluminum	1/16	11	13GW16	10 - 37.6	50 - 200 (7)	-	3700	N	1
Antimony	2/16	8.1 - 14.8	13GW14	12 - 22.3	6	6	1.5	Y	2
Arsenic	5/16	2.3 - 11	NESO10	1 - 20	50	50	0.045	N	1
Barium	13/16	6 - 139	NESO10	9.6 - 39.1	2000	2000	260	N	1
Boron	16/16	78.8 - 2370	13GW15	-	-	-	330	N	1
Calcium	16/16	24500 - 238000	13GW15	-	-	-	-	N	1
Copper	6/15	3.5 - 20.4	13GW16	2 - 5	1300 (8)	-	150	N	1
Iron	13/16	56.2 - 8490	WE5	17.8 - 50	300 (7)	-	1100	N	1
Lead	4/15	2.5 - 14.1	NESO11	1 - 20	15 (8)	-	-	N	1
Magnesium	16/16	2900 - 781000	13GW16	-	-	-	-	N	1
Manganese	15/16	6.1 - 611	WE5	10.9	50 (7)	-	~~18~~ 88	N	1
Potassium	16/16	6950 - 263000	13GW15	-	-	-	-	N	1
Selenium	1/15	2.1	NESO10	2 - 30	50	50	18	N	1
Sodium	14/16	6200 - 635000	13GW16	142	-	-	-	N	1
Thallium	1/15	6.8	WE5	1 - 20	2	2	0.26 (9)	N	1
Vanadium	1/16	5.7	13GW16	1 - 5	-	-	26	N	1
Zinc	6/16	8.5 - 20.6	NESO10	2 - 17.1	5000 (7)	-	1100	N	1

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL (SMCL) based on aesthetic water qualities.
8 Action Level.
9 Thallic oxide.

Rationale Designations:

1 Chemical detected in unfiltered sample; filtered results not used in risk assessment.
2 Chemical not detected in unfiltered samples; maximum is less than the COC screening level.

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Soil Data (0-10') - Lower Subase: Zone 1

~~Table X~~

Selection of Constituents of Potential Concern

Constituent	Frequency of Detection	Range of Detection Dist	Average Positive Hits	Represent. Concent.	T-Test Y-reject Ho N-accept Ho na-not applicable	WRS Test Y-reject Ho N-accept Ho na-not applicable	Test of Proportions Y-reject Ho N-accept Ho na-not applicable	Exceed the 95th Percentile Y-Yes N-No na-not applicable	Above Back-ground Y-Yes N-No	Comment
LEAD	11/11	3.4000Log ✓ 383.0000	67.9636	383(c)	na	na	na	na	na	
TPH	10/11	23.8000Log ✓ 4900.0000	866.8800	4900(c)	na	na	na	na	na	

000057

Dataset: U1 IES
Media : SOIL DATA (0-10') - (NSB-NLON)
Group : LOWER SUBASE - FIRE/POWER HOUSE

Parameter : LEAD (MG/KG)

	Sample Results	Background Results
Count	11.0000	No samples
Number of Detects	11.0000	
Average	67.9636	
Detection Limit - Minimum	NA	
Detection Limits - Maximum	NA	
Positive Hits - Minimum	3.4000	
Positive Hits - Maximum	383.0000 ucl	
Average Of Positive Hits	~~67.9636~~	
Standard Deviation	110.4722	
Upper Confidence Limit - Normal	128.3189	
Upper Confidence Limit - Lognormal	502.7437 > max	
95th Percentile - Nonparametric	383.0000 hit	
95th Percentile - Normal	249.6904	
95th Percentile - Lognormal	298.3786	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.7654	
Corr Coeff - Detected - Lognormal	0.9851	
Corr Coeff - Total - Normal	0.7654	
Corr Coeff - Total - Lognormal	0.9851	
Corr Coeff - Crit Val - Detected	0.9220	
Corr Coeff - Crit Val - Total	0.9220	
W-Test - Table Value	0.8500	NA
W-Test - Normal	0.6137	NA
W-Test - Lognormal	0.9619	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000059

Dataset: UTMP_RES
Media : SOIL DATA (0-10') - (NSB-NLON)
Group : LOWER SUBASE - FIRE/POWER HOUSE

Parameter : TPH (MG/KG)

	Sample Results	Background Results
Count	11.0000	No samples
Number of Detects	10.0000	
Average	791.2545	
Detection Limit - Minimum	35.0000	
Detection Limits - Maximum	35.0000	
Positive Hits - Minimum	~~23.8000~~	
Positive Hits - Maximum	4900.0000 ucl	
Average Of Positive Hits	~~866.8800~~	
Standard Deviation	1393.6999	
Upper Confidence Limit - Normal	1552.6865	
Upper Confidence Limit - Lognormal	8843.7392 > max	
95th Percentile - Nonparametric	4900.0000 hit	
95th Percentile - Normal	3083.8908	
95th Percentile - Lognormal	3949.9150	

Shapiro-Wilk and Probabilty Plot Results:

Corr Coeff - Detected - Normal	0.6179	
Corr Coeff - Detected - Lognormal	0.9320	
Corr Coeff - Total - Normal	0.7113	
Corr Coeff - Total - Lognormal	0.9661	
Corr Coeff - Crit Val - Detected	0.9170	
Corr Coeff - Crit Val - Total	0.9220	
W-Test - Table Value	0.8500	NA
W-Test - Normal	0.5401	NA
W-Test - Lognormal	0.9330	NA
Type of Distribution	LOGNORMAL ✓	

Test Results:

000060

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 1
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	240	IR:	0
EF:	80	EF:	1
Fi:	0.5	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	3.76E–07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	5.37E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~	
Arsenic	0.85	1	0.00E+00	3.19E–07	4.56E–09	3.00E–04	1.50E+00
Beryllium	0.19	1	0.00E+00	7.14E–08	1.02E–09	5.00E–03	4.30E+00
~~Iron~~	~~6120~~	~~1~~	~~0.00E+00~~	~~2.30E–03~~	~~3.28E–05~~	~~3.00E–01~~	
~~Manganese~~	~~107~~	~~1~~	~~0.00E+00~~	~~4.02E–05~~	~~5.74E–07~~	~~5.00E–03~~ 2.4E-2	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Arsenic	0.00E+00	1.06E−03	6.84E−09
Beryllium	0.00E+00	1.43E−05	4.39E−09
~~Iron~~	~~0.00E+00~~	~~7.66E−03~~	~~0.00E+00~~
~~Manganese~~	~~0.00E+00~~	~~8.04E−03~~ 1.68E−3	~~0.00E+00~~
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	**~~1.68E−02~~** 1.07 E-3	**1.12E−08**

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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 13 – Lower Subase, Zone 1
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, CTE

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE: Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	80
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.19E+01

CONVERSION FACTOR (CARCIN) = 1.70E–01

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Construction Worker, CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Benzene	0.003	O	6.30E-01	2.60E-01	2.10E-02	1.30E-02	5.31E-07
~~Aluminum~~	~~2.34~~	~~I~~			~~1.00E-03~~		~~1.87E-05~~
Antimony	0.0057	I			1.00E-03		4.56E-08
Arsenic	0.0036	I			1.00E-03		2.88E-08
Beryllium	0.00053	I			1.00E-03		4.24E-09
Boron	0.208	I			1.00E-03		1.66E-06
Cadmium	0.002	I			1.00E-03		1.60E-08
~~Iron~~	~~2.18~~	~~I~~			~~1.00E-03~~		~~1.74E-05~~
Manganese	0.307	I			1.00E-03		2.46E-06
Selenium	0.003	I			1.00E-03		2.40E-08
Vanadium	0.0422	I			1.00E-03		3.38E-07
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Benzene	6.32E-06		0.00E+00
~~Aluminum~~	~~2.23E-04~~	~~5.00E-02~~	~~4.45E-03~~
Antimony	5.43E-07	4.00E-04	1.36E-03
Arsenic	3.43E-07	2.80E-04	1.22E-03
Beryllium	5.04E-08	2.50E-04	2.02E-04
Boron	1.98E-05	4.50E-03	4.40E-03
Cadmium	1.90E-07	~~1.50E-05~~ 2.5E-5	~~1.27E-02~~ 7.62E-3
~~Iron~~	~~3.08E-04~~	~~1.50E-02~~	~~1.38E-02~~
Manganese	2.92E-05	~~4.50E-04~~ 7.2E-4	~~1.95E-01~~ 4.06E-2
Selenium	2.86E-07	1.00E-03	2.86E-04
Vanadium	4.02E-06	3.50E-04	1.15E-02
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~2.45E-01~~ 6.72E-2

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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Benzene	9.03E-08	2.90E-02	2.62E-09
~~Aluminum~~	~~3.18E-06~~		~~0.00E+00~~
Antimony	7.75E-09		0.00E+00
Arsenic	4.90E-09	1.60E+00	7.83E-09
Beryllium	7.21E-10		0.00E+00
Boron	2.83E-07		0.00E+00
Cadmium	2.72E-09		0.00E+00
~~Iron~~	~~2.06E-06~~		~~0.00E+00~~
Manganese	4.17E-07		0.00E+00
Selenium	4.08E-09		0.00E+00
Vanadium	5.74E-08		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			1.05E-08

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Revisions
08/14/96
KAS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 1
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	480	IR:	0
EF:	120	EF:	1
Fi:	1	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 2.25E–06 (AVG ANNUAL DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

ADULT/YOUTH (CANCER RISK):
CF: 3.22E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~	
Arsenic	1.9	1	0.00E+00	4.28E−06	6.12E−08	3.00E−04	1.50E+00
Beryllium	0.4	1	0.00E+00	9.02E−07	1.29E−08	5.00E−03	4.30E+00
~~Iron~~	~~9030~~	~~1~~	~~0.00E+00~~	~~2.04E−02~~	~~2.91E−04~~	~~3.00E−01~~	
~~Manganese~~	~~148~~	~~1~~	~~0.00E+00~~	~~3.34E−04~~	~~4.77E−06~~	~~3.00E−08~~ 2.4E-2	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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Revisions
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RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Arsenic	0.00E+00	1.43E−02	9.18E−08
Beryllium	0.00E+00	1.80E−04	5.54E−08
~~Iron~~	~~0.00E+00~~	~~6.79E−03~~	~~0.00E+00~~
~~Manganese~~	~~0.00E+00~~	~~6.67E−02~~ 1.39E-2	~~0.00E+00~~
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~**1.49E−01**~~ 1.45E-2	**1.47E−07**

Revisions
08/14/96
KAS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 13 – Lower Subase, Zone 1
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE: Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	120
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.78E+01

CONVERSION FACTOR (CARCIN) = 2.55E–01

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Construction Worker, RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Benzene	0.003	O	6.30E-01	2.60E-01	2.10E-02	1.30E-02	5.31E-07
~~Aluminum~~	~~13.7~~	~~I~~			~~1.00E-03~~		~~1.40E-04~~
Antimony	0.0057	I			1.00E-03		4.56E-08
Arsenic	0.0093	I			1.00E-03		7.44E-08
Beryllium	0.0009	I			1.00E-03		7.20E-09
Boron	1.22	I			1.00E-03		9.76E-06
Cadmium	0.0099	I			1.00E-03		7.92E-08
~~Iron~~	~~7.81~~	~~I~~			~~1.00E-03~~		~~6.89E-05~~
Manganese	0.919	I			1.00E-03		7.35E-06
Selenium	0.0112	I			1.00E-03		8.96E-08
Vanadium	0.353	I			1.00E-03		2.82E-06
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

Revisions
08/14/96
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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Benzene	9.48E-06		0.00E+00
~~Aluminum~~	~~1.96E-03~~	~~5.00E-02~~	~~3.91E-02~~
Antimony	8.14E-07	4.00E-04	2.03E-03
Arsenic	1.33E-06	2.80E-04	4.74E-03
Beryllium	1.29E-07	2.50E-04	5.14E-04
Boron	1.74E-04	4.50E-03	3.87E-02
Cadmium	1.41E-06	~~1.50E-05~~ 2.5E-5	~~9.42E-02~~ 5.65E-2
~~Iron~~	~~1.09E-03~~	~~1.50E-02~~	~~7.24E-02~~
Manganese	1.31E-04	~~1.50E-04~~ 7.2E-4	~~8.75E-01~~ 1.82E-1
Selenium	1.60E-06	1.00E-03	1.60E-03
Vanadium	5.04E-05	3.50E-04	1.44E-01
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~1.27E+00~~ 4.30 E-1

Revisions
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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Benzene	1.35E–07	2.90E–02	3.93E–09
~~Aluminum~~	~~2.79E–05~~		~~0.00E+00~~
Antimony	1.16E–08		0.00E+00
Arsenic	1.90E–08	1.60E+00	3.04E–08
Beryllium	1.84E–09		0.00E+00
Boron	2.49E–06		0.00E+00
Cadmium	2.02E–08		0.00E+00
~~Iron~~	~~1.55E–05~~		~~0.00E+00~~
Manganese	1.87E–06		0.00E+00
Selenium	2.28E–08		0.00E+00
Vanadium	7.20E–07		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			3.43E–08

Revisions 4/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 1
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	100
EDc:	2
BWc:	15
IRa:	50
EDa:	7
BWa:	70
IFadj:	18.33333
Fi:	0.5
EF:	150
AT(NONC):	3285
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 4.2E–07 CARCIN = 5.4E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~		~~0.00E+00~~	~~0.00E+00~~
Arsenic	0.85	1	3.56E-07	4.57E-08	3.00E-04	1.50E+00	1.19E-03	6.86E-08
Beryllium	0.19	1	7.95E-08	1.02E-08	5.00E-03	4.30E+00	1.59E-05	4.40E-08
~~Iron~~	~~6120~~	~~1~~	~~2.56E-03~~	~~3.29E-04~~	~~3.00E-01~~		~~8.54E-03~~	~~0.00E+00~~
~~Manganese~~	~~107~~	~~1~~	~~4.48E-05~~	~~5.76E-06~~	~~5.00E-03~~ 2.4E-2		~~8.96E-03~~ 1.87E-3	~~0.00E+00~~
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.60E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~1.87E-02~~ 1.21E-3	1.13E-07

Revisions 08/14/96 KAS

000478

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 1
LOCATION: NSB-NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE-ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE-ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	200
EDc:	6
BWc:	15
IRa:	100
EDa:	24
BWa:	70
IFadj:	114.2857
Fi:	1
EF:	150
AT(NONC):	10950
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 1.6E-06 CARCIN = 6.7E-07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 1
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~		~~0.00E+00~~	~~0.00E+00~~
Arsenic	1.9	1	2.97E−06	1.27E−06	3.00E−04	1.50E+00	9.92E−03	1.91E−06
Beryllium	0.4	1	6.26E−07	2.68E−07	5.00E−03	4.30E+00	1.25E−04	1.15E−06
~~Iron~~	~~9030~~	~~1~~	~~1.41E−02~~	~~6.06E−03~~	~~3.00E−01~~		~~4.71E−02~~	~~0.00E+00~~
~~Manganese~~	~~148~~	~~1~~	~~2.32E−04~~	~~9.93E−05~~	~~5.00E−03~~ 2.4E-2		~~4.63E−02~~ 9.65E-3	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~1.04E−01~~ 1.00E-2	3.07E−06

Revisions
08/14/96
KMS

000080

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 2
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x FI x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
FI = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	50	IR:	0
EF:	150	EF:	1
FI:	0.5	FI:	1
ED:	6	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	2190	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 1.47E–07 (AVG ANNUAL DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

ADULT/YOUTH (CANCER RISK):
CF: 1.26E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~	
Arsenic	1.8	1	0.00E+00	2.64E–07	2.26E–08	3.00E–04	1.50E+00
Beryllium	0.29	1	0.00E+00	4.26E–08	3.65E–09	5.00E–03	4.30E+00
~~Iron~~	~~9500~~	~~1~~	~~0.00E+00~~	~~1.40E–03~~	~~1.20E–04~~	~~3.00E–01~~	
~~Manganese~~	~~150~~	~~1~~	~~0.00E+00~~	~~2.25E–05~~	~~1.92E–06~~	~~5.00E–03~~ 2.4E-2	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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Revisions
08/14/96
AAS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Arsenic	0.00E+00	8.81E–04	3.40E–08
Beryllium	0.00E+00	8.51E–06	1.57E–08
~~Iron~~	~~0.00E+00~~	~~4.68E–03~~	~~0.00E+00~~
~~Manganese~~	~~0.00E+00~~	~~4.40E–03~~ 9.35E-4	~~0.00E+00~~
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~**4.91E–02**~~ 8.90E-4	**4.97E–08**

Revisions
08/14/96
AMS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 2
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	100	IR:	0
EF:	150	EF:	1
Fi:	1	Fi:	1
ED:	25	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	9125	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 5.87E–07 (AVG ANNUAL DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

ADULT/YOUTH (CANCER RISK):
CF: 2.10E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~	
Arsenic	1.8	1	0.00E+00	1.06E–06	3.77E–07	3.00E–04	1.50E+00
Beryllium	0.29	1	0.00E+00	1.70E–07	6.08E–08	5.00E–03	4.30E+00
~~Iron~~	~~9560~~	~~1~~	~~0.00E+00~~	~~5.61E–06~~	~~2.00E–06~~	~~3.00E–01~~	
~~Manganese~~	~~153~~	~~1~~	~~0.00E+00~~	~~8.98E–05~~	~~3.21E–05~~	~~5.00E–02~~ 2.4E-2	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/14/96
AS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Full–Time Employee (Surface Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Arsenic	0.00E+00	3.52E–03	5.66E–07
Beryllium	0.00E+00	3.41E–05	2.61E–07
~~Iron~~	~~0.00E+00~~	~~1.87E–02~~	~~0.00E+00~~
~~Manganese~~	~~0.00E+00~~	~~1.80E–02~~ 3.75E-3	~~0.00E+00~~
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~**4.02E–02**~~ 3.55 E-3	**8.28E–07**

Revisions
08/14/96
KMS

000087

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 2
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	240	IR:	0
EF:	80	EF:	1
Fi:	0.5	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	3.76E–07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	5.37E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~	
Arsenic	1.4	1	0.00E+00	5.26E–07	7.51E–09	3.00E–04	1.50E+00
Beryllium	0.17	1	0.00E+00	6.39E–08	9.12E–10	5.00E–03	4.30E+00
~~Iron~~	~~6330~~	~~1~~	~~0.00E+00~~	~~2.38E–06~~	~~3.40E–05~~	~~8.00E–01~~	
Manganese	162	1	0.00E+00	6.09E–05	8.70E–07	~~5.00E–03~~ 2.4E-2	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/14/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Arsenic	0.00E+00	1.75E–03	1.13E–08
Beryllium	0.00E+00	1.28E–05	3.92E–09
~~Iron~~	~~0.00E+00~~	~~7.93E–03~~	~~0.00E+00~~
Manganese	0.00E+00	~~1.22E–02~~ 2.54E-3	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	~~2.19E–02~~ 4.30E-3	1.52E–08

Revisions
08/14/96
KMS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 13 – Lower Subase, Zone 2
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/98

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, CTE

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE: Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	80
A:	3600
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.19E+01

CONVERSION FACTOR (CARCIN) = 1.70E–01

000093

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Construction Worker, CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Tetrachloroethene	0.003	O	4.30E+00	9.00E-01	4.80E-02	2.50E-01	1.28E-06
Chloroform	0.003	O	1.10E+00	4.70E-01	8.90E-03	9.30E-03	2.37E-07
Antimony	0.0082	I			1.00E-03		6.56E-08
Arsenic	0.0019	I			1.00E-03		1.52E-08
Boron	0.177	I			1.00E-03		1.42E-06
Cadmium	0.0011	I			1.00E-03		8.80E-09
~~Iron~~	~~1.08~~	~~I~~			~~1.00E-03~~		~~8.40E-06~~
Manganese	0.0649	I			1.00E-03		5.19E-07
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
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							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

000094

Revisions
08/14/96
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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Tetrachloroethene	1.53E-05	1.00E-02	1.53E-03
Chloroform	2.82E-06	1.00E-02	2.82E-04
Antimony	7.81E-07	4.00E-04	1.95E-03
Arsenic	1.81E-07	2.80E-04	6.46E-04
Boron	1.68E-05	4.50E-03	3.74E-03
Cadmium	1.05E-07	~~1.50E-05~~ 2,5E-5	~~6.98E-03~~ 4.19E-3
~~Iron~~	~~1.01E-04~~	~~1.50E-02~~	~~6.73E-03~~
Manganese	6.18E-06	~~1.50E-04~~ 7.2 E-4	~~4.12E-02~~ 8.58E-3
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~6.30E-02~~ 2.09E-2

Revisions
08/14/96
KAS

000635

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Tetrachloroethene	2.18E-07	5.20E-02	1.14E-08
Chloroform	4.03E-08	6.10E-03	2.46E-10
Antimony	1.12E-08		0.00E+00
Arsenic	2.58E-09	1.60E+00	4.13E-09
Boron	2.41E-07		0.00E+00
Cadmium	1.50E-09		0.00E+00
~~Iron~~	~~1.44E-06~~		~~0.00E+00~~
Manganese	8.83E-08		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			1.57E-08

Revisions
08/14/96
KMS

000036

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 2
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	480	IR:	0
EF:	120	EF:	1
Fi:	1	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	2.25E–06	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	3.22E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Aluminum	0	1	0.00E+00	0.00E+00	0.00E+00	1.00E+00	
Arsenic	1.9	1	0.00E+00	4.28E−06	6.12E−08	3.00E−04	1.50E+00
Beryllium	0.29	1	0.00E+00	6.54E−07	9.34E−09	5.00E−03	4.30E+00
~~Iron~~	~~9560~~	~~1~~	~~0.00E+00~~	~~2.16E−02~~	~~3.08E−04~~	~~3.00E−01~~	
Manganese	208	1	0.00E+00	4.69E−04	6.70E−06	~~5.00E−03~~ 2.4E-2	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/14/96
KMS

RISK ASSESSMENT SPREADSHEET -- INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 13 -- Lower Subase, Zone 2
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aluminum	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	1.43E-02	9.18E-08
Beryllium	0.00E+00	1.31E-04	4.02E-08
~~Iron~~	~~0.00E+00~~	~~7.18E-02~~	~~0.00E+00~~
Manganese	0.00E+00	~~0.38E-02~~ 1.95E-2	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~**1.80E-01**~~ 3.39E-2	**1.32E-07**

Revisions
08/14/96
KMB

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 13 – Lower Subase, Zone 2
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE: Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	120
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.78E+01

CONVERSION FACTOR (CARCIN) = 2.55E–01

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Construction Worker, RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Tetrachloroethene	0.003	O	4.30E+00	9.00E-01	4.60E-02	2.50E-01	1.28E-06
Chloroform	0.003	O	1.10E+00	4.70E-01	8.90E-03	9.30E-03	2.37E-07
Antimony	0.0151	I			1.00E-03		1.21E-07
Arsenic	0.0036	I			1.00E-03		2.88E-08
Boron	0.464	I			1.00E-03		3.71E-06
Cadmium	0.0019	I			1.00E-03		1.52E-08
~~Iron~~	~~5.1~~	~~I~~			~~1.00E-03~~		~~4.08E-05~~
Manganese	0.303	I			1.00E-03		2.42E-06
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

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Revisions
08/14/96

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Tetrachloroethene	2.29E-05	1.00E-02	2.29E-03
Chloroform	4.23E-06	1.00E-02	4.23E-04
Antimony	2.16E-06	4.00E-04	5.39E-03
Arsenic	5.14E-07	2.80E-04	1.84E-03
Boron	6.62E-05	4.50E-03	1.47E-02
Cadmium	2.71E-07	~~1.50E-05~~ 2.5E-5	~~1.81E-02~~ 1.09E-2
~~Iron~~	~~7.28E-04~~	~~1.50E-02~~	~~4.85E-02~~
Manganese	4.33E-05	~~1.50E-04~~ — 7.2E-4	~~2.88E-01~~ 6.00E-2
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~[illegible]E-01~~ 9.55E-2

Revisions
08/14/96
TMS

000103

RISK ASSESSMENT SPREADSHEET -- DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 13 -- Lower Subase, Zone 2
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Tetrachloroethene	3.27E-07	5.20E-02	1.70E-08
Chloroform	6.05E-08	6.10E-03	3.69E-10
Antimony	3.08E-08		0.00E+00
Arsenic	7.34E-09	1.60E+00	1.17E-08
Boron	9.46E-07		0.00E+00
Cadmium	3.66E-09		0.00E+00
~~Iron~~	~~1.04E-05~~		~~0.00E+00~~
Manganese	6.18E-07		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			2.91E-08

000104

Revisions
08/14/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 2
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	100
EDc:	2
BWc:	15
IRa:	50
EDa:	7
BWa:	70
IFadj:	18.33333
Fi:	0.5
EF:	150
AT(NONC):	3285
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 4.2E–07 CARCIN = 5.4E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~		~~0.00E+00~~	~~0.00E+00~~
Arsenic	1.4	1	5.86E−07	7.53E−08	3.00E−04	1.50E+00	1.95E−03	1.13E−07
Beryllium	0.17	1	7.12E−08	9.15E−09	5.00E−03	4.30E+00	1.42E−05	3.93E−08
~~Iron~~	~~6330~~	~~1~~	~~2.65E−03~~	~~3.41E−04~~	~~3.00E−01~~		~~8.83E−03~~	~~0.00E+00~~
Manganese	162	1	6.78E−05	8.72E−06	~~5.00E−03~~ 2.4E-2		~~1.36E−02~~ 2.83E-3	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~3.44E−02~~ 4.79E-3	1.52E−07

Revisions
08/14/96
KMS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 2
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	200
EDc:	6
BWc:	15
IRa:	100
EDa:	24
BWa:	70
IFadj:	114.2857
Fi:	1
EF:	150
AT(NONC):	10950
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 1.6E–06 CARCIN = 6.7E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 2
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~		~~0.00E+00~~	~~0.00E+00~~
Arsenic	1.9	1	2.97E−06	1.27E−06	3.00E−04	1.50E+00	9.92E−03	1.91E−06
Beryllium	0.29	1	4.54E−07	1.95E−07	5.00E−03	4.30E+00	9.08E−05	8.37E−07
~~Iron~~	~~9560~~	~~1~~	~~1.50E−02~~	~~6.41E−03~~	~~8.00E−01~~		~~4.99E−02~~	~~0.00E+00~~
Manganese	208	1	3.26E−04	1.40E−04	~~5.00E−03~~ 2.4E-2		~~6.51E−02~~ 1.36E-2	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~1.25E−01~~ 2.36E-2	2.75E−06

Revisions
08/14/96
KMS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 3
LOCATION: NSB-NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	240	IR:	0
EF:	80	EF:	1
Fi:	0.5	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	3.76E-07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	5.37E-09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
~~Aluminum~~	~~8120~~	~~1~~	~~0.00E+00~~	~~3.05E-03~~	~~4.36E-05~~	~~1.00E+00~~	
Arsenic	2.8	1	0.00E+00	1.05E–06	1.50E–08	3.00E–04	1.50E+00
Beryllium	0.33	1	0.00E+00	1.24E–07	1.77E–09	5.00E–03	4.30E+00
~~Iron~~	~~7230~~	~~1~~	~~0.00E+00~~	~~2.72E-03~~	~~3.88E-05~~	~~3.00E-01~~	
~~Manganese~~	~~88.1~~	~~1~~	~~0.00E+00~~	~~3.31E-05~~	~~4.73E-07~~	~~5.00E-03~~ 2.4E-2	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/14/96
JS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0.00E+00~~	~~3.05E-03~~	~~0.00E+00~~
Arsenic	0.00E+00	3.51E-03	2.25E-08
Beryllium	0.00E+00	2.48E-05	7.62E-09
~~Iron~~	~~0.00E+00~~	~~0.06E-03~~	~~0.00E+00~~
~~Manganese~~	~~0.00E+00~~	~~6.02E-03~~ 1.38E-3	~~0.00E+00~~
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~2.28E-02~~ 3.53E-3	**3.02E-08**

Revisions
08/14/96
KLS

000111

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 13 – Lower Subase, Zone 3
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: **Construction Worker, CTE**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE: Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	80
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.19E+01

CONVERSION FACTOR (CARCIN) = 1.70E–01

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Construction Worker, CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Tetrachloroethene	0	O	4.30E+00	9.00E-01	4.80E-02	2.50E-01	0.00E+00
Chloroform	0	O	1.10E+00	4.70E-01	8.90E-03	9.30E-03	0.00E+00
Antimony	0	I			1.00E-03		0.00E+00
Arsenic	0.0017	I			1.00E-03		1.36E-08
Boron	0	I			1.00E-03		0.00E+00
Cadmium	0	I			1.00E-03		0.00E+00
~~Iron~~	~~4880~~	~~I~~			~~1.00E-03~~		~~[illegible]~~
Manganese	0.289	I			1.00E-03		2.31E-06
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

Revisions
08/14/96
AS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Tetrachloroethene	0.00E+00	1.00E-02	0.00E+00
Chloroform	0.00E+00	1.00E-02	0.00E+00
Antimony	0.00E+00	4.00E-04	0.00E+00
Arsenic	1.62E-07	2.80E-04	5.78E-04
Boron	0.00E+00	4.50E-03	0.00E+00
Cadmium	0.00E+00	~~1.50E-05~~ 2.5E-5	0.00E+00
~~Iron~~	~~4.65E-01~~	~~1.50E-02~~	~~3.10E+01~~
Manganese	2.75E-05	~~1.50E-04~~ 7.2E-4	~~1.83E-01~~ 3.81E-2
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+0C		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~3.12E+01~~ 3.87E-2

000115

Revisions
08/14/96
KMS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Tetrachloroethene	0.00E+00	5.20E-02	0.00E+00
Chloroform	0.00E+00	6.10E-03	0.00E+00
Antimony	0.00E+00		0.00E+00
Arsenic	2.31E-09	1.60E+00	3.70E-09
Boron	0.00E+00		0.00E+00
Cadmium	0.00E+00		0.00E+00
~~Iron~~	~~6.64E-03~~		~~0.00E+00~~
Manganese	3.93E-07		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			3.70E-09

000116

Revisions
08/14/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 3
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	480	IR:	0
EF:	120	EF:	1
Fi:	1	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	2.25E–06	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	3.22E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
~~Aluminum~~	~~8120~~	~~1~~	~~0.00E+00~~	~~1.88E–02~~	~~2.62E–04~~	~~1.00E+00~~	
Arsenic	2.8	1	0.00E+00	6.31E–06	9.02E–08	3.00E–04	1.50E+00
Beryllium	0.33	1	0.00E+00	7.44E–07	1.06E–08	5.00E–03	4.30E+00
~~Iron~~	~~7230~~	~~1~~	~~0.00E+00~~	~~1.63E–02~~	~~2.33E–04~~	~~3.00E–01~~	
~~Manganese~~	~~88.1~~	~~1~~	~~0.00E+00~~	~~1.99E–04~~	~~2.84E–06~~	~~5.00E–03~~ 2.4E-2	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/14/96
KAS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH.	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aluminum	0.00E+00	1.83E−02	0.00E+00
Arsenic	0.00E+00	2.10E−02	1.35E−07
Beryllium	0.00E+00	1.49E−04	4.57E−08
~~Iron~~	~~0.00E+00~~	~~5.43E−02~~	~~0.00E+00~~
~~Manganese~~	~~0.00E+00~~	~~2.07E−02~~	~~0.00E+00~~
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~**1.34E−01**~~ 3.94E-2	**1.81E−07**

Revisions
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KAS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 13 – Lower Subase, Zone 3
LOCATION: NSB-NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE: Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	120
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.78E+01

CONVERSION FACTOR (CARCIN) = 2.55E-01

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Construction Worker, RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Tetrachloroethene	0	O	4.30E+00	9.00E-01	4.80E-02	2.50E-01	0.00E+00
Chloroform	0	O	1.10E+00	4.70E-01	8.90E-03	9.30E-03	0.00E+00
Antimony	0	I			1.00E-03		0.00E+00
Arsenic	0.0017	I			1.00E-03		1.36E-08
Boron	0	I			1.00E-03		0.00E+00
Cadmium	0	I			1.00E-03		0.00E+00
~~Iron~~	~~4660~~	~~I~~			~~1.00E-03~~		~~[illegible]E-02~~
Manganese	0.289	I			1.00E-03		2.31E-06
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00

000122

Revisions
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KMS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Tetrachloroethene	0.00E+00	1.00E-02	0.00E+00
Chloroform	0.00E+00	1.00E-02	0.00E+00
Antimony	0.00E+00	4.00E-04	0.00E+00
Arsenic	2.43E-07	2.80E-04	8.67E-04
Boron	0.00E+00	4.50E-03	0.00E+00
Cadmium	0.00E+00	~~1.50E-05~~ 2.5E-5	0.00E+00
~~Iron~~	~~6.87E-01~~	~~1.50E-02~~	~~4.95E+01~~
Manganese	4.13E-05	~~1.50E-04~~ 7.2E-4	~~2.75E-01~~ 5.73E-2
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Tetrachloroethene	0.00E+00	5.20E–02	0.00E+00
Chloroform	0.00E+00	6.10E–03	0.00E+00
Antimony	0.00E+00		0.00E+00
Arsenic	3.47E–09	1.60E+00	5.55E–09
Boron	0.00E+00		0.00E+00
Cadmium	0.00E+00		0.00E+00
~~Iron~~	~~9.95E–03~~		~~0.00E+00~~
Manganese	5.89E–07		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			5.55E–09

000124

Revisions
08/

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 3
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	100
EDc:	2
BWc:	15
IRa:	50
EDa:	7
BWa:	70
IFadj:	18.33333
Fi:	0.5
EF:	150
AT(NONC):	3285
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 4.2E–07 CARCIN = 5.4E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
~~Aluminum~~	~~8120~~	~~1~~	~~3.40E-03~~	~~4.37E-04~~	~~1.00E+00~~		~~3.40E-03~~	~~0.00E+00~~
Arsenic	2.8	1	1.17E-06	1.51E-07	3.00E-04	1.50E+00	3.91E-03	2.26E-07
Beryllium	0.33	1	1.38E-07	1.78E-08	5.00E-03	4.30E+00	2.76E-05	7.64E-08
~~Iron~~	~~7290~~	~~1~~	~~3.08E-03~~	~~3.89E-04~~	~~3.00E-01~~		~~1.01E-02~~	~~0.00E+00~~
~~Manganese~~	~~88.1~~	~~1~~	~~3.69E-05~~	~~4.74E-06~~	~~5.00E-03~~		~~7.38E-03~~	~~0.00E+00~~
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~2.48E-02~~ 3.94E-3	3.02E-07

Revisions
08/14/96
KAS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 3
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	200
EDc:	6
BWc:	15
IRa:	100
EDa:	24
BWa:	70
IFadj:	114.2857
Fi:	1
EF:	150
AT(NONC):	10950
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 1.6E–06 CARCIN = 6.7E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 3
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
~~Aluminum~~	~~8120~~	~~1~~	~~1.27E-02~~	~~5.45E-08~~	~~1.00E+00~~		~~1.27E-02~~	~~0.00E+00~~
Arsenic	2.6	1	4.38E-06	1.88E-06	3.00E-04	1.50E+00	1.46E-02	2.82E-06
Beryllium	0.33	1	5.17E-07	2.21E-07	5.00E-03	4.30E+00	1.03E-04	9.52E-07
~~Iron~~	~~7230~~	~~1~~	~~1.13E-02~~	~~4.85E-08~~	~~3.00E-01~~		~~3.77E-02~~	~~0.00E+00~~
~~Manganese~~	~~88.1~~	~~1~~	~~1.38E-04~~	~~5.91E-05~~	~~5.00E-03~~		~~2.76E-02~~	~~0.00E+00~~
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~9.27E-02~~ 1.47E-2	3.77E-06

Revisions
8/14/96
KMS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 4
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	240	IR:	0
EF:	80	EF:	1
Fi:	0.5	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	3.76E–07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	5.37E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 4
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~	
Arsenic	2.2	1	0.00E+00	8.27E−07	1.18E−08	3.00E−04	1.50E+00
Beryllium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E−03	4.30E+00
~~Iron~~	~~8560~~	~~1~~	~~0.00E+00~~	~~3.23E−03~~	~~4.59E−05~~	~~3.00E−01~~	
~~Manganese~~	~~155~~	~~1~~	~~0.00E+00~~	~~5.82E−05~~	~~8.32E−07~~	~~3.00E−03~~	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/14/96
AS

RISK ASSESSMENT SPREADSHEET -- INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 13 -- Lower Subase, Zone 4
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Aluminum	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	2.76E-03	1.77E-08
Beryllium	0.00E+00	0.00E+00	0.00E+00
~~Iron~~	~~0.00E+00~~	~~1.07E-02~~	~~0.00E+00~~
~~Manganese~~	~~0.00E+00~~	~~1.16E-02~~	~~0.00E+00~~
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	~~2.51E-02~~ 2.76E-3	1.77E-08

Revisions
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KMS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 13 – Lower Subase, Zone 4
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, CTE

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE: Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	80
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.19E+01

CONVERSION FACTOR (CARCIN) = 1.70E–01

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 13 – Lower Subase, Zone 4
EXPOSURE SCENARIO: Construction Worker, CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
1,2-Dichloroethene	0.007	O	8.20E-01	3.40E-01	1.00E-02	7.20E-03	6.04E-07
Vinyl chloride	0.005	O	5.10E-01	2.10E-01	7.30E-03	2.30E-03	3.07E-07
Methylene chloride	0.004	O	6.90E-01	2.90E-01	4.50E-03	1.80E-03	1.54E-07
Bis(2-ethylhexyl)phthalate	0.005	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	5.91E-06
Benzo(a)anthracene	0.003	O	1.00E+01	2.20E+00	8.10E-01	4.60E+01	2.82E-05
Benzo(b)fluoranthene	0.003	O	1.40E+01	3.00E+00	1.20E+00	1.30E+02	4.87E-05
Benzo(k)fluoranthene	0.003	O	1.40E+01	3.00E+00	1.20E+00	1.30E+02	4.87E-05
Benzo(a)pyrene	0.003	O	1.40E+01	2.90E+00	1.20E+00	1.30E+02	4.79E-05
Indeno(1,2,3-cd)pyrene	0.003	O	2.00E+01	4.20E+00	1.90E+00	3.80E+02	9.13E-05
~~Aluminum~~	~~1.54~~	~~I~~			~~1.00E-03~~		~~1.23E-05~~
Antimony	0.0079	I			1.00E-03		6.32E-08
Arsenic	0.0069	I			1.00E-03		5.52E-08
Barium	0.0448	I			1.00E-03		3.58E-07
Beryllium	0.0006	I			1.00E-03		4.80E-09
Boron	0.787	I			1.00E-03		6.30E-06
Cadmium	0.0026	I			1.00E-03		2.08E-08
Chromium	0.0061	I			2.00E-03		9.76E-08
~~Copper~~	~~0.0271~~	~~I~~			~~1.00E-03~~		~~2.17E-07~~
~~Iron~~	~~5.16~~	~~I~~			~~1.00E-03~~		~~4.13E-05~~
Manganese	0.249	I			1.00E-03		1.99E-06
Nickel	0.0129	I			1.00E-03		1.03E-07
Thallium	0.0044	I			1.00E-03		3.52E-08
Vanadium	0.0092	I			1.00E-03		7.36E-08
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00

Revisions
08/14/96
S

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 13 – Lower Subase, Zone 4
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
1,2-Dichloroethene	7.19E-06	9.00E-03	7.99E-04
Vinyl chloride	3.65E-06		0.00E+00
Methylene chloride	1.83E-06	6.00E-02	3.06E-05
Bis(2-ethylhexyl)phthalate	7.03E-05	1.10E-02	6.39E-03
Benzo(a)anthracene	3.35E-04		0.00E+00
Benzo(b)fluoranthene	5.80E-04		0.00E+00
Benzo(k)fluoranthene	5.80E-04		0.00E+00
Benzo(a)pyrene	5.70E-04		0.00E+00
Indeno(1,2,3-cd)pyrene	1.09E-03		0.00E+00
~~Aluminum~~	~~1.47E-04~~	~~5.00E-02~~	~~2.93E-03~~
Antimony	7.52E-07	4.00E-04	1.88E-03
Arsenic	6.57E-07	2.80E-04	2.35E-03
Barium	4.26E-06	3.50E-03	1.22E-03
Beryllium	5.71E-08	2.50E-04	2.28E-04
Boron	7.49E-05	4.50E-03	1.66E-02
Cadmium	2.47E-07	~~1.50E-05~~ 2.5E-3	~~1.65E-02~~ 9.9DE-3
Chromium	1.16E-06	1.00E-04	1.16E-02
~~Copper~~	~~2.58E-06~~	~~2.20E-02~~	~~1.17E-04~~
~~Iron~~	~~4.91E-04~~	~~1.50E-02~~	~~3.27E-02~~
Manganese	2.37E-05	~~1.50E-04~~ 7.2E-4	~~1.58E-01~~ 3.29E-2
Nickel	1.23E-06	2.00E-03	6.14E-04
Thallium	4.19E-07	4.00E-06	1.05E-01
Vanadium	8.76E-07	3.50E-04	2.50E-03
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~3.59E-01~~ 1.92E-1

Revisions
08/14/96
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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 13 – Lower Subase, Zone 4
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
1,2-Dichloroethene	1.03E-07		0.00E+00
Vinyl chloride	5.21E-08	1.90E+00	9.91E-08
Methylene chloride	2.62E-08	7.50E-03	1.97E-10
Bis(2-ethylhexyl)phthalate	1.00E-06	2.50E-02	2.51E-08
Benzo(a)anthracene	4.79E-06		0.00E+00
Benzo(b)fluoranthene	6.29E-06		0.00E+00
Benzo(k)fluoranthene	6.29E-06		0.00E+00
Benzo(a)pyrene	8.15E-06		0.00E+00
Indeno(1,2,3-cd)pyrene	1.55E-05		0.00E+00
~~Aluminum~~	~~2.69E-06~~		~~0.00E+00~~
Antimony	1.07E-08		0.00E+00
Arsenic	9.36E-09	1.60E+00	1.50E-08
Barium	6.09E-08		0.00E+00
Beryllium	8.16E-10	8.60E+01	7.02E-08
Boron	1.07E-06		0.00E+00
Cadmium	3.54E-09		0.00E+00
Chromium	1.66E-08		0.00E+00
~~Copper~~	~~3.69E-06~~		~~0.00E+00~~
~~Iron~~	~~7.82E-06~~		~~0.00E+00~~
Manganese	3.39E-07		0.00E+00
Nickel	1.75E-08		0.00E+00
Thallium	5.98E-09		0.00E+00
Vanadium	1.25E-08		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			2.10E-07

Revisions
08/1
KL

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 4
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	480	IR:	0
EF:	120	EF:	1
Fi:	1	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	2.25E–06	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	3.22E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 4
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~	
Arsenic	2.2	1	0.00E+00	4.96E–06	7.09E–08	3.00E–04	1.50E+00
Beryllium	0	1	0.00E+00	0.00E+00	0.00E+00	5.00E–03	4.30E+00
~~Iron~~	~~6500~~	~~1~~	~~0.00E+00~~	~~1.98E–02~~	~~2.76E–04~~	~~3.00E–01~~	
~~Manganese~~	~~155~~	~~1~~	~~0.00E+00~~	~~3.49E–04~~	~~4.99E–06~~	~~5.00E–03~~	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/14/96
KMS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 13 – Lower Subase, Zone 4
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Arsenic	0.00E+00	1.65E−02	1.06E−07
Beryllium	0.00E+00	0.00E+00	0.00E+00
~~Iron~~	~~0.00E+00~~	~~6.43E−02~~	~~0.00E+00~~
~~Manganese~~	~~0.00E+00~~	~~6.00E−02~~	~~0.00E+00~~
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	**~~1.51E−01~~** 1.65E-2	**1.06E−07**

Revisions
08/14/96
KAS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 13 – Lower Subase, Zone 4
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE: Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	120
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.78E+01

CONVERSION FACTOR (CARCIN) = 2.55E–01

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 13 – Lower Subase, Zone 4
EXPOSURE SCENARIO: Construction Worker, RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
1,2-Dichloroethene	0.027	O	8.20E-01	3.40E-01	1.00E-02	7.20E-03	2.33E-06
Vinyl chloride	0.007	O	5.10E-01	2.10E-01	7.30E-03	2.30E-03	4.29E-07
Methylene chloride	0.005	O	6.90E-01	2.90E-01	4.50E-03	1.80E-03	1.93E-07
Bis(2-ethylhexyl)phthalate	0.008	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	9.46E-06
Benzo(a)anthracene	0.003	O	1.00E+01	2.20E+00	8.10E-01	4.60E+01	2.82E-05
Benzo(b)fluoranthene	0.003	O	1.40E+01	3.00E+00	1.20E+00	1.30E+02	4.87E-05
Benzo(k)fluoranthene	0.003	O	1.40E+01	3.00E+00	1.20E+00	1.30E+02	4.87E-05
Benzo(a)pyrene	0.003	O	1.40E+01	2.90E+00	1.20E+00	1.30E+02	4.79E-05
Indeno(1,2,3-cd)pyrene	0.003	O	2.00E+01	4.20E+00	1.90E+00	3.80E+02	9.13E-05
~~Aluminum~~	~~18.8~~	~~I~~			~~1.00E-03~~		~~1.09E-04~~
Antimony	0.0148	I			1.00E-03		1.18E-07
Arsenic	0.0155	I			1.00E-03		1.24E-07
Barium	0.116	I			1.00E-03		9.28E-07
Beryllium	0.0012	I			1.00E-03		9.60E-09
Boron	1.98	I			1.00E-03		1.58E-05
Cadmium	0.0093	I			1.00E-03		7.44E-08
Chromium	0.0402	I			2.00E-03		6.43E-07
~~Copper~~	~~0.221~~	~~I~~			~~1.00E-03~~		~~1.77E-06~~
~~Iron~~	~~17.2~~	~~I~~			~~1.00E-03~~		~~1.38E-04~~
Manganese	0.799	I			1.00E-03		6.39E-06
Nickel	0.0355	I			1.00E-03		2.84E-07
Thallium	0.0073	I			1.00E-03		5.84E-08
Vanadium	0.039	I			1.00E-03		3.12E-07
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

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Revisions
08/14/96
HMS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 13 – Lower Subase, Zone 4
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RID (MG/KG/DAY)	HAZARD INDEX DERMAL
1,2-Dichloroethene	4.16E-05	9.00E-03	4.62E-03
Vinyl chloride	7.66E-06		0.00E+00
Methylene chloride	3.44E-06	6.00E-02	5.73E-05
Bis(2-ethylhexyl)phthalate	1.69E-04	1.10E-02	1.53E-02
Benzo(a)anthracene	5.03E-04		0.00E+00
Benzo(b)fluoranthene	8.70E-04		0.00E+00
Benzo(k)fluoranthene	8.70E-04		0.00E+00
Benzo(a)pyrene	8.55E-04		0.00E+00
Indeno(1,2,3-cd)pyrene	1.63E-03		0.00E+00
~~Aluminum~~	~~1.04E-06~~	~~5.00E-02~~	~~0.00E-02~~
Antimony	2.11E-06	4.00E-04	5.28E-03
Arsenic	2.21E-06	2.80E-04	7.90E-03
Barium	1.66E-05	3.50E-03	4.73E-03
Beryllium	1.71E-07	2.50E-04	6.85E-04
Boron	2.83E-04	4.50E-03	6.28E-02
Cadmium	1.33E-06	~~1.50E-05~~ 2.5E-5	~~8.85E-02~~ 5.31E-2
Chromium	1.15E-05	1.00E-04	1.15E-01
~~Copper~~	~~8.18E-05~~	~~2.20E-02~~	~~1.43E-03~~
~~Iron~~	~~2.48E-06~~	~~1.50E-02~~	~~1.84E-01~~
Manganese	1.14E-04	~~1.50E-04~~ 7.2E-4	~~7.61E-01~~ 1.59E-1
Nickel	5.07E-06	2.00E-03	2.53E-03
Thallium	1.04E-06	4.00E-06	2.61E-01
Vanadium	5.57E-06	3.50E-04	1.59E-02
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~1.55E+00~~ 7.08E-1

Revisions
08/14/96
HMS

RISK ASSESSMENT SPREADSHEET -- DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 13 – Lower Subase, Zone 4
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
1,2-Dichloroethene	5.94E-07		0.00E+00
Vinyl chloride	1.09E-07	1.90E+00	2.08E-07
Methylene chloride	4.91E-08	7.50E-03	3.69E-10
Bis(2-ethylhexyl)phthalate	2.41E-06	2.50E-02	6.03E-06
Benzo(a)anthracene	7.18E-06		0.00E+00
Benzo(b)fluoranthene	1.24E-05		0.00E+00
Benzo(k)fluoranthene	1.24E-05		0.00E+00
Benzo(a)pyrene	1.22E-05		0.00E+00
Indeno(1,2,3-cd)pyrene	2.33E-05		0.00E+00
~~Aluminum~~	~~2.77E-05~~		~~0.00E+00~~
Antimony	3.02E-08		0.00E+00
Arsenic	3.16E-08	1.60E+00	5.06E-08
Barium	2.37E-07		0.00E+00
Beryllium	2.45E-09	8.60E+01	2.10E-07
Boron	4.04E-06		0.00E+00
Cadmium	1.90E-08		0.00E+00
Chromium	1.64E-07		0.00E+00
~~Copper~~	~~4.51E-07~~		~~0.00E+00~~
~~Iron~~	~~3.51E-05~~		~~0.00E+00~~
Manganese	1.63E-06		0.00E+00
Nickel	7.24E-08		0.00E+00
Thallium	1.49E-08		0.00E+00
Vanadium	7.95E-08		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			5.30E-07

Revisions
08/14/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 4
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:

C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	100
EDc:	2
BWc:	15
IRa:	50
EDa:	7
BWa:	70
IFadj:	18.33333
Fi:	0.5
EF:	150
AT(NONC):	3285
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 4.2E–07 CARCIN = 5.4E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 4
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~		~~0.00E+00~~	~~0.00E+00~~
Arsenic	2.2	1	9.21E−07	1.18E−07	3.00E−04	1.50E+00	3.07E−03	1.78E−07
Beryllium	0	1	0.00E+00	0.00E+00	5.00E−03	4.30E+00	0.00E+00	0.00E+00
~~Iron~~	~~8560~~	~~1~~	~~3.58E−03~~	~~4.64E−04~~	~~3.00E−01~~		~~1.19E−02~~	~~0.00E+00~~
~~Manganese~~	~~155~~	~~1~~	~~8.49E−05~~	~~8.34E−06~~	~~5.00E−03~~		~~1.20E−02~~	~~0.00E+00~~
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~2.00E−02~~ 3.07E-3	1.78E−07

Revisions
08/14/96
KMS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 13 – Lower Subase, Zone 4
LOCATION: NSB–NLON, Groton, CT
DATE: 01/22/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	200
EDc:	6
BWc:	15
IRa:	100
EDa:	24
BWa:	70
IFadj:	114.2857
Fi:	1
EF:	150
AT(NONC):	10950
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 1.6E–06 CARCIN = 6.7E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 13 – Lower Subase, Zone 4
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
~~Aluminum~~	~~0~~	~~1~~	~~0.00E+00~~	~~0.00E+00~~	~~1.00E+00~~		~~0.00E+00~~	~~0.00E+00~~
Arsenic	2.2	1	3.44E−06	1.48E−06	3.00E−04	1.50E+00	1.15E−02	2.21E−06
Beryllium	0	1	0.00E+00	0.00E+00	5.00E−03	4.30E+00	0.00E+00	0.00E+00
~~Iron~~	~~8560~~	~~1~~	~~1.34E−02~~	~~5.74E−03~~	~~3.00E−01~~		~~4.47E−02~~	~~0.00E+00~~
Manganese	155	1	2.43E−04	1.04E−04	~~5.00E−03~~		~~4.85E−02~~	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
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			0.00E+00	0.00E+00			0.00E+00	0.00E+00
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			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~1.05E−01~~	E-2 2.21E−06

Revisions
7/14/96

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 2 OF 2)

SITE NAME: Site 13 - Lower Subase, Zone 2
LOCATION: NSB-NLON, Groton, CT
DATE: 01/22/96

EXPOSURE SCENARIO: CTE (All Soil)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	149.0	149.0
1-2	149.0	149.0
2-3	149.0	149.0
3-4	149.0	149.0
4-5	149.0	149.0
5-6	149.0	149.0
6-7	149.0	149.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

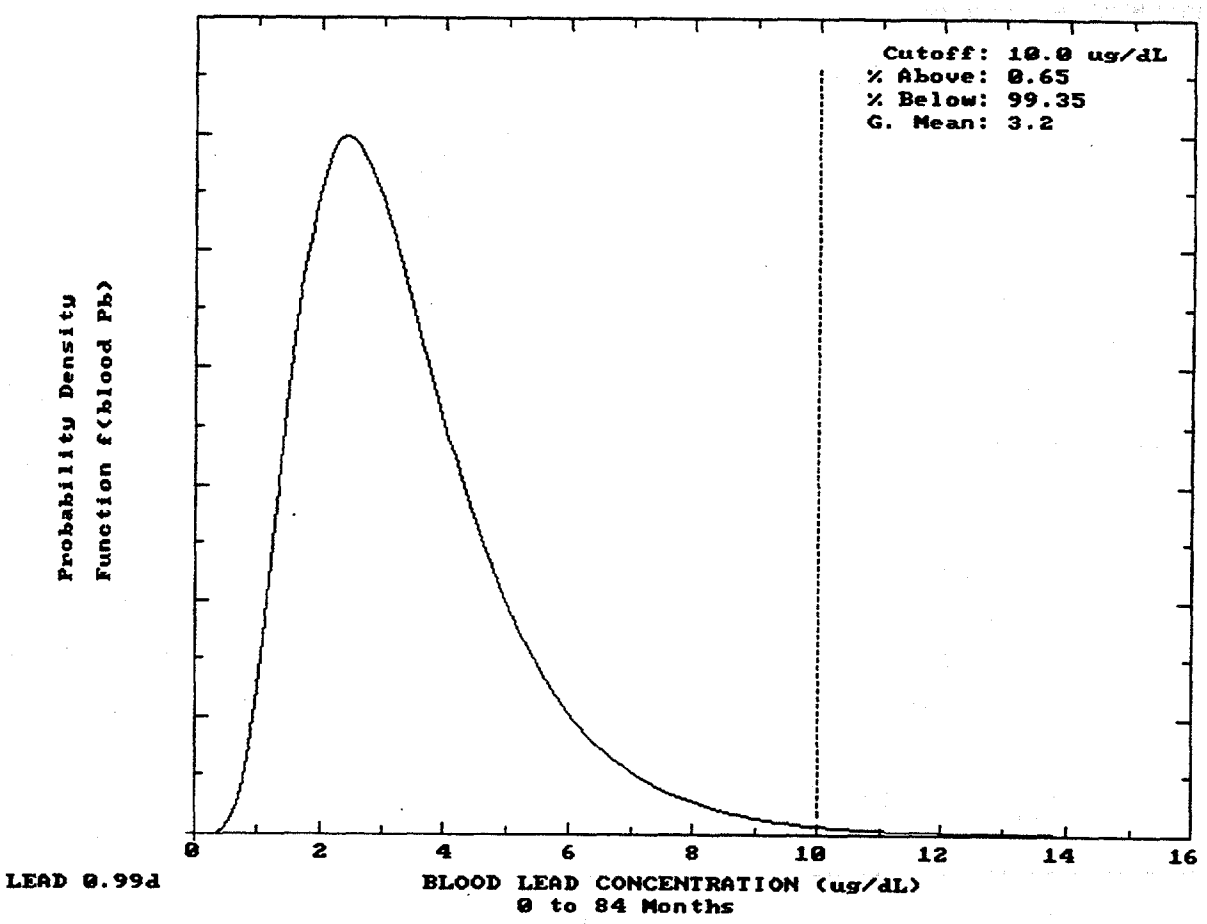
YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	3.5	6.49	3.53
1-2:	3.8	9.19	5.57
2-3:	3.6	9.67	5.62
3-4:	3.4	9.68	5.68
4-5:	2.9	8.27	4.27
5-6:	2.6	8.13	3.87
6-7:	2.4	8.27	3.66

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.57	0.37	0.00	0.02
1-2:	2.67	0.92	0.00	0.03
2-3:	3.02	0.97	0.00	0.06
3-4:	2.93	1.00	0.00	0.07
4-5:	2.87	1.05	0.00	0.07
5-6:	3.05	1.12	0.00	0.09
6-7:	3.37	1.14	0.00	0.09

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 1 OF 2)

SITE NAME: Site 13 - Lower Subase, Zone 2
LOCATION: NSB-NLON, Groton, CT
DATE: 01/22/96

EXPOSURE SCENARIO: CTE (All Soil)



IEUBK MODEL - EXPOSURE TO LEAD (PAGE 2 OF 2)

SITE NAME: Site 13 - Lower Subase, Zone 2
LOCATION: NSB-NLON, Groton, CT
DATE: 01/22/96

EXPOSURE SCENARIO: RME (All Soil)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	404.0	200.0
1-2	404.0	200.0
2-3	404.0	200.0
3-4	404.0	200.0
4-5	404.0	200.0
5-6	404.0	200.0
6-7	404.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

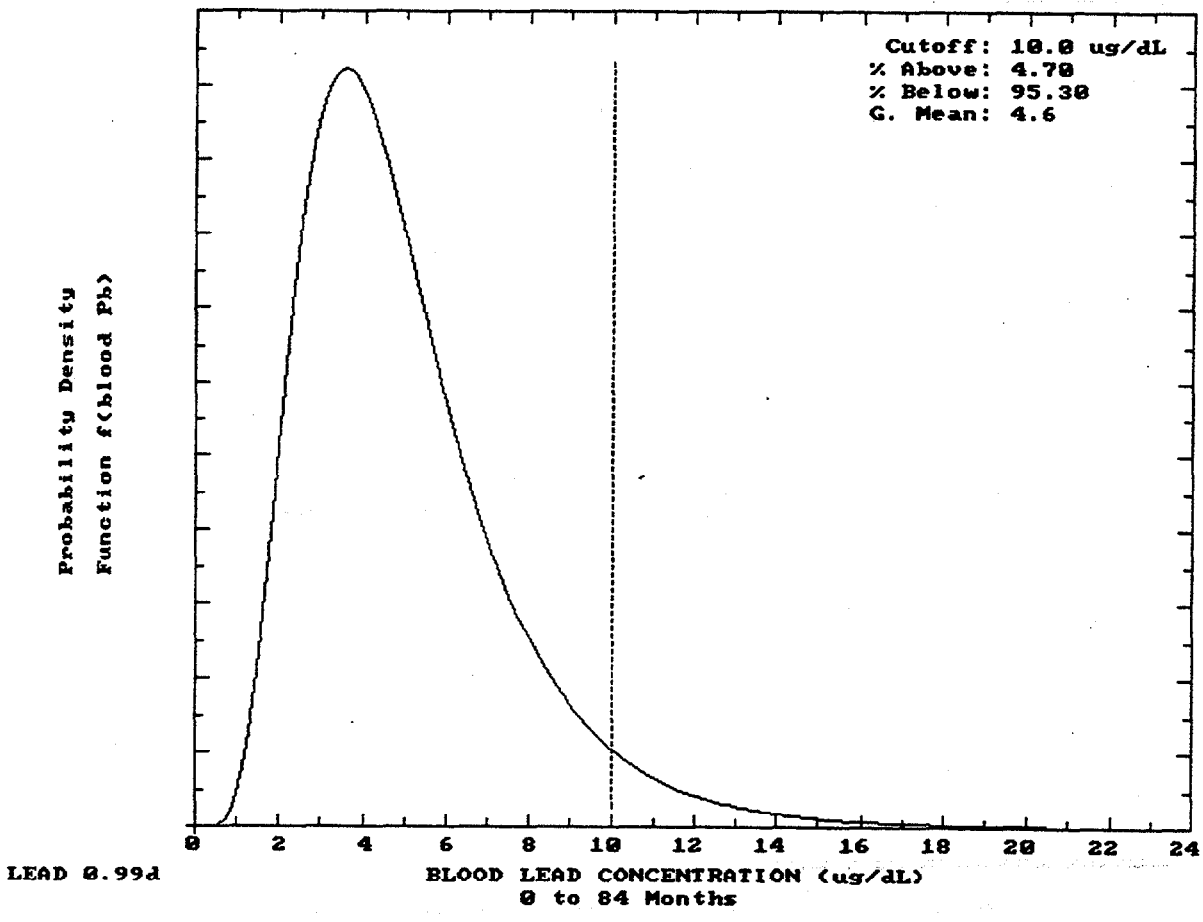
YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	5.1	9.53	6.67
1-2:	5.7	13.92	10.45
2-3:	5.4	14.51	10.60
3-4:	5.1	14.64	10.76
4-5:	4.3	12.10	8.19
5-6:	3.7	11.63	7.45
6-7:	3.3	11.61	7.07

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.48	0.36	0.00	0.02
1-2:	2.55	0.88	0.00	0.03
2-3:	2.91	0.93	0.00	0.06
3-4:	2.84	0.97	0.00	0.07
4-5:	2.81	1.03	0.00	0.07
5-6:	3.00	1.10	0.00	0.09
6-7:	3.32	1.12	0.00	0.09

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 1 OF 2)

SITE NAME: Site 13 - Lower Subase, Zone 2
LOCATION: NSB-NLON, Groton, CT
DATE: 01/22/96

EXPOSURE SCENARIO: RME (All Soil)



IEUBK MODEL - EXPOSURE TO LEAD (PAGE 2 OF 2)

SITE NAME: Site 13 - Lower Subase, Zone 3
LOCATION: NSB-NLON, Groton, CT
DATE: 01/22/96

EXPOSURE SCENARIO: CTE (Surface Soil)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	503.0	200.0
1-2	503.0	200.0
2-3	503.0	200.0
3-4	503.0	200.0
4-5	503.0	200.0
5-6	503.0	200.0
6-7	503.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

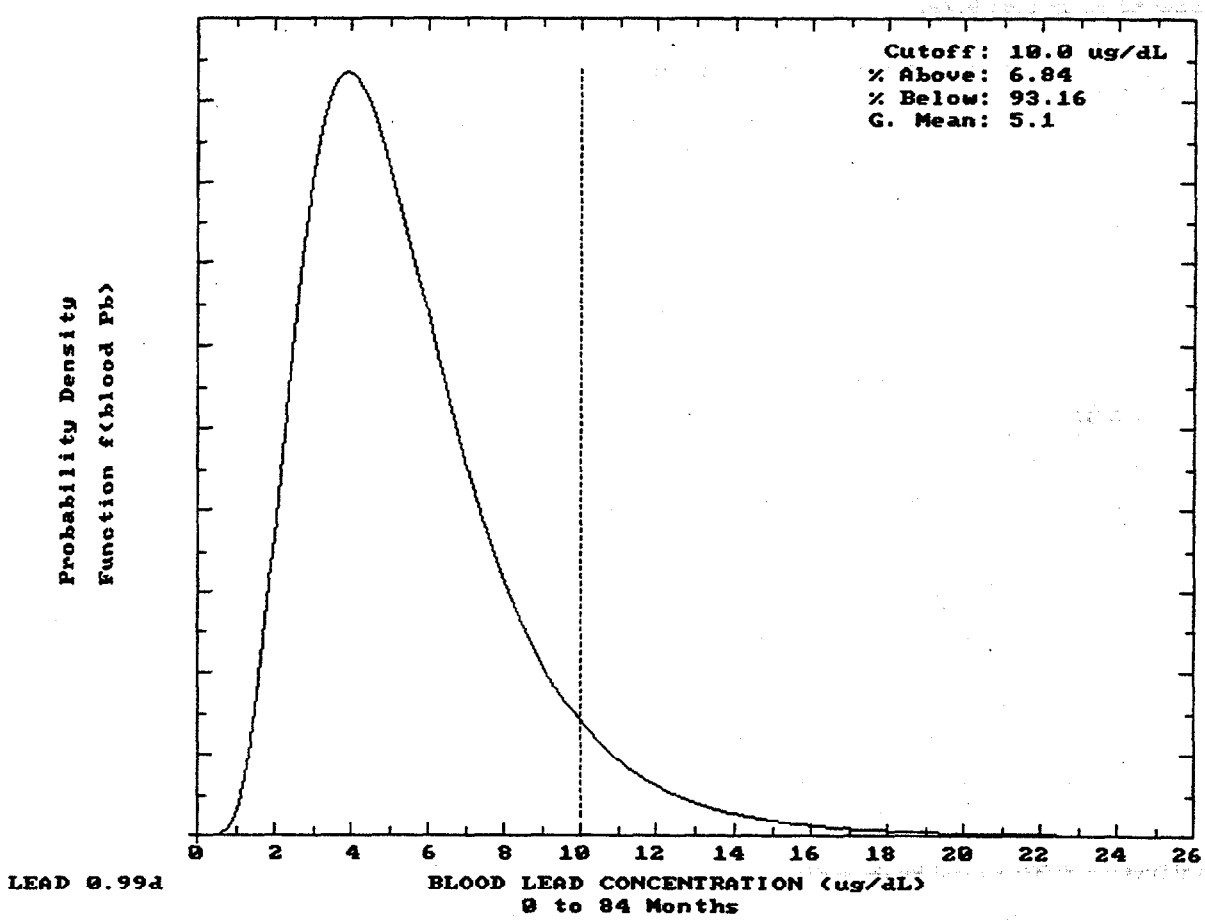
YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	5.6	10.44	7.61
1-2:	6.3	15.32	11.89
2-3:	5.9	15.95	12.08
3-4:	5.6	16.12	12.29
4-5:	4.7	13.27	9.38
5-6:	4.0	12.70	8.54
6-7:	3.6	12.63	8.11

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.45	0.35	0.00	0.02
1-2:	2.52	0.87	0.00	0.03
2-3:	2.88	0.92	0.00	0.06
3-4:	2.81	0.96	0.00	0.07
4-5:	2.79	1.02	0.00	0.07
5-6:	2.98	1.09	0.00	0.09
6-7:	3.31	1.12	0.00	0.09

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 1 OF 2)

SITE NAME: Site 13 - Lower Subase, Zone 3
LOCATION: NSB-NLON, Groton, CT
DATE: 01/22/96

EXPOSURE SCENARIO: CTE (Surface Soil)



IEUBK MODEL - EXPOSURE TO LEAD (PAGE 2 OF 2)

SITE NAME: Site 13 - Lower Subase, Zone 3
LOCATION: NSB-NLON, Groton, CT
DATE: 01/22/96

EXPOSURE SCENARIO: RME (Surface Soil)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	1320.0	200.0
1-2	1320.0	200.0
2-3	1320.0	200.0
3-4	1320.0	200.0
4-5	1320.0	200.0
5-6	1320.0	200.0
6-7	1320.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

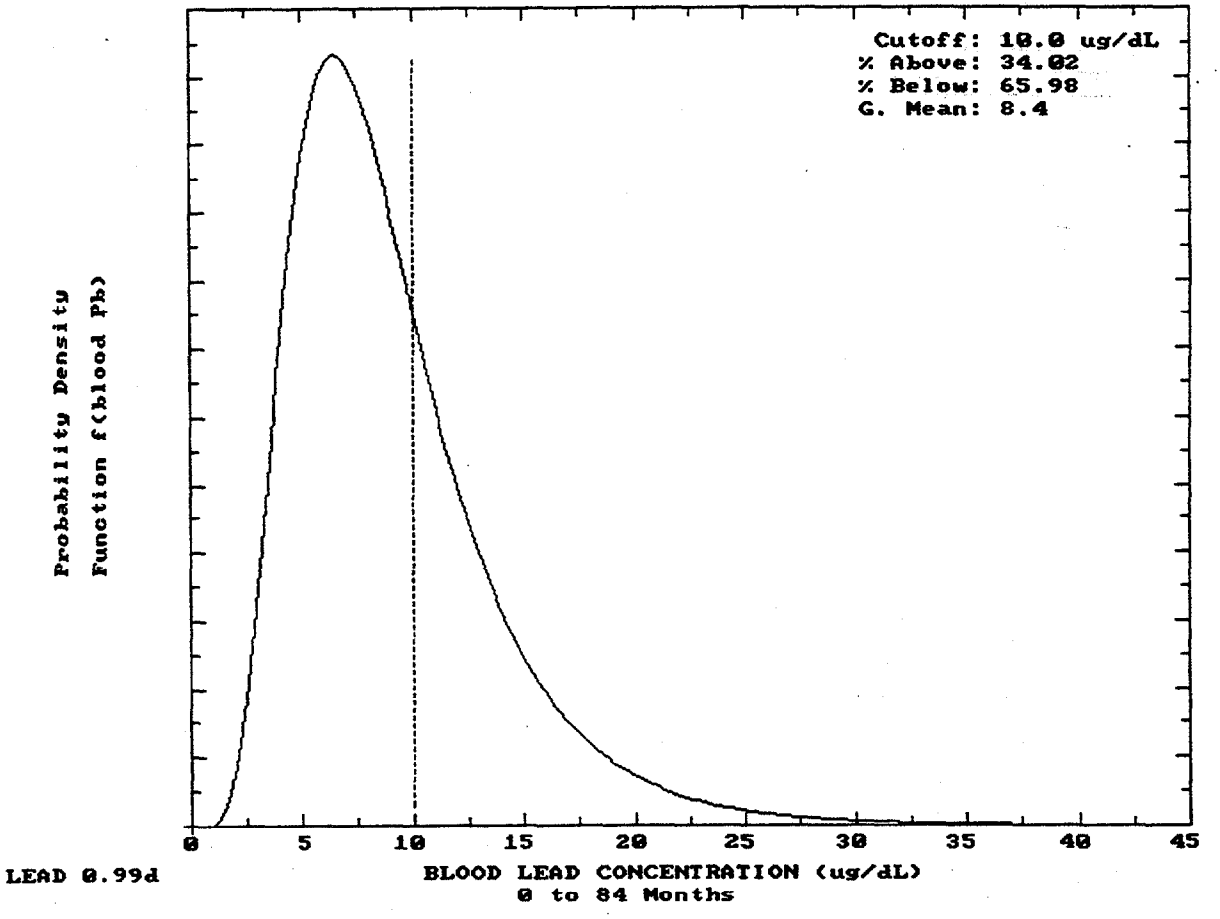
YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	9.1	17.28	14.67
1-2:	10.5	25.72	22.60
2-3:	9.8	26.79	23.24
3-4:	9.4	27.42	23.86
4-5:	7.9	22.35	18.66
5-6:	6.7	21.13	17.14
6-7:	5.9	20.72	16.36

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.26	0.33	0.00	0.02
1-2:	2.29	0.79	0.00	0.03
2-3:	2.64	0.85	0.00	0.06
3-4:	2.61	0.89	0.00	0.07
4-5:	2.65	0.97	0.00	0.07
5-6:	2.86	1.05	0.00	0.09
6-7:	3.19	1.08	0.00	0.09

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 1 OF 2)

SITE NAME: Site 13 - Lower Subase, Zone 3
LOCATION: NSB-NLON, Groton, CT
DATE: 01/22/96

EXPOSURE SCENARIO: RME (Surface Soil)



SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 1 - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Carbon disulfide	0.005	0.005	-	-	-	-
Aluminum	6490	4150	-	-	-	-
Arsenic	1.9	1.1	10	10	-	-
Barium	37.1	23.4	4700	1.4E+5	-	-
Beryllium	0.4	0.40	2	2	-	-
Cadmium	1.4	0.9	34	1000	-	-
Calcium	1870	990	-	-	-	-
Chromium (total)	13.8	8.2	100 (6)	100 (6)	-	-
Cobalt	5.5	3.4	-	-	-	-
Copper	59.6	23.0	2500	7.6E+4	-	-
Iron	9030	6115	-	-	-	-
Lead	383	68	500	1000	-	-
Magnesium	3020	1870	-	-	-	-
Manganese	148	107	-	-	-	-
Mercury	0.48	0.30	20	610	-	-
Nickel	12	6	1400	7500	-	-
Potassium	1950	1558	-	-	-	-
Silver	2.2	2.2	340	1E+4	-	-
Sodium	821	454	-	-	-	-
Vanadium	27.1	15.3	470	1.4E+4	-	-
Zinc	70.4	38.0	2E+4	6.1E+5	-	-
TPH	4900	867	500 *	2500 *	500 *	2500 *

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

000157

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 2 - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Methylene chloride	0.002	0.002	82	760	0.1	1.0
Trichloroethene	0.001	0.001	56	520	0.1	1
Aluminum	7210	4823	-	-	-	-
Arsenic	1.9	1.9	10	10	-	-
Barium	30.1	23.4	4700	1.4E+5	-	-
Beryllium	0.29	0.29	2	2	-	-
Cadmium	1.3	0.9	34	1000	-	-
Calcium	1650	1265	-	-	-	-
Chromium (total)	12.4	7.8	100 (6)	100 (6)	-	-
Cobalt	4.1	2.9	-	-	-	-
Copper	17.8	11.7	2500	7.6E+4	-	-
Iron	9560	6330	-	-	-	-
Lead	404	149	500	1000	-	-
Magnesium	2330	1777	-	-	-	-
Manganese	208	162	-	-	-	-
Mercury	0.11	0.11	20	610	-	-
Nickel	8.2	5.8	1400	7500	-	-
Potassium	1590	1367	-	-	-	-
Sodium	250	224	-	-	-	-
Vanadium	16.8	10.7	470	1.4E+4	-	-
Zinc	54.3	29.5	2E+4	6.1E+5	-	-
TPH	856	266	500 *	2500	500 *	2500

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 3 - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Aluminum	8120	8120	-	-	-	-
Arsenic	2.8	2.8	10	10	-	-
Barium	29.2	29.2	4700	1.4E+5	-	-
Beryllium	0.33	0.33	2	2	-	-
Cadmium	0.83	0.83	34	1000	-	-
Calcium	1100	1100	-	-	-	-
Chromium (total)	10.5	10.5	100 (6)	100 (6)	-	-
Cobalt	4.4	4.4	-	-	-	-
Copper	8.8	8.8	2500	7.6E+4	-	-
Iron	7230	7230	-	-	-	-
Lead	1320	358	500 *	1000 *	-	-
Magnesium	1930	1930	-	-	-	-
Manganese	88.1	88.1	-	-	-	-
Nickel	7	7	1400	7500	-	-
Potassium	910	910	-	-	-	-
Sodium	114	114	-	-	-	-
Vanadium	15.7	15.7	470	1.4E+4	-	-
Zinc	17	17	2E+4	6.1E+5	-	-
TPH	3400	921	500 *	2500 *	500 *	2500 *

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

000159

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 4 - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Methylene chloride	0.012	0.011	82	760	0.1	1.0
Tetrachloroethene	0.008	0.007	12	110	0.1	1
Trichloroethene	0.005	0.005	56	520	0.1	1
Aluminum	6510	5680	-	-	-	-
Arsenic	2.2	2.1	10	10	-	-
Barium	48.3	38.1	4700	1.4E+5	-	-
Cadmium	1	0.9	34	1000	-	-
Calcium	867	803	-	-	-	-
Chromium (total)	17.5	12.7	100 (6)	100 (6)	-	-
Cobalt	4.1	3.8	-	-	-	-
Copper	14	12	2500	7.6E+4	-	-
Iron	8560	7220	-	-	-	-
Lead	10600	3243	500 *	1000 *	-	-
Magnesium	2660	2265	-	-	-	-
Manganese	155	128	-	-	-	-
Nickel	9.5	7.7	1400	7500	-	-
Potassium	1890	1585	-	-	-	-
Sodium	126	125	-	-	-	-
Vanadium	16.1	13.4	470	1.4E+4	-	-
Zinc	62.4	45.3	2E+4	6.1E+5	-	-
TPH	11800	2073	500 *	2500 *	500 *	2500 *

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 1 - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
1,1-Dichloroethane	3	3	-	70	-
Benzene	3	3	5	1 *	710
Carbon disulfide	3	2	-	-	-
Ethylbenzene	11	7	700	700	580000
Styrene	2	2	100	100	-
Xylenes (total)	44	26	10000	530	-
1,2,4-Trichlorobenzene	0.7	0.70	70	-	-
1,3-Dichlorobenzene	0.5	0.50	-	600	26000
2-Methylnaphthalene	47	13	-	-	-
4-Methylphenol	6	3	-	-	-
Acenaphthene	10	3	-	-	-
Acenaphthylene	1	1	-	420	0.3 *
Anthracene	2	2	-	2000	1100000
Benzoic acid	0.6	0.60	-	-	-
Bis(2-Ethylhexyl)phthalate	3	2	6	2 *	59
Carbazole	1	1	-	-	-
Di-N-butyl phthalate	1	1	-	700	120000
Dibenzofuran	11	4	-	-	-
Diethyl phthalate	3	2	-	-	-
Fluoranthene	2	1	-	280	3700
Fluorene	15	5	-	280	140000
Naphthalene	28	9	-	280	-
Phenanthrene	9	4	-	200	0.077 *
Phenol	28	28	-	4000	92000000
Pyrene	1	1	-	200	110000
Aluminum	26100	3113	-	-	-
Arsenic	16.8	4.9	50	50	4 *
Barium	210	52	2000	1000	-
Beryllium	1.3	1.3	4	4	4

001161

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 13 LOWER SUBASE, ZONE 1 - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Boron	1430	233	-	-	-
Cadmium	20.9	9.2	5 *	5 *	6 *
Calcium	139000	36630	-	-	-
Chromium (total)	11.6	8.4	100 (5)	50 (5)	110 (6)
Cobalt	8.2	6.8	-	-	-
Copper	68.4	18.2	-	1300	48 *
Iron	11600	2371	-	-	-
Lead	39.3	9.2	-	15 *	13 *
Magnesium	443000	44958	-	-	-
Manganese	2290	347	5000 (7)	-	-
Mercury	0.97	0.70	2	2	0.4 *
Nickel	27.2	19.3	100	100	880
Potassium	138000	16950	-	-	-
Selenium	22	12	50	50	50
Silver	7.4	7.4	50	36	12
Sodium	2980000	381584	28000 (8) *	-	-
Vanadium	689	109	-	50 *	-
Zinc	121	19	-	5000	123
TPH	2100	1125	-	500 *	-

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

000162

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 1 - FILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Aluminum	18700	3820	-	-	-
Antimony	5.7	5.7	6	6	86000
Arsenic	24.8	5.3	50	50	4 *
Barium	95	51	2000	1000	-
Beryllium	1	4	4	4	4
Boron	1410	232	-	-	-
Calcium	138000	40773	-	-	-
Chromium (total)	9.3	3.6	100 (5)	50 (5)	110 (6)
Copper	44.2	10.5	-	1300	48
Iron	7520	1818	-	-	-
Lead	13.5	11.3	-	15	13 *
Magnesium	449000	42882	-	-	-
Manganese	1930	433	5000 (7)	-	-
Mercury	0.35	0.33	2	2	0.4
Potassium	141000	18251	-	-	-
Sodium	3660000	439038	28000 (8) *	-	-
Vanadium	593	120	-	50 *	-
Zinc	20	9	-	5000	123

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

000163

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 2 - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
1,1,1-Trichloroethane	3	3	200	200	62000
Carbon disulfide	2	2	-	-	-
Chloroform	1	1	100	6	14100
Tetrachloroethene	2	2	5	5	88
Benzoic acid	1	1	-	-	-
Bis(2-Ethylhexyl)phthalate	0.8	0.80	6	2	59
Aluminum	23.8	20.6	-	-	-
Arsenic	4.7	3.5	50	50	4 *
Barium	41.8	28.4	2000	1000	-
Boron	630	213	-	-	-
Cadmium	3.3	3.3	5	5	6
Calcium	113000	41756	-	-	-
Chromium (total)	1.2	1.2	100 (5)	50 (5)	110 (6)
Copper	34.7	15.2	-	1300	48
Iron	6620	1598	-	-	-
Lead	23.2	5.1	-	15 *	13 *
Magnesium	215000	41079	-	-	-
Manganese	356	139	5000 (7)	-	-
Nickel	23.9	19.2	100	100	880
Potassium	68800	16061	-	-	-
Selenium	2.8	2.1	50	50	50
Sodium	1850000	331644	28000 (8) *	-	-
Zinc	37.6	20.2	-	5000	123
TPH	600	600	-	500 *	-

0001164

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 13 LOWER SUBASE, ZONE 2 - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 2 - FILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Aluminum	33.9	33.9	-	-	-
Antimony	15.1	9.5	6 *	6 *	86000
Arsenic	10	6	50	50	4 *
Barium	44.3	28.6	2000	1000	-
Boron	627	212	-	-	-
Calcium	113000	50283	-	-	-
Chromium (total)	3.5	2.4	100 (5)	50 (5)	110 (6)
Copper	5.3	3.1	-	1300	48
Iron	5070	4195	-	-	-
Lead	1.6	1.6	-	15	13
Magnesium	212000	49112	-	-	-
Manganese	387	110	5000 (7)	-	-
Potassium	68100	18933	-	-	-
Selenium	2.7	2.5	50	50	50
Sodium	1880000	440767	28000 (8) *	-	-
Zinc	37.7	17.7	-	5000	123

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

001136

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 3 - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Bis(2-Ethylhexyl)phthalate	1	1	6	2	59
Fluorene	1	1	-	280	140000
Arsenic	2.8	2.7	50	50	4
Barium	56.9	43.6	2000	1000	-
Calcium	28000	25925	-	-	-
Iron	6040	5153	-	-	-
Lead	3.2	2.7	-	15	13
Magnesium	3690	3268	-	-	-
Manganese	329	289	5000 (7)	-	-
Nickel	19.1	19.1	100	100	880
Potassium	6570	5790	-	-	-
Sodium	99700	80175	28000 (8) *	-	-
Zinc	27.8	27.8	-	5000	123

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 3 - FILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Arsenic	3.2	2.9	50	50	4
Barium	54.1	48.9	2000	1000	-
Calcium	27300	25133	-	-	-
Iron	5900	5633	-	-	-
Magnesium	3290	3063	-	-	-
Manganese	321	296	5000 (7)	-	-
Potassium	6380	6177	-	-	-
Selenium	3.2	3.2	50	50	50
Sodium	97700	90500	28000 (8) *	-	-
Zinc	5.1	5.1	-	5000	123

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

000168

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 4 - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
1,1,1-Trichloroethane	1	1	200	200	62000
1,1-Dichloroethane	15	5	-	70	-
1,1-Dichloroethene	57	22	7 *	7 *	96
Ethylbenzene	8	5	700	700	580000
Methylene chloride	9	9	5 *	5 *	48000
Toluene	36	36	1000	1000	4000000
Vinyl chloride	12	9	2 *	2 *	15750
Xylenes (total)	27	17	10000	530	-
Acenaphthene	1	-	-	-	-
Benzo(a)anthracene	1	-	-	0.06 *	0.3 *
Benzo(a)pyrene	0.8	0.80	0.2 *	0.2 *	0.3 *
Benzo(b)fluoranthene	0.6	0.60	-	0.08 *	0.3 *
Benzo(g,h,i)perylene	1	-	-	-	-
Benzo(k)fluoranthene	1	-	-	0.5 *	0.3 *
Bis(2-Ethylhexyl)phthalate	10	6	6 *	2 *	59
Chrysene	0.9	0.90	-	-	-
Di-N-butyl phthalate	0.6	0.60	-	700	120000
Fluoranthene	2	2	-	280	3700
Indeno(1,2,3-Cd)pyrene	0.7	0.70	-	-	-
Naphthalene	0.8	0.70	-	280	-
Phenanthrene	1	-	-	200	0.077 *
Pyrene	2	1	-	200	110000
Aluminum	40800	8243	-	-	-
Arsenic	29.6	10.2	50	50	4 *
Barium	283	56	2000	1000	-
Beryllium	2.6	1.9	4	4	4
Boron	2070	787	-	-	-
Cadmium	25.5	11.8	5 *	5 *	6 *
Calcium	181000	84258	-	-	-

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 13 LOWER SUBASE, ZONE 4 - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Chromium (total)	116	59	100 (5) *	50 (5) *	110 (6) *
Cobalt	25.6	25.6	-	-	-
Copper	649	87	-	1300	48 *
Iron	36700	5730	-	-	-
Lead	2760	233	-	15 *	13 *
Magnesium	776000	226375	-	-	-
Manganese	1980	265	5000 (7)	-	-
Mercury	0.47	0.47	2	2	0.4 *
Nickel	80	22	100	100	880
Potassium	259000	80918	-	-	-
Selenium	7.7	7.7	50	50	50
Sodium	6310000	1918723	28000 (8) *	-	-
Thallium	11.5	7.1	2 *	5 *	63
Vanadium	105	38	-	50 *	-
Zinc	924	72	-	5000	123 *
TPH	5400	1850	-	500 *	-

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 13 LOWER SUBASE, ZONE 4 - FILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Aluminum	11	11	-	-	-
Antimony	14.8	11.5	6 *	6 *	86000
Arsenic	11	6	50	50	4 *
Barium	139	52	2000	1000	-
Boron	2370	830	-	-	-
Calcium	238000	100344	-	-	-
Copper	20.4	9.1	-	1300	48
Iron	8490	3001	-	-	-
Lead	14.1	9.7	-	15	13 *
Magnesium	781000	233788	-	-	-
Manganese	611	183	5000 (7)	-	-
Potassium	263000	91724	-	-	-
Selenium	2.1	2.1	50	50	50
Sodium	6350000	1340964	28000 (8) *	-	-
Thallium	6.8	6.8	2 *	5 *	63
Vanadium	5.7	5.7	-	50	-
Zinc	20.6	13.4	-	5000	123

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

000171

APPENDIX F.14

SITE 14 - OBDANE

SUMMARY OF COC SELECTION
SITE 14 OBDANE - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
1,1,2,2-Tetrachloroethane	1/7	0.002	14SS3	0.005 - 0.018	3.2	0.4	0.001	N	2
1,1,2-Trichloroethane	1/7	0.003	14SS3	0.005 - 0.018	11	0.8	0.01	N	2
1,1-Dichloroethene	1/7	0.002	14SS3	0.005 - 0.018	1.1	0.04	0.03	N	2
Benzene	1/7	0.002	14SS3	0.005 - 0.018	22	0.5	0.02	N	2
Bromodichloromethane	1/7	0.002	14SS3	0.005 - 0.018	10	1800	0.3	N	2
Chloromethane	1/7	0.008	14SS3	0.011 - 0.018	49	0.3	0.0066	N	2
cis-1,3-Dichloropropene	1/7	0.002	14SS3	0.005 - 0.018	3.7 (7)	0.1 (7)	0.001 (7)	N	2
Tetrachloroethene	2/7	0.002 - 0.003	14SS3	0.005 - 0.018	12	11	0.04	N	2
Toluene	1/7	0.018	14MW1S	0.005 - 0.017	1600	520	5	N	2
Xylenes, total	1/7	0.002	14SS3	0.005 - 0.018	16000	320	74	N	2
Benzo(a)anthracene	3/4	0.027 - 0.064	14TB1	0.45	0.88	-	0.7	N	2
Benzo(a)pyrene	2/4	0.043 - 0.085	14TB1	0.45 - 0.56	0.088	-	4	N	2
Benzo(b)fluoranthene	2/4	0.082	14MW1S	0.45 - 0.56	0.88	-	4	N	2
Benzo(b)fluoranthene	2/4	0.082	14TB1	0.45 - 0.56	0.88	-	4	N	2
Benzo(g,h,i)perylene	1/4	0.057	14TB1	0.45 - 0.6	-	-	-	N	1
Benzo(k)fluoranthene	1/4	0.074	14TB1	0.45 - 0.6	8.8	-	4	N	2
Benzoic acid	3/4	0.026 - 0.064	14SS3	2.2	31000	-	280	N	2
Chrysene	3/4	0.044 - 0.082	14TB1	0.45	88	-	1	N	2
Fluoranthene	4/4	0.025 - 0.098	14TB1	-	310	-	980	N	2
Indeno(1,2,3-cd)pyrene	1/4	0.06	14TB1	0.45 - 0.6	0.88	-	35	N	2
Phenanthrene	3/4	0.026 - 0.039	14TB1	0.45	-	-	-	N	1
Pyrene	4/4	0.028 - 0.09	14TB1	-	230	-	1400	N	2
4,4'-DDD	1/1	0.011	14SS3	-	2.7	-	0.7	N	2
4,4'-DDE	1/1	0.074	14SS3	-	1.9	-	0.5	N	2
4,4'-DDT	1/1	0.4	14SS3	-	1.9	80	1.0	N	2
Aluminum	4/4	7840 - 18100	14MW1S	-	7800	-	-	Y	3
Antimony	1/3	4.9	14TB2A	13.7 - 31	3.1	-	-	~~Y~~ N	~~3~~ 4
Arsenic	4/4	2.5 - 16.3	14SS3	-	0.43	380	15	Y	3
Barium	4/4	33.7 - 84.1	14TB1	-	550	350000	32	N	2
Beryllium	4/4	0.34 - 0.6	14TB2A	-	0.15	690	180	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 14 OBDANE - SURFACE SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Boron	1/4	27.6	14SS3	11.7 - 18.4	700	-	-	N	2
Cadmium	1/4	0.64	14TB2A	0.47 - 0.83	3.9	920	6	N	2
Calcium	4/4	549 - 1950	14MW1S	-	-	-	-	N	1
Chromium (total)	4/4	15.4 - 61.8	14MW1S	-	39 (8)	140 (8)	19 (8)	Y	3
Cobalt	4/4	4 - 6.7	14MW1S	-	470	-	-	N	2
Copper	4/4	9.1 - 24.5	14MW1S	-	290	-	-	N	2
Iron	4/4	9540 - 38000	14MW1S	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	2/4	15.4 - 403	14SS3	160 - 193	400 (9)	-	-	Y	3
Magnesium	4/4	1850 - 6750	14MW1S	-	-	-	-	N	1
Manganese	4/4	113 - 330	14TB1	-	~~39~~ 190	-	-	Y	3
Nickel	4/4	8.8 - 18.8	14MW1S	-	160	6900	21	N	2
Potassium	4/4	513 - 4190	14TB1	-	-	-	-	N	1
Sodium	3/4	197 - 418	14MW1S	186	-	-	-	N	1
Vanadium	4/4	27 - 56.3	14MW1S	-	55	-	-	Y	3
Zinc	4/4	34.9 - 52.8	14MW1S	-	2300	-	42000	N	2

Footnotes:

1 Results in mg/kg unless otherwise noted. Surface soil designated as soil from depths of 0 to 2 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Value is for 1,3-dichloropropene (total).
8 Hexavalent chromium.
9 OSWER soil screening level for residential land use (USEPA, July 14, 1994).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 14 OBDANE - SURFACE SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
1,1,2,2-Tetrachloroethane	2	4.5
1,1,2-Trichloroethane	3	4.6429
1,1-Dichloroethene	2	4.5
Benzene	2	4.5
Bromodichloromethane	2	4.5
Chloromethane	8	6.5714
Cis-1,3-dichloropropene	2	4.5
Tetrachloroethene	3	4.5714
Toluene	18	6.7143
Xylenes, total	2	4.5
Benzo(a)anthracene	64	88
Benzo(a)pyrene	85	158.25
Benzo(b)fluoranthene	82	167.25
Benzo(g,h,i)perylene	57	215.5
Benzo(k)fluoranthene	74	219.75
Benzoic acid	64	307.5
Chrysene	82	101
Fluoranthene	98	56.5
Indeno(1,2,3-cd)pyrene	60	216.25
Phenanthrene	39	81.75
Pyrene	90	60.25
4,4'-DDD	11	11
4,4'-DDE	74	74
4,4'-DDT	400	400
Inorganics (mg/kg)		
Aluminum	18100	12335
Antimony	4.9	9.0833
Arsenic	16.3	8
Barium	84.1	62.55
Beryllium	0.6	0.4725
Boron	27.6	12.35
Cadmium	0.64	0.415
Calcium	1950	1249.75
Chromium (total)	61.8	33.45
Cobalt	6.7	5.575
Copper	24.5	16.275
Iron	38000	23335
Lead	403	148.725
Magnesium	6750	4772.5
Manganese	330	207.25
Nickel	18.8	13.9
Potassium	4190	3010.75
Sodium	418	227.5
Vanadium	56.3	40.925
Zinc	52.8	44.5

SUMMARY OF COC SELECTION
SITE 14 OBDANE - ALL SOILS (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
1,1,2,2-Tetrachloroethane	1/10	0.002	14SS3	0.005 - 0.018	3.2	0.4	0.001	N	2
1,1,2-Trichloroethane	1/10	0.003	14SS3	0.005 - 0.018	11	0.8	0.01	N	2
1,1-Dichloroethene	1/10	0.002	14SS3	0.005 - 0.018	1.1	0.04	0.03	N	2
Benzene	1/10	0.002	14SS3	0.005 - 0.018	22	0.5	0.02	N	2
Bromodichloromethane	1/10	0.002	14SS3	0.005 - 0.018	10	1800	0.3	N	2
Chloromethane	1/10	0.008	14SS3	0.011 - 0.018	49	0.3	0.0066	N	2
Cis-1,3-dichloropropene	1/10	0.002	14SS3	0.005 - 0.018	3.7 (7)	0.1 (7)	0.001 (7)	N	2
Methylene chloride	1/10	0.007	14TB2A	0.005 - 0.018	85	7	0.01	N	2
Tetrachloroethene	2/10	0.002 - 0.003	14SS3	0.005 - 0.018	12	11	0.04	N	2
Toluene	1/10	0.018	14MW1S	0.005 - 0.017	1600	520	5	N	2
Xylenes, total	1/10	0.002	14SS3	0.005 - 0.018	16000	320	74	N	2
Benzo(a)anthracene	4/7	0.027 - 0.086	14TB1	0.4 - 0.48	0.88	-	0.7	N	2
Benzo(a)pyrene	3/7	0.043 - 0.11	14TB1	0.4 - 0.56	0.088	-	4	Y	3
Benzo(b)fluoranthene	3/7	0.082 - 0.097	14TB1	0.4 - 0.56	0.88	-	4	N	2
Benzo(g,h,i)perylene	2/7	0.057 - 0.075	14TB1	0.4 - 0.6	-	-	-	N	1
Benzo(k)fluoranthene	2/7	0.074 - 0.093	14TB1	0.4 - 0.6	8.8	-	4	N	2
Benzoic acid	4/7	0.026 - 0.064	14SS3	1.8 - 2.2	31000	-	280	N	2
Chrysene	4/7	0.044 - 0.11	14TB1	0.4 - 0.48	88	-	1	N	2
Fluoranthene	5/7	0.025 - 0.1	14TB1	0.4 - 0.48	310	-	980	N	2
Indeno(1,2,3-cd)pyrene	2/7	0.06 - 0.076	14TB1	0.4 - 0.6	0.88	-	35	N	2
Phenanthrene	4/7	0.026 - 0.04	14TB1	0.4 - 0.48	-	-	-	N	1
Pyrene	5/7	0.028 - 0.09	14TB1	0.4 - 0.48	230	-	1400	N	2
4,4'-DDD	1/1	0.011	14SS3	-	2.7	-	0.7	N	2
4,4'-DDE	1/1	0.074	14SS3	-	1.9	-	0.5	N	2
4,4'-DDT	1/1	0.4	14SS3	-	1.9	80	1.0	N	2
Aluminum	7/7	7840 - 18900	14TB2A	-	7800	-	-	~~Y~~ N	~~3~~ 4
Antimony	1/6	4.9	14TB2A	3.7 - 31	3.1	-	-	Y	3
Arsenic	7/7	2 - 16.3	14SS3	-	0.43	380	15	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 14 OBDANE - ALL SOILS (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Barium	7/7	13 - 84.1	14TB1	-	550	350000	32	N	2
Beryllium	7/7	0.33 - 0.61	14MW1S	-	0.15	690	180	Y	3
Boron	1/7	27.6	14SS3	11.2 - 18.4	700	-	-	N	2
Cadmium	2/7	0.64 - 0.89	14MW1S	0.45 - 0.83	3.9	920	6	N	2
Calcium	7/7	490 - 1950	14MW1S	-	-	-	-	N	1
Chromium (total)	7/7	10.2 - 61.8	14MW1S	-	39 (8)	140 (8)	19 (8)	Y	3
Cobalt	7/7	2.6 - 6.7	14MW1S	-	470	-	-	N	2
Copper	7/7	6.4 - 24.5	14MW1S	-	290	-	-	N	2
Iron	7/7	8310 - 38000	14MW1S	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	4/7	9 - 403	14SS3	2.9 - 193	400 (9)	-	-	Y	3
Magnesium	7/7	1400 - 6750	14MW1S	-	-	-	-	N	2
Manganese	7/7	55.1 - 330	14TB1	-	~~39~~ 190	-	-	Y	3
Mercury	1/7	0.15	14MW1S	0.11 - 0.18	2.3	7	3	N	2
Nickel	7/7	7.4 - 18.8	14MW1S	-	160	6900	21	N	2
Potassium	7/7	491 - 4190	14TB1	-	-	-	-	N	1
Selenium	1/7	0.92	14MW1S	0.67 - 1.1	39	-	3	N	2
Silver	1/7	0.61	14MW1S	0.45 - 1.4	39	-	-	N	2
Sodium	4/7	181 - 418	14MW1S	151 - 231	-	-	-	N	1
Vanadium	7/7	15.4 - 56.3	14MW1S	-	55	-	-	Y	3
Zinc	7/7	13.7 - 52.8	14MW1S	-	2300	-	42000	N	2

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000006

SUMMARY OF COC SELECTION (Continued)
SITE 14 OBDANE - ALL SOILS (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in mg/kg unless otherwise noted. ~~Surface~~ All soil designated as soil from depths of 0 to ~~2~~ 10 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Value is for 1,3-dichloropropene (total).
8 Hexavalent chromium.
9 OSWER soil screening level for residential land use (USEPA, July 14, 1994).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 14 OBDANE - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
1,1,2,2-Tetrachloroethane	2	5.05
1,1,2-Trichloroethane	3	5.15
1,1-Dichloroethene	2	5.05
Benzene	2	5.05
Bromodichloromethane	2	5.05
Chloromethane	8	6.5
Cis-1,3-dichloropropene	2	5.05
Methylene chloride	7	5.8
Tetrachloroethene	3	5.1
Toluene	18	6.6
Xylenes, total	2	5.05
Benzo(a)anthracene	86	125.4286
Benzo(a)pyrene	110	169
Benzo(b)fluoranthene	97	172.2857
Benzo(g,h,i)perylene	75	196.7143
Benzo(k)fluoranthene	93	201.7143
Benzoic acid	64	444.1429
Chrysene	110	136.2857
Fluoranthene	100	109.4286
Indeno(1,2,3-Cd)pyrene	76	197.2857
Phenanthrene	40	115.2857
Pyrene	90	110.1429
4,4'-DDD	11	11
4,4'-DDE	74	74
4,4'-DDT	400	400
Inorganics (mg/kg)		
Aluminum	18900	13348.5714
Antimony	4.9	6.2833
Arsenic	16.3	5.6429
Barium	84.1	50.2714
Beryllium	0.61	0.4614
Boron	27.6	9.8214
Cadmium	0.89	0.4314
Calcium	1950	1047.7143
Chromium (total)	61.8	26.2143
Cobalt	6.7	4.8857
Copper	24.5	12.9571
Iron	38000	19107.1429
Lead	403	87.9643
Magnesium	6750	3771.4286
Manganese	330	174.2143
Mercury	0.15	0.0814

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 14 OBDANE - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (mg/kg) (Continued)		
Nickel	18.8	11.5429
Potassium	4190	2360.8571
Selenium	0.92	0.4686
Silver	0.61	0.3793
Sodium	418	183.1429
Vanadium	56.3	33.1
Zinc	52.8	35.9571

SUMMARY OF COC SELECTION
SITE 14 OBDANE - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Carbon disulfide	1/2	1	14GW1S	10	-	-	100	N	2
Bis(2-ethylhexyl)phthalate	1/2	1	14GW1S	10	6	6	4.8	N	2
Aluminum	1/2	171	14GW1S	66	50 - 200 (7)	-	3700	N	2
Barium	2/2	35.5 - 39.3	14GW1S	-	2000	2000	260	N	2
Boron	2/2	89.3 - 130	14GW1S	-	-	-	330	N	2
Calcium	2/2	4190 - 6600	14GW1S	-	-	-	-	N	1
Cobalt	1/2	7	14GW1S	22.6	-	-	220	N	2
Iron	2/2	2260 - 4430	14GW1S	-	300 (7)	-	1100	~~Y~~ N	~~3~~ 4
Magnesium	2/2	2780 - 3700	14GW1S	-	-	-	-	N	1
Manganese	2/2	458 - 770	14GW1S	-	50 (7)	-	~~18~~ 88	Y	3
Potassium	2/2	4080 - 4460	14GW1S	-	-	-	-	N	1
Sodium	2/2	43800 - 45800	14GW1S	-	-	-	-	N	1
Zinc	1/2	9.1	14GW1S	9.1	5000 (7)	-	1100	N	2

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample-specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL (SMCL).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 14 OBDANE - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
Carbon disulfide	3	3
Bis(2-ethylhexyl)phthalate	3	3
Inorganics (ug/L)		
Aluminum	102	102
Barium	37.4	37.4
Boron	109.65	109.65
Calcium	5395	5395
Cobalt	9.15	9.15
Iron	3345	3345
Magnesium	3240	3240
Manganese	614	614
Potassium	4270	4270
Sodium	44800	44800
Zinc	6.825	6.825

SUMMARY OF COC SELECTION
SITE 14 OBDANE - FILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Arsenic	1/2	2.1	14GW1S	5	50	50	0.045	Y	3
Barium	2/2	35.1 - 37.9	14GW1S	-	2000	2000	260	N	1
Boron	2/2	99.8 - 120	14GW1S	-	-	-	330	N	1
Calcium	2/2	4430 - 6730	14GW1S	-	-	-	-	N	1
Iron	2/2	2040 - 4680	14GW1S	-	300 (7)	-	1100	N	1
Lead	1/2	2.2	14GW1S	2	15 (8)	-	-	N	2
Magnesium	2/2	2820 - 3600	14GW1S	-	-	-	-	N	1
Manganese	2/2	476 - 779	14GW1S	-	50 (7)	-	~~18~~ 88	N	1
Potassium	2/2	4390 - 4510	14GW1S	-	-	-	-	N	1
Sodium	2/2	44000 - 47400	14GW1S	-	-	-	-	N	1
Vanadium	1/2	8.9	14GW1S	1	-	-	26	N	2
Zinc	1/2	6.5	14GW1S	12.6	5000	-	1100	N	1

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL.
8 Action Level.

Rationale Designations:

1 Chemical detected in unfiltered sample; filtered results not used in risk assessment.
2 Chemical not detected in unfiltered samples; maximum is less than action level/COC screening level.
3 Chemical not detected in unfiltered samples; maximum is greater than or equal to the COC screening level.

Revisions
08/19/96
JMS

F14_COC.XLS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 14 – OBDANE
LOCATION: NSB–NLON, Groton, CT
DATE: 01/17/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	240	IR:	0
EF:	80	EF:	1
Fi:	0.5	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 3.76E–07 (AVG ANNUAL DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

ADULT/YOUTH (CANCER RISK):
CF: 5.37E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 14 – OBDANE
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)pyrene	0.11	1	0.00E+00	4.13E–08	5.90E–10		7.30E+00
~~Aluminum~~	~~13400~~	~~1~~	~~0.00E+00~~	~~5.03E–03~~	~~7.19E–05~~	~~1.00E+00~~	
Antimony	4.9	1	0.00E+00	1.84E–06	2.63E–08	3.00E–04	
Arsenic	5.6	1	0.00E+00	2.10E–06	3.01E–08	4.00E–04	1.50E+00
Beryllium	0.46	1	0.00E+00	1.73E–07	2.47E–09	5.00E–03	4.30E+00
Chromium	26.2	1	0.00E+00	9.84E–06	1.41E–07	5.00E–03	
~~Iron~~	~~19100~~	~~1~~	~~0.00E+00~~	~~7.18E–06~~	~~1.03E–04~~	~~3.00E–01~~	
Manganese	174	1	0.00E+00	6.54E–05	9.34E–07	~~5.00E–03~~ 2.4E-2	
Vanadium	33.1	1	0.00E+00	1.24E–05	1.78E–07	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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Revisions
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RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 14 – OBDANE
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)pyrene	0.00E+00	0.00E+00	4.31E−09
~~Aluminum~~	~~0.00E+00~~	~~5.03E−03~~	~~0.00E+00~~
Antimony	0.00E+00	6.14E−03	0.00E+00
Arsenic	0.00E+00	5.26E−03	4.51E−08
Beryllium	0.00E+00	3.46E−05	1.06E−08
Chromium	0.00E+00	1.97E−03	0.00E+00
~~Iron~~	~~0.00E+00~~	~~2.39E−02~~	~~0.00E+00~~
Manganese	0.00E+00	~~1.31E−02~~ 2.97E−3	0.00E+00
Vanadium	0.00E+00	1.78E−03	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	**~~5.72E−02~~** 1.79E−2	**6.00E−08**

Revisions
08/19/96
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RISK ASSESSMENT SPREADSHEET -- DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 14 -- ORDANE
LOCATION: NSB--NLON, Groton, CT
DATE: 01/17/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: **Construction Worker, CTE**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS:
IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY--STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	80
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.19E+01

CONVERSION FACTOR (CARCIN) = 1.70E--01

000027

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 14 – OBDANE
EXPOSURE SCENARIO: Construction Worker, CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Arsenic	0.0021	I			1.00E-03		1.68E-08
~~Iron~~	~~3.35~~	~~I~~			~~1.00E-03~~		~~2.68E-05~~
Manganese	0.614	I			1.00E-03		4.91E-06
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00

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Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 14 – OBDANE
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Arsenic	2.00E-07	2.80E-04	7.14E-04
~~Iron~~	~~3.19E-04~~	~~1.50E-02~~	~~2.13E-02~~
Manganese	5.84E-05	~~1.50E-04~~ 7.2E-4	~~3.90E-01~~ 8.13E-2
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~4.12E-01~~ 8.20E-2

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Revisions
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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 14 – OBDANE
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Arsenic	2.86E–09	1.50E+00	4.28E–09
~~Iron~~	~~4.58E–06~~		~~0.00E+00~~
Manganese	8.35E–07		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			4.28E–09

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Revisions
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JM

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 14 – ORDANE
LOCATION: NSB–NLON, Groton, CT
DATE: 01/17/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	480	IR:	0
EF:	120	EF:	1
Fi:	1	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:
CF: 2.25E–06 (AVG ANNUAL DOSE)

YOUTH:
CF: 0.00E+00 (AVG ANNUAL DOSE)

ADULT/YOUTH (CANCER RISK):
CF: 3.22E–08

00025

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 14 – OBDANE
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)pyrene	0.11	1	0.00E+00	2.48E–07	3.54E–09		7.30E+00
~~Aluminum~~	~~18900~~	~~1~~	~~0.00E+00~~	~~4.26E–02~~	~~6.09E–04~~	~~1.00E+00~~	
Antimony	4.9	1	0.00E+00	1.10E–05	1.58E–07	3.00E–04	
Arsenic	16.3	1	0.00E+00	3.67E–05	5.25E–07	4.00E–04	1.50E+00
Beryllium	0.61	1	0.00E+00	1.38E–06	1.96E–08	5.00E–03	4.30E+00
Chromium	61.8	1	0.00E+00	1.39E–04	1.99E–06	5.00E–03	
~~Iron~~	~~38000~~	~~1~~	~~0.00E+00~~	~~8.57E–02~~	~~1.22E–03~~	~~3.00E–01~~	
Manganese	330	1	0.00E+00	7.44E–04	1.06E–05	~~5.00E–03~~ 2.4E-2	
Vanadium	56.3	1	0.00E+00	1.27E–04	1.81E–06	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 14 – OBDANE
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)pyrene	0.00E+00	0.00E+00	2.59E-08
~~Aluminum~~	~~0.00E+00~~	~~4.26E-02~~	~~0.00E+00~~
Antimony	0.00E+00	3.68E-02	0.00E+00
Arsenic	0.00E+00	9.19E-02	7.87E-07
Beryllium	0.00E+00	2.75E-04	8.45E-08
Chromium	0.00E+00	2.79E-02	0.00E+00
~~Iron~~	~~0.00E+00~~	~~2.86E-01~~	~~0.00E+00~~
Manganese	0.00E+00	~~1.49E-01~~ 3.10E-2	0.00E+00
Vanadium	0.00E+00	1.81E-02	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	~~**6.52E-01**~~ 2.06E-1	**8.98E-07**

Revisions
08/19/96
JMS

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 14 – OBDANE
LOCATION: NSB–NLON, Groton, CT
DATE: 01/17/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS:
IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS.

EV:	1
ED:	1
EF:	120
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.78E+01

CONVERSION FACTOR (CARCIN) = 2.55E–01

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 14 – OBDANE
EXPOSURE SCENARIO: Construction Worker, RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Arsenic	0.0021	I			1.00E-03		1.68E-08
~~Iron~~	~~3.35~~	~~I~~			~~1.00E-03~~		~~2.68E-05~~
Manganese	0.614	I			1.00E-03		4.91E-06
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
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							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

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Revisions
OP '96

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 14 – OBDANE
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Arsenic	3.00E-07	2.80E-04	1.07E-03
~~Iron~~	~~4.78E-04~~	~~1.50E-02~~	~~3.19E-02~~
Manganese	8.77E-05	~~1.50E-04~~ 7.2E-4	~~5.84E-01~~ 1.22E-1
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~6.17E-01~~ 1.23E-1

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Revisions 08/19/96

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 14 – OBDANE
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Arsenic	4.28E-09	1.50E+00	6.43E-09
~~Iron~~	~~6.83E-06~~		~~0.00E+00~~
Manganese	1.25E-06		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			6.43E-09

Revisions
on 1/9/96
AS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 14 – OBDANE
LOCATION: NSB–NLON, Groton, CT
DATE: 01/17/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	50
EF:	1	EF:	52
Fi:	1	Fi:	0.5
ED:	1	ED:	3
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	1095

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	8.28E–08	(AVG ANNUAL DOSE)	CF:	3.55E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 14 – OBDANE
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)pyrene	0	1	0.00E+00	0.00E+00	0.00E+00		7.30E+00
~~Aluminum~~	~~12300~~	~~1~~	~~1.02E–03~~	~~0.00E+00~~	~~4.87E–05~~	~~1.00E+00~~	
Antimony	4.9	1	4.06E–07	0.00E+00	1.74E–08	3.00E–04	
Arsenic	8	1	6.63E–07	0.00E+00	2.84E–08	4.00E–04	1.50E+00
Beryllium	0.47	1	3.89E–08	0.00E+00	1.67E–09	5.00E–03	4.30E+00
Chromium	33.5	1	2.77E–06	0.00E+00	1.19E–07	5.00E–03	
~~Iron~~	~~23300~~	~~1~~	~~1.93E–03~~	~~0.00E+00~~	~~8.27E–05~~	~~3.00E–01~~	
Manganese	207	1	1.71E–05	0.00E+00	7.35E–07	~~5.00E–03~~ 2.4E-2	
Vanadium	40.9	1	3.39E–06	0.00E+00	1.45E–07	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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Revisions
03/19/96
JLS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 14 – OBDANE
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)pyrene	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~1.02E-03~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	1.35E-03	0.00E+00	0.00E+00
Arsenic	1.66E-03	0.00E+00	4.26E-08
Beryllium	7.79E-06	0.00E+00	7.17E-09
Chromium	5.55E-04	0.00E+00	0.00E+00
~~Iron~~	~~6.43E-03~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	~~0.48E-03~~ 7.15E-4	0.00E+00	0.00E+00
Vanadium	4.84E-04	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	~~1.49E-02~~ 4.77E-3	**0.00E+00**	**4.98E-08**

Revision
08/19/96
JLS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 14 – OBDANE
LOCATION: NSB–NLON, Groton, CT
DATE: 01/17/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	0	IR:	100
EF:	1	EF:	120
Fi:	1	Fi:	1
ED:	1	ED:	10
BW:	1	BW:	43
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	3650

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	7.65E–07	(AVG ANNUAL DOSE)	CF:	1.09E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 14 – OBDANE
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)pyrene	0	1	0.00E+00	0.00E+00	0.00E+00		7.30E+00
~~Aluminum~~	~~18100~~	~~1~~	~~1.88E–02~~	~~0.00E+00~~	~~1.96E–03~~	~~1.00E+00~~	
Antimony	4.9	1	3.75E–06	0.00E+00	5.35E–07	3.00E–04	
Arsenic	16.3	1	1.25E–05	0.00E+00	1.78E–06	4.00E–04	1.50E+00
Beryllium	0.6	1	4.59E–07	0.00E+00	6.55E–08	5.00E–03	4.30E+00
Chromium	61.8	1	4.73E–05	0.00E+00	6.75E–06	5.00E–03	
~~Iron~~	~~38000~~	~~1~~	~~2.91E–02~~	~~0.00E+00~~	~~4.15E–03~~	~~3.00E–01~~	
Manganese	330	1	2.52E–04	0.00E+00	3.60E–05	~~5.00E–03~~ 2AE-2	
Vanadium	56.3	1	4.30E–05	0.00E+00	6.15E–06	7.00E–03	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE THREE)
Site 14 – OBDANE
EXPOSURE SCENARIO: Older Child Trespasser (Surface Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)pyrene	0.00E+00	0.00E+00	0.00E+00
~~Aluminum~~	~~1.38E-02~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	1.25E-02	0.00E+00	0.00E+00
Arsenic	3.12E-02	0.00E+00	2.67E-06
Beryllium	9.17E-05	0.00E+00	2.82E-07
Chromium	9.45E-03	0.00E+00	0.00E+00
~~Iron~~	~~9.68E-02~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	~~5.05E-02~~ 1.05E-2	0.00E+00	0.00E+00
Vanadium	6.15E-03	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	~~2.20E-01~~ 6.99E-2	**0.00E+00**	**2.95E-06**

Revisions
08/19/96
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IEUBK MODEL - EXPOSURE TO LEAD (PAGE 1 OF 2)

SITE NAME: Site 14 - OBDANE
LOCATION: NSB-NLON, Groton, CT
DATE: 01/17/96

EXPOSURE SCENARIO: RME (SURFACE SOIL & ALL SOIL)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	403.0	200.0
1-2	403.0	200.0
2-3	403.0	200.0
3-4	403.0	200.0
4-5	403.0	200.0
5-6	403.0	200.0
6-7	403.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

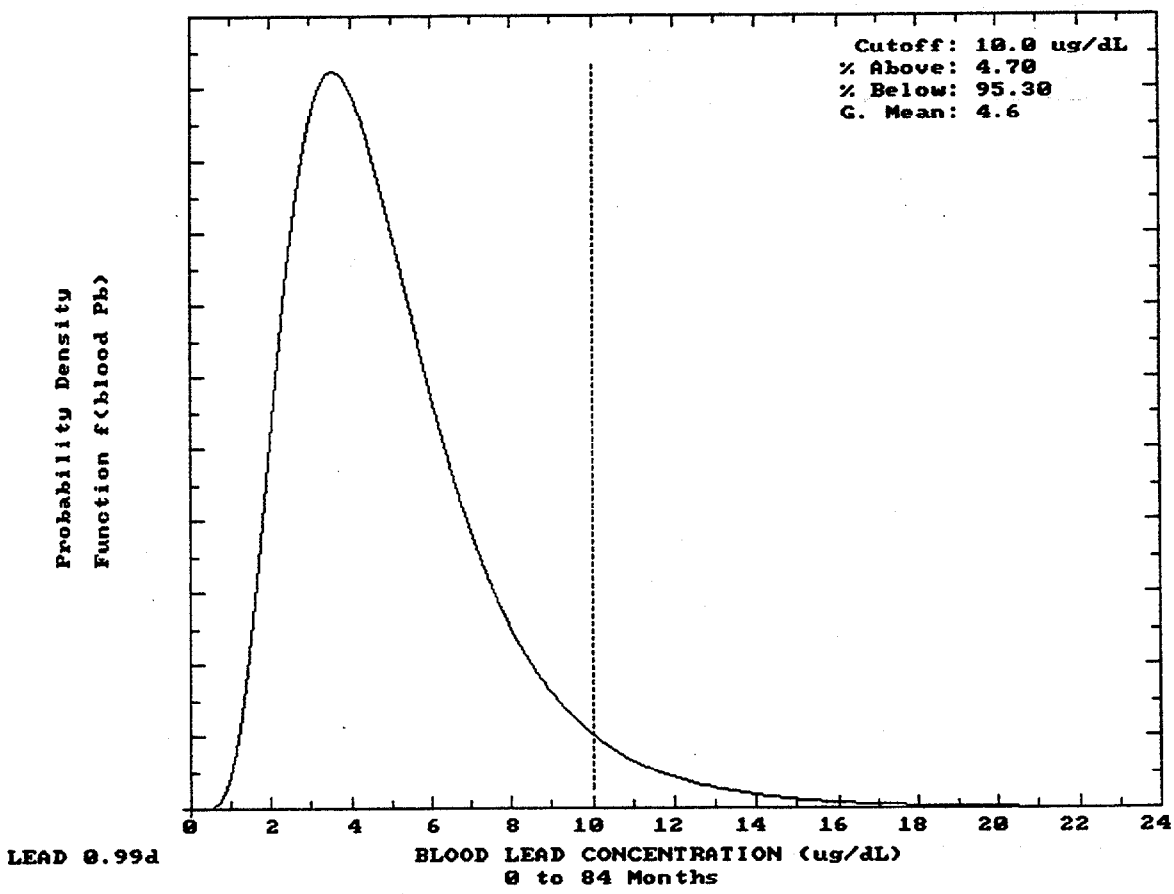
YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	5.1	9.52	6.66
1-2:	5.7	13.91	10.43
2-3:	5.4	14.49	10.59
3-4:	5.1	14.62	10.75
4-5:	4.3	12.09	8.18
5-6:	3.7	11.62	7.44
6-7:	3.3	11.60	7.06

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.48	0.36	0.00	0.02
1-2:	2.56	0.88	0.00	0.03
2-3:	2.91	0.93	0.00	0.06
3-4:	2.84	0.97	0.00	0.07
4-5:	2.81	1.03	0.00	0.07
5-6:	3.00	1.10	0.00	0.09
6-7:	3.32	1.12	0.00	0.09

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 2 OF 2)

SITE NAME: Site 14 - OBDANE
LOCATION: NSB-NLON, Groton, CT
DATE: 01/17/96

EXPOSURE SCENARIO: RME (SURFACE SOIL & ALL SOIL)



SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 14 OBDANE - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
1,1,2,2-Tetrachloroethane	0.002	0.002	3.1	29	0.01	0.1
1,1,2-Trichloroethane	0.003	0.003	11	100	0.1	1
1,1-Dichloroethene	0.002	0.002	1	9.5	0.14	1.4
Benzene	0.002	0.002	21	200	0.02	0.2
Bromodichloromethane	0.002	0.002	-	-	-	-
Chloromethane	0.008	0.008	-	-	-	-
Cis-1,3-dichloropropene	0.002	0.002	3.4 (4)	32 (4)	0.01 (4)	0.1 (4)
Methylene chloride	0.007	0.007	82	760	0.1	1.0
Tetrachloroethene	0.003	0.003	12	110	0.1	1
Toluene	0.018	0.018	500	1000	20	67
Xylenes (total)	0.002	0.002	500	1000	19.5	19.5
Benzo(a)anthracene	0.086	0.053	1	7.8	1	1
Benzo(a)pyrene	0.11	0.08	1	1	1	1
Benzo(b)fluoranthene	0.097	0.087	1	7.8	1	1
Benzo(g,h,i)perylene	0.075	0.066	-	-	-	-
Benzo(k)fluoranthene	0.093	0.084	8.4	78	1	1
Benzoic acid	0.064	0.040	-	-	-	-
Bis(2-Ethylhexyl)phthalate	0.13	0.09	44	410	1	11
Chrysene	0.11	0.07	-	-	-	-
Fluoranthene	0.1	0.07	1000	2500	5.6	56
Indeno(1,2,3-Cd)pyrene	0.076	0.068	-	-	-	-
Phenanthrene	0.04	0.036	1000	2500	4	40
Pyrene	0.09	0.066	1000	2500	4	40
4,4'-DDD	0.011	0.011	-	-	-	-
4,4'-DDE	0.074	0.074	-	-	-	-
4,4'-DDT	0.4	0.40	-	-	-	-
Aluminum	18900	13349	-	-	-	-
Antimony	4.9	4.9	27	8200	-	-
Arsenic	16.3	5.6	10 *	10 *	-	-

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 14 OBDANE - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Barium	84.1	50.3	4700	1.4E+5	-	-
Beryllium	0.61	0.46	2	2	-	-
Boron	27.6	27.6	-	-	-	-
Cadmium	0.89	0.77	34	1000	-	-
Calcium	1950	1048	-	-	-	-
Chromium (total)	61.8	26.2	100 (6)	100 (6)	-	-
Cobalt	6.7	4.9	-	-	-	-
Copper	24.5	13.0	2500	7.6E+4	-	-
Iron	38000	19107	-	-	-	-
Lead	403	109	500	1000	-	-
Magnesium	6750	3771	-	-	-	-
Manganese	330	174	-	-	-	-
Mercury	0.15	0.15	20	610	-	-
Nickel	18.8	11.5	1400	7500	-	-
Potassium	4190	2361	-	-	-	-
Selenium	0.92	0.92	340	1E+4	-	-
Silver	0.61	0.61	340	1E+4	-	-
Sodium	418	250	-	-	-	-
Vanadium	56.3	33.1	470	1.4E+4	-	-
Zinc	52.8	36.0	2E+4	6.1E+5	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 14 OBDANE - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Carbon disulfide	1	1	-	-	-
Bis(2-Ethylhexyl)phthalate	1	1	6	2	59
Aluminum	171	171	-	-	-
Barium	39.3	37.4	2000	1000	-
Boron	130	110	-	-	-
Calcium	6600	5395	-	-	-
Cobalt	7	7	-	-	-
Iron	4430	3345	-	-	-
Magnesium	3700	3240	-	-	-
Manganese	770	614	5000 (7)	-	-
Potassium	4460	4270	-	-	-
Sodium	45800	44800	28000 (8) *	-	-
Zinc	9.1	9.1	-	5000	123

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 14 OBDANE - FILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Arsenic	2.1	2.1	50	50	4
Barium	37.9	36.5	2000	1000	-
Boron	120	110	-	-	-
Calcium	6730	5580	-	-	-
Iron	4680	3360	-	-	-
Lead	2.2	2.2	-	15	13
Magnesium	3600	3210	-	-	-
Manganese	779	628	5000 (7)	-	-
Potassium	4510	4450	-	-	-
Sodium	47400	45700	28000 (8) *	-	-
Vanadium	8.9	8.9	-	50	-
Zinc	6.5	6.5	-	5000	123

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

APPENDIX F.15

SITE 15 - SPENT ACID STORAGE AND DISPOSAL AREA

SUMMARY OF COC SELECTION
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Ethylbenzene	1/10	0.003	15TB3	0.011 - 0.013	780	260	5	N	2
Toluene	2/10	0.001 - 0.003	15MW2S	0.006 - 0.013	1600	520	5	N	2
Trichloroethene	1/10	0.002	15MW2S	0.006 - 0.013	58	3	0.02	N	2
Xylenes, total	1/10	0.026	15TB3	0.011 - 0.013	16000	320	74	N	2
2-Methylnaphthalene	1/10	0.029	15MW2S	0.35 - 0.76	-	-	-	N	1
Acenaphthene	3/10	0.054 - 0.33	15TB9	0.35 - 0.76	470	-	200	N	2
Anthracene	3/10	0.24 - 0.97	15TB9	0.35 - 0.76	2300	-	4300	N	2
Benzo(a)anthracene	4/10	0.025 - 2.2	15TB9	0.37 - 0.76	0.88	-	0.7	Y	3
Benzo(a)pyrene	4/10	0.026 - 1.6	15TB9	0.37 - 0.76	0.088	-	4	Y	3
Benzo(b)fluoranthene	4/10	0.062 - 2.2	15TB9	0.37 - 0.76	0.88	-	4	Y	3
Benzo(g,h,i)perylene	4/10	0.019 - 0.8	15TB9	0.37 - 0.76	-	-	-	N	1
Benzo(k)fluoranthene	3/10	0.28 - 0.57	15TB9	0.35 - 0.76	8.8	-	4	N	2
Benzoic acid	2/5	0.032 - 0.04	15MW1S	1.7 - 2	31000	-	280	N	2
Bis(2-ethylhexyl)phthalate	1/10	0.2	15TB4	0.35 - 0.76	46	210	11	N	2
Carbazole	3/9	0.07 - 0.64	15TB9	0.35 - 0.76	32	-	0.2	N	2
Chrysene	4/10	0.033 - 1.8	15TB9	0.37 - 0.76	88	-	1	N	2
Dibenzo(a,h)anthracene	1/10	0.091	15MW2S	0.35 - 0.76	0.088	-	11	Y	3
Dibenzofuran	3/10	0.082 - 0.27	15TB9	0.35 - 0.76	31	-	310	N	2
Fluoranthene	6/10	0.039 - 3.705	15TB9	0.39 - 0.76	310	-	980	N	2
Fluorene	3/10	0.15 - 0.48	15TB9	0.35 - 0.76	310	-	160	N	2
Indeno(1,2,3-cd)pyrene	3/10	0.2 - 0.83	15TB9	0.35 - 0.76	0.88	-	35	N	2
Naphthalene	1/10	0.037	15MW2S	0.35 - 0.76	310	-	30	N	2
Phenanthrene	4/10	0.018 - 3.2	15TB9	0.37 - 0.76	-	-	-	N	1
Pyrene	6/10	0.036 - 3.3	15TB9	0.39 - 0.76	230	-	1400	N	2
4,4'-DDD	1/9	0.19	15TB7	0.004 - 0.041	2.7	-	0.7	N	2
4,4'-DDE	1/8	0.055	15TB7	0.004 - 0.041	1.9	-	0.5	N	2
4,4'-DDT	1/9	0.13	15TB7	0.004 - 0.041	1.9	80	1.0	N	2
Aluminum	10/10	3440 - 15900	15MW2S	-	7800	-	-	~~Y~~ N	~~3~~ 4
Antimony	1/6	4.3	15MW4S	2 - 14.4	3.1	-	-	Y	3

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SUMMARY OF COC SELECTION (Continued)
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	SSL Inhalation (5)	SSL Migration to Groundwater (6)	Selected as COC?	Rationale
Arsenic	10/10	1.8 - 6.3	15MW2S	-	0.43	380	15	Y	3
Barium	10/10	25 - 101	15MW3S	-	550	350000	32	N	2
Beryllium	10/10	0.17 - 1	15TB9/15TB8	-	0.15	690	180	Y	3
Cadmium	3/10	0.7 - 4.2	15TB3	0.27 - 1	3.9	920	6	Y	3
Calcium	10/10	234 - 2550	15MW3S	-	-	-	-	N	1
Chromium (total)	10/10	6 - 23.4	15TB3	-	39 (7)	140 (7)	19 (7)	N	2
Cobalt	9/10	2.9 - 7.8	15TB3	3	470	-	-	N	2
Copper	10/10	7 - 23.4	15MW3S	-	290	-	-	N	2
Cyanide	5/6	0.11 - 0.36	15TB9	1.4	160	-	-	N	2
Iron	10/10	7380 - 14700	15MW3S	-	2300	-	-	~~Y~~ N	~~3~~ 4
Lead	10/10	8.5 - 85	15TB9	-	400 (8)	-	-	N	2
Magnesium	10/10	1250 - 4980	15MW3S	-	-	-	-	N	1
Manganese	10/10	61 - 327	15MW3S	-	~~39~~ 190	-	-	Y	3
Mercury	6/10	0.03 - 0.14	15MW4S	0.11 - 0.12	2.3	7	3	N	2
Nickel	10/10	3 - 15.3	15TB3	-	160	6900	21	N	2
Potassium	10/10	339 - 4170	15MW3S	-	-	-	-	N	1
Selenium	1/10	0.46	15TB4	0.25 - 0.92	39	-	3	N	2
Silver	1/10	0.46	15MW3S	0.22 - 1.7	39	-	-	N	2
Sodium	7/10	46 - 357	15MW3S	43 - 239	-	-	-	N	1
Thallium	1/10	0.32	15MW3S	0.24 - 7.4	0.55 (9)	-	0.4	N	2
Vanadium	10/10	11 - 30.2	15TB3	-	55	-	-	N	2
Zinc	10/10	18 - 187	15TB3	-	2300	-	42000	N	2

Revisions
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SUMMARY OF COC SELECTION (Continued)
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - ALL SOIL (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in mg/kg unless otherwise noted. All soil designated as soil from depths of 0 to 10 feet.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Soil screening level guidance (USEPA, December 1994).
6 Soil screening level guidance (USEPA, December 1994) with a dilution and attenuation factor of 10.
7 Hexavalent chromium.
8 OSWER soil screening level for residential land use (USEPA, July 14, 1994).
9 Thallic oxide.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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000003

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
Ethylbenzene	3	5.6111
Toluene	3	4.7778
Trichloroethene	2	5.1667
Xylenes, total	26	8.1667
2-Methylnaphthalene	29	197.1111
Acenaphthene	330	212.6667
Anthracene	970	304.4444
Benzo(a)anthracene	2200	434.4444
Benzo(a)pyrene	1600	366.7778
Benzo(b)fluoranthene	2200	435.2222
Benzo(g,h,i)perylene	800	264.8889
Benzo(k)fluoranthene	570	264.4444
Benzoic acid	40	564.4
Bis(2-ethylhexyl)phthalate	200	216.6667
Carbazole	640	256.875
Chrysene	1800	396.4444
Dibenzo(a,h)anthracene	91	204
Dibenzofuran	270	209.1111
Fluoranthene	3705	663.6667
Fluorene	480	240
Indeno(1,2,3-cd)pyrene	830	284.4444
Naphthalene	37	198
Phenanthrene	3200	619.2222
Pyrene	3300	589.1111
4,4'-DDD	190	34.1875
4,4'-DDE	55	19.5
4,4'-DDT	130	26.6875
Inorganics (mg/kg)		
Aluminum	15900	11446.6667
Antimony	4.3	4.2333
Arsenic	6.3	3.4
Barium	101	46.1667
Beryllium	1	0.5711
Cadmium	4.2	0.7911
Calcium	2550	1274.6667
Chromium (total)	23.4	14.4667
Cobalt	7.8	4.5889
Copper	23.4	13.8222
Cyanide	0.36	0.324
Iron	14700	11631.1111
Lead	85	43.9222
Magnesium	4980	2630
Manganese	327	155.1111

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS (Continued)
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - ALL SOIL
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Inorganics (mg/kg) (Continued)		
Mercury	0.14	0.0578
Nickel	15.3	8.1667
Potassium	4170	1173
Selenium	0.46	0.2572
Silver	0.46	0.29
Sodium	357	144.5
Thallium	0.32	0.5861
Vanadium	30.2	22.4889
Zinc	187	68.3444

SUMMARY OF COC SELECTION
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Carbon disulfide	1/11	3	15GW1D	10	-	-	100	N	2
1,4-Dichlorobenzene	1/11	1	15GW2S	10	75	75	0.44	Y	3
Bis(2-ethylhexyl)phthalate	4/11	0.6 - 45	15GW1D	10	6	6	4.8	Y	3
Di-n-butyl phthalate	5/11	0.5 - 0.9	15GW1D	10	-	-	370	N	2
Naphthalene	1/11	1	15GW3S	10	-	-	150	N	2
Phenanthrene	2/11	0.5 - 0.6	15GW3S	10	-	-	-	N	1
Heptachlor	1/11	0.54	15GW3S	0.05	0.4	0.4	0.0023	Y	3
Aluminum	10/11	114 - 4210	15GW3S	42	50 - 200 (7)	-	3700	~~Y~~ N	~~3~~ 5
Antimony	1/11	3.6	15GW2S	3 - 15	6	6	1.5	Y	3
Arsenic	3/11	1.2 - 1.7	15GW1D	1 - 4.3	50	50	0.045	Y	3
Barium	11/11	31.6 - 125	15GW3S	-	2000	2000	260	N	2
Boron	3/11	50.2 - 73.2	15GW3S	50	-	-	330	N	2
Cadmium	5/11	1.4 - 5.3	15GW2S	1 - 2	5	5	1.8	Y	3
Calcium	11/11	11700 - 31900	15GW3S	-	-	-	-	N	1
Chromium (total)	4/11	1.4 - 5.9	15GW3S	1 - 3	100	100	18 (9)	N	2
Cobalt	6/11	1.1 - 10.8	15GW2S	1 - 8.3	-	-	220	N	2
Copper	5/11	2.4 - 12.8	15GW2S	1 - 2	1300 (8)	-	150	N	2
Iron	10/11	83.1 - 7110	15GW3S	16	300 (7)	-	1100	~~Y~~ N	~~3~~ 5
Lead	4/11	2.1 - 21.2	15GW3S	1 - 4.4	15 (8)	-	-	Y	4
Magnesium	11/11	2390 - 9490	15GW1D	-	-	-	-	N	1
Manganese	11/11	27.4 - 3080	15GW3S	-	50 (7)	-	~~18~~ 88	Y	3
Nickel	1/11	10.6	15GW2S	10 - 12	100	100	73	N	2
Potassium	11/11	1550 - 7020	15GW1D	-	-	-	-	N	1
Selenium	1/11	3	15GW2S	1 - 2	50	50	18	N	2
Silver	1/11	1.9	15GW1D	1 - 2	100 (7)	50	18	N	2
Sodium	11/11	24600 - 71000	15GW1D	-	-	-	-	N	1
Vanadium	5/11	1 - 9.3	15GW3S	1 - 5	-	-	26	N	2
Zinc	11/11	2.9 - 453	15GW2S	-	5000 (7)	-	1100	N	2

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000007

SUMMARY OF COC SELECTION (Continued)
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - UNFILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample-specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL.
8 Action Level.
9 Hexavalent chromium.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 No COC screening level available; maximum is greater than or equal to Action Level.
5 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - UNFILTERED GROUNDWATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
Carbon disulfide	4	4.8
1,4-Dichlorobenzene	3	4.6
Bis(2-ethylhexyl)phthalate	25	8.26
Di-n-butyl phthalate	2.875	3.225
Naphthalene	3	4.6
Phenanthrene	0.55	4.11
Heptachlor	0.2825	0.0765
Inorganics (ug/L)		
Aluminum	3040	1321.8
Antimony	5.55	4.71
Arsenic	1.825	1.06
Barium	105.55	59.74
Boron	61.7	33.685
Cadmium	5.1	2
Calcium	30100	23575
Chromium (total)	4.65	1.885
Cobalt	7.475	3.67
Copper	9.65	4.5325
Iron	5115	1306.06
Lead	11.7	4.155
Magnesium	9337.5	4629.5
Manganese	1930	707.92
Nickel	8.3	6.06
Potassium	6682.5	4256.5
Selenium	2	1
Silver	1.1	0.82
Sodium	69025	38995
Vanadium	6.4	2.685
Zinc	438	99.845

SUMMARY OF COC SELECTION
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - FILTERED GROUNDWATER (UG/L) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Federal MCL (4)	State MCL (5)	Risk-based COC Screening Level (6)	Selected as COC?	Rationale
Aluminum	7/11	13.4 - 2980	15GW2S	14 - 14.6	50 - 200 (7)	-	3700	N	1
Antimony	1/11	14.3	15GW3S	12 - 15	6	6	1.5	N	1
Barium	11/11	28.3 - 86.1	15GW3S	-	2000	2000	260	N	1
Beryllium	1/11	1.5	15GW2S	1	4	4	0.016	Y	2
Boron	7/11	19 - 62.3	15GW3S	50	-	-	330	N	1
Cadmium	2/11	4.4 - 5.5	15GW2S	2	5	5	1.8	N	1
Calcium	11/11	11800 - 31100	15GW3S	-	-	-	-	N	1
Chromium (total)	2/11	3.1 - 3.4	15GW4S	3	100	100	18 (9)	N	1
Cobalt	4/11	3.5 - 9	15GW2S	3 - 10.6	-	-	220	N	1
Copper	7/11	2.3 - 11	15GW2S	2	1300 (8)	-	150	N	1
Iron	7/11	15 - 2720	15GW3S	50	300 (7)	-	1100	N	1
Magnesium	11/11	2160 - 9340	15GW1D	-	-	-	-	N	1
Manganese	11/11	26.9 - 3080	15GW3S	-	50 (7)	-	~~18~~ 88	N	1
Nickel	1/11	10.6	15GW2S	7 - 10	100	100	73	N	1
Potassium	11/11	1500 - 6640	15GW1D	-	-	-	-	N	1
Sodium	11/11	25600 - 68900	15GW1D	-	-	-	-	N	1
Zinc	7/11	3.4 - 450	15GW2S	2 - 6.4	5000 (7)	-	1100	N	1

Footnotes:

1 Results in ug/L unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated and rejected results are not used in risk assessment.
3 Sample specific.
4 Maximum contaminant level. (USEPA, May 1995).
5 Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II EnvironmentalHealth.
6 For tap water, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
7 Secondary MCL (SMCL) based on aesthetic water qualities.
8 Action level.
9 Hexavalent chromium.

Rationale Designations:

1 Chemical detected in unfiltered sample; filtered results not used in risk assessment.
2 Chemical not detected in unfiltered samples; maximum is greater than or equal to the COC screening level.

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SUMMARY OF COC SELECTION
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - SEDIMENT (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
Anthracene	1/1	0.025	15SD1	-	2300	N	2
Benzo(a)anthracene	1/1	0.1	15SD1	-	0.88	N	2
Benzo(a)pyrene	1/1	0.075	15SD1	-	0.088	N	2
Benzo(b)fluoranthene	1/1	0.1	15SD1	-	0.88	N	2
Benzo(g,h,i)perylene	1/1	0.071	15SD1	-	-	N	1
Benzo(k)fluoranthene	1/1	0.09	15SD1	-	8.8	N	2
Benzoic acid	1/1	0.26	15SD1	-	31000	N	2
Carbazole	1/1	0.022	15SD1	-	32	N	2
Chrysene	1/1	0.12	15SD1	-	88	N	2
Di-n-butyl phthalate	1/1	0.14	15SD1	-	780	N	2
Di-n-octyl phthalate	1/1	0.037	15SD1	-	160	N	2
Dimethyl phthalate	1/1	0.99	15SD1	-	78000	N	2
Fluoranthene	1/1	0.25	15SD1	-	310	N	2
Indeno(1,2,3-cd)pyrene	1/1	0.078	15SD1	-	0.88	N	2
Phenanthrene	1/1	0.21	15SD1	-	-	N	1
Pyrene	1/1	0.2	15SD1	-	230	N	2
4,4'-DDT	1/1	0.006	15SD1	-	1.9	N	2
Endosulfan sulfate	1/1	0.01	15SD1	-	-	N	1
Heptachlor	1/1	0.0025	15SD1	-	0.14	N	2
Aluminum	1/1	2160	15SD1	-	7800	N	2
Arsenic	1/1	1.2	15SD1	-	0.43	Y	3
Barium	1/1	24.2	15SD1	-	550	N	2
Beryllium	1/1	0.26	15SD1	-	0.15	Y	3
Calcium	1/1	1200	15SD1	-	-	N	1
Chromium (total)	1/1	7.7	15SD1	-	39 (5)	N	2
Copper	1/1	6.9	15SD1	-	290	N	2
Iron	1/1	4500	15SD1	-	2300	~~Y~~ N	~~3~~ 4
Lead	1/1	18.1	15SD1	-	400 (6)	N	2
Magnesium	1/1	1400	15SD1	-	-	N	1

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SUMMARY OF COC SELECTION (Continued)
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - SEDIMENT (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
Manganese	1/1	75.7	15SD1	-	~~39~~ 190	~~Y~~ N	~~3~~ 2
Nickel	1/1	5	15SD1	-	160	N	2
Potassium	1/1	731	15SD1	-	-	N	1
Sodium	1/1	217	15SD1	-	-	N	1
Vanadium	1/1	5.3	15SD1	-	55	N	2
Zinc	1/1	22.8	15SD1	-	2300	N	2

Footnotes:

1 Results presented in mg/kg unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment
3 Sample-specific.
4 For residential use, based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Hexavalent chromium.
6 OSWER soil screening level for residential land use (USEPA, July 14, 1994).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATIONS
SITE 15 SPENT ACID STORAGE AND DISPOSAL AREA - SEDIMENT
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
Anthracene	25	25
Benzo(a)anthracene	100	100
Benzo(a)pyrene	75	75
Benzo(b)fluoranthene	100	100
Benzo(g,h,i)perylene	71	71
Benzo(k)fluoranthene	90	90
Benzoic acid	260	260
Carbazole	22	22
Chrysene	120	120
Di-n-butyl phthalate	140	140
Di-n-octyl phthalate	37	37
Dimethyl phthalate	990	990
Fluoranthene	250	250
Indeno(1,2,3-cd)pyrene	78	78
Phenanthrene	210	210
Pyrene	200	200
4,4'-DDT	6	6
Endosulfan sulfate	10	10
Heptachlor	2.5	2.5
Inorganics (mg/kg)		
Aluminum	2160	2160
Arsenic	1.2	1.2
Barium	24.2	24.2
Beryllium	0.26	0.26
Calcium	1200	1200
Chromium (total)	7.7	7.7
Copper	6.9	6.9
Iron	4500	4500
Lead	18.1	18.1
Magnesium	1400	1400
Manganese	75.7	75.7
Nickel	5	5
Potassium	731	731
Sodium	217	217
Vanadium	5.3	5.3
Zinc	22.8	22.8

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL[redacted]

SITE NAME: Site 15 – Spent Acid Storage & Disposal Area
LOCATION: NSB–NLON, Groton, CT
DATE: 01/21/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL[redacted]T SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	240	IR:	0
EF:	80	EF:	1
Fi:	0.5	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	3.76E–07	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	5.37E–09

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL [redacted] (PAGE TWO)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG-DAY/MG)
Benzo(a)anthracene	0.43	1	0.00E+00	1.62E-07	2.31E-09		7.30E-01
Benzo(b)fluoranthene	0.44	1	0.00E+00	1.65E-07	2.36E-09		7.30E-01
Benzo(a)pyrene	0.37	1	0.00E+00	1.39E-07	1.99E-09		7.30E+00
Dibenz(a,h)anthracene	0.091	1	0.00E+00	3.42E-08	4.88E-10		7.30E+00
~~Aluminum~~	~~11400~~	~~1~~	~~0.00E+00~~	~~4.28E-03~~	~~6.12E-05~~	~~1.00E+00~~	
Antimony	4.2	1	0.00E+00	1.58E-06	2.25E-08	4.00E-04	
Arsenic	3.4	1	0.00E+00	1.28E-06	1.82E-08	3.00E-04	1.50E+00
Beryllium	0.57	1	0.00E+00	2.14E-07	3.06E-09	5.00E-03	4.30E+00
Cadmium	0.79	1	0.00E+00	2.97E-07	4.24E-09	5.00E-04	
~~Iron~~	~~11600~~	~~1~~	~~0.00E+00~~	~~4.36E-03~~	~~6.23E-05~~	~~3.00E-01~~	
Manganese	155	1	0.00E+00	5.82E-05	8.32E-07	~~5.00E-03~~ 2.4E-2	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL [redacted] (PAGE THREE)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	1.68E-09
Benzo(b)fluoranthene	0.00E+00	0.00E+00	1.72E-09
Benzo(a)pyrene	0.00E+00	0.00E+00	1.45E-08
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	3.57E-09
~~Aluminum~~	~~0.00E+00~~	~~4.28E-03~~	~~0.00E+00~~
Antimony	0.00E+00	3.95E-03	0.00E+00
Arsenic	0.00E+00	4.26E-03	2.74E-08
Beryllium	0.00E+00	4.28E-05	1.32E-08
Cadmium	0.00E+00	5.94E-04	0.00E+00
~~Iron~~	~~0.00E+00~~	~~1.45E-02~~	~~0.00E+00~~
Manganese	0.00E+00	~~1.16E-02~~ 2.42E-3	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	**~~3.93E-02~~ 1.13E-2**	**6.20E-08**

00019

Revising
08/19/96

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 15 – Spent Acid Storgae & Disposal Area
LOCATION: NSB–NLON, Groton, CT
DATE: 01/21/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Construction Worker (All Soil), CTE

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		3800
AF = ADHERENCE FACTOR (MG/SQ CM):		0.2
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		80
ED1 = YOUTH EXPOSURE DURATION (YEARS):		1
ED2 = ADULT EXPOSURE DURATION (YEARS):		1
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
BW1 = BODY WEIGHT ADOLESCENT (KG):		1
BW2 = BODY WEIGHT ADULT (KG):		70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		365
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS)	CF1 =	0.00E+00	CANCER RISK = (CF3)*(C)*(ABS)	CF3 =	1.70E–08
DOSEadult = (CF2)*(C)*(ABS)	CF2 =	1.19E–06			

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG-DAY/MG)
Cadmium	0.79	0.01	0.00E+00	9.40E-09	1.34E-10	~~1.50E-05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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Revisions
1/19/96
JME

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker (All Soil), CTE
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Cadmium	0.00E+00	~~8.27E-04~~ 3.76E-4	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	~~8.27E-04~~ 3.76E-4	0.00E+00

Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 15 – Spent Acid Storage & Disposal Area
LOCATION: NSB–NLON, Groton, CT
DATE: 01/21/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, CTE

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE: Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	80
A:	3800
tevent:	6
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.19E+01

CONVERSION FACTOR (CARCIN) = 1.70E–01

000025

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker, CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Bis(2-ethylhexyl)phthalate	0.006	O	1.00E +02	2.10E +01	3.30E -02	1.30E +01	9.46E -06
1,4-Dichlorobenzene	0.003	O	3.30E +00	6.90E -01	6.20E -02	2.50E -01	1.55E -06
Heptachlor	0.000077	O	9.40E +01	1.70E +01	1.10E -02	1.90E +00	2.73E -08
~~Aluminum~~	~~1.32~~	~~I~~			~~1.00E -03~~		~~1.06E -05~~
Antimony	0.0047	I			1.00E -03		3.76E -08
Arsenic	0.0011	I			1.00E -03		8.80E -09
Beryllium	0.00059	I			1.00E -03		4.72E -09
Cadmium	0.002	I			1.00E -03		1.60E -08
~~Iron~~	~~1.31~~	~~I~~			~~1.00E -03~~		~~1.05E -05~~
Manganese	0.708	I			1.00E -03		5.66E -06
							0.00E +00
							0.00E +00
							0.00E +00
							0.00E +00
							0.00E +00
							0.00E +00
							0.00E +00
							0.00E +00
							0.00E +00
							0.00E +00
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							0.00E +00
							0.00E +00
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							0.00E +00
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							0.00E +00
							0.00E +00
							0.00E +00
							0.00E +00
							0.00E +00

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Revision 08/

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Bis(2-ethylhexyl)phthalate	1.13E-04	1.10E-02	1.02E-02
1,4-Dichlorobenzene	1.64E-05		0.00E+00
Heptachlor	3.25E-07	5.00E-04	6.50E-04
~~Aluminum~~	~~1.26E-04~~	~~5.00E-02~~	~~2.51E-03~~
Antimony	4.47E-07	4.00E-04	1.12E-03
Arsenic	1.05E-07	2.80E-04	3.74E-04
Beryllium	5.62E-08	2.50E-04	2.25E-04
Cadmium	1.90E-07	~~1.50E-05~~ 2.5E-5	~~1.27E-02~~ 7.62E-3
~~Iron~~	~~1.26E-04~~	~~1.50E-02~~	~~8.31E-03~~
Manganese	6.74E-05	~~1.50E-04~~ 7.2E-4	~~4.49E-01~~ 9.35E-2
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~4.85E-01~~ 1.14E-1

Revisions
08/19/96
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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker, CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Bis(2-ethylhexyl)phthalate	1.61E-06	2.50E-02	4.02E-08
1,4-Dichlorobenzene	2.63E-07	2.40E-02	6.32E-09
Heptachlor	4.64E-09	4.50E+00	2.09E-08
~~Aluminum~~	~~1.79E-06~~		~~0.00E+00~~
Antimony	6.39E-09		0.00E+00
Arsenic	1.50E-09	1.60E+00	2.39E-09
Beryllium	8.02E-10	8.60E+01	6.90E-08
Cadmium	2.72E-09		0.00E+00
~~Iron~~	~~1.78E-06~~		~~0.00E+00~~
Manganese	9.63E-07		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			1.39E-07

000028

Revisions 08/19/96 KWS

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL/[redacted]

SITE NAME: Site 15 – Spent Acid Storage & Disposal Area
LOCATION: NSB–NLON, Groton, CT
DATE: 01/21/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: IEX = (C x IR x Fi x BIO x EF x ED)/(BW x AT x 1E6)

WHERE:
C = MEAN CONCENTRATION IN SOIL/[redacted] SAMPLE (MG/KG)
IR = SOIL INGESTION RATE (MG/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
Fi = FRACTION FROM CONTAMINATED SOURCE
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)
BIO = BIOAVAILABILITY

ENTER INPUT PARAMETERS:

ADULT:		YOUTH:	
IR:	480	IR:	0
EF:	120	EF:	1
Fi:	1	Fi:	1
ED:	1	ED:	1
BW:	70	BW:	1
AT(CAR):	25550	AT(CAR):	25550
AT(NON):	365	AT(NON):	365

DETERMINE CONVERSION FACTORS:

ADULT:			YOUTH:			ADULT/YOUTH (CANCER RISK):	
CF:	2.25E–06	(AVG ANNUAL DOSE)	CF:	0.00E+00	(AVG ANNUAL DOSE)	CF:	3.22E–08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL[redacted] (PAGE TWO)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
CALCULATE DOSES:

CHEMICAL	C(MG/KG)	BIOAVAILABILITY	YOUTH ANNUAL DOSE (MG/KG/DAY)	ADULT ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)
Benzo(a)anthracene	2.2	1	0.00E+00	4.96E–06	7.09E–08		7.30E–01
Benzo(b)fluoranthene	2.2	1	0.00E+00	4.96E–06	7.09E–08		7.30E–01
Benzo(a)pyrene	1.6	1	0.00E+00	3.61E–06	5.15E–08		7.30E+00
Dibenz(a,h)anthracene	0.091	1	0.00E+00	2.05E–07	2.93E–09		7.30E+00
~~Aluminum~~	~~15900~~	~~1~~	~~0.00E+00~~	~~8.58E–02~~	~~5.12E–04~~	~~1.00E+00~~	
Antimony	4.3	1	0.00E+00	9.69E–06	1.38E–07	4.00E–04	
Arsenic	6.3	1	0.00E+00	1.42E–05	2.03E–07	3.00E–04	1.50E+00
Beryllium	1	1	0.00E+00	2.25E–06	3.22E–08	5.00E–03	4.30E+00
Cadmium	4.2	1	0.00E+00	9.47E–06	1.35E–07	5.00E–04	
~~Iron~~	~~14700~~	~~1~~	~~0.00E+00~~	~~3.31E–02~~	~~4.73E–04~~	~~3.00E–01~~	
Manganese	327	1	0.00E+00	7.37E–04	1.05E–05	~~5.00E–03~~ 2.4E-2	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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Revisions
10/19/96

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL/~~SEDIMENT~~ (PAGE THREE)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.00E+00	0.00E+00	5.17E−08
Benzo(b)fluoranthene	0.00E+00	0.00E+00	5.17E−08
Benzo(a)pyrene	0.00E+00	0.00E+00	3.76E−07
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	2.14E−08
~~Aluminum~~	~~0.00E+00~~	~~3.58E−02~~	~~0.00E+00~~
Antimony	0.00E+00	2.42E−02	0.00E+00
Arsenic	0.00E+00	4.73E−02	3.04E−07
Beryllium	0.00E+00	4.51E−04	1.38E−07
Cadmium	0.00E+00	1.89E−02	0.00E+00
~~Iron~~	~~0.00E+00~~	~~1.10E−01~~	~~0.00E+00~~
Manganese	0.00E+00	~~1.47E−01~~ 3.06E-2	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	**0.00E+00**	**~~3.86E−01~~** 1.21 E-1	**9.44E−07**

Revisions
08/19/96
KMS

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RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: Site 15 – Spent Acid Storgae & Disposal Area
LOCATION: NSB–NLON, Groton, CT
DATE: 01/21/96

QUANTITATIVE EVALUATION PERFORMED FOR CADMIUM, DIOXINS, AND PCBS ONLY.
EXPOSURES TO OTHER CHEMICALS OF CONCERN ARE ADDRESSED QUALITATIVELY.

EXPOSURE SCENARIO: Construction Worker (All Soil), RME

RELEVANT EQUATION: DEX = (C x SA x AF x ABS x EF x ED)/(BW x AT x 1E6)

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SA1 = YOUTH SKIN SURFACE AREA (SQ CM/DAY):		0
SA2 = ADULT SKIN SURFACE AREA (SQ CM/DAY):		3600
AF = ADHERENCE FACTOR (MG/SQ CM):		1
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF1 = YOUTH EXPOSURE FREQUENCY (DAYS/YEAR):		1
EF2 = ADULT EXPOSURE FREQUENCY (DAYS/YEAR):		120
ED1 = YOUTH EXPOSURE DURATION (YEARS):		1
ED2 = ADULT EXPOSURE DURATION (YEARS):		1
Fd = FRACTION OF SOIL FROM SOURCE AVAILABLE FOR DERMAL CONTACT		1
BW1 = BODY WEIGHT ADOLESCENT (KG):		1
BW2 = BODY WEIGHT ADULT (KG):		70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS (YOUTH):		365
AT2 = AVERAGING TIME (DAYS), NONCARCINOGENS (ADULT):		365
AT3 = AVERAGING TIME (DAYS), CARCINOGENS:		25550

DETERMINE CONVERSION FACTORS:
DEX = (C)*(SA SQ CM)*(AF MG/SQ CM)*(ABS)*(EF DAYS/YEAR)*(ED YEARS)/(AT DAYS)/(BW KG)/(1 KG/1E6 MG)

DOSEyouth = (CF1)*(C)*(ABS)	CF1 =	0.00E+00	CANCER RISK = (CF3)*(C)*(ABS)	CF3 =	2.55E–07
DOSEadult = (CF2)*(C)*(ABS)	CF2 =	1.78E–05			

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 15 – Spent Acid Storgae & Disposal Area
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL YOUTH DOSE (MG/KG/DAY)	ANNUAL ADULT DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG-DAY/MG)
Cadmium	4.2	0.01	0.00E+00	7.50E-07	1.07E-08	~~1.50E-05~~ 2.5E-5	
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		
			0.00E+00	0.00E+00	0.00E+00		

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Revisions
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RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE THREE)
Site 15 – Spent Acid Storgae & Disposal Area
EXPOSURE SCENARIO: Construction Worker (All Soil), RME
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	HAZARD INDEX YOUTH	HAZARD INDEX ADULT	INCREMENTAL CANCER RISK
Cadmium	0.00E+00	~~5.00E-02~~ 3.00E-2	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00	0.00E+00
TOTAL	0.00E+00	~~5.00E-02~~ 3.00E-2	0.00E+00

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Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER

SITE NAME: Site 15 – Spent Acid Storage & Disposal Area
LOCATION: NSB–NLON, Groton, CT
DATE: 01/21/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Construction Worker, RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1 L/1000 CM**3)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

EV:	1
ED:	1
EF:	120
A:	3800
tevent:	8
BW:	70
AT(NON):	365
AT(CAR):	25550

CONVERSION FACTOR (NONCAR) = 1.78E+01

CONVERSION FACTOR (CARCIN) = 2.55E–01

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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE TWO)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker, RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Bis(2-ethylhexyl)phthalate	0.025	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	2.96E-05
1,4-Dichlorobenzene	0.003	O	3.30E+00	6.90E-01	6.20E-02	2.50E-01	1.55E-06
Heptachlor	0.00028	O	9.40E+01	1.70E+01	1.10E-02	1.90E+00	9.93E-08
~~Aluminum~~	~~3.04~~	~~I~~			~~1.00E-03~~		~~3.43E-05~~
Antimony	0.0056	I			1.00E-03		4.48E-08
Arsenic	0.0018	I			1.00E-03		1.44E-08
Beryllium	0.0015	I			1.00E-03		1.20E-08
Cadmium	0.0051	I			1.00E-03		4.08E-08
~~Iron~~	~~5.12~~	~~I~~			~~1.00E-03~~		~~4.18E-05~~
Manganese	1.93	I			1.00E-03		1.54E-05
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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Revisions
08/19
MK

RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER WATER (PAGE THREE)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE DOSES:

CHEMICAL	ANNUAL DERMAL DOSE (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX DERMAL
Bis(2-ethylhexyl)phthalate	5.27E-04	1.10E-02	4.80E-02
1,4-Dichlorobenzene	2.77E-05		0.00E+00
Heptachlor	1.77E-06	5.00E-04	3.54E-03
~~Aluminum~~	~~4.34E-04~~	~~5.00E-02~~	~~8.68E-03~~
Antimony	8.00E-07	4.00E-04	2.00E-03
Arsenic	2.57E-07	2.80E-04	9.18E-04
Beryllium	2.14E-07	2.50E-04	8.57E-04
Cadmium	7.28E-07	~~1.50E-05~~ 2.5E-5	~~4.85E-02~~ 2.91E-2
~~Iron~~	~~7.81E-04~~	~~1.50E-02~~	~~4.87E-02~~
Manganese	2.76E-04	~~1.50E-04~~ 7.2E-4	~~1.84E+00~~ 3.83E-1
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			~~2.00E+00~~ 4.67E-1

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Revisions
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RISK ASSESSMENT SPREADSHEET – DERMAL CONTACT WITH GROUNDWATER (PAGE FOUR)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Construction Worker, RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF DERMAL (KG/DAY/MG)	CANCER RISK DERMAL CONTACT
Bis(2-ethylhexyl)phthalate	7.54E-06	2.50E-02	1.88E-07
1,4-Dichlorobenzene	3.95E-07	2.40E-02	9.48E-09
Heptachlor	2.53E-08	4.50E+00	1.14E-07
~~Aluminum~~	~~6.20E-06~~		~~0.00E+00~~
Antimony	1.14E-08		0.00E+00
Arsenic	3.67E-09	1.60E+00	5.87E-09
Beryllium	3.06E-09	8.60E+01	2.63E-07
Cadmium	1.04E-08		0.00E+00
~~Iron~~	~~1.04E-05~~		~~0.00E+00~~
Manganese	3.94E-06		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
0	0.00E+00		0.00E+00
TOTAL RISK			5.81E-07

000040

Revisions
08/19/96
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RISK ASSESSMENT SPREADSHEET -- INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 15 -- Spent Acid Storagae & Disposal Area
LOCATION: NSB-NLON, Groton, CT
DATE: 01/21/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE-ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE-ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	100
EDc:	2
BWc:	15
IRa:	50
EDa:	7
BWa:	70
IFadj:	18.33333
Fi:	0.5
EF:	150
AT(NONC):	3285
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 4.2E-07 CARCIN = 5.4E-08

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 15 – Spent Acid Storagae & Disposal Area
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Benzo(a)anthracene	0.43	1	1.80E−07	2.31E−08		7.30E−01	0.00E+00	1.69E−08
Benzo(b)fluoranthene	0.44	1	1.84E−07	2.37E−08		7.30E−01	0.00E+00	1.73E−08
Benzo(a)pyrene	0.37	1	1.55E−07	1.99E−08		7.30E+00	0.00E+00	1.45E−07
Dibenz(a,h)anthracene	0.091	1	3.81E−08	4.90E−09		7.30E+00	0.00E+00	3.58E−08
~~Aluminum~~	~~11400~~	~~1~~	~~4.77E−03~~	~~6.14E−04~~	~~1.00E+00~~		~~4.77E−03~~	~~0.00E+00~~
Antimony	4.2	1	1.76E−06	2.26E−07	4.00E−04		4.39E−03	0.00E+00
Arsenic	3.4	1	1.42E−06	1.83E−07	3.00E−04	1.50E+00	4.74E−03	2.74E−07
Beryllium	0.57	1	2.39E−07	3.07E−08	5.00E−03	4.30E+00	4.77E−05	1.32E−07
Cadmium	0.79	1	3.31E−07	4.25E−08	5.00E−04		6.61E−04	0.00E+00
~~Iron~~	~~11600~~	~~1~~	~~4.86E−03~~	~~6.24E−04~~	~~3.00E−01~~		~~1.62E−02~~	~~0.00E+00~~
Manganese	155	1	6.49E−05	8.34E−06	~~5.00E−03~~ 2.4E-2		~~1.30E−02~~ 2.71E-3	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~4.38E−02~~ 1.25E-2	6.22E−07

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Revisions
9/96
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RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: **Site 15 – Spent Acid Storage & Disposal Area**
LOCATION: **NSB–NLON, Groton, CT**
DATE: **01/21/96**

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR DERMAL CONTACT WITH SOIL ARE CALCULATED BY THE FOLLOWING SPREADSHEETS USING AGE–ADJUSTED EXPOSURE FACTORS. ASUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

RELEVANT EQUATION: DEX = (C x SAadj x AF x ABS x EF x Fd)/(AT x CF) SAadj = (SAc x EDc)/BWc + (SAa x EDa)/BWa

WHERE:

C = CONCENTRATION IN SOIL (MG/KG)		
SAc = CHILD SKIN SURFACE AREA (CM**2/DAY):		2094
SAa = ADULT SKIN SURFACE AREA (CM**2/DAY):		3800
EDc = CHILD EXPOSURE DURATION (YEARS):		2
EDa = ADULT EXPOSURE DURATION (YEARS):		7
BWc = CHILD BODY WEIGHT (KG):		15
BWa = ADULT BODY WEIGHT (KG):		70
SAadj = AGE–ADJUSTED SKIN SURFACE AREA FACTOR (CM**2 YR/DAY KG)		659.2
AF = ADHERENCE FACTOR (MG/CM**2):		0.2
ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
	Dioxins:	0.03
	PCBS:	0.06
EF = EXPOSURE FREQUENCY (DAYS/YEAR):		150
Fd = FRACTION OF SOIL FROM CONTAMINATED SOURCE AVAILABLE FOR DERMAL CONTACT		0.5
AT = AVERAGING TIME (DAYS), NONCARCINOGENS:		3285
AVERAGING TIME (DAYS), CARCINOGENS:		25550
CF = CONVERSION FACTOR (UNITLESS)		1.00E+06

DETERMINE CONVERSION FACTORS:

NONCARCIN = 3.01E–06 CARCIN = 3.87E–07

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), CTE

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Cadmium	0.79	0.01	2.38E-08	3.06E-09	~~1.50E-05~~ 2.5E-5		~~1.59E-03~~ 9.54E-4	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~1.59E-03~~ 9.54E-4	0.00E+00

000044

Revisions 3/19/96 KMS

RISK ASSESSMENT SPREADSHEET – EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: Site 15 – Spent Acide Storage & Disposal Area
LOCATION: NSB–NLON, Groton, CT
DATE: 01/21/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS. THREE EXPOSURE ROUTES ARE CONSIDERED: INGESTION OF GROUNDWATER, DERMAL CONTACT WHILE SHOWERING/BATHING, AND INHALATION OF VOLATILES WHILE SHOWERING/BATHING. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child), CTE

REFERENCES: *EPA, DECEMBER 1989 AND JANUARY 1992*

INGESTION: IEX = (C x IR x EF x ED)/(BW x AT)

WHERE:
C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

INHALATION: ADDRESSED QUALITATIVELY; INHALATION RISK ASSOCIATED WITH VOCS IS ASSUMED TO BE EQUAL TO INGESTION RISK FOR VOCS.

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS:
IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1000 CM**3/L)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

INGESTION:

IR:	1.4	CONVERSION FACTOR (NONCAR) =	1.28E –02
EF:	234		
ED:	9		
BW:	70	CONVERSION FACTOR (CARCIN) =	1.65E –03
AT(NON):	3285		
AT(CAR):	25550		

DERMAL CONTACT:

EV:	1	CONVERSION FACTOR (NONCAR) =	1.83E +02
ED:	9		
EF:	234		
A:	20000	CONVERSION FACTOR (CARCIN) =	2.36E +01
tevent:	0.166667		
BW:	70		
AT(NON):	3285		
AT(CAR):	25550		

RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE TWO)
Site 15 – Spent Acide Storage & Disposal Area
EXPOSURE SCENARIO: Future Resident (Adult/Child), CTE

CHEMICAL	GW CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Bis(2-ethylhexyl)phthalate	0.008	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	1.37E-06
1,4-Dichlorobenzene	0.003	O	3.30E+00	6.90E-01	6.20E-02	2.50E-01	1.74E-07
Heptachlor	0.000077	O	9.40E+01	1.70E+01	1.10E-02	1.90E+00	3.94E-09
~~Aluminum~~	~~1.32~~	~~I~~			~~1.00E-03~~		~~2.20E-07~~
Antimony	0.0047	I			1.00E-03		7.83E-10
Arsenic	0.0011	I			1.00E-03		1.83E-10
Beryllium	0.00059	I			1.00E-03		9.83E-11
Cadmium	0.002	I			1.00E-03		3.33E-10
~~Iron~~	~~1.31~~	~~I~~			~~1.00E-03~~		~~2.18E-07~~
Manganese	0.708	I			1.00E-03		1.18E-07
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
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Revisions
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RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE THREE)
Site 15 – Spent Acide Storage & Disposal Area
EXPOSURE SCENARIO: Future Resident (Adult/Child), CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL INGESTION DOSE (MG/KG/DAY)	ANNUAL DERMAL DOSE (MG/KG/DAY)	INGESTION RfD (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX INGESTION	HAZARD INDEX DERMAL	HAZARD INDEX INHALATION	TOTAL HAZARD INDEX
Bis(2-ethylhexyl)phthalate	1.03E-04	2.50E-04	2.00E-02	1.10E-02	5.13E-03	2.27E-02	5.13E-03	3.30E-02
1,4-Dichlorobenzene	3.85E-05	3.19E-05			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor	9.87E-07	7.22E-07	5.00E-04	5.00E-04	1.97E-03	1.44E-03	0.00E+00	3.42E-03
~~Aluminum~~	~~1.89E-02~~	~~4.08E-05~~	~~1.00E+00~~	~~5.00E-02~~	~~1.89E-02~~	~~8.08E-04~~	~~0.00E+00~~	~~1.77E-02~~
Antimony	6.03E-05	1.43E-07	4.00E-04	4.00E-04	1.51E-01	3.59E-04	0.00E+00	1.51E-01
Arsenic	1.41E-05	3.36E-08	3.00E-04	2.80E-04	4.70E-02	1.20E-04	0.00E+00	4.71E-02
Beryllium	7.56E-06	1.80E-08	5.00E-03	2.50E-04	1.51E-03	7.20E-05	0.00E+00	1.59E-03
Cadmium	2.56E-05	6.11E-08	5.00E-04	~~1.50E-05~~ 2.5E-5	~~5.13E-02~~ 5.13E-2	~~4.07E-03~~ 2.44E-3	0.00E+00	~~5.54E-02~~ 5.37E-2
~~Iron~~	~~1.68E-02~~	~~4.00E-05~~	~~3.00E-01~~	~~1.50E-02~~	~~5.60E-02~~	~~2.67E-03~~	~~0.00E+00~~	~~5.87E-02~~
Manganese	9.08E-03	2.16E-05	~~5.00E-03~~ 2.4E-2	~~1.50E-04~~ 7.2E-4	~~1.82E+00~~ 3.79E-1	~~1.44E-01~~ 3.00E-2	0.00E+00	~~1.96E+00~~ 4.09E-1
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					~~2.15E+00~~ 6.31E-1	~~1.76E-01~~ 5.71E-2	5.13E-03	~~2.36E+00~~ 6.99E-1

00047

Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE FOUR)
Site 15 – Spent Acide Storage & Disposal Area
EXPOSURE SCENARIO: Future Resident (Adult/Child), CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE INGESTION DOSE (MG/KG/DAY)	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF INGESTION (KG/DAY/MG)	CSF DERMAL (KG/DAY/MG)	CANCER RISK INGESTION	CANCER RISK DERMAL CONTACT	CANCER RISK INHALATION	TOTAL CANCER RISK
Bis(2-ethylhexyl)phthalate	1.32E-05	3.21E-05	1.40E-02	2.50E-02	1.85E-07	8.04E-07	1.85E-07	1.17E-06
1,4-Dichlorobenzene	4.95E-06	4.11E-06	2.40E-02	2.40E-02	1.19E-07	9.85E-08	1.19E-07	3.36E-07
Heptachlor	1.27E-07	9.28E-08	4.50E+00	4.50E+00	5.71E-07	4.18E-07	0.00E+00	9.89E-07
~~Aluminum~~	~~2.18E-03~~	~~5.18E-06~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	7.75E-06	1.84E-08			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	1.81E-06	4.32E-09	1.50E+00	1.60E+00	2.72E-06	6.91E-09	0.00E+00	2.73E-06
Beryllium	9.73E-07	2.32E-09	4.30E+00	8.60E+01	4.18E-06	1.99E-07	0.00E+00	4.38E-06
Cadmium	3.30E-06	7.85E-09			0.00E+00	0.00E+00	0.00E+00	0.00E+00
~~Iron~~	~~2.16E-03~~	~~5.14E-06~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	1.17E-03	2.78E-06			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					7.78E-06	1.53E-06	3.03E-07	9.61E-06

00048

Revisions
08/19/010

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL

SITE NAME: Site 15 – Spent Acid Storage & Disposal Area
LOCATION: NSB–NLON, Groton, CT
DATE: 01/21/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR RESIDENTS ARE CALCULATED BY THIS SPREADSHEET USING AGE–ADJUSTED EXPOSURE FACTORS. EXPOSURES THROUGH PICA INGESTION ARE CONSIDERED. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

RELEVANT EQUATIONS: IEX = (C x IFadj x Fi x BIO x EF)/(AT x CF) IFadj = (IRc x EDc)/BWc + (IRa x EDa)/BWa

WHERE:
C = MEAN CONCENTRATION IN SOIL SAMPLE (MG/KG)
IFadj = AGE–ADJUSTED SOIL INGESTION FACTOR (MG YEAR/KG DAY)
Fi = FRACTION FROM CONTAMINATED SOURCE (UNITLESS)
BIO = BIOAVAILABILITY (UNITLESS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
AT = AVERAGING TIME (DAYS)
CF = CONVERSION FACTOR (1E+6 MG/KG)
IRc = CHILD INGESTION RATE (MG/DAY)
EDc = CHILD EXPOSURE DURATION (YEARS)
BWc = CHILD BODY WEIGHT (KG)
IRa = ADULT INGESTION RATE (MG/DAY)
EDa = ADULT EXPOSURE DURATION (YEARS)
BWa = ADULT BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

IRc:	200
EDc:	6
BWc:	15
IRa:	100
EDa:	24
BWa:	70
IFadj:	114.2857
Fi:	1
EF:	150
AT(NONC):	10950
AT(CARC):	25550

DETERMINE CONVERSION FACTORS:

NONCARC = 1.6E–06 CARCIN = 6.7E–07

RISK ASSESSMENT SPREADSHEET – INCIDENTAL INGESTION OF SOIL (PAGE TWO)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), RME

CHEMICAL	C (MG/KG)	BIOAVAILABILITY	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Benzo(a)anthracene	2.2	1	3.44E-06	1.48E-06		7.30E-01	0.00E+00	1.08E-06
Benzo(b)fluoranthene	2.2	1	3.44E-06	1.48E-06		7.30E-01	0.00E+00	1.08E-06
Benzo(a)pyrene	1.6	1	2.50E-06	1.07E-06		7.30E+00	0.00E+00	7.84E-06
Dibenz(a,h)anthracene	0.091	1	1.42E-07	6.11E-08		7.30E+00	0.00E+00	4.46E-07
~~Aluminum~~	~~15900~~	~~1~~	~~2.49E-02~~	~~1.07E-02~~	~~1.00E+00~~		~~2.49E-02~~	~~0.00E+00~~
Antimony	4.3	1	6.73E-06	2.89E-06	4.00E-04		1.68E-02	0.00E+00
Arsenic	6.3	1	9.86E-06	4.23E-06	3.00E-04	1.50E+00	3.29E-02	6.34E-06
Beryllium	1	1	1.57E-06	6.71E-07	5.00E-03	4.30E+00	3.13E-04	2.89E-06
Cadmium	4.2	1	6.58E-06	2.82E-06	5.00E-04		1.32E-02	0.00E+00
~~Iron~~	~~14700~~	~~1~~	~~2.30E-02~~	~~9.86E-03~~	~~3.00E-01~~		~~7.67E-02~~	~~0.00E+00~~
Manganese	327	1	5.12E-04	2.19E-04	~~5.00E-03~~ 2.4E-2		~~1.02E-01~~ 2.13E-2	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~2.67E-01~~ 8.45E-2	1.97E-05

00050

Revisions
08/19/96
MS

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: **Site 15 – Spent Acid Storage & Disposal Area**
LOCATION: **NSB-NLON, Groton, CT**
DATE: **01/21/96**

HAZARD INDICES AND INCREMENTAL CANCER RISKS FOR DERMAL CONTACT WITH SOIL ARE CALCULATED BY THE FOLLOWING SPREADSHEETS USING AGE-ADJUSTED EXPOSURE FACTORS. ASUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), ~~CTE~~ RME

RELEVANT EQUATION: DEX = (C x SAadj x AF x ABS x EF x Fd)/(AT x CF) SAadj = (SAc x EDc)/BWc + (SAa x EDa)/BWa

WHERE:			
	C = CONCENTRATION IN SOIL (MG/KG)		
	SAc = CHILD SKIN SURFACE AREA (CM**2/DAY):		2094
	SAa = ADULT SKIN SURFACE AREA (CM**2/DAY):		3600
	EDc = CHILD EXPOSURE DURATION (YEARS):		6
	EDa = ADULT EXPOSURE DURATION (YEARS):		24
	BWc = CHILD BODY WEIGHT (KG):		15
	BWa = ADULT BODY WEIGHT (KG):		70
	SAadj = AGE-ADJUSTED SKIN SURFACE AREA FACTOR (CM**2 YR/DAY KG)		2140.457
	AF = ADHERENCE FACTOR (MG/CM**2):		1
	ABS = ABSORPTION FRACTION: (DECIMAL FRACTION)	Cd:	0.01
		Dioxins:	0.03
		PCBS:	0.06
	EF = EXPOSURE FREQUENCY (DAYS/YEAR):		150
	Fd = FRACTION OF SOIL FROM CONTAMINATED SOURCE AVAILABLE FOR DERMAL CONTACT		1
	AT = AVERAGING TIME (DAYS), NONCARCINOGENS:		10950
	AVERAGING TIME (DAYS), CARCINOGENS:		25550
	CF = CONVERSION FACTOR (UNITLESS)		1.00E+06

DETERMINE CONVERSION FACTORS:

NONCARCIN = 2.93E-05 CARCIN = 1.26E-05

000051

RISK ASSESSMENT SPREADSHEET – DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)
Site 15 – Spent Acid Storage & Disposal Area
EXPOSURE SCENARIO: Future Resident (Adult/Child) (All Soil), ~~OTS~~ RME

CHEMICAL	C (MG/KG)	ABSORPTION FRACTION	ANNUAL DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG/DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Cadmium	4.2	0.01	1.23E–06	5.28E–07	~~1.50E–05~~ 2.5E-5		~~8.21E–02~~ 4.93E-2	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
			0.00E+00	0.00E+00			0.00E+00	0.00E+00
TOTAL RISK							~~8.21E–02~~ 4.93E-2	0.00E+00

000052

Revisions
1/19/96
[illegible]

RISK ASSESSMENT SPREADSHEET – EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: Site 15 – Spent Acide Storage & Disposal Area
LOCATION: NSB–NLON, Groton, CT
DATE: 01/21/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS. THREE EXPOSURE ROUTES ARE CONSIDERED: INGESTION OF GROUNDWATER, DERMAL CONTACT WHILE SHOWERING/BATHING, AND INHALATION OF VOLATILES WHILE SHOWERING/BATHING. ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Future Resident (Adult/Child), RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

INGESTION: IEX = (C x IR x EF x ED)/(BW x AT)

WHERE:
C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

INHALATION: ADDRESSED QUALITATIVELY; INHALATION RISK ASSOCIATED WITH VOCS IS ASSUMED TO BE EQUAL TO INGESTION RISK FOR VOCS.

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1000 CM**3/L)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

INGESTION:

IR:	2	CONVERSION FACTOR (NONCAR) =	2.74E –02
EF:	350		
ED:	30		
BW:	70	CONVERSION FACTOR (CARCIN) =	1.17E –02
AT(NON):	10950		
AT(CAR):	25550		

DERMAL CONTACT:

EV:	1	CONVERSION FACTOR (NONCAR) =	2.74E +02
ED:	30		
EF:	350		
A:	20000	CONVERSION FACTOR (CARCIN) =	1.17E +02
tevent:	0.25		
BW:	70		
AT(NON):	10950		
AT(CAR):	25550		

RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE TWO)
Site 15 – Spent Acide Storage & Disposal Area
EXPOSURE SCENARIO: Future Resident (Adult/Child), RME

CHEMICAL	GW CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Bis(2-ethylhexyl)phthalate	0.025	O	1.00E+02	2.10E+01	3.30E-02	1.30E+01	5.22E-06
1,4-Dichlorobenzene	0.003	O	3.30E+00	6.90E-01	6.20E-02	2.50E-01	2.14E-07
Heptachlor	0.00028	O	9.40E+01	1.70E+01	1.10E-02	1.90E+00	1.75E-08
~~Aluminum~~	~~3.04~~	~~I~~			~~1.00E-03~~		~~7.60E-07~~
Antimony	0.0056	I			1.00E-03		1.40E-09
Arsenic	0.0018	I			1.00E-03		4.50E-10
Beryllium	0.0015	I			1.00E-03		3.75E-10
Cadmium	0.0051	I			1.00E-03		1.28E-09
~~Iron~~	~~5.12~~	~~I~~			~~1.00E-03~~		~~1.28E-06~~
Manganese	1.93	I			1.00E-03		4.83E-07
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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Revisions
08/19/96

RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE THREE)
Site 15 – Spent Acide Storage & Disposal Area
EXPOSURE SCENARIO: Future Resident (Adult/Child), RME
CALCULATE DOSES:

CHEMICAL	ANNUAL INGESTION DOSE (MG/KG/DAY)	ANNUAL DERMAL DOSE (MG/KG/DAY)	INGESTION RID (MG/KG/DAY)	DERMAL RID (MG/KG/DAY)	HAZARD INDEX INGESTION	HAZARD INDEX DERMAL	HAZARD INDEX INHALATION	TOTAL HAZARD INDEX
Bis(2-ethylhexyl)phthalate	6.85E-04	1.43E-03	2.00E-02	1.10E-02	3.42E-02	1.30E-01	3.42E-02	1.99E-01
1,4-Dichlorobenzene	8.22E-05	5.85E-05			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor	7.67E-06	4.81E-06	5.00E-04	5.00E-04	1.53E-02	9.62E-03	0.00E+00	2.50E-02
~~Aluminum~~	~~8.33E-02~~	~~2.08E-04~~	~~1.00E+00~~	~~5.00E-02~~	~~8.33E-02~~	~~4.16E-03~~	~~0.00E+00~~	~~8.75E-02~~
Antimony	1.53E-04	3.84E-07	4.00E-04	4.00E-04	3.84E-01	9.59E-04	0.00E+00	3.85E-01
Arsenic	4.93E-05	1.23E-07	3.00E-04	2.80E-04	1.64E-01	4.40E-04	0.00E+00	1.65E-01
Beryllium	4.11E-05	1.03E-07	5.00E-03	2.50E-04	8.22E-03	4.11E-04	0.00E+00	8.63E-03
Cadmium	1.40E-04	3.49E-07	5.00E-04	1.50E-05	2.79E-01	2.33E-02	0.00E+00	3.03E-01
~~Iron~~	~~1.40E-01~~	~~3.51E-04~~	~~3.00E-01~~	~~1.50E-02~~	~~4.68E-01~~	~~2.34E-02~~	~~0.00E+00~~	~~4.91E-01~~
Manganese	5.29E-02	1.32E-04	~~5.00E-03~~ 2.HE-2	~~1.50E-04~~ 7.2E-4	~~1.06E+01~~ 2.21E+0	~~8.81E-01~~ 1.84E-1	0.00E+00	~~1.15E+01~~ 2.39E+0
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					~~1.20E+01~~ 3.09E+0	~~1.07E+00~~ 3.49E-1	3.42E-02	~~1.31E+01~~ 3.48E+0

Revisions
08/19/96
AMS

000055

RISK ASSESSMENT SPREADSHEET – HOUSEHOLD USE OF GROUNDWATER (PAGE FOUR)
Site 15 – Spent Acide Storage & Disposal Area
EXPOSURE SCENARIO: Future Resident (Adult/Child), RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE INGESTION DOSE (MG/KG/DAY)	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF INGESTION (KG/DAY/MG)	CSF DERMAL (KG/DAY/MG)	CANCER RISK INGESTION	CANCER RISK DERMAL CONTACT	CANCER RISK INHALATION	TOTAL CANCER RISK
Bis(2-ethylhexyl)phthalate	2.94E-04	6.13E-04	1.40E-02	2.50E-02	4.11E-06	1.53E-05	4.11E-06	2.38E-05
1,4-Dichlorobenzene	3.52E-05	2.51E-05	2.40E-02	2.40E-02	8.45E-07	6.02E-07	8.45E-07	2.29E-06
Heptachlor	3.29E-06	2.06E-06	4.50E+00	4.50E+00	1.48E-05	9.27E-06	0.00E+00	2.41E-05
~~Aluminum~~	~~3.57E-02~~	~~8.92E-05~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Antimony	6.58E-05	1.64E-07			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	2.11E-05	5.28E-08	1.50E+00	1.60E+00	3.17E-05	8.45E-08	0.00E+00	3.18E-05
Beryllium	1.76E-05	4.40E-08	4.30E+00	8.60E+01	7.57E-05	3.79E-06	0.00E+00	7.95E-05
Cadmium	5.99E-05	1.50E-07			0.00E+00	0.00E+00	0.00E+00	0.00E+00
~~Iron~~	~~6.01E-02~~	~~1.50E-04~~			~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~	~~0.00E+00~~
Manganese	2.27E-02	5.67E-05			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
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0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					1.27E-04	2.91E-05	4.95E-06	1.61E-04

Revisions
08/12/96
JKS

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 1 OF 2)

SITE NAME: Site 15 - Spent Acid Storage & Disposal Area
LOCATION: NSB-NLON, Groton, CT
DATE: 01/21/96

EXPOSURE SCENARIO: RME

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 11.70 ug Pb/L
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	200.0	200.0
1-2	200.0	200.0
2-3	200.0	200.0
3-4	200.0	200.0
4-5	200.0	200.0
5-6	200.0	200.0
6-7	200.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

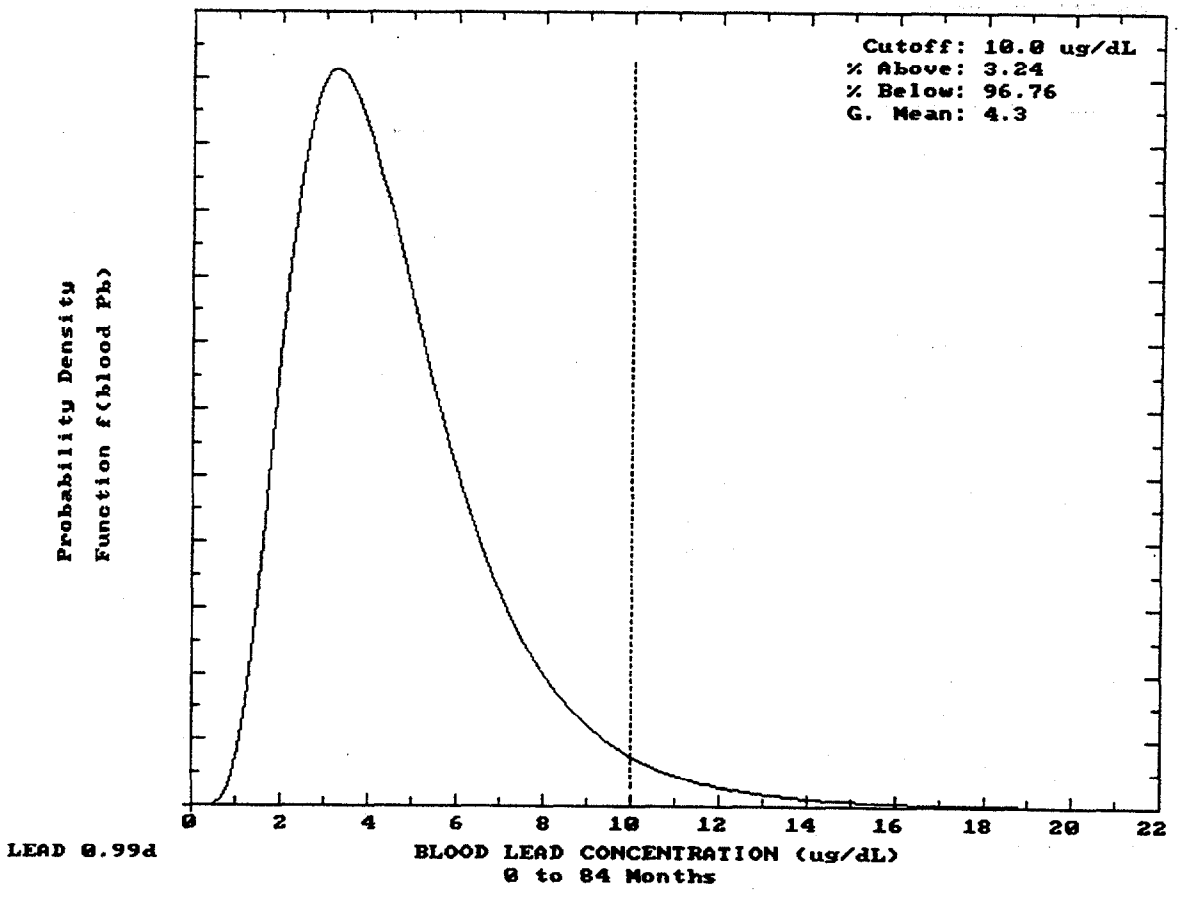
YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	4.5	8.24	4.64
1-2:	5.1	12.50	7.25
2-3:	4.9	13.11	7.34
3-4:	4.6	13.23	7.45
4-5:	4.0	11.54	5.63
5-6:	3.6	11.41	5.11
6-7:	3.3	11.54	4.85

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.52	1.06	0.00	0.02
1-2:	2.59	2.62	0.00	0.03
2-3:	2.94	2.76	0.00	0.06
3-4:	2.87	2.85	0.00	0.07
4-5:	2.82	3.02	0.00	0.07
5-6:	3.00	3.21	0.00	0.09
6-7:	3.33	3.28	0.00	0.09

IEUBK MODEL - EXPOSURE TO LEAD (PAGE 2 OF 2)

SITE NAME: Site 15 - Spent Acid Storage & Disposal Area
LOCATION: NSB-NLON, Groton, CT
DATE: 01/21/96

EXPOSURE SCENARIO: RME



SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 15 SPENT ACID STORAGE AND DISPOSAL - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Ethylbenzene	0.003	0.003	500	1000	10.1	10.1
Toluene	0.003	0.002	500	1000	20	67
Trichloroethene	0.002	0.002	56	520	0.1	1
Xylenes (total)	0.026	0.026	500	1000	19.5	19.5
2-Methylnaphthalene	0.029	0.029	-	-	-	-
Acenaphthene	0.33	0.21	-	-	-	-
Anthracene	0.97	0.65	1000	2500	40	400
Benzo(a)anthracene	2.2	1.0	1 *	7.8	1 *	1 *
Benzo(a)pyrene	1.6	0.7	1 *	1 *	1 *	1 *
Benzo(b)fluoranthene	2.2	0.9	1 *	7.8	1 *	1 *
Benzo(g,h,i)perylene	0.8	0.39	-	-	-	-
Benzo(k)fluoranthene	0.57	0.45	8.4	78	1	1
Benzoic acid	0.04	0.036	-	-	-	-
Bis(2-Ethylhexyl)phthalate	0.2	0.20	44	410	1	11
Carbazole	0.64	0.36	-	-	-	-
Chrysene	1.8	0.9	-	-	-	-
Dibenzo(a,h)anthracene	0.091	0.091	-	-	-	-
Dibenzofuran	0.27	0.20	-	-	-	-
Fluoranthene	3.705	1.2	1000	2500	5.6	56
Fluorene	0.48	0.36	1000	2500	5.6	56
Indeno(1,2,3-Cd)pyrene	0.83	0.52	-	-	-	-
Naphthalene	0.037	0.037	1000	2500	5.6	56
Phenanthrene	3.2	1.7	1000	2500	4	40
Pyrene	3.3	1.1	1000	2500	4	40
4,4'-DDD	0.19	0.19	-	-	-	-
4,4'-DDE	0.055	0.055	-	-	-	-
4,4'-DDT	0.13	0.13	-	-	-	-
Aluminum	15900	11288	-	-	-	-
Antimony	4.3	4.3	27	8200	-	-

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 15 SPENT ACID STORAGE AND DISPOSAL - SOIL (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Arsenic	6.3	3.4	10	10	-	-
Barium	101	45	4700	1.4E+5	-	-
Beryllium	1	0.56	2	2	-	-
Cadmium	4.2	1.9	34	1000	-	-
Calcium	2550	1217	-	-	-	-
Chromium	23.4	14.0	100 (6)	100 (6)	-	-
Cobalt	7.8	4.9	-	-	-	-
Copper	23.4	13.8	2500	7.6E+4	-	-
Cyanide	0.36	0.23	1400	4.1E+4	-	-
Iron	14700	11351	-	-	-	-
Lead	85	47	500	1000	-	-
Magnesium	4980	2510	-	-	-	-
Manganese	327	146	-	-	-	-
Mercury	0.14	0.06	20	610	-	-
Nickel	15.3	7.9	1400	7500	-	-
Potassium	4170	1093	-	-	-	-
Selenium	0.46	0.46	340	1E+4	-	-
Silver	0.46	0.46	340	1E+4	-	-
Sodium	357	169	-	-	-	-
Thallium	0.32	0.32	5.4	160	-	-
Vanadium	30.2	22.0	470	1.4E+4	-	-
Zinc	187	68	2E+4	6.1E+5	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

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SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 15 SPENT ACID STORAGE AND DISPOSAL - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Carbon disulfide	3	3	-	-	-
1,4-Dichlorobenzene	1	1	75	75	26000
Bis(2-Ethylhexyl)phthalate	45	13	6 *	2 *	59
Di-N-butyl phthalate	0.9	0.60	-	700	120000
Naphthalene	1	1	-	280	-
Phenanthrene	0.6	0.55	-	200	0.077 *
Heptachlor	0.54	0.54	0.4 *	0.4 *	0.05 *
Aluminum	4210	1334	-	-	-
Antimony	3.6	3.6	6	6	86000
Arsenic	1.7	1.5	50	50	4
Barium	125	57	2000	1000	-
Boron	73.2	58.4	-	-	-
Cadmium	5.3	3.1	5 *	5 *	6
Calcium	31900	23955	-	-	-
Chromium	5.9	3.1	100 (5)	50 (5)	110 (6)
Cobalt	10.8	4.6	-	-	-
Copper	12.8	8.3	-	1300	48
Iron	7110	1326	-	-	-
Lead	21.2	8.6	-	15 *	13 *
Magnesium	9490	5044	-	-	-
Manganese	3080	738	5000 (7)	-	-
Nickel	10.6	10.6	100	100	880
Potassium	7020	4446	-	-	-
Selenium	3	3	50	50	50
Silver	1.9	1.9	50	36	12
Sodium	71000	41873	28000 (8) *	-	-
Vanadium	9.3	3.6	-	50	-
Zinc	453	91	-	5000	123 *

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SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 15 SPENT ACID STORAGE AND DISPOSAL - UNFILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 15 SPENT ACID STORAGE AND DISPOSAL - FILTERED GROUNDWATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	State MCL (2)	Groundwater Protection (3)	Surface Water Protection (3)
Aluminum	2980	751	-	-	-
Antimony	14.3	14.3	6 *	6 *	86000
Barium	86.1	50.0	2000	1000	-
Beryllium	1.5	1.5	4	4	4
Boron	62.3	43.3	-	-	-
Cadmium	5.5	5.0	5 *	5 *	6
Calcium	31100	23982	-	-	-
Chromium	3.4	3.3	100 (5)	50 (5)	110 (6)
Cobalt	9	6	-	-	-
Copper	11	5	-	1300	48
Iron	2720	513	-	-	-
Magnesium	9340	4773	-	-	-
Manganese	3080	729	5000 (7)	-	-
Nickel	10.6	10.6	100	100	880
Potassium	6640	4226	-	-	-
Sodium	68900	41736	28000 (8) *	-	-
Zinc	450	132	-	5000	123 *

Footnotes:

1 * - Indicates that maximum detection exceed this standard.
2 Maximum Contaminant Level. Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter II Environmental Health.
3 CTDEP, December 13, 1995.
4 Cis-1,2-dichloroethene.
5 Chromium (total).
6 Chromium (hexavalent).
7 Current Connecticut Department of Public Health and Addiction Services Action Level.
8 Notification Level.

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
SITE 15 SPENT ACID STORAGE AND DISPOSAL - SEDIMENT (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Anthracene	0.025	0.025	1000	2500	40	400
Benzo(a)anthracene	0.1	0.10	1	7.8	1	1
Benzo(a)pyrene	0.075	0.075	1	1	1	1
Benzo(b)fluoranthene	0.1	0.10	1	7.8	1	1
Benzo(g,h,i)perylene	0.071	0.071	-	-	-	-
Benzo(k)fluoranthene	0.09	0.090	8.4	78	1	1
Benzoic acid	0.26	0.26	-	-	-	-
Carbazole	0.022	0.022	-	-	-	-
Chrysene	0.12	0.12	-	-	-	-
Di-N-butyl phthalate	0.14	0.14	1000	2500	14	140
Di-N-octyl phthalate	0.037	0.037	1000	2500	2	20
Dimethyl phthalate	0.99	0.99	-	-	-	-
Fluoranthene	0.25	0.25	1000	2500	5.6	56
Indeno(1,2,3-Cd)pyrene	0.078	0.078	-	-	-	-
Phenanthrene	0.21	0.21	1000	2500	4	40
Pyrene	0.2	0.20	1000	2500	4	40
4,4'-DDT	0.006	0.0060	-	-	-	-
Endosulfan sulfate	0.01	0.010	-	-	-	-
Heptachlor	0.0025	0.0025	0.14	1.3	0.013	0.013
Aluminum	2160	2160	-	-	-	-
Arsenic	1.2	1.2	10	10	-	-
Barium	24.2	24.2	4700	1.4E+5	-	-
Beryllium	0.26	0.26	2	2	-	-
Calcium	1200	1200	-	-	-	-
Chromium	7.7	7.7	100 (6)	100 (6)	-	-
Copper	6.9	6.9	2500	7.6E+4	-	-
Iron	4500	4500	-	-	-	-
Lead	18.1	18.1	500	1000	-	-
Magnesium	1400	1400	-	-	-	-

SUMMARY OF COMPARISON TO STATE STANDARDS (1) (Continued)
SITE 15 SPENT ACID STORAGE AND DISPOSAL - SEDIMENT (MG/KG)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Direct Exposure (2)		Pollutant Mobility (2)	
			Residential	Industrial	GA/GAA	GB
Manganese	75.7	75.7	-	-	-	-
Nickel	5	5	1400	7500	-	-
Potassium	731	731	-	-	-	-
Sodium	217	217	-	-	-	-
Vanadium	5.3	5.3	470	1.4E+4	-	-
Zinc	22.8	22.8	2E+4	6.1E+5	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 CTDEP, December 13, 1995.
3 Cis-1,2-dichloroethene.
4 1,3-Dichloropropene (total).
5 Chlordane.
6 Chromium (hexavalent).

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APPENDIX F.16

THAMES RIVER

SUMMARY OF COC SELECTION
THAMES RIVER - UNFILTERED SHALLOW SURFACE WATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (1)	Range of Detection (1) (ug/L)	Location of Maximum	Range of Nondetects (2) (ug/L)	AWQC (3) (ug/L)	BCF (4) (L/kg)	Estimated Max Finfish Conc (5) (mg/kg)	Risk-based COC Screening Level For Fish (6) (mg/kg)	Risk-based COC Screening Level for Water (7) (ug/L)	Selected as COC? (Tissue/Water)	Rationale (Tissue/Water)
Trichloroethene	1/8	3	6SW1	10	2.7	97	0.291	0.29	1.6	Y/Y	3/3
Butyl benzyl phthalate	1/8	0.5	6SW1	10	3000	47000	23.5	27	730	N/N	2/2
Di-n-butyl phthalate	1/8	0.6	T3SW1S	10	2700	47000	28.2	14	370	N ~~Y~~/N	4 ~~3~~/2
Aluminum	7/8	16.3 - 79.6	T3SW1S	14	-	1	0.0796	140	3700	N/N	2/2
Barium	1/1	25.9	T3SW1S	-	-	1	0.0259	9.5	260	N/N	2/2
Boron	8/8	518 - 2210	T3SW3S	-	-	1	2.21	12	330	N/Y	2/3
Cadmium	1/8	10.2	8SW1	2	16	64	0.6528	0.068	1.8	Y/Y	3/3
Calcium	8/8	50900 - 176000	T3SW3S	-	-	1	176	-	-	N/N	1/1
Iron	8/8	95.9 - 425	T3SW1S	-	-	1	0.425	41	1100	N/N	2/2
Lead	3/8	1 - 1.5	T3SW1AS	1 - 10	50	1	0.0015	-	15 (8)	N/N	1/2
Magnesium	8/8	128000 - 57500	T3SW3S	-	-	1	575	-	-	N/N	1/1
Manganese	8/8	16.7 - 148	T3SW1S	-	-	1	0.148	~~0.08~~ 3.2	~~18~~ 88	N/Y	2/3
Mercury	8/8	0.24 - 0.49	8SW1	-	0.14	1	0.00049	0.041	1.1	N/N	2/2
Potassium	8/8	46700 - 288000	T3SW3S	-	-	1	288	-	-	N/N	1/1
Sodium	8/8	118000 - 59600	T3SW3S	-	-	1	596	-	-	N/N	1/1
Vanadium	2/8	5.3 - 6.9	T3SW1AS	5	-	1	0.0069	0.95	26	N/N	2/2
Zinc	1/8	6.7	T3SW1S	2	-	47	0.3149	41	1100	N/N	2/2

Footnote:

1 *Sample and duplicate considered to be separate samples.*
2 Sample-specific.
3 Ambient Water Quality Criteria for water and/or inorganics (USEPA, June 14, 1991).
4 *Bioconcentration factor (presented in Section 3.2).*
5 Maximum surface water cocnetration (mg/L) multiplied by BCF (L/kg). BCF assumed to be 1.0 for various metals
6 For fish ingestion, based on target hazard quotient of 0.1 or incremental cancer risk of 1E-6 (USEPA, Region III, October 20, 1995).
7 For drinking water ingestion, (USEPA, Region III, October 20, 1995).
8 Federal Action Level for drinking water.

Rationale Designations:

1 *No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.*
2 Maximum is less than the COC screening level.
3 *Maximum is greater than or equal to the COC screening level.*
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATION
THAMES RIVER - UNFILTERED SHALLOW SURFACE WATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
Trichloroethene	3	4.7143
Butyl benzyl phthalate	0.5	4.3571
Di-n-butyl phthalate	0.6	4.3714
Inorganics (ug/L)		
Aluminum	79.6	29.1429
Barium	25.9	25.9
Boron	2210	1646.8571
Cadmium	10.2	2.3143
Calcium	176000	133128.5714
Iron	425	159.4143
Lead	1.5	2.6429
Magnesium	575000	426285.7143
Manganese	148	38.7286
Mercury	0.49	0.3221
Potassium	288000	198100
Sodium	596000	433928.5714
Vanadium	5.3	3.2143
Zinc	6.7	1.8143

SUMMARY OF COC SELECTION
THAMES RIVER - FILTERED SHALLOW SURFACE WATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (1)	Range of Detection (1) (ug/L)	Location of Maximum	Range of Nondetects (2) (ug/L)	AWQC (3) (ug/L)	BCF (4) (L/kg)	Estimated Max Finfish Conc (5) (mg/kg)	Risk-based COC Screening Level For Fish (6) (mg/kg)	Risk-based COC Screening Level for Water (7) (ug/L)	Selected as COC? (Tissue/Water)	Rationale (Tissue/Water)
Aluminum	1/5	14	6SW1S	14	-	1	0.014	140	3700	N/N	1/1
Barium	5/5	5.8 - 7.8	T3SW1AS	-	-	1	0.0078	9.5	260	N/N	1/1
Boron	5/5	1560 - 2160	8SW1S	-	-	1	2.16	12	330	N/N	1/1
Calcium	5/5	130000 - 17700	8SW1S	-	-	1	177	-	-	N/N	1/1
Chromium (total)	1/5	3.1	8SW1S	3	170	16	0.0496	0.68 (8)	18 (8)	N/N	2/2
Magnesium	5/5	411000 - 57800	8SW1S	-	-	1	578	-	-	N/N	1/1
Manganese	5/5	19.9 - 25.9	6SW1S	-	-	1	0.0259	~~0.68~~ 3.2	~~18~~ 88	N/N	1/1
Potassium	5/5	183000 - 28900	8SW1S	-	-	1	289	-	-	N/N	1/1
Vanadium	3/5	4.05 - 5.8	8SW1S	5	-	1	0.0058	0.95	26	N/N	1/1

Footnote:

1 Sample and duplicate considered to be separate samples.
2 Sample-specific.
3 Ambient Water Quality Criteria for water and/or inorganics (USEPA, June 14, 1991).
4 Bioconcentration factor (presented in Section 3.2).
5 Maximum surface water cocnetration (mg/L) multiplied by BCF (L/kg). BCF assumed to be 1.0 for various metals.
6 For fish ingestion, based on target hazard quotient of 0.1 or incremental cancer risk of 1E-6 (USEPA, Region III, October 20, 1995).
7 For drinking water ingestion, (USEPA, Region III, October 20, 1995).
8 Hexavalent chromium.

Rationale Designations:

1 Chemical detected in unfiltered samples; unfiltered results used in risk assessment.
2 Chemical not detected in unfiltered samples; maximum greater than or equal to COC screening level.

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SUMMARY OF COC SELECTION
THAMES RIVER - UNFILTERED BOTTOM SURFACE WATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (1)	Range of Detection (1) (ug/L)	Location of Maximum	Range of Nondetects (2) (ug/L)	AWQC (3) (ug/L)	BCF (4) (L/kg)	Estimated Max Finfish Conc (5) (mg/kg)	Risk-based COC Screening Level For Fish (6) (mg/kg)	Risk-based COC Screening Level for Water (7) (ug/L)	Selected as COC? (Tissue/Water)	Rationale (Tissue/Water)
Endrin aldehyde	1/7	0.14	T3SW2B	0.1	0.76	310	0.0434	-	-	N/N	1/1
Boron	7/7	2430 - 3330	8SW1B	-	-	1	3.33	12	330	N/N	2/3
Calcium	7/7	191000 - 26100	8SW1B	-	-	1	261	-	-	N/N	1/1
Iron	7/7	51 - 90.2	T3SW1BB	-	-	1	0.0902	41	1100	N/N	2/2
Magnesium	7/7	630000 - 85800	8SW1B	-	-	1	858	-	-	N/N	1/1
Manganese	7/7	6.2 - 15.7	T3SW1BB	-	-	1	0.0157	~~0.68~~ 3.2	~~18~~ 88	N/N	2/2
Mercury	7/7	0.26 - 0.39	T3SW2B	-	0.14	1	0.00039	0.041	1.1	N/N	2/2
Potassium	7/7	324000 - 50300	8SW1B	-	-	1	503	-	-	N/N	1/1
Sodium	7/7	17000 - 673000	T3SW1BB	-	-	1	6730	-	-	N/N	1/1
Vanadium	3/7	5 - 6.9	T3SW1BB	5	-	1	0.0069	0.95	26	N/N	2/2

Footnote:

1 Sample and duplicate considered to be separate samples.
2 Sample-specific.
3 Ambient Water Quality Criteria for water and/or organisms (USEPA, June 14, 1991).
4 Bioconcentration factor (presented in Section 3.2).
5 Maximum surface water cocnetration (mg/L) multiplied by BCF (L/kg). BCF assumed to be 1.0 for various metals.
6 For fish ingestion, based on target hazard quotient of 0.1 or incremental cancer risk of 1E-6 (USEPA, Region III, October 20, 1995).
7 For drinking water ingestion, (USEPA, Region III, October 20, 1995).

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Surface water results used in risk assessment to address risks to human receptors.

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SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATION
THAMES RIVER - UNFILTERED BOTTOM SURFACE WATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/L)		
Endrin aldehyde	0.14	0.065
Inorganics (ug/L)		
Boron	3330	2960.8333
Calcium	261000	230500
Iron	88.15	69.9417
Magnesium	858000	762916.6667
Manganese	14.25	8.8583
Mercury	0.39	0.3233
Potassium	503000	429083.3333
Sodium	3711500	1190416.667
Vanadium	6.7	3.775

SUMMARY OF COC SELECTION
THAMES RIVER - FILTERED BOTTOM SURFACE WATER
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (1)	Range of Detection (1) (ug/L)	Location of Maximum	Range of Nondetects (2) (ug/L)	AWQC (3) (ug/L)	BCF (4) (L/kg)	Estimated Max Finfish Conc (5) (mg/kg)	Risk-based COC Screening Level For Fish (6) (mg/kg)	Risk-based COC Screening Level for Water (7) (ug/L)	Selected as COC? (Tissue/Water)	Rationale (Tissue/Water)
Barium	2/2	5.2	SW1B/8SW1	-	-	1	0.0052	9.5	260	N/N	2/2
Boron	2/2	2580 - 3210	8SW1B	-	-	1	3.21	12	330	N/N	1/1
Calcium	2/2	208000 - 25800	8SW1B	-	-	1	258	-	-	N/N	1/1
Chromium (total)	1/2	3.4	6SW1B	3	170	16	0.0544	0.68 (8)	18 (8)	N/N	2/2
Magnesium	2/2	680000 - 85200	8SW1B	-	-	1	852	-	-	N/N	1/1
Manganese	1/2	16.2	6SW1B	8.6	-	1	0.0162	~~0.68~~ 3.2	~~18~~ 88	N/N	1/1
Potassium	2/2	363000 - 49900	8SW1B	-	-	1	499	-	-	N/N	1/1

Footnote:

1 Sample and duplicate considered to be separate samples.
2 Sample-specific.
3 Ambient Water Quality Criteria for water and/or inorganics (USEPA, June 14, 1991).
4 Bioconcentration factor (presented in Section 3.2).
5 Maximum surface water cocnetration (mg/L) multiplied by BCF (L/kg). BCF assumed to be 1.0 for various metals.
6 For fish ingestion, based on target hazard quotient of 0.1 or incremental cancer risk of 1E-6 (USEPA, Region III, October 20, 1995).
7 For drinking water ingestion, (USEPA, Region III, October 20, 1995).
8 Hexavalent chromium.

Rationale Designations:

1 Chemical ddetected in unfiltered samples; unfiltered results used in risk assessment.
2 Chemical not detected in unfiltered samples; maximum is greater than or equal to the COC screening level.

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SUMMARY OF COC SELECTION
THAMES RIVER - CLAMS (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
Benzoic acid	1/3	5.4	BVC2	0.8 - 1.6	540	N	2
Benzyl alcohol	1/3	0.57	BVC2	0.33	41	N	2
Bis(2-ethylhexyl)phthalate	2/3	0.059 - 0.082	BVC2	0.33	0.23	N	2
gamma-Chlordane	1/3	0.0021	BVC1	0.017	.0024 (5)	N	2
Heptachlor	2/3	0.002 - 0.0021	BVC1	0.017	0.0007	Y	3
Arsenic	3/3	4.1 - 6.7	BVC2	-	0.041	Y	3
Barium	3/3	0.5 - 0.86	BVC3	-	9.5	N	2
Cadmium	3/3	0.11 - 0.59	BVC2	-	0.068	Y	3
Calcium	3/3	885 - 2580	BVC3	-	-	N	1
Chromium (total)	3/3	0.98 - 4.1	BVC2	-	0.68 (6)	Y	3
Copper	3/3	2.9 - 7.5	BVC1	-	5.4	~~Y~~ N	~~3~~ 4
Iron	3/3	36.3 - 48	BVC2	-	41	~~Y~~ N	~~3~~ 4
Magnesium	3/3	726 - 790	BVC1	-	-	N	1
Manganese	3/3	5.1 - 15.1	BVC2	-	~~0.68~~ 3, 2	Y	3
Nickel	3/3	1.1 - 1.7	BVC2	-	2.7	N	2
Potassium	3/3	1960 - 2020	BVC1	-	-	N	1
Selenium	3/3	0.27 - 0.95	BVC2	-	0.68	Y	3
Silver	1/3	1.1	BVC2	0.1	0.68	Y	3
Sodium	3/3	4390 - 4740	BVC1	-	-	N	1
Vanadium	2/3	0.22 - 0.58	BVC2	0.15	0.95	N	2
Zinc	3/3	18.1 - 34.6	BVC2	-	41	N	2

Footnotes:

1 Results presented in mg/kg unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment.
3 Sample-specific.
4 For fish ingestion, values are based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Total chlordane.
6 Hexavalent chromium.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

Revisions
08/19/96
JMS

TRCL_COC.XLS

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATION
THAMES RIVER - CLAMS
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
Benzoic acid	5400	2200
Benzyl alcohol	570	300
Bis(2-ethylhexyl)phthalate	82	102
gamma-Chlordane	2.1	6.3667
Heptachlor	2.1	4.2
Inorganics (mg/kg)		
Arsenic	6.7	5.3667
Barium	0.86	0.6933
Cadmium	0.59	0.28
Calcium	2580	1645
Chromium (total)	4.1	2.16
Copper	7.5	5.6667
Iron	48	41.5
Magnesium	790	757.6667
Manganese	15.1	9.4333
Nickel	1.7	1.4
Potassium	2020	1990
Selenium	0.95	0.5267
Silver	1.1	0.4
Sodium	4740	4516.6667
Vanadium	0.58	0.2917
Zinc	34.6	24.1667

SUMMARY OF COC SELECTION
THAMES RIVER - OYSTERS (MG/KG) (1)
NSB-NLON, GROTON, CONNECTICUT

Chemical	Frequency of Detection (2)	Range of Detection (2)	Location of Maximum	Range of Nondetects (3)	Risk-based COC Screening Level (4)	Selected as COC?	Rationale
Bis(2-ethylhexyl)phthalate	3/5	0.089 - 0.16	BV04	0.0825	0.23	N	2
Heptachlor	5/5	0.002 - 0.0031	BV04	-	0.0007	Y	3
Aluminum	4/5	33.6 - 40.6	BV03	5.275	140	N	2
Arsenic	5/5	0.9 - 1.5	BV03	-	0.041	Y	3
Barium	5/5	0.83 - 1.5	BV03	-	9.5	N	2
Cadmium	5/5	0.61 - 0.92	BV04	-	0.068	Y	3
Calcium	5/5	981 - 3470	BV03	-	-	N	1
Chromium (total)	5/5	1 - 1.5	BV03	-	0.68 (5)	~~Y~~ N	~~3~~ 4
Copper	5/5	62.9 - 253	BV02	-	5.4	~~Y~~ N	~~3~~ 4
Iron	5/5	48.3 - 79.1	BV01	-	41	Y	3
Magnesium	5/5	548 - 776	BV03-D	-	-	N	1
Manganese	5/5	2.3 - 3.8	BV03	-	~~0.68~~ 3.2	Y	3
Nickel	5/5	0.6 - 1.1	BV03	-	2.7	N	2
Potassium	5/5	1760 - 2480	BV03	-	-	N	1
Selenium	5/5	0.32 - 0.42	BV03	-	0.68	N	2
Silver	5/5	0.79 - 2.5	BV04	-	0.68	Y	3
Sodium	5/5	2720 - 5020	BV03-D	-	-	N	1
Vanadium	2/5	0.16 - 0.2	BV02	0.0376	0.95	N	2
Zinc	5/5	1210 - 2960	BV02	-	41	Y	3

Footnotes:

1 Results presented in mg/kg unless otherwise noted.
2 Sample and duplicate counted as separate samples. Non-validated, rejected, composite, and excavated samples/results not used in risk assessment
3 Sample-specific.
4 For fish ingestion, values are based on a target hazard quotient of 0.1 or an incremental cancer risk of 1E-6 (USEPA Region III, October 20, 1995).
5 Hexavalent chromium.

Rationale Designations:

1 No toxicity criteria available; exposure to chemical will be addressed in uncertainty section of risk assessment.
2 Maximum is less than the COC screening level.
3 Maximum is greater than or equal to the COC screening level.
4 USEPA Region I does not advocate quantitative evaluation of this chemical.

Revisions
08/13/96
JKLS

TROY_COC.XLS

SUMMARY OF MAXIMUM AND AVERAGE CONCENTRATION
THAMES RIVER - OYSTERS
NSB-NLON, GROTON, CONNECTICUT

Chemical	Maximum	Average
Organics (ug/kg)		
Bis(2-ethylhexyl)phthalate	160	128
Heptachlor	3.1	2.4025
Inorganics (mg/kg)		
Aluminum	37.9	33.5688
Arsenic	1.2	1.1375
Barium	1.3	1.125
Cadmium	0.92	0.7988
Calcium	3150	2062.75
Chromium (total)	1.4	1.25
Copper	253	151.7875
Iron	79.1	70.1
Magnesium	662.5	608.625
Manganese	3.2	2.925
Nickel	0.96	0.7675
Potassium	2330	2080
Selenium	0.41	0.36
Silver	2.5	1.9113
Sodium	3920	3545
Vanadium	0.2	0.1275
Zinc	2960	2048.75

RISK ASSESSMENT SPREADSHEET – INGESTION OF CLAMS

SITE NAME: Thames River
LOCATION: NSB–NLON, Groton, CT
DATE: 01/09/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INGESTION OF CLAMS ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Recreational Adult User; CTE

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x FI x EF x ED)/(BW x AT)

ASSUMPTIONS:

C	= CONCENTRATION IN CLAM (MG/KG)	
IR	= INGESTION RATE (KG/MEAL):	0.003
FI	= FRACTION INGESTED FROM CONTAMINATED SOURCE: (DIMENSIONLESS)	0.5
EF	= EXPOSURE FREQUENCY (MEALS/YEAR):	234
ED	= EXPOSURE DURATION (YEARS):	9
BW	= RECEPTOR BODY WEIGHT (KG):	70
AT1	= AVERAGING TIME (DAYS), NONCARCINOGENS:	3285
AT2	= AVERAGING TIME (DAYS), CARCINOGENS:	25550

DETERMINE CONVERSION FACTORS:

ANNUAL AVERAGE INTAKE:	CF1 =	1.37E–05
LIFETIME AVERAGE INTAKE:	CF2 =	1.77E–06

RISK ASSESSMENT SPREADSHEET – INGESTION OF CLAMS (PAGE TWO)
Thames River
EXPOSURE SCENARIO: Recreational Adult User; CTE
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ANNUAL AVERAGE DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Trichloroethene	0	0.00E+00	0.00E+00	6.00E–03	1.10E–02	0.00E+00	0.00E+00
Di–n–butylphthalate	0	0.00E+00	0.00E+00	1.00E–01		0.00E+00	0.00E+00
Heptachlor	0.0021	2.88E–08	3.71E–09	5.00E–04	4.50E+00	5.77E–05	1.67E–08
Arsenic	5.4	7.42E–05	9.54E–06	3.00E–04	1.50E+00	2.47E–01	1.43E–05
Cadmium	0.28	3.85E–06	4.95E–07	5.00E–04		7.69E–03	0.00E+00
~~Copper~~	~~5.7~~	~~7.83E–05~~	~~1.01E–05~~	~~4.00E–02~~		~~1.96E–03~~	~~0.00E+00~~
Chromium	2.2	3.02E–05	3.89E–06	5.00E–03		6.04E–03	0.00E+00
~~Iron~~	~~41.5~~	~~5.70E–04~~	~~7.33E–05~~	~~3.00E–01~~		~~1.90E–03~~	~~0.00E+00~~
Manganese	9.4	1.29E–04	1.66E–05	~~5.00E–03~~ 2.4E-2		~~2.58E–02~~ 5.39E-3	0.00E+00
Selenium	0.53	7.28E–06	9.36E–07	5.00E–03		1.46E–03	0.00E+00
Silver	0.4	5.50E–06	7.07E–07	5.00E–03		1.10E–03	0.00E+00
Zinc	0	0.00E+00	0.00E+00	3.00E–01		0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
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		0.00E+00	0.00E+00			0.00E+00	0.00E+00
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		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
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		0.00E+00	0.00E+00			0.00E+00	0.00E+00
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		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
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		0.00E+00	0.00E+00			0.00E+00	0.00E+00
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		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
						~~2.98E–01~~ 2.69E-1	1.43E–05

Revisions
08/13/96
MS

000022

RISK ASSESSMENT SPREADSHEET – INGESTION OF OYSTERS

SITE NAME: Thames River
LOCATION: NSB–NLON, Groton, CT
DATE: 01/09/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INGESTION OF OYSTERS ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Recreational Adult User; CTE

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x FI x EF x ED)/(BW x AT)

ASSUMPTIONS:

C = CONCENTRATION IN OYSTER (MG/KG)	
IR = INGESTION RATE (KG/MEAL):	0.003
FI = FRACTION INGESTED FROM CONTAMINATED SOURCE: (DIMENSIONLESS)	0.5
EF = EXPOSURE FREQUENCY (MEALS/YEAR):	234
ED = EXPOSURE DURATION (YEARS):	9
BW = RECEPTOR BODY WEIGHT (KG):	70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS:	3285
AT2 = AVERAGING TIME (DAYS), CARCINOGENS:	25550

DETERMINE CONVERSION FACTORS:

ANNUAL AVERAGE INTAKE:	CF1 =	1.37E–05
LIFETIME AVERAGE INTAKE:	CF2 =	1.77E–06

RISK ASSESSMENT SPREADSHEET – INGESTION OF OYSTERS (PAGE TWO)
Thames River
EXPOSURE SCENARIO: Recreational Adult User; CTE
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ANNUAL AVERAGE DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Trichloroethene	0	0.00E+00	0.00E+00	6.00E–03	1.10E–02	0.00E+00	0.00E+00
Di–n–butylphthalate	0	0.00E+00	0.00E+00	1.00E–01		0.00E+00	0.00E+00
Heptachlor	0.0024	3.30E–08	4.24E–09	5.00E–04	4.50E+00	6.59E–05	1.91E–08
Arsenic	1.1	1.51E–05	1.94E–06	3.00E–04	1.50E+00	5.04E–02	2.91E–06
Cadmium	0.8	1.10E–05	1.41E–06	5.00E–04		2.20E–02	0.00E+00
~~Copper~~	~~152~~	~~2.09E–03~~	~~2.68E–04~~	~~4.00E–02~~		~~5.22E–02~~	~~0.00E+00~~
Chromium	1.3	1.79E–05	2.30E–06	5.00E–03		3.57E–03	0.00E+00
~~Iron~~	~~70.1~~	~~9.63E–04~~	~~1.24E–04~~	~~3.00E–01~~		~~3.21E–03~~	~~0.00E+00~~
Manganese	2.9	3.98E–05	5.12E–06	~~5.00E–03~~ 2.4E-2		~~7.97E–03~~ 1.66E-3	0.00E+00
Selenium	0	0.00E+00	0.00E+00	5.00E–03		0.00E+00	0.00E+00
Silver	1.9	2.61E–05	3.36E–06	5.00E–03		5.22E–03	0.00E+00
Zinc	2050	2.82E–02	3.62E–03	3.00E–01		9.39E–02	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		~~2.38E–04~~	1.77E-1			2.93E–06	

000024

Revisions
08/13/92
JS

RISK ASSESSMENT SPREADSHEET – INGESTION OF FINFISH

SITE NAME: Thames River
LOCATION: NSB–NLON, Groton, CT
DATE: 01/09/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INGESTION OF OYSTERS ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Recreational Adult User; CTE

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x FI x EF x ED)/(BW x AT)

ASSUMPTIONS:

C = CONCENTRATION IN FISH (MG/KG)	
IR = INGESTION RATE (KG/MEAL):	0.0095
FI = FRACTION INGESTED FROM CONTAMINATED SOURCE: (DIMENSIONLESS)	0.5
EF = EXPOSURE FREQUENCY (MEALS/YEAR):	234
ED = EXPOSURE DURATION (YEARS):	9
BW = RECEPTOR BODY WEIGHT (KG):	70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS:	3285
AT2 = AVERAGING TIME (DAYS), CARCINOGENS:	25550

DETERMINE CONVERSION FACTORS:

ANNUAL AVERAGE INTAKE:	CF1 =	4.35E–05
LIFETIME AVERAGE INTAKE:	CF2 =	5.59E–06

RISK ASSESSMENT SPREADSHEET – INGESTION OF FINFISH (PAGE TWO)
Thames River
EXPOSURE SCENARIO: Recreational Adult User; CTE
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ANNUAL AVERAGE DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Trichloroethene	0.29	1.26E–05	1.62E–06	6.00E–03	1.10E–02	2.10E–03	1.78E–08
Di–n–butylphthalate	28	1.22E–03	1.57E–04	1.00E–01		1.22E–02	0.00E+00
Heptachlor	0	0.00E+00	0.00E+00	5.00E–04	4.50E+00	0.00E+00	0.00E+00
Arsenic	0	0.00E+00	0.00E+00	3.00E–04	1.50E+00	0.00E+00	0.00E+00
Cadmium	0.65	2.83E–05	3.64E–06	5.00E–04		5.66E–02	0.00E+00
~~Copper~~	~~0~~	~~0.00E+00~~	~~0.00E+00~~	~~4.00E–02~~		~~0.00E+00~~	~~0.00E+00~~
Chromium	0	0.00E+00	0.00E+00	5.00E–03		0.00E+00	0.00E+00
~~Iron~~	~~0~~	~~0.00E+00~~	~~0.00E+00~~	~~3.00E–01~~		~~0.00E+00~~	~~0.00E+00~~
Manganese	0	0.00E+00	0.00E+00	~~5.00E–03~~ 2.4E-2		0.00E+00	0.00E+00
Selenium	0	0.00E+00	0.00E+00	5.00E–03		0.00E+00	0.00E+00
Silver	0	0.00E+00	0.00E+00	5.00E–03		0.00E+00	0.00E+00
Zinc	0	0.00E+00	0.00E+00	3.00E–01		0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
						7.08E–02	**1.78E–08**

Revisions
08 16
15

000026

RISK ASSESSMENT SPREADSHEET -- SURFACE WATER EXPOSURES

SITE NAME: Thames River
LOCATION: NSB-NLON, Groton, CT
DATE: 01/09/98

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
TWO EXPOSURE ROUTES ARE CONSIDERED: INCIDENTAL INGESTION AND DERMAL CONTACT.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Recreational Adult User (Waterskier), CTE

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

INGESTION: IEX = (C x CR x ET x EF x ED)/(BW x AT)

WHERE:
C = SURFACE WATER CONCENTRATION (MG/L)
CR = CONTACT RATE (L/HR)
ET = EXPOSURE TIME (HRS/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1000 CM**3/L)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

INGESTION:

CR:	0.05	CONVERSION FACTOR (NONCAR) =	4.07E-05
ET:	2.6		
EF:	8		
ED:	9	CONVERSION FACTOR (CARCIN) =	5.23E-06
BW:	70		
AT(NOCN):	3285		
AT(CAR):	25550		

DERMAL CONTACT:

EV:	1	CONVERSION FACTOR (NONCAR) =	6.26E+00
ED:	9		
EF:	8		
A:	20000	CONVERSION FACTOR (CARCIN) =	8.05E-01
tevent:	2.6		
BW:	70		
AT(NON):	3285		
AT(CAR):	25550		

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE TWO)
Thames River
EXPOSURE SCENARIO: Recreational Adult User (Waterskier), CTE

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Trichloroethene	0.003	O	1.30E+00	5.50E-01	1.60E-02	2.60E-02	1.77E-07
Boron	1.65	I			1.00E-03		4.29E-06
Cadmium	0.0023	I			1.00E-03		5.96E-09
Manganese	0.0387	I			1.00E-03		1.01E-07
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00

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RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE THREE)
Thames River
EXPOSURE SCENARIO: Recreational Adult User (Waterskier), CTE
CALCULATE DOSES:

CHEMICAL	ANNUAL INGESTION DOSE (MG/KG/DAY)	ANNUAL DERMAL DOSE (MG/KG/DAY)	INGESTION RfD (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX INGESTION	HAZARD INDEX DERMAL	TOTAL HAZARD INDEX
Trichloroethene	1.22E-07	1.11E-06	6.00E-03	6.00E-03	2.04E-05	1.85E-04	2.05E-04
Boron	6.72E-05	2.69E-05	9.00E-02	4.50E-03	7.46E-04	5.97E-03	6.72E-03
Cadmium	9.36E-08	3.74E-08	5.00E-04	~~1.58E-05~~ 2.5E-5	1.87E-04	~~2.58E-03~~ 1.50E-3	~~2.66E-06~~ 1.69E-3
Manganese	1.58E-06	6.30E-07	~~5.00E-03~~ 2.4E-2	~~1.58E-04~~ 7.2E-4	~~6.15E-04~~ 6.56E-5	~~4.20E-03~~ 8.75E-4	~~4.52E-06~~ 9.41E-4
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					~~1.27E-03~~ 1.02E-3	~~1.20E-02~~ 8.53E-3	~~1.41E-02~~ 9.56E-3

Revisions
08/19/96
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RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE FOUR)
Thames River
EXPOSURE SCENARIO: Recreational Adult User (Waterskier), CTE
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE INGESTION DOSE (MG/KG/DAY)	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF INGESTION (KG/DAY/MG)	CSF DERMAL (KG/DAY/MG)	CANCER RISK INGESTION	CANCER RISK DERMAL CONTACT	TOTAL CANCER RISK
Trichloroethene	1.57E-08	1.43E-07	1.10E-02	1.10E-02	1.73E-10	1.57E-09	1.74E-09
Boron	8.84E-06	3.45E-06			0.00E+00	0.00E+00	0.00E+00
Cadmium	1.20E-08	4.61E-09			0.00E+00	0.00E+00	0.00E+00
Manganese	2.03E-07	8.10E-08			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					1.73E-10	1.57E-09	1.74E-09

000030

RISK ASSESSMENT SPREADSHEET – INGESTION OF CLAMS

SITE NAME: Thames River
LOCATION: NSB–NLON, Groton, CT
DATE: 01/09/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INGESTION OF CLAMS ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Recreational Adult User; RME

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x FI x EF x ED)/(BW x AT)

ASSUMPTIONS:

C = CONCENTRATION IN CLAM (MG/KG)	
IR = INGESTION RATE (KG/MEAL):	0.055
FI = FRACTION INGESTED FROM CONTAMINATED SOURCE: (DIMENSIONLESS)	1
EF = EXPOSURE FREQUENCY (MEALS/YEAR):	350
ED = EXPOSURE DURATION (YEARS):	30
BW = RECEPTOR BODY WEIGHT (KG):	70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS:	10950
AT2 = AVERAGING TIME (DAYS), CARCINOGENS:	25550

DETERMINE CONVERSION FACTORS:

ANNUAL AVERAGE INTAKE:	CF1 =	7.53E–04
LIFETIME AVERAGE INTAKE:	CF2 =	3.23E–04

RISK ASSESSMENT SPREADSHEET – INGESTION OF CLAMS (PAGE TWO)
Thames River
EXPOSURE SCENARIO: Recreational Adult User; RME
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ANNUAL AVERAGE DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Trichloroethene	0	0.00E+00	0.00E+00	6.00E–03	1.10E–02	0.00E+00	0.00E+00
Di–n–butylphthalate	0	0.00E+00	0.00E+00	1.00E–01		0.00E+00	0.00E+00
Heptachlor	0.0021	1.58E–06	6.78E–07	5.00E–04	4.50E+00	3.16E–03	3.05E–06
Arsenic	6.7	5.05E–03	2.16E–03	3.00E–04	1.50E+00	1.68E+01	3.25E–03
Cadmium	0.59	4.45E–04	1.91E–04	5.00E–04		8.89E–01	0.00E+00
~~Copper~~	~~7.5~~	~~5.65E–03~~	~~2.42E–03~~	~~4.00E–02~~		~~1.41E–01~~	~~0.00E+00~~
Chromium	4.1	3.09E–03	1.32E–03	5.00E–03		6.18E–01	0.00E+00
~~Iron~~	~~48~~	~~3.62E–02~~	~~1.55E–02~~	~~3.00E–01~~		~~1.21E–01~~	~~0.00E+00~~
Manganese	15.1	1.14E–02	4.88E–03	~~5.00E–03~~ 2.4E-2		~~2.28E+00~~ 4.75E-1	0.00E+00
Selenium	0.95	7.16E–04	3.07E–04	5.00E–03		1.43E–01	0.00E+00
Silver	1.1	8.29E–04	3.55E–04	5.00E–03		1.66E–01	0.00E+00
Zinc	0	0.00E+00	0.00E+00	3.00E–01		0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
						~~2.12E+01~~ 1.91E+1	3.25E–03

Revisions 08/19/91 JT

RISK ASSESSMENT SPREADSHEET – INGESTION OF OYSTERS

SITE NAME: Thames River
LOCATION: NSB–NLON, Groton, CT
DATE: 01/09/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INGESTION OF OYSTERS ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Recreational Adult User; RME

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x FI x EF x ED)/(BW x AT)

ASSUMPTIONS:

C = CONCENTRATION IN OYSTER (MG/KG)	
IR = INGESTION RATE (KG/MEAL):	0.055
FI = FRACTION INGESTED FROM CONTAMINATED SOURCE: (DIMENSIONLESS)	1
EF = EXPOSURE FREQUENCY (MEALS/YEAR):	350
ED = EXPOSURE DURATION (YEARS):	30
BW = RECEPTOR BODY WEIGHT (KG):	70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS:	10950
AT2 = AVERAGING TIME (DAYS), CARCINOGENS:	25550

DETERMINE CONVERSION FACTORS:

ANNUAL AVERAGE INTAKE:	CF1 =	7.53E–04
LIFETIME AVERAGE INTAKE:	CF2 =	3.23E–04

RISK ASSESSMENT SPREADSHEET – INGESTION OF OYSTERS (PAGE TWO)
Thames River
EXPOSURE SCENARIO: Recreational Adult User; RME
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ANNUAL AVERAGE DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG-DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Trichloroethene	0	0.00E+00	0.00E+00	6.00E-03	1.10E-02	0.00E+00	0.00E+00
Di-n-butylphthalate	0	0.00E+00	0.00E+00	1.00E-01		0.00E+00	0.00E+00
Heptachlor	0.0031	2.34E-06	1.00E-06	5.00E-04	4.50E+00	4.67E-03	4.50E-06
Arsenic	1.2	9.04E-04	3.87E-04	3.00E-04	1.50E+00	3.01E+00	5.81E-04
Cadmium	0.92	6.93E-04	2.97E-04	5.00E-04		1.39E+00	0.00E+00
~~Copper~~	~~253~~	~~1.91E-01~~	~~8.17E-02~~	~~4.00E-02~~		~~4.77E+00~~	~~0.00E+00~~
Chromium	1.4	1.05E-03	4.52E-04	5.00E-03		2.11E-01	0.00E+00
~~Iron~~	~~79.1~~	~~5.96E-02~~	~~2.55E-02~~	~~3.00E-01~~		~~1.99E-01~~	~~0.00E+00~~
Manganese	3.2	2.41E-03	1.03E-03	~~5.00E-03~~ 2.4E-2		~~4.82E-01~~ 1.00E-1	0.00E+00
Selenium	0	0.00E+00	0.00E+00	5.00E-03		0.00E+00	0.00E+00
Silver	2.5	1.88E-03	8.07E-04	5.00E-03		3.77E-01	0.00E+00
Zinc	2960	2.23E+00	9.56E-01	3.00E-01		7.43E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
						~~1.79E+01~~ 1,25E+1	5.86E-04

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Revisions 08/13/96

RISK ASSESSMENT SPREADSHEET – INGESTION OF FINFISH

SITE NAME: Thames River
LOCATION: NSB–NLON, Groton, CT
DATE: 01/09/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INGESTION OF OYSTERS ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Recreational Adult User; RME

REFERENCE: EPA, DECEMBER 1989

RELEVANT EQUATION: IEX = (C x IR x FI x EF x ED)/(BW x AT)

ASSUMPTIONS:

C = CONCENTRATION IN FISH (MG/KG)	
IR = INGESTION RATE (KG/MEAL):	0.054
FI = FRACTION INGESTED FROM CONTAMINATED SOURCE: (DIMENSIONLESS)	1
EF = EXPOSURE FREQUENCY (MEALS/YEAR):	350
ED = EXPOSURE DURATION (YEARS):	30
BW = RECEPTOR BODY WEIGHT (KG):	70
AT1 = AVERAGING TIME (DAYS), NONCARCINOGENS:	10950
AT2 = AVERAGING TIME (DAYS), CARCINOGENS:	25550

DETERMINE CONVERSION FACTORS:

ANNUAL AVERAGE INTAKE:	CF1 =	7.40E–04
LIFETIME AVERAGE INTAKE:	CF2 =	3.17E–04

RISK ASSESSMENT SPREADSHEET – INGESTION OF FINFISH (PAGE TWO)
Thames River
EXPOSURE SCENARIO: Recreational Adult User; RME
CALCULATE DOSES:

CHEMICAL	C (MG/KG)	ANNUAL AVERAGE DOSE (MG/KG/DAY)	LIFETIME AVERAGE DOSE (MG/KG/DAY)	RFD (MG/KG/DAY)	CSF (KG–DAY/MG)	HAZARD INDEX	INCREMENTAL CANCER RISK
Trichloroethene	0.29	2.15E–04	9.19E–05	6.00E–03	1.10E–02	3.58E–02	1.01E–06
Di–n–butylphthalate	28	2.07E–02	8.88E–03	1.00E–01		2.07E–01	0.00E+00
Heptachlor	0	0.00E+00	0.00E+00	5.00E–04	4.50E+00	0.00E+00	0.00E+00
Arsenic	0	0.00E+00	0.00E+00	3.00E–04	1.50E+00	0.00E+00	0.00E+00
Cadmium	0.65	4.81E–04	2.06E–04	5.00E–04		9.62E–01	0.00E+00
~~Copper~~	~~0~~	~~0.00E+00~~	~~0.00E+00~~	~~4.00E–02~~		~~0.00E+00~~	~~0.00E+00~~
Chromium	0	0.00E+00	0.00E+00	5.00E–03		0.00E+00	0.00E+00
~~Iron~~	~~0~~	~~0.00E+00~~	~~0.00E+00~~	~~8.00E–01~~		~~0.00E+00~~	~~0.00E+00~~
Manganese	0	0.00E+00	0.00E+00	~~5.00E–03~~ 2.4E-2		0.00E+00	0.00E+00
Selenium	0	0.00E+00	0.00E+00	5.00E–03		0.00E+00	0.00E+00
Silver	0	0.00E+00	0.00E+00	5.00E–03		0.00E+00	0.00E+00
Zinc	0	0.00E+00	0.00E+00	3.00E–01		0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
		0.00E+00	0.00E+00			0.00E+00	0.00E+00
						1.20E+00	**1.01E–06**

000036

Revisions
08/12/96

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES

SITE NAME: Thames River
LOCATION: NSB–NLON, Groton, CT
DATE: 01/09/96

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY ON THE FOLLOWING SPREADSHEETS.
TWO EXPOSURE ROUTES ARE CONSIDERED: INCIDENTAL INGESTION AND DERMAL CONTACT.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO: Recreational Adult User (Waterskier), RME

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

INGESTION: IEX = (C x CR x ET x EF x ED)/(BW x AT)

WHERE:
C = SURFACE WATER CONCENTRATION (MG/L)
CR = CONTACT RATE (L/HR)
ET = EXPOSURE TIME (HRS/EVENT)
EF = EXPOSURE FREQUENCY (EVENTS/YEAR)
ED = EXPOSURE DURATION (YEARS)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM**2/EVENT)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT (CM**2)
BW = BODY WEIGHT (KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2Kp x C x CF x (6T x tevent/3.141592654)**0.5
IF tevent > t*, DAevent = Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B)/(1 + B))))

WHERE:
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1000 CM**3/L)
t* = TIME IT TAKES TO REACH STEADY–STATE (HOUR)
T = LAG TIME (HOUR)
B = PARTITIONING CONSTANT DERVIDED BY BUNGE MODEL (DIMENSIONLESS)

INPUT PARAMETERS:

INGESTION:

CR:	0.05	CONVERSION FACTOR (NONCAR) =	8.14E–05
ET:	2.6		
EF:	16		
ED:	30	CONVERSION FACTOR (CARCIN) =	3.49E–05
BW:	70		
AT(NOCN):	10950		
AT(CAR):	25550		

DERMAL CONTACT:

EV:	1	CONVERSION FACTOR (NONCAR) =	1.25E+01
ED:	30		
EF:	16		
A:	20000	CONVERSION FACTOR (CARCIN) =	5.37E+00
tevent:	2.6		
BW:	70		
AT(NON):	10950		
AT(CAR):	25550		

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE TWO)
Thames River
EXPOSURE SCENARIO: Recreational Adult User (Waterskier), RME

CHEMICAL	CONC. (MG/L)	ORGANIC OR INORGANIC?	t* (HR)	T (HR)	Kp (CM/HR)	B	DAevent
Trichloroethene	0.003	O	1.30E+00	5.50E−01	1.60E−02	2.60E−02	1.77E−07
Boron	2.21	I			1.00E−03		5.75E−06
Cadmium	0.0102	I			1.00E−03		2.65E−08
Manganese	0.148	I			1.00E−03		3.85E−07
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
							0.00E+00
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RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE THREE)
Thames River
EXPOSURE SCENARIO: Recreational Adult User (Waterskier), RME
CALCULATE DOSES:

CHEMICAL	ANNUAL INGESTION DOSE (MG/KG/DAY)	ANNUAL DERMAL DOSE (MG/KG/DAY)	INGESTION RfD (MG/KG/DAY)	DERMAL RfD (MG/KG/DAY)	HAZARD INDEX INGESTION	HAZARD INDEX DERMAL	TOTAL HAZARD INDEX
Trichloroethene	2.44E-07	2.22E-06	6.00E-03	6.00E-03	4.07E-05	3.70E-04	4.10E-04
Boron	1.80E-04	7.20E-05	9.00E-02	4.50E-03	2.00E-03	1.60E-02	1.80E-02
Cadmium	8.30E-07	3.32E-07	5.00E-04	~~1.50E-05~~ 2.5E-5	1.66E-03	~~2.21E-02~~ 1.33E-2	~~2.38E-02~~ 1.50E-2
Manganese	1.20E-05	4.82E-06	~~5.00E-03~~ 2.4E-2	~~1.50E-04~~ 7.2E-4	~~2.41E-03~~ 5.02E-4	~~3.21E-02~~ 6.69E-3	~~3.45E-02~~ 7.19E-3
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					~~6.11E-03~~ 4.20E-3	~~7.00E-02~~ 3.64E-2	~~7.07E-02~~ 4.06E-2

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Revisions
08/13/96
JMS

RISK ASSESSMENT SPREADSHEET – SURFACE WATER EXPOSURES (PAGE FOUR)
Thames River
EXPOSURE SCENARIO: Recreational Adult User (Waterskier), RME
CALCULATE INCREMENTAL CANCER RISKS:

CHEMICAL	LIFETIME AVERAGE INGESTION DOSE (MG/KG/DAY)	LIFETIME AVERAGE DERMAL DOSE (MG/KG/DAY)	CSF INGESTION (KG/DAY/MG)	CSF DERMAL (KG/DAY/MG)	CANCER RISK INGESTION	CANCER RISK DERMAL CONTACT	TOTAL CANCER RISK
Trichloroethene	1.05E-07	9.51E-07	1.10E-02	1.10E-02	1.15E-09	1.05E-08	1.16E-08
Boron	7.71E-05	3.08E-05			0.00E+00	0.00E+00	0.00E+00
Cadmium	3.56E-07	1.42E-07			0.00E+00	0.00E+00	0.00E+00
Manganese	5.16E-06	2.07E-06			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
0	0.00E+00	0.00E+00			0.00E+00	0.00E+00	0.00E+00
TOTAL RISK					1.15E-09	1.05E-08	1.16E-08

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
THAMES RIVER SURFACE - UNFILTERED SURFACE WATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Water Quality Standards (2)			
			Aquatic Life		Human Health	
			Freshwater	Saltwater	Organisms	Water and Organisms
Trichloroethene	3	3	-	-	81	2.7 *
Butyl benzyl phthalate	0.5	0.50	-	-	-	-
Di-N-butyl phthalate	0.6	0.60	-	-	12000	2700
Aluminum	79.6	32.1	-	-	-	-
Barium	25.9	25.9	-	-	-	-
Boron	2210	1646	-	-	-	-
Cadmium	10.2	10.2	660	9.3 *	170	16
Calcium	176000	133238	-	-	-	-
Iron	425	155	-	-	-	-
Lead	1.5	1.3	1.3 *	8.5	-	50
Magnesium	575000	426375	-	-	-	-
Manganese	148	37	-	-	-	-
Mercury	0.49	0.31	0.012 *	0.025 *	0.15 *	0.14 *
Potassium	288000	197338	-	-	-	-
Sodium	596000	431125	-	-	-	-
Vanadium	6.9	6.1	-	-	-	-
Zinc	6.7	6.7	12.3	86	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 Connecticut Water Quality Standards, 1992.
3 Chromium (hexavalent).

SUMMARY OF COMPARISON TO STATE STANDARDS (1)
THAMES RIVER SURFACE - FILTERED SURFACE WATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Water Quality Standards (2)			
			Aquatic Life		Human Health	
			Freshwater	Saltwater	Organisms	Water and Organisms
Aluminum	14	14	-	-	-	-
Barium	7.8	6.8	-	-	-	-
Boron	2160	1719	-	-	-	-
Calcium	177000	141800	-	-	-	-
Chromium (total)	3.1	3.1	11 (3)	50 (3)	3400 (3)	170 (3)
Magnesium	578000	453400	-	-	-	-
Manganese	25.9	24.4	-	-	-	-
Potassium	289000	209000	-	-	-	-
Vanadium	5.8	5.2	-	-	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 Connecticut Water Quality Standards, 1992.
3 Chromium (hexavalent).

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SUMMARY OF COMPARISON TO STATE STANDARDS (1)
THAMES RIVER BOTTOM - UNFILTERED SURFACE WATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Water Quality Standards (2)			
			Aquatic Life		Human Health	
			Freshwater	Saltwater	Organisms	Water and Organisms
Endrin aldehyde	0.14	0.14	-	-	0.81	0.76
Boron	3330	2889	-	-	-	-
Calcium	261000	225000	-	-	-	-
Iron	90.2	72.5	-	-	-	-
Magnesium	858000	744571	-	-	-	-
Manganese	15.7	9.6	-	-	-	-
Mercury	0.39	0.32	0.012 *	0.025 *	0.15 *	0.14 *
Potassium	503000	414714	-	-	-	-
Sodium	6730000	1550571	-	-	-	-
Vanadium	6.9	6.2	-	-	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 Connecticut Water Quality Standards, 1992.
3 Chromium (hexavalent).

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SUMMARY OF COMPARISON TO STATE STANDARDS (1)
THAMES RIVER BOTTOM - FILTERED SURFACE WATER (UG/L)
NSB-NLON, GROTON, CONNECTICUT

Parameter	Maximum	Average of Positive Hits	Water Quality Standards (2)			
			Aquatic Life		Human Health	
			Freshwater	Saltwater	Organisms	Water and Organisms
Barium	5.2	5.2	-	-	-	-
Boron	3210	2895	-	-	-	-
Calcium	258000	233000	-	-	-	-
Chromium (total)	3.4	3.4	11 (3)	50 (3)	3400 (3)	170 (3)
Magnesium	852000	766000	-	-	-	-
Manganese	16.2	16.2	-	-	-	-
Potassium	499000	431000	-	-	-	-

Footnotes:

1 * - Indicates that maximum detection exceeds this standard.
2 Connecticut Water Quality Standards, 1992.
3 Chromium (hexavalent).

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